SCIENCE GOSSIP.

HARDWICKE'S

SCIENCE-GOSSIP

For 1867.

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Science-Gossip:

AN ILLUSTRATED MEDIUM OF INTERCHANGE AND GOSSIP

FOR STUDENTS AND

LOVERS OF NATURE.

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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," "A FERN BOOK FOR EVERYBODY," ETC. ETC.

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WINTER WORK.

"Look on Nature as a volume
Ever open to inspection,
In which characters are written
By the Hand of the Almighty:
Reverently turn its pages."

THE reign of Winter is now fairly begun; and the naturalist, who has occupied the preceding months in the study of the wonders presented to his eye in the world around him, begins to find a diminution in their number. Not that *nothing* is left to engage his attention. Myriads of Fungi, of bright and varied hues, spring up in the wood and on the hedgebank; a few hardy Wild Flowers brave the inclement season; and underground, many an Insect is awaiting the return of genial weather to assume its perfect state. To such naturalists as are also collectors, the want of active employment in searching after additions to their store is often a most welcome "rest from their labours." The Botanist delights in a long winter evening, when he can bring out his treasured specimens from their various hiding-places in music-books or old newspapers, to transfer them neatly to their destined foolscap; and the Entomologist has always his insects to arrange or re-arrange, to select specimens for "exchange," or fight his battles over again—in describing to a correspondent how he captured *Edusa* flying over a clover-field, or how his supposed Cabbage Butterfly proved to be a Bath White!

No: the Winter is no dead time for the collector—rather is it a time for additional exertion in-doors, compensating for the comparative inactivity without.

But, besides these, there are many who have not time or inclination to do more than cursorily inspect the works of Nature—who have noticed many of their beauties during the summer months, and, having neither insects to arrange nor plants to mount, still do not wish to lose altogether the memory of the enjoyment of their country walks. They know too little to enable them to appreciate scientific works, and Natural History books which are at once *cheap* and *good* are "few and far between;" and yet they would like to keep up and add to the little information they have already gained, so that another season may find them more prepared to observe and admire. The question, then, is: Can we provide a means by which information may be pleasantly gained at a time unfavourable for the examination of natural objects in their most perfect state? In answer, it may be said that, to a certain extent, this is possible; and the following suggestions for so doing are offered in the hope that they may prove useful to at least a few of our readers.

In many of our larger towns, and in not a few villages, there exists a Natural History Society, the members of which meet during the summer months for rambles in different parts of their district, with a view to increasing their knowledge of the natural objects which it contains. It is gratifying to learn that such societies are greatly on the increase; but it is to be regretted that many of them confine their investigations to the summer months, remaining (like many of the objects of their study) dormant during the winter. Where such a society is fairly

established, the meetings should be held as regularly in winter as in summer; and personal experience testifies that they are even better attended. In such a case, the staff of the society is responsible for the management of the meetings, &c.; but our hints are intended more especially for those who have no such assistance.

In most places there is at least one person who takes an interest in Nature's works. Very probably he is in humble circumstances; in all likelihood he is considered harmlessly insane by his compeers, or, as they would phrase it, "a button short!" There are also usually two or three more, who use their eyes, and know something of the habits of birds, insects, or plants. If these three or four would meet together, and talk the matter over, they could arrange affairs accordiug to their own convenience; aud, all being straightforward, we may suppose them to agree iu inviting as many people as they think likely to come, to attend at such a place on such a night. In villages it is always easy to hire a room for such a purpose at a trifling cost; and in them, as in towns, one or more of the parties interested will, in all probability, be able to leud a room or rooms, on one occasion at least. Where practicable, the sociability of the evening is much enhanced by having tea or coffee hauded round before the real proceedings begin. The conversation which then arises serves to place at their ease those who might otherwise be prevented by shyness from taking part in the business of the evening. Indeed our experience leads us to believe that naturalists seldom find any difficulty in conversing with one another wheu once the ice is broken; and the pursuit of Nature is so truly Catholic that Churchman and Dissenter, Papist and Protestant, can alike join in it without auy fear of treading upon one another's (mental) corns. The humanising influence of Natural History is certainly not the least of its many charms; and it is pleasant to notice how the instinctive good-feeling, which all true naturalists possess, enables them to avoid topics which are likely to be in any way distasteful to those with whom they are temporarily associated. In towns the tea is frequently provided at the expense of the lender of the room, but this of course cannot be *expected;* and the small cost is easily defrayed by a proportionately small contribution from each present.

Having thus supposed that all prelimiuary difficulties have been surmounted, and that our friends are comfortably gathered together, the next question is, what to provide for their amusement? It is well to start with the definite principle that the evening is to be devoted solely to Natural History, and that objects of *vertu* or art, however beautiful or interesting in themselves, must consequently for this occasion be left unnoticed. In this respect some little judgment is necessary; for people willing to assist, but lacking objects suitable for exhibition, will offer for inspection a collectiou of coins, or some curiosities from China, or a volume of portraits—all extremely iuteresting, no doubt, but quite out of place at a Natural History meeting; and it is sometimes difficult to refuse without giving offeuce to the would-be lenders. We must not, however, particularise too miuutely as to the objects exhibited, lest we be reminded of the old adage, "Beggars must not be choosers;" but we would suggest that the first place should be given to specimens connected with the district in which the meeting is held, aud the next to those which are furnished by other parts of the British Isles. Cases of Birds or Insects (especially the latter) are attractive objects to many, both on account of their varied and beautiful colours, and because they may be looked at without any great trouble on the part of the inspector. Dried Plants, which require to be turned over with care, aud lose so much of their beauty wheu pressed, are seldom much noticed, with the exception, however, of Ferns, which are more frequently appreciated. A Microscope, if available, and if presided over by one well "up" in its use, will be found to excite considerable iuterest; and a few nicely-illustrated books (relating, of course, to natural objects) may be placed upon the table. As mauy specimens as possible should be exhibited in a living state. Slow-worms, Toads, and other reptiles may be temporarily domiciled in glass globes (which may be borrowed for the occasion, at a trifling expense, from auy china-shop); and Water-beetles, Fishes, and other aquatic objects, may be shown in a similar manner. Specimens of the few plauts to be found in flower, the common Ferns and Mosses, aud various forms of Fungi—all these should be pressed into service. The oue great advantage gaiued by the exhibition of such objects is, that they, by their presence, furnish and suggest appropriate subjects for conversation; but, in additiou, it is always as well to have at least one short paper read by some one present, upon some local or interesting natural production. This should be as much as possible *original:* the writer should speak from his own individual knowledge—and makes a break in the evening, besides affording further material for conversation. The simpler the style of language employed, the better. In the succeeding discussiou, many facts may be elicited which, though perhaps trivial in themselves, all go to perfecting the links of Nature's endless chain.

Such are a few of the ideas which arise upon this subject, most of which have had the test of success applied to them, and have stood it well. Imperfect as they are, they may suggest to some a course of action as yet new to them; while others may, from their own experience, add further hints, which may prove yet more useful. B.

AN INTERESTING EVENT.

"On the 24th day of November, 1866, at the Zoological Gardens, Regent's Park, London, the wife of Polar Bear, Esq., of a son and daughter."

THE receipt of this important intelligence induced me to start at once from my residence, situate in the southern part of the metropolis, for the "Zoo."—Why do I employ the abbreviation? Because the heaviest of heavy swells always say they are going to "do the Zoo.," and I like to follow the example of my betters. It may be as well to state, that I possess a lawful right and privilege to append three important letters to my otherwise unobtrusive name. F.Z.S. gives to it an outward show of importance, not to be lightly estimated. I deem it expedient to state this fact, because it will in some measure account for my anxiety to see the twins, to which I have a sort of paternal right. More than this I cannot visit the nursery of a Lady Polar-bear, in her home amidst the bergs and floes, so I do the next best thing within my reach, which is to get a peep at the infant bruins in their snug room at the Zoological Gardens, a plan by the way in every respect much safer and immeasurably more comfortable.

As very few persons are admitted to the domestic sanctuary wherein the babies of Madam Bear are deposited, I am induced to believe there are many readers of SCIENCE GOSSIP, who will feel interested in hearing about them. Assuming this desire for information concerning bear babies to exist,—and I see no reason why Polar bears' infants should not obtain a share of public attention,—I shall commence by stating that having discovered Mr. Bartlett, the intelligent superintendent, the next item in the programme was to proceed to a small room behind the Aquarium House. The door being securely locked we had to await the advent of the keeper, who, as he let me pass in, confidentially whispered into my ear, "they (meaning the infant bears) are a sleeping quite comfortable;" and so they were, nevertheless there was nothing cherub like about the slumberers, neither did I feel at all impressed with any very exalted ideas of the beauty of infantile bruins. Gazing upon the twain, I could recall nothing to my remembrance to which they bore so apt a similitude as kittens, when, dead and dripping wet, these slaughtered innocents are dragged from out the pail in which they have been drowned. Before giving a more detailed description of the young bears, I had better put the reader in possession of a few links in their brief history. When Madam Bear was observed to be ill, she was continually watched by a keeper equipped with a scraper affixed to a long handle, and immediately each infant appeared in the world it was scraped out of the den, rolled in flannel, and carried as rapidly as possible to he house I am now visiting. Here a small rough-haired terrier was in waiting to become their foster-mother; the terrier had just produced a litter of pups, all of which, excepting one, were removed from her. She took kindly to the strange children, although it was very evident her instincts were sorely tried to comprehend the change. The Mamma Bear is a badly disposed, unnatural old parent; twice before she has had cubs whilst a resident in the Gardens, and on both occasions they were lost. I am told when her children become fat and substantial she devours them. In order to frustrate such Saturnine propensities this time, the cubs are to be reared, if possible, by a less savage mother.

Now the reader will the better comprehend how it came about that I saw on entering the room a terrier, small in size, coiled up in a box before the fire, and nestling close to her, two young white bears and a black puppy. What completely staggered me, was the tiny size of the bear-cubs. The terrier was a remarkably small one, and her pup more than usually diminutive, even for that class of mongrel; nevertheless, the puppy was considerably larger than either of the cubs, notwithstanding the age of each was about the same. I measured the cubs, and the extreme length from the nose to the root of the tail was barely nine inches, whereas the mother is over six feet; and, roughly speaking, the young bears would not weigh more than a few ounces, whilst the parent would turn the scale at seven hundred weight; there are instances recorded of Polar bears weighing sixteen hundred pounds. In colour the infants were of a pinkish white, the pink cast being attributable to the thinness of the hair permitting the skin to show through, the ears were quite bare, and gave one the idea of being two fleshy teats. The only thing about these quaint little creatures that in the remotest degree suggested their bear descent was, that all four feet were armed with well developed claws, and the foot itself had the wide flat look of that belonging to a Plantigrade animal. The eyes firmly closed, will not be opened, if the creatures live, for fifteen days. Not the least singular part of these singular little cubs was discoverable in the construction of their mouths, the gape of which for such small animals appeared to be preposterous, and the tongue was doubled in at the edges, so as to form a kind of tube, in which the teat lay during the act of sucking. Like babies higher in the scale of creation, they grew cross and clamorous if their tiny foster-mother moved, or in any way disturbed them; and it seemed to me these baby bruins proved, even at this early stage of their existence, that "cross as a bear" is an adage having in it a good slice of truth, and I shall adopt it for the future with a firmer confidence in the aptness of its application to un-amiable human kind from babies upwards, than I have been wont to do heretofore. The curious noise the little bears make sorely bothers the terrier, and in some degree frightens her into the bargain; what she thinks about it is

more than I can tell, but this I know, she dislikes to hear them, and I feel sure it is often an open question with mamma-terrier whether to abandon or bite the 'noisy chits is the better plan of proceeding.

Why the cubs of the Bear family (for the same fact holds good in its application to the entire race as it does to the Polar Bear) should be so remarkably diminutive in proportion to the parent is a matter worthy of serious consideration. I cannot help thinking the remarkably small size of the cubs accounts for the fact, and fact I know from long experience it is, viz., that hunters very rarely kill a female bear in cub. Now it occurs to me, having seen these infant Polars, that female bears may be frequently killed in this interesting condition, and the embryo be so small as to escape a hunter's observation; and at or near to the time of birth the female bear hides, and does not reappear until from two to three months after the cubs are born, during which time she neither eats nor drinks, but suckles her cubs whilst in a quasi-state of hybernation. She lives during that period upon the material supplied her by the absorption of her own fat and tissues.

The habits of the Polar Bear, apart from its aquatic and carnivorous propensities, differ entirely from those of the North American, Brown, and Black Bears. The latter hybernate during the colder months of winter; the former, although subject to perpetual Arctic cold, never does. The female Polar Bear when in cub retires about the mouth of November, and hides in a cave, or in some secure retreat deep beneath the snow; in December, so say the Esquimaux, she brings forth two cubs. This, as far as dates are concerned, tallies nearly with the birth I have just recorded in the Zoological Gardens. Thus concealed, and without tasting food of any description, the Mamma Bear carries on her maternal duties until the month of April in the year following; she then quits her nursery, thin, savage, and terribly exhausted, but running at her heels are two cubs, by this time as large as good-sized *dogs*. These, her children, she teaches to feed on seal and fish, to swim, to hunt, and to become fitted for and presentable to the best society in bear-land. This duty accomplished, the mother drives them off to live by their own claws and teeth as best they can.

Papa Polar Bear, during the retirement of his wife, leads that disreputable, roaming, ne'er-do-well sort of life the lord of creation is always accused of indulging in—whether deservedly or not, let him so stigmatised answer—when cast loose upon the world, freed from the protecting guidance of the fair. He keeps no regular hours, sleeps anywhere, dines when it suits his humour, flirts with unmarried lady Polars, indulges in a fight now and again, just, as the Hibernian says, to keep his hand in, and altogether *does* the unbridled bachelor—mind, I do not say husband; I tremble to think what might befall me were I to commit myself to so rash a statement.

Now if these tiny bears came into the world larger and more fully developed, would it not probably happen that, with erratic and disobedient habits, always inherent in young animals, they would incautiously quit their nursery too soon, and get starved to death by cold and hunger? More than this, the most pressing desire for food would hardly tempt the female bear to quit them whilst in a helpless condition; but if she found her cubs could follow her before the snow was gone or food obtainable, might she not be tempted to sally forth from her snug den too soon, and by so doing imperil the safety of her offspring? But being so small at birth, and withal so utterly helpless, it becomes absolutely necessary that many mouths should pass away before the possibility arrives of their being able to follow the mother.

Twice only in my long experience as hunter and trapper has it fallen to my lot to see a bear killed in cub. So rarely does it happen even to Indians who are always bear-hunting to destroy a female in cub, that they hold doing it in superstitious dread, and firmly believe and maintain that he who so destroys a pregnant female bear will die before the end of a year. Once during the marking the Boundary line in North West America it occurred that a bear was killed in cub; and in this case the hunter who shot Madam Bear was an Indian, in the employ of the Commission. Of course his comrades thought him doomed; but as it was not very clear in what manner harm could befall him, the matter passed away, and I had almost forgotten it, when, strange to say, the very Indian who killed the bear was shot dead in a fray with some gold-washers — a coincidence that the more firmly established in the red-skins' mind the truth of their belief.

The time a she-bear carries her young is about seven months, and I have never seen a bear with more than two cubs. I am indebted to Mr. Bartlett, the able superintendent of the Zoological Gardens, for the knowledge of the singular arrangement observable in the mammæ or teats of the female bear. There are six in all; but four of them are placed at the posterior part of the abdomen, and two on the anterior, the latter two being separated from the posterior four by a wide interval, to all appearance unprovided with any lacteal glands. There is some reason for this, but what that may be, a more intimate acquaintance with the habits of the beast can only determine.

Fear of occupying space that can be more profitably employed forbids my writing a tithe of what I should like to write concerning this, to me most interesting subject. I have, however, been tempted to offer these somewhat crude speculations

in the pages of SCIENCE GOSSIP in the hope of inducing some other naturalists or hunters to give us their theories, or experiences—which is much better—about bears and their cubs.

I left the baby Polars with a hearty wish, that during their babyhood "good digestion might wait on appetite, and health on both."*

JOHN KEAST LORD, F.Z.S.

THE WHITE DODO.

IT is an interesting though melancholy matter of observation to the natural historian and the philosopher, to witness the gradual diminution and ultimate extinction of various living races from the surface of the globe. Man himself, the lord of the creation, is not exempt from this destiny; but in some one or other of the numerous branches of the human family is obliged to yield to the mighty and various (though, perhaps, little regarded) causes which are producing such striking results. The tribes of Red Indians which inhabited Newfoundland have entirely disappeared within the last fifty years, and are now only known in the records of the past; while their co-genitors of the adjacent continent are as gradually, though as surely, diminishing before the progress of the backwoodsman of the "far west." In Australia, also, the same results are visible; for her aboriginal inhabitants are yearly decreasing, while in Tasmania not one remains.

But it is not our present purpose to enter on the discussion of the changes which have affected the human family. In the lower orders of animals these changes are equally marked, and their results, perhaps, are the more striking because they are entirely effected by external and unnoticed agencies; and it is seldom, until a species has become nearly extinct, that our attention is called to the matter. Nor need we go far to seek for these changes, for in England itself they are rapidly going on. Macaulay, speaking of the state of the country in the seventeenth century, says, "The red deer were then as common in Gloucestershire and Hampshire as they now are among the Grampian Hills. On one occasion, Queen Anne on her way to Portsmouth saw a herd of no less than five hundred. The wild bull, with his white mane, was still to be found wandering in a few of the southern forests. The badger made his dark and tortuous hole on the side of every hill where the copsewood grew thick. The wild cats were frequently heard by night wailing round the lodges of the rangers of Whittlebury and Needwood. The yellow-breasted marten was still pursued in Cranbourne Chase for his fur, reputed inferior only to that of the sable. Sea eagles, measuring more than nine feet between the extremities of the wings, preyed on fish along the coast of Norfolk. On all the downs from the British Channel to Yorkshire, bustards strayed in troops of fifty or sixty, and were often hunted with greyhounds. The marshes of Cambridgeshire and Lincolnshire were covered during some months of every year by immense crowds of cranes. Some of these races the progress of cultivation has extirpated. Of others, the numbers are so much diminished that men crowd to gaze at a specimen as at a Bengal tiger or a polar bear."* The most remarkable illustration of the changes which have been mentioned is that singular bird the Dodo (*Didus ineptus*), which in the fifteenth and sixteenth centuries was numerous in the islands of Mauritius, Rodriguez, and Bourbon, but is now totally extinct.

Indeed until very recently, a few disjointed and decaying relics in the British Museum, and in the Ashmolean Museum, at Oxford, a painting in oil in the former, and a few rude pictorial representations in the journals of the early Dutch voyagers, were nearly all that remained to attest their past existence. The disappearance of this species is the more remarkable from its having been comparatively recent, for from one of the Sloane MSS. in the British Museum, there is every reason to believe that, in 1639, a living dodo was exhibited in England. Yet until the discovery of the head and foot in a lumber-room in the Museum at Oxford, so mysterious and sudden had been its extinction from the islands where it was alleged to have been found, that it was almost considered to have been a fabulous creature. The admirable memoir by Dr. Melville, and the late Mr. Strickland, has, however, thrown much light on the subject, proving not only their existence, but that they belonged, notwithstanding their large size and unwieldly flightless character, to the family of the Columbidæ, or Pigeons, and somewhat allied to the genus Treron.

The MS. note to which we have alluded, is by Sir H. L'Estrange, and is as follows:—"About 1639, as I walked London streets, I saw the picture of a strange fowle hong out upon a cloth, and myself, with one or two more in company, went in to see it. It was kept in a chamber, and was a great fowle, somewhat bigger than the largest turkey cock, and so legged and footed, but stouter and thicker, and of a more erected shape, coloured before like the breast of a young cock fesan, and on the back of dunn or deare colour. The keeper called it a Dodo." It seems most probable that this very bird was bought by Tradescant, and on its death was placed in his museum, for when the latter was presented to the University of Oxford, by Ashmole, it contained a perfect stuffed Dodo. There it remained, having become decayed from neglect, until January 8, 1755, on which day it was ordered by the

* 'My wish was not realized.' Since the above went to press the baby bears have died.

* "History of England." Vol. 1, p. 312.

Vice-Chancellor and his co-trustees to be burnt! So disappeared the last of the Dodos, the head and foot, now in the Ashmolean Museum, being by accident saved from destruction.

Unwieldly as this bird was, yet it seemed perfectly fitted for the position in which it existed. The island of Mauritius, when the Dutch took possession of it in 1598, was covered with dense forests of palms and other fruit trees. Professor Reinhardt well remarks, "A bird adapted to feed on the fruits produced by these forests, would, in that equable climate, have no occasion to migrate to distant lands; it would revel in the perpetual luxuriance of tropical vegetation, and would have but little need of locomotion. Why, then, should it have the means of flying? Such a bird might wander from tree to tree, tearing with its powerful beak the fruits which strewed the ground, and digesting their stony kernels with its powerful gizzard, enjoying tranquillity and abundance, until the arrival of man destroyed the balance of animal life, and put a term to its existence. Such, in my opinion, was the Dodo, a colossal, brevipennate, frugivorous pigeon."

Its flesh does not appear to have been very palatable, for the Dutch sailors called the bird *Walckvögels*, or *disgusting birds*, from their toughness.

Much interest has been excited by the discovery of numerous bones of the Dodo, by Mr. Clark, in a marsh, on the estate of M. de Bissy, in Mauritius. This was made so recently as October, 1865, and strongly proves the truth of the narratives of the Dutch navigators as to the numbers of the birds which they found. The *Mauritius Commercial Gazette* gives an interesting account of Mr. Clark's discovery, stating that all the bones have been found except the toes. Some of these have been sent to Professor Owen, and are now in the British Museum, where our readers may see them.

And now for the evidence respecting the existence of a white Dodo. In the *Illustrated London News*, of September, 1856, an engraving appeared of a white Dodo, and a red-necked goose, accompanied by the following information:—"When I was staying with a friend a few days ago, he showed me some old drawings, which he told me were made by an artist in Persia, representing birds of that country. Amongst them was one containing five or six species of waterfowl, all of them common to the north of Europe and Asia, well drawn, and accurately coloured, although somewhat faded by age. The two birds, of which I send you an accurate copy of the same size as the original, are in the foreground. They represent the *Anser ruficollis* (as any ornithologist will at once recognise), and an unknown species of Dodo, differing considerably from that which formerly inhabited the Isles of Bourbon and Mauritius, in the form and colour of the beak, wings, and tail plumes, as well as in the texture and colour of the plumage, but still bearing a strong general resemblance to it. Its appearance is so singular, that I should at once have supposed it to be the creature of the artist's imagination, had it not been surrounded by a number of other figures of well-known species; and it is certainly not a little odd that one purely ideal bird should be introduced amongst a group of real ones. I should be glad if any of your ornithological correspondents can throw any light on the matter. The bird figured in company with this nondescript is an inhabitant of northern latitudes; but as it is a bird of passage, with an extensive range, this does not prove that the artist intended to intimate that his Dodo was also a northern bird, though it must have probably been an inhabitant of a much cooler climate than his congener of the Isle of Bourbon.

Hortley Lodge, Parkstern. Wm. W. Coker."

The drawing of the two birds was sent to Mr. Gould, the ornithologist, who made the following remarks respecting it:—"The drawing which you have sent for my inspection is not without interest. The front figure is a good representation of the *Anser ruficollis;* the other appears to me to have been taken from an Albino, or white variety of the Dodo. Now, as everything pertaining to this extinct bird is regarded with great interest, I think it desirable that a drawing of the same size should be published in the *Illustrated London News*. The *Anser* doubtless sometimes visits Persia; but I should suppose that the artist had made his sketch of the Dodo from a Mauritius or Bourbon specimen, for we have no evidence that this bird was ever found elsewhere."

I have lately had an opportunity of examining the original drawing alluded to, and possess a photograph of it. It is most carefully and minutely drawn, and coloured in body colours. Besides the two birds which have been mentioned, the drawing contains figures of six others, amongst which are the Tufted Duck (*Fuligula cristuta*), a Spoonbill, and a Merganser. To me they are evidently drawn from life, as all are in most life-like attitudes. In the left-hand corner of the drawing is the artist's monogram, "P. W.," which a friend has ascertained to be that of Pierre Witthoos, who died at Amsterdam in 1693. The question arises, did the artist make his drawing in Persia as Mr. Coker's friend supposes, or was it not more likely to have been made by Witthoos from menagerie specimens in Holland? It seems undoubted that living specimens of the Dodo were taken to Holland by the Dutch navigators, and there is every reason to believe that the oil painting in the British Museum was painted from life. Why not the drawing of the White Dodo in question? As Mr. Gould remarks, it is a subject of much interest, and makes us long to know something more of the mysterious bird than a mere glance at its portrait. W. J. Sterland.

THE CROCODILE IN ENGLAND.

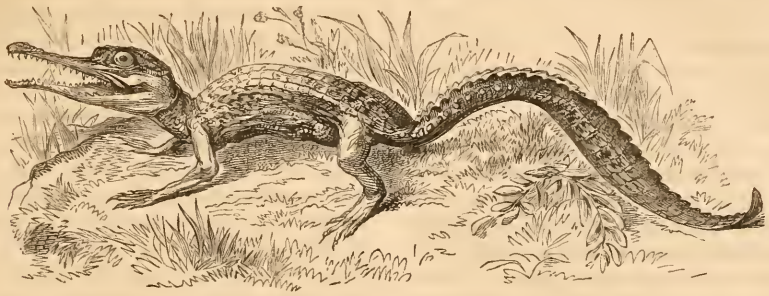

Fig. 1.

IN the *Gentleman's Magazine* for August, 1866, appeared an article entitled, "Notes on a young Crocodile found in a Farm-yard at Over-Norton, Oxfordshire," by George R. Wright, F.S.A. As the subject may be of interest to many of our readers, we have extracted from the article in question, and the publishers have kindly placed the illustrations at our disposal.

"Whilst on a visit in Oxfordshire, at the farm-house of a then tenant of mine at Over-Norton, near Chipping Norton, I first saw the little reptile already referred to, in a glass case, where other specimens of animals and birds were well arranged and kept, the whole having been preserved by my tenant, Mr. William Phillips, who is well known in that part of the world as a keen sportsman and good naturalist. On noticing at once the peculiarities of the little animal, I asked Mr. Phillips how and where it was found, when to my great surprise, as well as increasing interest, he told me, as well as I can now recollect, the following story of its discovery:—

"He said, that one morning, in the year 1856 or '7, I can hardly now say for certain which, as he was walking in his farm-yard at Over-Norton, his attention was attracted by the sight of, as he at first thought, a lizard, lying in the gutter, evidently but lately killed, its bowels protruding from a wound in its belly. Upon, however, taking it up, he soon discovered that the animal was not a lizard, and he immediately asked his labourers, who were close by, unstacking some faggots for the use of the house, if they knew anything about it. The answer was that they had killed it as it ran out of the stack of wood, I think the day before; and on Mr. Phillips expressing his regret at their having done so without bringing it to him alive, they replied they could easily get him another, as at the place where the wood was cut, a few miles from the farm, near to Chipping Norton Common, and not far from the village of Salford, at the 'Minny' Pool—which I presume is a shortened form of Minnow—they saw them frequently in the water and on the land, and often running up the trees. Upon this statement, Mr. Phillips offered his wondering workmen a guinea for another specimen, adding the remark that they had killed an animal of a most rare character, and one he thought, in spite of all they said, they would have some difficulty in meeting with again. Mr. Phillips then proceeded to preserve the little reptile, which he did by carefully skinning it, and setting it in the position I subsequently saw it, and which the drawing annexed faithfully depicts. Seeing how

Fig. 2.

much interest I took in the affair, Mr. Phillips presented the little animal to me to bring to London, as I told him I should be able, through some of my friends in town, to find out more about it. My friend in reply remarked that it had already been to London, and been shown at the British Museum, but to whom he could not say; and that the opinion he had received of it was to the effect that it was a young crocodile, and had very likely been dropped in a rain shower, or perhaps had escaped from some travelling menagerie. As both these ideas or suggestions were in my mind entirely out of the question, and as Mr. Phillips strengthened my belief, especially as regarded the latter suggestion, by saying that the

'Minny Pool' was several miles away from any high road, I resolved on my arrival in London to consult my old schoolfellow and attached friend, Dr. Vesalius Pettigrew, on the subject of the little animal's history and habits, as I well knew I could not refer the matter to a more safe or competent naturalist to determine all that I wished to know, respecting the little fellow's birth, parentage, and education.

"The result of my inquiry was that Dr. Pettigrew pronounced the reptile a young crocodile, with a mother and father, as he laughingly remarked, as long as the hearthrug in his room, or even longer, but how it had been found and killed in this country, he could not venture an opinion upon. At his request I left the young reptile with him, to show to his friend Mr. Frank Buckland, who afterwards not only confirmed Dr. Pettigrew's views as to the character of the reptile, but subsequently, in a description of it in the *Field* newspaper, narrated the circumstances attending its discovery, giving it as his opinion that it had escaped from some travelling show—a thing not uncommon, as he attested by the instances of several such escapes that had come under his notice with little animals of a similar description, although he did not venture to say he had ever heard of a young crocodile being found alive some time after, in the country or town. This letter I replied to at the time, and I then gave the account of the discovery of the little creature in a similar way to which I have done now. I forget the date of these letters, but they will be found in the *Field* newspaper for, I think, the years 1861 or 1862. No further correspondence appeared on the subject, nor have I ever heard from my friend Mr. Phillips of the finding another specimen in or about his farm, although, in addition to his reward of one guinea, I offered two, for another specimen, dead or alive."*

MOUNTING IN BALSAM AND CHLOROFORM.

THE treatises on "Mounting" that have hitherto been published, contain but scant information on this subject. Davies in his work, about the best and most recent, mentions it, but does not go sufficiently into the details to enable a beginner to adopt it; and as "E. G. M." asks for an opinion from one who has tried it, I am induced to give the result of my experience with it, together with some few instructions, which I trust will be of service to the beginner.

I may state for "E. G. M.'s" satisfaction, that I first used balsam dissolved in chloroform about five years ago, and that my slides, put up at that time, are as perfect now in every respect as they were when first mounted, and quite as secure. I have never used anything else since, except in mounting diatoms, when I use the ordinary balsam; my reason for so doing I will explain further on. I will now return to the balsam and chloroform.

I first dry the balsam until it becomes quite hard, and a ready way of doing this is to pour it into a large pomade pot, the larger the area the quicker will be the process of hardening. I then place it in the kitchen oven after the fire has gone out, care being taken that the temperature is not too high, or the balsam will be discoloured. This operation must be repeated for five or six nights, when it will (with a layer of about an eighth of an inch deep) become quite hard, so that it may be chipped out with a knife. The pot must be kept closely covered, during the drying, to keep out all dust, but it would be as well to raise the cover now and then to allow the vapour to escape.

When the drying has been completed, a sufficient quantity must then be put into the chloroform, until it becomes of the consistency of an ordinary varnish, or if any thing rather more fluid. As a matter of course it must be kept in a stoppered bottle; a two ounce bottle with a small neck being a convenient size. The balsam being now prepared we will proceed to its application.

Every amateur must know that the objects after dissection and soaking in *liquor potassæ* (those that require it), must be *thoroughly* dried before they are placed in the turpentine bath; unless this is carefully attended to the "milky" appearance, complained of by "T. B. N." in the last number, will be the result, which renders the objects worthless for the cabinet.

As some objects require but little or no arrangement after taken out of the *liquor potassæ*, they can be thoroughly washed in warm water and placed on the slides in the position they are intended permanently to occupy, and the cover tied on with a piece of thread, and put away to dry in a warm place well protected from dust. When they are perfectly dry, the slides, with the object and cover thus secured, can be placed in the turpentine bath in a flat position; a sardine box answers admirably for this purpose, and by packing them one above the other, one box will hold about a dozen slides.

It will be necessary to keep them in turpentine for two or three days, according to the nature of the object, and when taken out, place them on edge to allow the turpentine to drain off; they should be kept in this position for about an hour, when they will be ready for fixing. Now take the bottle containing the balsam, and drop on, close to the cover, a small portion; it will be observed to rush between the cover and slide, permeate the object, and drive

* The length of the little creature, as far as it is now possible to get at it, the skin having shrunk and become very dry, seems to be about 12 to 13 inches from the tip of the nose to the end of the tail, from the tip of the nose to the crown of the head about 2 inches, the front legs 1½ inches and the hinder ones about 2 inches long.

all the air before it. The slides may now be put on one side in a flat position for a day or so before they are subjected to heat; then place them on a tray, still in a flat position, and put them in the oven, after the fire has been taken out; when, with two or three nights' baking, the balsam will become quite hard and the slides can be cleaned. For this operation I should recommend an old penknife blade with a sharp point heated in the flame of the spirit lamp, and run round the cover; the balsam can then be chipped off without the risk of chipping the cover.

The above method answers very well if you can depend upon the objects being thoroughly clean before the cover is tied on, but with some this is uncertain, as they require well pressing before the fatty matter they contain can be got rid of. As a more satisfactory plan I prefer the following.

After my objects have soaked a sufficient time in the *liquor potassæ*, I place them between two slides; by adopting this plan I can dry a dozen or more small objects at one time. I then press them with one of the common wood clips, and when dry I remove them from the slide and immerse them in turpentine. When they are ready for mounting, I "centre" them on the slides, and for this purpose I use a card-board template cut to the size of the slide (three inches by one inch), coloured black on one side, with the exception of a white disc in the centre, which I leave about five-eighths of an inch in diameter. On the other side I colour the disc black and leave the ground white; the black one I use for diatoms, &c., and the white one for entomological subjects, but the adaptability of each will be readily ascertained when once made. I place the slide on the template and arrange the object in the centre, then drop on the cover, the template being a guide for this also. I have by my side a number of pieces of strong thread, about six inches long, already looped up ready for tying on the cover. When the latter is in its place, I drop the template and slip on one of these loops, place one end between my teeth and the other in my right hand and tighten. The knot may then be secured and the slide put on one side, on edge, to drain off the turpentine; in this manner two dozen slides or more can be put up in an hour, and by that time the first one put up is ready for the balsam, which can be applied as previously described.

I stated in a former part of this paper, that in mounting diatoms I preferred the ordinary balsam, and for this reason, viz., the diatoms can, without injury, be subjected to a much greater heat than animal objects, and consequently the balsam, by being so heated, will harden more rapidly than even if mounted with the chloroform. For this purpose the older the balsam is the better. After evaporating the fluid containing the diatoms on the slide, I drop on a small globule of the balsam and place the cover on its summit and hold the slide over the lamp. As the balsam warms, the cover will gradually descend to its place without the least chance of air bubbles being confined; a little gentle pressure and the cover will be secure.

Clapham. James Rowley.

DIATOMS.

MANY persons have heard of these beautiful objects, and those who possess a microscope have no doubt often wished to have specimens to examine; and the object of this paper is to tell them when, where, and how to collect and mount them in the most advantageous manner.

The Diatomaceæ (for that is the name of the group I intend to describe) may be collected always, as some one of the many varieties may be found in almost any pond or brook; but the most beautiful are found in the mouths of tidal rivers, or in fossil deposits.

A diatom is characterized by having a flinty case or shell, beautifully marked with lines, or rows of dots; but these are often so fine and close together that they cannot be distinguished, except with a well-constructed instrument and high powers (a $\frac{1}{4}$-inch objective will do for most), and this has led to the employment of some of these as test-objects —that is to say, that if one glass will define the markings better than another it is considered more fit for scientific purposes; and so great is the difference between the size and distance apart of the markings, that some may be used as tests for the low powers, while others can only be used for the highest.

Many of these beautiful forms can be found living in the Thames, and other rivers on our own coasts. In the months of April, May, September, October, and November they will be found in the greatest abundance and variety; the salt marshes on the banks of most of the rivers will also well repay the trouble of searching for them.

Supposing the reader to be in London, and wishes to collect these interesting objects for himself, I should advise him to go to Southend (which may be reached by the Tilbury and Southend line, starting from Fenchurch Street station), which is as good a place as any other for the purpose of collecting the objects under discussion; the mode of doing which is to gather the seaweeds at low tide, taking care to take as little sand with them as possible, and at once put them into a bottle of sea-water, if it is desired to examine the living forms in their natural position on the weed. But if their flinty cases are wanted to exhibit the markings, the weeds may be put, dry, into a bag; and, on reaching home, they are to be plunged into a jar of fresh water for half an hour, which will kill the animalculæ attached; and when the weeds are rubbed and stirred about in the water, they come off and form a cloud of muddiness,

which is to be allowed to settle, and the water then poured off and the sediment transferred to an oil-flask (which has been well cleaned), and boiled with nitric acid over a candle, or gas jet. After the first portion of acid ceases to act, the flask, with its contents, must be set aside till the liquid is perfectly clear, when it is to be poured off, and fresh acid added. This is to be continued as long as the acid exerts any action, and the sediment is perfectly white, when it is to be washed with water until the liquid is no longer acid.

In this sediment, when examined by the microscope, may be found the *Triceratium favus*, which is one of the largest of the Diatomaceæ, and is about the $\frac{1}{160}$th of an inch in diameter. It is in the form of an equilateral triangle, with slightly curved sides. At each corner is a projecting spine or hook, and round the base of each there is a row of round dots; and the rest of the surface is covered with large and regular hexagonal markings, resembling, in the closest manner, the formation of honeycomb. If you wish to mount it, when found, you must pick it out from among the grains of sand and other impurities by the help of a stout hair from a shaving-brush, or a cat's whisker stuck in a split at the end of a slender wooden handle, such as a paint-brush handle, and place it in the centre of a glass slide. A drop of Canada balsam is then to be added, and the slide warmed till the balsam becomes rather hard. On cooling, all the air-bubbles should be broken by the point of a needle, and then the thin glass cover is to be put on, taking care to have the object as nearly in the centre as possible, and not to press so hard as to break it. Objects mounted in this way, under small round pieces of thin glass, on plain ground-edged slides, look very neat; and all the rest of the things described in this paper may be mounted in the same way, though more than one specimen may be mounted at once. *Surirella constricta*, which resembles a lady's needle-case, may also be found. It has strongly-marked ribs running from the outside edge towards the centre, where a clear space may be observed. *Surirella plicata* has no resemblance to the last; but strongly resembles a lemon in outline, as does also another object (of which I never found but one), but which is covered with minute dots instead of being marked with faint lines. A small but beautiful variety of the *Coscinodiscus*, which is a round shell resembling a thick shilling, closely covered with dots on both sides, is worth mounting, when found; but, being extremely brittle, great care must be used. The *Gramataphora serpentina* is found in great numbers, and is like a card-case, with four curved lines running from opposite ends towards the centre. Different kinds of *Naviculæ*, or little ships, are to be found by careful examination; and they are very amusing when alive, for they run about and bump up against one another, then draw back after a time and swim away in the opposite direction. A few specimens of *Pleurosigma hippocampus* (Sea-horse), and some other varieties of these most beautiful objects, which are at once recognized by their form, which is that of Hogarth's lines of beauty of different curvature joining at their ends, and having another which runs between them and expands in the centre, and at each end into round dots or spaces (which some say are openings; others, only a thickening of the central rib; but I am inclined to believe the latter, from the manner in which the valve is broken on being pressed; for the crack does not run across the dots, as it would do if they were openings, but round them, proving them to be stronger there than elsewhere). And all the rest of the surface is covered with rows of minute dots, arranged in regular rows, but so fine that, except with the very highest powers, nothing can be seen but longitudinal and transverse lines; and a ¼-inch that will show even these may be considered very good.

Pinnularia dactylus is like *Surirella constricta*, only much smaller and expanded instead of contracted in the centre. The *Gallionela sulcata* is a beautiful object, and resembles highly-carved ivory bones stuck end to end, so as sometimes to form a filament appearing as much as three inches in length, when viewed under a good ¼ inch power. *Symphonema geminatum*, which may be compared to a number of folded fans attached to a branched stalk by the end held in the hand; and *Acnanthes longipes*, which is a bundle of oblong boxes joined together and connected by a long gelatinous stalk to the weed, complete the list of those from South-end which I have found; but I have no doubt that a much greater variety would be obtained if the weeds were collected at the proper time.

A great number of the most beautiful forms are contained in fossil earth, which may be obtained from dealers in minerals. Those of Bermuda, Oran in Algeria, and Richmond, U.S., are the most important, and contain the greatest variety. Bermuda earth contains one most beautiful object, the *Heliopelta* (sun-shield), of which a tolerable notion may be got by cutting an orange in half transversely. Then every alternate triangle you must suppose to be marked with a different pattern—one being covered with large and regular round markings; and the next, which appears to be on a different level, to be marked with smaller and less distinct, but nevertheless very beautiful markings. The ribs which divide the triangles from one another, dilate at their extremities, forming in the centre a clear space corresponding to the central pith in the orange, and at the ends next the margin expand and gradually melt into the rim or border, which is thickly set round with transparent spikes of different lengths. The earth from Richmond affords many beautiful specimens, especially of the genus *Navicula*.

Guano, the dry excrement of sea-fowls, is very rich in objects. One, the *Arachnoidiscus*, is like a small and perfect spider's web (whence its name), with all the colours of the rainbow condensed in it. A large variety, or indeed two or three varieties, of the *Coscinodiscus* are present in considerable numbers; and the *Zygoceros rhombus* is a miniature shepherd's purse, such as is found on the sea-shore, only covered with dots. The *Actinocyclus* is the same kind of thing as the *Heliopelta*, only without the marginal spines. The earth of Oran contains the same Diatoms as guano. The guano* and the earths mentioned are to be prepared in the same way as the sediment from the weeds from Southend, only they should be well washed in water first (the guano more especially). The *modus operandi* is to shake up the earth or guano with water in an oil flask, and then allow it to settle: this is to be repeated until the water is no longer coloured. It is then to be treated as before directed. Most writers recommend the use of hydrochloric acid first, and secondly nitric acid, when the former ceases to act. With large quantities this would be more economical; but it necessitates the purchase of a second stoppered bottle.

The reader exclaims, "Well! Now I have found these things, what are they?" The writer answers, *that* is a subject of dispute, some claiming them for the animal world and others for the vegetable. The chief argument for their belonging to the animal kingdom, is their voluntary motion; but that is possessed by undoubted plants, so *that* is not conclusive. On the other hand it is asserted that they resemble plants in decomposing carbonic acid and liberating oxygen, whilst animals do the contrary. This to me seems to settle the question, but everyone had better judge for himself. Again, the reader may say, "You tell me of things that are covered with round dots, what are those dots? raised knobs, little pits, or only surface markings?" This, too, like most things connected with them, is a bone of contention. Some will have it that they are prominences, others depressions; but my impression is that it is sometimes one and sometimes the other; for some break in such a manner as to lead to the idea of their being indentations, whilst others break in the contrary direction. And if you happen to get some of them on their edges and look along their surfaces, some exhibit spikes, others not; and the mode in which shadows fall when they are viewed by oblique light leads now to one and then to the other conclusion.

Finally, I may state that the reason I have made so many comparisons is, that the reader may recognize the forms when found. ANDREW WAINE.

* The guano can be had for 4d. the lb. at Butler's, in Covent Garden.

PINE-APPLE.

(*Ananassa sativa.*)

"PINE-APPLE, a penny a-slice!" is a sound familiar to cockney ears, whilst the variation indulged in by the more learned itinerant vendor, of "Here's yer fine West Injun pines!" localises the product, and contributes a trifle to street science. It must not be taken for granted, however, that the West Indies is the only great centre of pine-apple growth, or that "Pine-apple Rum" is the distilled spirit from the juice of this fruit. That "partickler wanity" of Mr. Stiggins, as immortalized by "Boz," does *not* absorb our Christmas thoughts, and we have ever been innocent of any hankerings after the "Genuine Pine-apple Rum." If any sceptic should inquire at our office, he may procure "Social Bees," "Lissom Fingers," and such like "Curiosities of Civilization," but as for the other article, the only reply will be, "Wery sorry to say, sir, that they don't allow that partickler wanity to be sold in this here establishment."

That we may begin early in our history of this plant, we quote from Father Kircher, as translated in 1669. "They have in China a tree called *Kagin*, yielding fruit twice a-year, which, by inversion, thrusts forth the seeds or kernels, the werts, or such excrescences, on the outside of the fruit, and is in common to the East and West Indies, who call it *Ananas;* but the Chinese call it *Fan-polo-mie;* it groweth in the provinces Quantung Kiangsi and Fokien, and is supposed to have been brought from Peru; the tree on which it groweth is not a shrub, but an herb like unto Carduus; they call it *Cartriofoli*, on whose leaf a fruit groweth sticking unto its stalk, of so pleasant and exquisite a taste that it may easily obtain the pre-eminency amongst the most noble fruits of India and China; the spermatick faculty is innate in all the parts thereof, for not only the seeds shed on the ground, but its sprouts and leaves being planted, produce the like fruits."

Our opinion of pine-apple, whilst derived only from an experience of imported West Indian specimens, was by no means so flattering as that of the learned Father. In fact, it remains doubtful, though some may regard it as heresy, whether, since we have deliberately tasted of fine varieties ripened at home by experienced growers, that our opinion is much altered for the better and in favour of the pine. Our depraved tastes would lead us to pronounce in favour of a rich mellow pear, or a dish of strawberries and cream, against a dozen pine-apples. But we are wandering again, and who can blame us?—even editors and authors are but "men" at Christmas time, and cannot help thinking about the good things which comfort the inner man, and forsaking the "midnight oil" for—some other "partickler wanity."

Fig. 3. PINE APPLE (*Ananassa sativa*).

Before us lies a list of names by which the pine-apple is known in about forty languages or dialects, and the root of the majority of them is the original South American *Nanas;* from which the Tamul *Anasa,* and the Arabic *Anannas,* as well as the generic Latin name, by which the plant is known to botanists, is derived. There is but little doubt that America was the original home of the pine-apple, whence it became introduced into eastern and southern Asia. How it got into Africa we do not pretend to explain, nor would we like to assert that it is *not* known anywhere on the habitable globe, wherever the temperature is sufficient for its production.

When Oliver Cromwell ruled in these realms, a present of pine-apples was one of the things which fell to his lot, and this was probably the first introduction of the fruit into England, although it was known on the Continent four years previously. Four years afterwards and Evelyn writes of its appearance on the royal table.

But the fruit, however much it may have been extolled, is not the only good product of this plant.

From the leaves thereof is procured a fibrous material known and appreciated by the barbarous hordes of Africa and the semi-civilized Malays. The celebrated pine-apple cloth of the Philippines, resembling the finest muslin, is woven with the delicate fibres of the uncultivated pine-apple plant. This muslin is embroidered by the nuns of the convents of Manilla with excellent skill and taste, so that the "Pina" muslin of the Philippines has become a celebrated article of manufacture. Mr. Bennett has observed in his "Wanderings," that one of the coarser fibres may be subdivided into filaments of such fineness as to be barely perceptible, and yet sufficiently strong for textile purposes.

The Malays use the fibre of the pine-apple to manufacture their fishing nets, and so plentiful is the plant in many parts of India and the East, that it forms immense thickets; and Dr. Helfer says that the fruit is so abundant in the Tenasserim provinces that it is sold in Amherst Town during June and July at the rate of two shillings for a boat load. What an inducement for the rapturous devourers of pine-apples! Should a Tenasserim Pine-apple Emigration Company (Limited) become one of the projects for 1867, we shall not permit the fact to be forgotten, that its suggestion originated with ourselves and the New Year.

UP-HILL WORK.

MR. CHARLES BONER has recently published a very portable and useful little guide to tourists and mountain-climbers; and, although this is not exactly the season when people sling the "Rücksack" over their shoulders, and grasp the alpen-stock, with a determination to brave the dangers of the Wetterhorn, or "do" the Capel Curig ascent of Snowdon, we are, nevertheless, induced to make our readers acquainted with the mysteries of the alpen-stock as revealed by the said Charles Boner, in anticipation of next season.

"Your pole should be of your own height—six feet, we will say; light, tough, unbending, and iron-shod." One who has done a little climbing every autumn adds that it should be of good, tough, old, well-seasoned ash.

"Let your whole body be as quiet as possible, slightly bending forward, and your pole *before* you. Such pole properly used is a great help in going up a mountain: a great assistance and support. But if you plant it behind or beside, instead of before you, thus *pushing* yourself on, its use will fatigue rather than otherwise. The staff being in front, you lean the whole weight of your forward-bending body upon it—thus quite resting on it—as you step.

"In coming down a 'Geröll' (sloping bed of stones), you will soon get to the bottom. With your pole behind you, and your body bent backward and leaning upon it, jump on boldly among

Fig. 4.

the loose stones, with your heels downwards and the toes well pointed upwards. The weight of your

Fig. 5.

body will carry the mass on which you alight several feet forwards. The 'Geröll' will slide on like a miniature landslip, and you slide with it. To go

down thus, leaping along, is pleasant enough, and very speedy; only be careful to come down on your heels, which, sinking somewhat in the rubbish, push it forward. You might sprain your ankle otherwise. You cannot fall; for your pole behind, which bears your whole weight, keeps you up.

Fig. 6.

"Always descend with your face turned thither where you are going. Never go backwards like one descending a ladder. Should you do so you could make no use of your pole, and that is certainly of greater assistance to you than your hands afford by thus holding the rocks; for you only thus go backwards in order not to relinquish your hold of them; besides, your pole would be in your way if you were to descend in this manner. As was said above, keep your pole *behind* you in coming down, *never before you*. Neglect of this rule will make your task of descending doubly difficult.

"In climbing convince yourself that the chief thing to be considered is whether the spot your foot rests on be *firm*. You do not want *much* space to obtain a firm footing, for you may stand well on anything not larger than the palm of your hand, but it must be sure. If your head be steady, you may in reality walk along a ledge not broader than the soles of your shoes, but then you must have the conviction that the ground beneath your feet is as firm as the mountain. Should you have to walk along such place lean your body inwards.

"Do not look out into space, but keep your eyes fixed on the path, however narrow, before you; for the grand thing is that the eye have something to rest on, to seize, and, as it were, to hold by. You have grown giddy because the range of your vision had no boundary: it was lost in the indefinite. Let it be bounded by the small but defined form which that spot then affording you a footing presents, and your eye grows at once quieter, for it has again what its and your nature are accustomed to and require. In daily life your vision rests at every second on distinct outlines of things, and you move

Fig. 7.

among them safely, your eye helping you to avoid them; but they also, *by your sight finding something to rest on*—to lean upon, as it were—in their turn give a support and lead you along progressingly.

"On moving over certain ground you cannot help loosening larger or smaller stones. In such places do not follow directly behind him who precedes you, but a little to the side, so that when a stone comes leaping down it may fly *by* and not *against* your head or shins. Should you loosen a stone, call at once to those behind to look out, so that they may jump aside as it comes bounding towards them. Stones thus sent rolling fly down with terrible force and inflict serious injury."

In this manner Mr. Boner gives plain and easy instructions to hill-climbers, in familiar language, and without affectation. Every paragraph contains

some good practical advice, or friendly caution; and for the inexperieneed, who for the first time emulates to climb a mountain, his little volume is as

Fig. 8.

indispensable as the "Rücksack," or the "alpenstoek," and those who have trodden the rugged path will doubtless do it better the next time after taking a little of his advice.

PERILS OF A NATURALIST.

FROM a letter by Mr. William Gray (District Inspector of Public Works in Ireland), published in the *Belfast Northern Whig* of December 15th last, we glean the following singular narrative. Being in Londonderry on the Wednesday previous, he resolved to find a correspondent, whom he had not seen. Not knowing where to find the street he inquired of a man on the footpath for Pump Street. This individual not only pointed the way, but offered to go with Mr. Gray and show him. During the walk the conductor in "seedy uniform" says that he is a "harbour-constable." Arrived at the street, and the number, the name on the door-plate proved to be some other than the one which Mr. Gray was seeking; he resolved, therefore, on returning to his hotel without further inquiry. The officious conductor steps up to his side, learns the name of the person sought, and again offers his services, this time more pressingly, and urges that it is all on the way to the hotel. Pulling up at a doorway, they enter, two or three policemen are standing about, the conductor inquires for the sergeant, and Mr. Gray for Mr. Greer for whom he was seeking. Light then broke in upon him as his "seedy" friend announced, in not very choice language, "You are my prisoner; I arrest you on suspicion; I charge you with coming down Pump Street and knocking at every house you passed." Protestations were vain, the prisoner was taken into the kitchen of the police-barrack; he explained who and what he was, gave his card, announced his business, and produced the following letter:—

"19, Pump Street, Londonderry, March 2, 1866.

"Dear Sir,—I would take it as a particular favour if you would let me have a small quantity of the Diatomaceous earth you refer to in Science Gossip. I enclose two stamps, and remain yours, &c."

The fact was made clear that he was a naturalist and had exchanged letters with this gentleman through the medium of a publication called Science Gossip, but had never seen his correspondent, and had been in search of him. By dint of perseverance he was permitted to go again, under the protection of two police, in search of his unknown correspondent. This time the search was successful, one of the police soon presented himself with Mr. Greer. The latter apologized that since his note was written the number on the door had been altered. The rain poured in torrents as the five individuals marched to see the mayor. This functionary was entertaining a large dinner party, but *did* attend to his unbidden visitors. The "seedy harbour-constable" made the charge, the prisoner denied, and ultimately it was understood that the mayor was satisfied that the prisoner need not be detained, but should be taken to the head-constable and have his papers examined, and if *he* was satisfied Mr. Gray might be released. The head-constable was not at home. For an hour or more he was waited for. In the interval Mr. Gray and Mr. Greer had time to talk over their favourite pursuits. This did not improve matters with the "harbour-constable," who, of course, took care to hear all. "For," says Mr. G., "when we talked of the thousands of *Diatomaceæ* to be had in my district, the beauty of the *Polycystins*, the movements of *Naviculæ*, and the best way of mounting Algæ and Polyzoa, the poor constable seemed utterly bewildered, and expressed his feelings by saying, 'It was d——d quare that fellows

that never knew each other should have so many acquaintances; and, look here,' he says to one of the police, 'there's something quare about this; just read that word.' 'Well,' says the policeman, 'I am not a great reader, read it yourself.' And he began to spell—'di-i-a-t-o-&c.' Observing his perplexity, I told him that the word was 'Diatomaceous earth,' and if he required to know further, he must refer to 'Pritchard's Infusoria' or 'Smith's Diatomaceæ.' He professed to know all that, but still he was certain 'there was something about it that required to be explained!'" Suffice it to say that on the return of the head-constable, his examination of the papers, &c., after some altercation, to the great annoyance and chagrin of the "harbour-constable," Mr. Gray obtained his liberty again between 10 and 11 o'clock at night. We regret that our space would not allow us to reprint Mr. Gray's letter in full. It is a most amusing episode, as good as a farce to any but our unfortunate correspondent.

WHEAT MILDEW (*Puccinia graminis*).

THE wheat mildew is but too well known in its external appearances to all who are interested in agriculture, to need much description, and even amongst townsmen there are but few who have not heard of it, many that on account of its reputation have made acquaintance with its uninviting exterior.

Fig. 9.

Of its internal and microscopical character very few of those who know it as a pest have any experience, and it is with a view to its better acquaintance that we have selected it for illustration. Early in the year and whilst the plant is still green the leaves of wheat and grass become more or less covered with a bright rust-coloured or orange powder, which bursts through the cuticle and disperses itself over the surface of the plant. This is what has been called the "rust," and is undoubtedly a stage or condition of the mildew, and if examined microscopically in the autumn the globose or elliptical spores of the rust (fig. *d*) will be found in all stages intermediate between the simple form and the elongated septate spores of the "mildew" (fig. *c*). The mature mildew occurs on the yellow straw, and fading leaves at harvest time, in elongated dark-brown, almost black sori, or compact tufts, bursting through the cuticle (fig. *a*); and if a portion is removed with the point of a penknife and placed with a drop of water on a slide the tufts will be seen to be composed (fig. *b*) of a mass of stalked spores, each divided transversely by a medial wall or partition, dividing each spore into two nearly equal parts, of which the upper is more deeply coloured than the lower, and blunt or obtuse at the apex.

It was long believed in agricultural districts that wheat grown in the neighbourhood of Berberry bushes was sure to be mildewed, and that there was some mysterious connection between the Berberry and the mildew. In consequence of this belief the Berberry was carefully extirpated from the neighbourhood of cornfields. Scarcely more than twelve months ago Dr. De Bary announced that as the result of careful experiments he had come to the conclusion that the parasite (*Æcidium*) of the Berberry was only another condition of the mildew of the wheat. Although his observations require confirmation before they are accepted as incontrovertible fact, there is every reason to believe that there is a mysterious link which unites the two parasites. For many years mycologists have strenuously opposed the popular belief as a vulgar error, and in 1843 an eminent authority in the pages of the "Gardener's Chronicle" (p. 694) observed, "we should as soon soon believe that a hen's egg would be hatched into toads as that the seed of an *Æcidium* would produce *Uredo* or *Puccinia*." Twenty-one years after this and there is every probability of its becoming an admitted fact that *Uredo* (or *Trichobasis*) and *Æcidium* are the same plants as *Puccinia* in different conditions of a kind of "alternation of generations."

M. C. C.

ZOOLOGY.

Spider Poison.—I have read with some interest the discussion which has appeared from time to time in the pages of Science Gossip regarding the poisonous property of the spider. The little article in a recent number has, I should presume, settled the *fact* that the insect is endowed with a poison apparatus. I have been curious to observe if any of your readers' *experience* on this point has been similar to my own, and as no one has as yet quoted personal experience, I now venture to state mine. One summer morning, feeling a smart degree of irritation about the middle of the forearm, instead of rubbing the part as one instinctively does, I cautiously turned up my shirt-sleeve a little, when,

to my surprise, and I must also add disgust, a large black spider [dropped out. Looking at the seat of irritation, I could not observe the mark of any puncture, but there was a red spot at the part about three-fourths of an inch in diameter. The irritation was slight and soon went off. It is not always safe to use the *post hoc propter hoc* argument, but from your late correspondent's description of the poison-gland, I think that conclusion may now be considered correct.—*G. A. W.*

Common Tern (*Sterna Hirundo*).—I succeeded in shooting a single specimen of the above bird some short time since in this neighbourhood. With us it is a very rare visitant; no doubt it was driven out of its course by contrary winds which prevailed at that time. Scores of people were watching it at the time I shot it.—*C. Denny, Kelvedon.*

The Barn Owl.—In all old barns a hole may be observed in the angle of the roof, made on purpose to allow of the owls flying in and out. It is not made in the newer barns; but surely it was more sensible thus to encourage these great destroyers of vermin than to shoot them, as both gamekeepers and farmers now do.—*W. R. Tate, Grove Place, Denmark Hill.*

Swallows and the Cholera.—A correspondent whose signature is familiar to the readers of Science Gossip, draws attention to the fact that these birds deserted those districts affected by the fatal scourge, and I venture to suggest a reason for their doing so. Swallows are insect-feeders, and I have noticed that on the appearance of cholera, flies and other insects decrease; may not this account for the departure of the birds? It was a long time ago, the first advent of cholera that I remember, and persons were far more nervous about it then than they are at present. I was a very little girl, but can well recollect remarks to the effect that, "the cholera had not reached us, because the flies were as numerous as ever:" it having been observed that in those towns where the plague raged, there was not a fly to be seen.—*Helen E. Watney.*

Galls on the Elm.—At a meeting of the Entomological Society (November 5th), Mr. F. Smith exhibited some large galls formed by *Aphides*, and found at Deal, on the elm. On the 24th of July last, Mr. R. McLachlan observed numbers of these galls on some elms on the banks of the Thames, near Hampton Court. Each was at, or near, the extremity of a twig. In size they varied from that of a walnut to that of a medium-sized potato, of an irregular shape, green externally, turning to rosy on the side exposed to the sun. They were hollow, and each had a large hole on one side. Internally they were half full of liquid. Mr. McLachlan considers that the insect which produces the gall is *Schizoneura gallarum-ulmi* of De Geer. The account from which the above notice is taken will be found in the *Entomologist's Monthly Magazine*, December, 1866. Mr. McLachlan is reminded that in Italy and the south of France, similar, if not identical, galls are produced on the elm, sometimes as large as the fist, containing a clear water called *eau d'orme*, which is sweet and viscid, and is recommended to wash wounds, contusions, and sore eyes. Towards autumn, when the galls become dry, a residue in the form of a yellow or blackish balsam, called *beaume d'ormeau*, is found, which is said to be recommended for diseases of the chest. Kirchner (in "Lotos," 1855, p. 241), calls the insect *Schizoneura lanuginosa*, Hart., of which Mr. McLachlan's *S. gallarum-ulmi* is probably a synonym. The same authority states that it has a parasite in a new species of *Entedon.—Ed.*

Fine Tench.—I succeeded in capturing a fine tench some short time since, weighing upwards of two pounds and a half, length eighteen inches, girth thirteen and a half inches, and which is now in course of preservation by Mr. H. Rose of Coggeshall.—*C. Denny, Kelvedon.*

Lateness of Martins and Swallows.—These birds stayed with us remarkably late this year, later than I ever knew them to stay before; up to the 14th of November several specimens were observed, I suppose, owing to the mildness of the season.—*C. Denny, Kelvedon.*

Bittern in Norfolk.—I have a fine female specimen of the Bittern (*Ardea Stellaris*, Linn.) shot on Barton Broad, Norfolk, 26th November last. As these birds have nearly, if not entirely, become extinct in Norfolk, I think very probably it was blown over from Holland during the gales that prevailed about that time. Several beautiful specimens of the Bohemian Waxwing (*Bombycilla garrulus*) have been shot at different parts of Norfolk during the last three weeks, at Cromer, Wroxham, Beeston, Hickling, Mutford, and other places. From the numbers already procured, there must have been a very unusual flock of them visiting us this winter. The extremities of their wings are adorned with waxlike tips of a bright red colour, and varying from two to seven on each wing. The tails in some specimens are slightly tipped in the same manner. Their food here appears to consist of the haws of the whitethorn. It is three years since any number has been noticed here, when about sixteen were shot.—*Stephen Wm. Utting.*

Nesting of the Pied Wagtail (*Motacilla alba*).—For some years a pair of Chimney Swallows built their nest in an unused chimney; but three years ago, before their arrival, a pair of Wagtails took possession of it, and, spite of an endeavour to dislodge them, they reared four young ones, and have continued to build in the same chimney ever since.—*John Ranson, Linton-on-Ouse.*

BOTANY.

Curious Flower.—One of the most singular flowers growing in this pretty garden (of the Panama Railway Company) was an orchid, called by the natives "Flor del Espiritu Santo," or the "Flower of the Holy Ghost." The blossom, white as Parian marble, somewhat resembles the Tulip in form; its perfume is not unlike that of the Magnolia, but more intense. Neither its beauty nor fragrance begat for it the high reverence in which it is held, but the image of a dove placed in its centre. Gathering the freshly-opened flower, and pulling apart its alabaster petals, there sits the dove; its slender pinions droop listlessly by its side; the head inclining gently forward, as if bowed in humble submission, brings the delicate beak, just blushed with carmine, in contact with the snowy breast. Meekness and innocence seem embodied in this singular freak of nature; and who can marvel that crafty priests, ever watchful for any phenomenon convertible into the miraculous, should have knelt before this wondrous flower, and trained the minds of the superstitious natives to accept the title, the "Flower of the Holy Ghost," to gaze upon it with awe and reverence, sanctifying even the rotten wood from which it springs, and the air laden with its exquisite perfume? But it is the flower alone I fear they worship; their minds ascend not from "nature up to nature's God;" the image only is bowed down to, not He who made it. The stalks of the plant are jointed, and attain a height of from six to seven feet, and from each joint spring two lanceolate leaves; the time of flowering is in June and July.—*J. K. Lord's "The Naturalist in Vancouver Island."*

The Tulip.—It is related that a sailor, having taken some goods to a Dutch merchant, had a herring given him for his breakfast; but seeing what he supposed to be a kind of small onions lying on the counter, the tar carelessly took up a handful, which he immediately ate with his dried fish. These proved to have been tulips of so much value, that it was estimated a magnificent breakfast might have been given to the heads of the Dutch government for less expense than the cost of the sauce which the sailor so inadvertently took with his salt herring.—*Flora Historica.*

Talipat Palm (*Corypha umbraculifera*).—The most majestic and wonderful of the Palm tribe is the *talpat* or *talipat*, the stem of which sometimes attains the height of 100 feet, and each of its enormous fan-like leaves, when laid upon the ground, will form a semicircle of sixteen feet in diameter, and cover an area of nearly 200 superficial feet. The tree flowers but once, and dies; and the natives assert that the bursting of the spadix is accompanied by a loud explosion.—*Tennent's Ceylon.*

Wintergreens.—In a fir-wood not far from my residence several plants of *Pyrola minor*, Lesser Wintergreen, are growing in a patch of a few yards in extent. I have examined them occasionally, three or four years last past, for the purpose of procuring specimens for friends. Last season I was somewhat surprised to find six or eight plants of *Pyrola secunda* growing in the midst of the other species. I had never observed a single specimen before. I cannot, of course, be positive that this is the first appearance of *P. secunda;* but if it is, it would lead to grave doubts about the permanency of distinction between closely-allied species. Is it possible that *P. minor*, under certain conditions, stretches out its style till it becomes *P. secunda?* for this length of style seems the principal difference between them.—*W. R.*

Fungi.—Has the past year been noted for an unusual growth of fungi? In this district (Knap Hill), immense numbers and in great variety have appeared; although, singularly enough, the common mushroom (*Agaricus campestris*) has been far from plentiful. A fir plantation, adjoining the Woking Necropolis, was especially rich in many forms of the larger kinds of fungi. On the side of a recent road cutting, and apparently springing out of the bare sand (the mycelium had probably fallen there from the top of the bank), appeared a group of the *Amanita muscaria*, some of large size, the pileus of a bright scarlet hue, and studded with white warty excrescences. Amongst the heath on the adjoining common, were found several examples of the hollow-stemmed *Marasmius scorodonius*, rather uncommon in this country. But the most remarkable form of fungus for extent, beauty, and persistency, was due to a singular cause. Rather more than two months since, the sleepers (fir-wood) of a temporary tramway, of several hundred yards in extent, and which had been down for two and a half years, were removed, leaving in the shallow trenches, portions of decaying wood. From nearly every trench, sprung up immense clusters of orange cups (*Peziza aurantia*), successive crops of which have continued to appear for two months. The earlier growths were of a dark orange red (even darker than the one figured on the title-page of M. C. Cooke's *British Fungi*); but the later ones were much paler, some being almost yellow. The fierce and sudden way in which some of the matured groups, when gathered, ejected their spores, in the form of a minute dust-shower, was very amusing.—*T. N. Brushfield, M.D., Brookwood, near Woking.*

Anacharis alsinastrum.—We may state a singular fact that has recently come to our knowledge with reference to this plant; that whereas some time since it was very abundant in the lake in front of the palm-house at Kew, it was this season all but supplanted by *Nitella flexilis.*—*Gardeners' Chronicle, Dec.* 1, 1866.

MICROSCOPY.

STEPHANOPS, &c.—Referring to your figure in December No., it may be interesting to some of your correspondents to learn that the other species of *Stephanops*, viz., *S. muticus*, was obtained in tolerable abundance by me on Hampstead Heath on the 12th of last November. At times their movements were very rapid, but they would often remain so motionless for minutes together that they might have been taken for dead, except for a slight ciliary motion which a one-fifth objective rendered visible. They were in company with the beautiful *Conochilus volvox*, which objects to confinement so strongly that it commits suicide by breaking itself up, if the "durance vile" be long continued. The glass slides having a *deep* depression in them keep it alive longest. I also obtained at the same time a remarkably abundant gathering of the more common desmids and *Volvox globator*. The filamentous desmid (*Desmidium*) may be obtained on Wandsworth Common in fine condition.—*S. J. McIntire.*

MELICERTA, FLOSCULES, &c.—It may be interesting to microscopists in search of Infusoria, &c., at this time of year, to know that I found, on the 14th of November, in a pond behind the temporary church Hampstead Fields, Belsize Lane, the following: *Floscularia* in abundance, *Melicerta*, *Hydra viridis*, *Epistylis*, *Vaginacolæ*, and many bunches of large *Vorticellæ*, &c. This, so late in the year, is interesting, and I would advise any one being in that neighbourhood to visit this prolific pond.—*G. H. F.*

VARNISH, AS AN OBJECT.—A drop of the transparent varnish used by photographers for varnishing collodion pictures, forms an interesting microscopic object. The drop should be placed upon a cold glass slide, and viewed with a power of about 200 diameters. As the spirit evaporates the varnish is broken up into small globules, which settle on the glass, and are surrounded with exceedingly minute globules, exhibiting very rapid motions, in consequence of the currents produced by evaporation. The slide should be slightly inclined at first, in order to spread the varnish, and then viewed upon a horizontal stage.—*J. S. Tute.*

FISH SCALES.—These are mounted "dry," and in balsam. If for use with ordinary transmitted light, the first method is preferable, as the balsam renders them (generally speaking) too translucent. If, however, they are required for the polariscope, they must be mounted in the latter way. Glycerine might give good results for viewing them by transmitted light, but I have no experience of this.

To mount dry.—First clean the scales by washing them in a weak solution of caustic potash, then thoroughly free them from all traces of the alkali, by repeated washings in clear water. They may then be placed flat between two glass slides, held together by clips at either end, and suffered to dry, *but without heat*, or they will curl up upon the glass being removed. When *thoroughly* dry, take them out and mount at once, to prevent any chance of their curling up again.

To mount in Balsam.—Proceed as before, but when dry, soak for a few hours in spirits of turpentine, and then mount as usual, leaving a clip upon the thin glass cover until the balsam has set hard. Chloroform and balsam answer well for these objects.

WHEAT EELS (*Vibrio Tritici*).—Several years ago a friend of mine gave me a slide containing a large quantity of these eels; he also gave me some account of their habits and character, since which I have desired to obtain specimens for my own examination; and lately, while in our corn market, I incidentally looked into a sack of wheat and saw amongst the perfect grains some black, dried-looking seed of some kind, which, on closer inspection, proved to be blighted grains of wheat, and on cutting open one and placing the contents in water found it was what I had been so long looking for. I am not intending to give a description of them. I have by me about 100 grains containing these little creatures, which are interesting microscopic objects, and I shall be glad to supply amateurs with two or three grains, if they will send a stamped addressed envelope. The grains will require to be soaked two days in water, then taken out, cut open, and the contents placed in a watch glass in water. In two or three hours after while in water they will display considerable animation by twisting about; they then, or before if desirable, may be taken out in sufficient numbers, placed on a slide, and mounted in Dean's gelatine. When this is sufficiently cooled, say from four to six hours, wash off with cold water the gelatine extending beyond the edges of the glass cover, wipe it dry with a cloth, and use the liquid varnish brush so as to make the gelatine air-tight, which will soon dry on, cover this with black asphalt, you will then have a very neat nice slide—take care that the asphalt is quite dry before you put it away; place a label on the slide and the whole business is accomplished.—*J. J. Fox, Devizes.*

MOUNTING WHALEBONE.—Mr. E. Davies recommends the steeping of whalebone for twenty-four hours in Liq. Potass.," to show the structure. I have repeatedly tried his plan without success. The result I have obtained each time has been the swelling of the section and giving it the appearauce of gelatine and the destruction of its polarizing properties. Several of my friends have tried the plan with the same result.—*G. M. I.*

GEOLOGY.

SANDSTONE MARKINGS.—At the meeting of the British Association, held at Leeds on September 22, 1858, a paper was read by Mr. Albany Hancock of Newcastle, on certain vermiform fossils found in the mountain limestone of the North of England, and which afterwards appeared in the "Transactions of the Tyneside Naturalist Field Club," vol. iv., with elaborate illustrations. Your correspondent will find in this paper a different solution for these mysterious markings to the prevailing opinion that they are "worm borings" or "worm casts." Mr. Hancock was struck with the appearance of some track-like markings on the sand of the sea-shore, which, after patient and careful investigation, he discovered to arise from the borings of a small crustacean—one of the Amphipoda—something like a common sand-hopper, but not quite so long. He watched the whole process of the little creature's operations, and saw the sand rise on its being pushed upwards by the animal's back, while the arch or tunnel thus formed partially subsided as it passed onward, and, breaking along the centre, a sort of median groove was produced. This crustacean has been named *Suleator arenarius*. The fossil markings seen on the carboniferous slabs have exactly the appearance and structure of the galleries made by *arenaria*, or such as might be expected to result from similar operations in a more coherent substance than plain sea-sand, and Mr. Hancock concludes "that if the tunnel-tracks were formed in a tenacious material, their walls would not entirely collapse, but the cylindrical form would be more or less retained. It is, therefore, fair to suppose that the sedimentary matter, as it was being deposited, would gradually find its way into these lengthened tunnels or burrows after their submergence, and ultimately fill them up; but the particles of such infiltrated matter, having a different arrangement from those forming the general mass of the rock, the phenomenon presented on breaking it up into slabs would necessarily occur—the casts of the tracks would become isolated, like the fossil remains of any organic body, or might be left in relief in either the upper or the lower slab." This very plausible theory seems to answer your correspondent's inquiry, and accounts for the character he alludes to, viz., "being in bas-relief," and that a "broken line should show at the point of fracture a *compressed circle*."—*A. W. D., Seaham.*

CLAYS are largely derived from felspars, and felspar itself has perhaps been originally derived from still older clays. Granite, gneiss, basalt, clay-slate, and some other metamorphic and igneous rocks yield clay soils on decomposition. This is owing to the facility with which the sand and other minerals mixed with the clay are carried away on disintegration, leaving the clay behind.

NOTES AND QUERIES.

SELF-DENIAL OF CATS.—In answer to "W. F.," as to the self-denial of cats in abstaining from taking young birds from the nest until they are ready to fly, I could give him many instances noticed by myself. I have a large cat, which I have very frequently seen in *this* particular *most* self-denying. I have noticed this cat attend regularly many nests, beginning his attentions soon after their commencement, and continuing it (and that most regularly) both during the time occupied in building, and also that of incubation; and having carefully noticed the cat during that time, I never once have known him to satisfy his murderous appetite until the young were just about to quit the nest; and then, one by one, the unfortunate fledglings have been carefully abstracted and devoured with the most self-satisfied air. Not only in one case, but in numberless cases, have I watched this cat, and with exactly the same result; and have upon many occasions (upon discovering the placing of the first few twigs of a nest) been obliged to tie brambles round the trunk of the tree to prevent the attentions and active interference of "Peter."—*W. A. S.*

CARMINE FOR INJECTIONS.—Let "J. B. B." try the following receipt (Dr. Carter's), taken from the third edition of Dr. Beale's excellent book, "How to Work with the Microscope:"—

Pure Carmine	1 drachm.
Liq. Ammon. fort. ..	2 drachms.
Glacial Acetic Acid..	1 drachm 26 minims.
Solution of Gelatine (1 to 6 of water) ..	2 ounces.
Water	1½ ounces.

Dissolve the carmine in the solution of ammonia and water, and filter if necessary. To this add an ounce and a half of the hot solution of gelatine, and mix thoroughly. With the remaining half ounce of gelatine solution mix the acetic acid, and then drop this, little by little, into the carmine solution, stirring briskly during the whole time.—*J. J. R.*

SKIPJACK (SCIENCE GOSSIP, vol. i. p. 69) is the *Gasterosteus saltatrix*, Linn.

WAR-BIRD (SCIENCE GOSSIP, vol. ii. p. 46).—Major Ross King, in a recently-published work, "The Sportsman and Naturalist in Canada," bestows this name upon the Scarlet Tanager (*Pyranga rubra*, Swains); but I think that the description extracted from the "Backwoods of Canada" can hardly apply to this bird.—*H. G. O.*

GRAND LORY (SCIENCE GOSSIP, vol. ii. p. 213).—I am convinced that the bird inquired about was the *Psittacus grandis*, Linn.—*H. G.*

PAGODA THRUSH (SCIENCE GOSSIP, vol. ii. p. 213).—This is the *Turdus pagodarum*, Linn., called by Jerdon *Temenuchus pagodarum*. In Madras it is called the "Brahmin's Myna," or "Black-headed Myna," and I have also heard it called "Rajah Myna."—*H. G.*

ATHELA OF BABYLON (SCIENCE GOSSIP, vol. ii. p. 214).—The ancient tree alluded to is *Tamarix orientalis*, Forsk. The Egyptian name is said to be Athlè. It is known to the Arabs as "Asul;" but Burckhart, Lynch, and others give the Arabic name as *turfa* or *tarfa*.—*Bangalore.*

MOUNTING IN BALSAM.—I am convinced by my own experience that any-one who wishes to attain proficiency in preparing microscopic objects, must rely upon himself, and not upon directions in books. The latter are often more a hindrance than a help. A "mounting instrument," a "water-bath," a "spirit-lamp," a "slider-forceps," an "air-pump," and all the other implements usually recommended, are expensive to obtain, and practically useless when got. For most purposes, a penknife, a camel-hair brush, a pin, and a candle, will be found sufficient. To follow the advice of some writers, it would require a month or six weeks to prepare the proboscis of a fly. First it must be steeped in potash; then it must be washed in water, after which it will take a fortnight to dry. Then it must be steeped in turpentine for another week, and dried again before it is mounted. To harden the balsam, the slide has now to be put "in a warm situation," where it may remain from "May till September," and then not be hard. By the plan I adopt the whole of this business may be performed in a few minutes. The length of time the object must remain in the potash will depend upon its texture; but when it is taken out of the potash, if it is washed *with turpentine instead of water*, it may be mounted immediately. The turpentine most effectually clears it of the "milky appearance," which forms the difficulty of "T. B. N." Having washed the object with turpentine until the milky appearance is gone, place a little balsam upon the glass slip, hold it over the candle until the balsam boils, then place the object in it, and put on the cover. When the slide cools, the balsam will be perfectly hard, and the specimen may at once be cleaned for the cabinet. The whole of this process, from the taking of the object out of the potash to the finish, may be performed in about five minutes. Of course, expertness at the work is gained only by experience; and every preparer will have a way peculiar to himself. The answer to James W. Impey is:—*The hardening of the balsam depends upon the amount of heat applied to it, and this must be regulated by the state of the balsam and the nature of the object.* And if "T. B. N." will wash with turpentine instead of water, the "milky appearance" will cease to trouble him.—*T. Craggs, Gateshead.*

CEMENT FOR SLIDES.—I see amongst several correspondents, J. W. Impey complains of the time balsam takes to harden; and so it will; and even after it seems hard, a very slight degree of warmth will soften it. I venture again to mention the way in which I set a great majority of objects. I put them on the slide very slightly damp, put some balsam over them, and the glass at top; and gently heat them till the water boils away: the balsam takes its place. The vapour of the water takes most of the air away, and a little manipulating with the thin glass removes the rest. This done, the balsam sets hard at once, and three or four minutes will finish the slide.

I see some of your correspondents find difficulty in dissolving india-rubber, and it is a troublesome thing to do unless they get the right kind of naphtha. If they use india-rubber which has been dissolved, they will find it easier; but it is best to buy it. Some years ago I wanted some cement to put round slides in which glycerine was used, and, for want of something better at the time, I used the contents of a bottle of preserving waterproof varnish for shoes; I found it do very nicely, and have used nothing else since. It dries quickly and tough, and doesn't peel off the glass. I cannot tell the name of the maker, but it came from 39, Queen-street, Lincoln's-Inn. Perhaps the notice of this may prove useful.—*E. T. Scott.*

TENACITY OF LIFE IN A FLEA.—A few days since one of these irritating little creatures attacked a member of the genus *Homo*, and while in the act of piercing the skin, the individual placed his finger on it, and put it into a basin full of clean water. This was about eleven o'clock p. m. Next morning it was found at the bottom of the water, to all appearance quite dead. It was then put into an envelope, and placed in the gentleman's waistcoat pocket for inspection at his leisure. An hour or two afterwards the envelope was examined, when out jumped the animal with all the agility for which the genus *Pulex* are remarkable, after having been under water ten hours. Not being an amphibious animal, I cannot understand upon what principle it could escape drowning; having spiracles and a tracheal system it would appear impossible that these should not fill with water, and thus kill the little creature; but it was not so; it still lives.—*J. J. Fox.*

MOUNTING IN BALSAM.—The difficulty experienced in mounting with Canada balsam may arise in several ways; the most probable is, that the balsam employed is *genuine* that is to say, in its *thick* state; as imported, such a specimen will not acquire solidity so rapidly as is *absolutely necessary* for the purpose. Another cause of indifferent mount may be that the vendor has diluted the pure article with commercial spirits of turpentine; and although this is to a certainty preferable to the undiluted balsam it is by no means satisfactory. If your inquirer will attenuate the *pure* balsam with camphor (a highly rectifying spirit of turpentine, until it acquires a consistence a *little less* limpid than olive-oil, he will be, as I have been, perfectly satisfied with the result. I presume its superiority is due to the increased solubility which it acquires by the addition of the camphor. I ought to observe that, having mixed as above, the compound should not be used until perfectly clear (it will become so after a few hours).—*W. R.*

BLUE BIRDS OF GALILEE.—I see that a correspondent in a late number inquired what was "the blue bird of Galilee." I suppose that fancy may be allowed some scope in the question, but as a matter of fact there are but two birds to which it can be applied—the blue Thrush (*Petrocincla cyanea*) which is scattered about the Galilean hills and glens in small numbers all the year round, and the Roller (*Coracias garrula*) which is very common over the whole country in summer only. The Sun-bird (*Nectarinia osea*) is quite out of the question. It is not blue, and it barely exists in Galilee; one or two pairs merely straggling into the neighbourhood of the Lake of Galilee. It is a bird of the Lower Jordan valley and Dead-Sea basin strictly, and even there will only be seen by those who look closely for it.—*H. B. Tristram.*

["T. G. P." writes to us again in support of his opinion that the bird alluded to by Renan, as "so small and light that it can rest on a blade of grass without bending it," must be some such small creature as *Cinnyris osea.*]

BIDMUSK (SCIENCE GOSSIP, vol. ii. p. 214), called in Persia and the gardens of Northern India, *Bedmooskh* ("Royle Illustrations," p. 345), is *Salix Ægyptiaca.*—*H. G.*

Skeleton Leaves.—The following method has been communicated to the Botanical Society of Edinburgh:—"A solution of caustic soda is made by dissolving 3 oz. of washing soda in 2 pints of boiling water, and adding 1½ oz. of quick lime, previously slacked; boil for ten minutes, decant the clear solution and bring it to the boil. During ebullition add the leaves; boil briskly for some time—say an hour, occasionally adding hot water to supply the place of that lost by evaporation. Take out a leaf and put into a vessel of water, rub it between the fingers under the water. If the epidermis and parenchyma separate easily, the rest of the leaves may be removed from the solution, and treated in the same way; but if not, then the boiling must be continued for some time longer. To bleach the skeletons, mix about a drachm of chloride of lime with a pint of water, adding sufficient acetic acid to liberate the chlorine. Steep the leaves in this till they are whitened (about ten minutes), taking care not to let them stay in too long, otherwise they are apt to become brittle. Put them into clean water, and float them out on pieces of paper. Lastly, remove them from the paper before they are quite dry, and place them in a book or botanical press."—*Dr. G. Dickson.*

Movements in Closterium.—On a recent occasion your paper contained a short discussion of the "Closterium," in which the author refers cursorily to the circulating movement observed within those plants. The character of the movements has not, I believe, been very distinctly ascertained. The motion in the two species most common in this locality differs considerably. In *Closterium rostratum* the ends appear to be freely open, the small bodies within exhibit by their movements a current flowing inwards and outwards at either end, and this constant, and not in pulsations; and the bodies themselves are, I believe, foreign, and do not in any sense belong to the plants under investigation; in fact, simply monads. In *C. striolatum*, on the contrary, there does not seem to be any communication by the ends with the water outside; but at each end may be seen an oval body, deeply coloured, continually revolving on itself, within, as it were, a closed cage, and this not freely, but as though it were attached by a cord at the inner end of its longer axis. I do not refer to the circulation to be frequently observed along the edges which appears to be independent of that at the ends to which the foregoing remarks apply. There are few objects so curious or so beautiful as these very common desmids; but they so rapidly become "quiet," when in the collecting bottle, that sedentary Londoners seldom get a sight of them in their most lively condition.—*C. F. W., St. Anne's Heath, Chertsey.*

Saws of Flies.—In addition to "J. J. R.'s" account of the saws of some flies, the vessel which runs along the saw of the *Tenthredo* deserves notice, and so does the foot. The body between the two claws in its natural condition is folded up between them, but in using becomes expanded into a beautiful kind of sucker. The whole leg is covered with hairs and spines, and is a lovely object altogether. One can see how like this sucker is to a boy's leather one in action. So unlike is it in its mechanism to the sometimes so-called sucker of a fly. A collection of the different saws and ovipositors of insects is very interesting. And besides those mentioned by "J. J. R.," I would notice the saws of the ruby-tailed fly, which resemble a key-hole saw; the dragon-fly's ovipositor; and that of a beautiful green saw-fly, which is found about the gooseberry-tree. This last is particularly worthy of notice.—*E. J. Scott.*

Confervoid Growth in Slides.—Whether "J. M. S." can apply it or not, I cannot say; but in old times when objects were put into shades without balsam or other preparation, they soon became covered with a kind of mould. To prevent it, I used to wet the object and slide with a solution of corrosive sublimate. If the solution of it in spirit of wine is sufficiently diluted, it will not crystallize so as to be noticed, but used to prove a very effectual antidote.—*E. J. Scott.*

Sanguinaria.—Mr. H. J. Bacon calls the attention of microscopists to sections of the root of *Sanguinaria canadensis* as an interesting object; but he does not state where the fresh root, which he appears to allude to, can be obtained, as it is not a plant in common cultivation.

Double Egg-Shell.—Knowing you are curious in natural-history matters, I think it may interest you to hear that yesterday I met with a hen's egg with *two* shells. The *outer* was the supplemental one, and the thickest; the inner, the natural one, and rather thinner than usual. The two were divided by a thin, damp, false membrane, similar in appearance, but differing in structure from the true membranes. My attention was directed to the fact, by finding the shell unusually hard to fracture at each end with my penknife, before sucking it. I have cracked scores of eggs before, but never met with a like case. I should like to know whether such a thing has been observed before.—*A. J. C.*

Circulating Case.—It has occurred to me that those subscribers to Science Gossip who feel interested in marine algæ might add to their collections by forming a society for the interchange of specimens by means of a circulating case. Rather more than a year ago there was a society in existence for the exchange of botanical specimens, of which I was a member. From some cause or other it failed—at least the case ceased to come to me, and I took for granted it had gone down. Perhaps the readers of this journal would communicate their mind on the subject. Should it be started I will be happy to do all in my power to secure subscribers.—*James Greer, jun.*

Preservation of Fossils.—I have a fine specimen of the tusk, teeth, and forearm bone of a large elephant, which was dug up in a railroad cutting in a bed of river gravel. The tusk has been broken, but sufficient remains to show it must have been sixteen or seventeen feet in length. It feels hard, but is rapidly diminishing from the process of exfoliation. I have well soaked it in a solution of gelatine, yet the decay continues. Should any of your correspondents be acquainted with any management to preserve the specimens it will much oblige. —*Charles Bailey.*

The Viper.—Can any of your readers say why they do not succeed, at the Zoological Gardens, in keeping the common Viper—after a few months or so they die. The last time I was in New Forest I intended to have investigated this subject, but the weather was so unfavourable that I was prevented from so doing.—*G. M.*

Halo of a Shadow.—The following singular effect, which seems to be due to diffraction, may perhaps be worthy of notice. I have observed, when in a boat on the sea, that, when the sun is shining and the shadow of the person falls upon the water, a peculiar brightness surrounds the shadow; not unlike one of those softened glories which surround some of the pictures of saints in old paintings. The same effect I have observed in strong moonlight, when the shadow was thrown upon grass covered with hoar-frost; though the effect is not so marked as it is on the sea.—*J. S. Tute.*

Preserving Fossils.—The following extract from Mansell's "Medals of Creation," may be of use to "L. F. R." (S. G., vol. ii., page 283):—

"The *broken* porous bones may be repaired by a hot weak solution of glue; and when the joinings are set, the bone should be saturated with thin glue, well brushed in, and the surface be spunged clean with very hot water before the cement is congealed." (A liquid called "Neuber's liquid glue" is an excellent cement. It is sold at 54, Oxford Street, London.)

"When the bones are tolerably perfect, but dry and friable from the loss of their animal oil, they may be made durable by saturating them with drying-oil, and exposing them to a considerable degree of heat. In this manner the magnificent skeletons of the Sloth tribe—the Megatherium and Mylodon, in the Hunterian Museum—were prepared. (The drying-oil is made by boiling litharge in oil, in the proportion of one ounce of litharge to a pint of oil.)

"For the Ichythyosauri, &c., in the British Museum, Mr. Hawkins employed a strong, watery solution of gum arabic as the cement, and plaster of Paris as the ground, using shallow wooden trays of well-seasoned wood in which the specimens were permanently imbedded: the bones, scales, &c., were then varnished with a solution of mastic, and the ground coloured bluish grey to imitate the Lias."—Vol. i. p. 46 *et seq.*, Bohn's edition.—*A. H., Torquay.*

Hare-Rabbits.—In the October number of this Journal, "G. B. C." mentions a gamekeeper catching a supposed hybrid between a hare and a rabbit. I have not before heard of a wild one being seen; but quantities are imported from Belgium by the great rabbit-fanciers. They are called Hare-Rabbits. Many gentlemen purchase them for turning loose, to improve the wild breed. They may be obtained for 15s. each. I kept three last year, a buck and two does. I found that, like other mules, they would not breed with one another; but they breed very well with the common rabbit, having seven or eight at a time. Their habits are, in all respects, similar to the common rabits.—*C. K.*

["H. S." and other correspondents who write doubtfully, will learn that the question was long since decided by the experiments of M. Rouy, of Augoulême. It can no longer be said that the rabbit will not hybridize with the hare.]

Dyeing Grass, Mosses, &c.—By using Judson's simple dyes, which can be procured at any chemist's in bottles at 6d. each with directions, "J. H." can dye grass, &c., a variety of colours without any previous preparation. I may also state that I have used the dyes to tinge animal substances (freed from grease), which otherwise were so transparent as to be almost invisible when mounted in balsam, with excellent effect.—*J. M., Barnard Castle.*

Tenacious Anemone.—On the 26th of October some sea anemones (*Actinia Mesembryanthum*) were packed in wet sea-weed in a stone jar. On the 30th I received them in good condition. In unpacking them, one was accidentally left in the sea-weed, which was thrown into a wooden bucket without any water. On the 12th of November I found the sea-weed nearly dry, except in one or two places. Whilst I was collecting it to throw it away something stuck to my fingers, which I discovered to be a small actinia nearly dried up. Wishing to try if there was any vitality left in the unfortunate animal I broke off the bit of sea-weed to which it adhered and which was perfectly dry, and put it into sea-water. In a few minutes it moved almost imperceptibly, in an hour it began to put forth its tentacles, and in the course of four or five hours it was sufficiently recovered to produce ten young ones nearly white, with the tentacles formed. The following morning the little actinia was perfectly flourishing and fully expanded.—*T. L. N.*

India-Rubber Cement.—I experienced all the difficulties named by several of your correspondents, until I adopted the following plan, which answers admirably. 1. Dissolve the caoutchouc in chloroform; 2. Dissolve the asphalt in benzole; add No. 1 to No. 2 until you find, by experiment—drying a little on glass—that the brittleness is overcome. —*G. S. R., Blackheath.*

Marine-Glue Varnish.—(In answer to "J. H. McK." and others). I have tried a mixture of *marine glue* and naphtha with very good results. It dissolves readily in the naphtha, and probably will answer the same result as the asphalt, forming a very useful cement.—*F. J. B.*

Mounting in Balsam.—Since sending my last on the difficulty experienced in getting the balsam to harden properly, I have tried baking the slides in a common Dutch oven before the fire, with perfect success. After about six hours' good baking, the balsam becomes perfectly hard and well set. The air bubbles also disappear in a miraculous way. I hope this may be of use to your correspondents.—*F. J. B.*

Milky Appearance.—The milky appearance of objects mounted after soaking in liquor potassæ is ascribed by numerous correspondents to imperfect washing. "A. B.," "T. S.," "A. M. C.," and "V. F." recommend thorough washing, first in water, and afterwards in turpentine, and then mounting in the usual manner, as described by "F. Fletcher," in Science Gossip, vol. ii. p. 282.

Scarcity of Insects.—"B. C. R." and "F. R." complain of scarcity of lepidoptera. They may possibly recollect that at the close of the summer of 1865 we had some days of *hot* weather, swarms of butterflys came out, particularly the common cabbage butterfly; also numbers of the mischievous though beautiful little white (hawthorn) moth. There was a sudden change in the weather, rain with easterly wind prevailed for some time, and, of course, as they had an untimely birth they met with an untimely end. Having observed this, I predicted a paucity of early butterflies in 1866, and have been highly gratified in finding my prediction verified, and, consequently, my cabbages flourishing, and two fine red hawthorn bushes luxuriant in flowers and foliage which in 1865 were eaten nearly bare by thousands of the tiny caterpillars of the "Little White Moth." —*H. C. R., Streatham Hill.*

NOTICES TO CORRESPONDENTS.

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

B.—The mosses are—14, *Rhyncostegium depressum*; 15, *Eurhynchium Swartzii*; 16, *Neckera complanata*.—*R. B.*

F. S.—What kind of information is desired about truffles? See an article in "Popular Science Review," vol. i., p. 496; also SCIENCE GOSSIP, vol. i., pp. 89, 139.

A. L. D.—The moss is *Philonotis fontana*, var. γ, *falcata*.—*R. B.*

C. P. C.—From the sketch your fungus appears to be *Agaricus* (*Collybia*) *radicatus*, but the rooting portion is broken off.

J. P.—*Neckera crispa*.

H. H. M.—No larva enclosed.

D. R.—We much regret to learn that H. Balls, of Reedham, has failed to fulfil the engagements of his advertisements in our columns at the close of last year. The publisher exercises all the caution that he can to prevent other than *bonâ fide* advertisements being admitted to our pages, but manifestly he cannot make inquiries into the particulars of every advertisement that is sent for insertion or the character of the advertiser.

S. J. B.—Of course it does.

J. G.—No prospectus received.

M. D.—We have never made solutions of corrosive sublimate in spirit by weight or measure; it should be very finely powdered, and we should think two grains to the ounce sufficient. It does not injure the specimens.

J. W. I.—Your parasite is *Puccinia compositarum*.

H. W. K.—The galls on oak-leaves *were* at one time regarded as fungi, were published as such in collections of fungi, and are often sent to us as "a curious fungus."

G. A. W.—We could not answer your query here, and you did not enclose full address.

E. F. W.—No one could even guess from such a description. Was it an *Amœba*?

A. L.—Certainly no improvement on the very cheap wire-clips which can now be purchased.

T. P. F. should write his queries separately, and on one side of the paper, otherwise we cannot insert them.

J. J. R. should have been quite sure that we were wrong in printing *aterrimus*, at p. 273, before calling us to account.

A. G.—Safe this time. We cannot say *when* "Groser's Beetles" will be published. It is impossible to name your foreign gasteropod from its tongue. Beetles not yet named.

B. D.—We have already figured a fountain, SCIENCE GOSSIP, vol. ii., p. 14; and yours is no improvement.

W. C.—"London Catalogue of British Plants," 4d., Dulau & Co., Soho-square.

J. A. (Mile End).—The fungus is *Agaricus ostreatus*.

J. H. G.—See p. 19 in this number. Single slides may be transmitted safely in the black millboard cases sold by all opticians.

F. HORTON (Powick). } Letter awaits you. Send correct
A. BADGER (Eccleshall). } address.

G. F. P.—The section "Mineralogy" in "Orr's Circle of Sciences," or "Weale's Mineralogy," will either of them suit your purpose: at from one to two shillings.

A. A. A.—We object to recommend any special maker of microscopes. A useful instrument may be had for £5 of more than one maker. Dr. Lankester's "Handbook of the Aquavivarium" is being revised for a new edition.

B. D.—The mycelium of some fungus, proceeding from an old stump or decayed vegetable matter.

H. G. (Bangalore).—The title of the book is "A General History of Humming Birds, or the Trochilidæ, with especial reference to the Collection of J. Gould, F.R.S.," by W. C. L. Martin. 12mo., London, H. G. Bohn, 1861.

J. A. B. is reminded that the letters which he alludes to are the initials of certain societies of which the person using them is a fellow or member. They have no relation either to academic honours or to scientific attainments, since, with scarcely an exception, money, to pay for admission and annual fees, is the only real *sine qua non*.

BANGALORE.—The Australian acacia is *Acacia dealbata*.—*J. G. B.*

J. B. L.—"Berkeley's Introduction," £1. 1s., Baillière. "Hooker's Jungermanniæ," out of print, and scarce.

J. H. C.—If he requires more than we insert in our exchanges, it must be paid for and inserted as an advertisement.

R. B.—*Bryum Atropurpureum*.

S. L. B.—A mistaken notion. Replace your camphor, or, if you prefer it, try benzine. More on the subject next month.

T. H. H.—No. 1, *Xylophasia polyodon*; 2, *Polia Chi*; 4, *Hypena proboscidalis*; 3 and 5, in too bad a condition for identification.—*F. M.*

EXCHANGES.

OBJECTS OF INTEREST, mounted or unmounted.—Send lists to A. L., 61, Buckingham road, N.

OAK-WOOD from St. Helena.—Send stamped envelope to J. Powell, 19, Burton-road, Brixton, S.

BRITISH MOSSES, named, for Foreign Shells or rare British species.—Jane S. Milne, Buckland, Faringdon, Berks.

PENCIL-TAIL (*Polyrenus lagurus*), see SCIENCE GOSSIP, vol. i., p. 230, in exchange for Barbadoes Earth or other good (unmounted) objects.—J. Webster, Hanwell, Middlesex.

MOUNTED OBJECTS, dry, in fluid, or balsam. A large variety in exchange for mounted microscopic Fungi, or other objects.—For lists, send specimen slide and address to W. Hislop, 108, St. John Street-road, E.C.

CAMPYLODISCUS COSTATUS, for any other Diatoms or Lepidoptera.—J. W. Whelan, Bank, Bury St. Edmunds.

PAULOWNIA SEEDS, unmounted, for other objects of interest.—T. Buckle, Tunbridge.

OBJECTS, sixty varieties, unmounted.—Send lists to G. W. Webb, 108, White Rock-street, Liverpool.

PELARGONIUM PETALS (mounted), for other objects of interest.—E. M., 6, Holford-square, Pentonville, W.C.

BOOKS RECEIVED.

"The Technologist." No. 5, New Series, December, 1866. Kent & Co.

"Die Entwickelung der Ideen in der Naturwissenschaft." Von Justus von Liebig. München, 1866.

"Hints on Spectacles, when to wear and how to select them." By W. Ackland. London: Horne & Thornthwaite.

"The European and Asiatic Races." By Dadabhai Naoroji. London: Trübner & Co.

COMMUNICATIONS RECEIVED.—F. W.—M. D.—E. J. S. C.—T. G. P.—D. R.—G. S. R.—J. G.—E. T.—J. P.—A. J. C.—A. L.—H. B. T.—S. J. McI.—A. M.—C. P. C.—J. S. T.—E. T. S.—A. H.—J. P.—J. W. I.—S. J. B.—E. F. W.—H. H. M.—Ehba (no name).—A. W.—G. A. W.—G. H. F.—G. M.—L. G.—H. B.—H. E. W.—W. J. S.—C. D.—F. S.—C. B.—H. E. A.—J. R.—J. J. R.—J. M.—W. F.—J. S. M.—F. S.—H. W.—A. G.—J. W.—B. D.—W. C.—W. H.—W. N.—J. M.—J. A., Jun.—J. A. (Mile End).—T. P.—W. S. G.—A. W.—J. J. F.—G. M. I.—A. A. A.—J. R.—J. W. W.—S. W. U.—G. F. P—S. B.—G. W. W.—T. B.—H. C. O.—J. M.—J. O.—B. A. J.—H. E. R.—T. H. H.—J. B.—H. W.—C. A.—H. S.—H. D. C.—F. K.—J. H. C.—S. L. B.—W. H. B.

TRAVELLERS' TALES.

"We ought not to be too hasty in casting ridicule upon the narratives of ancient travellers. In a geographical point of view they possess great value, and if sometimes they contain statements which appear marvellous, the mystery is often explained away by a more minute and careful inquiry."—Tennant's "Ceylon."

It is an unfortunate circumstance, that the necessary isolation of explorers should render them so liable to the insinuations of the malicious and the cavils of the hypercritical.

Marco Polo, Bruce, and Du Chaillu have successively suffered, in character and in prospects, from suspicions which subsequent inquiry has proved to have been utterly groundless.

Brave men are seldom untruthful, and the high qualities of head and heart necessary to form a successful explorer are rarely, if ever, combined with that meanness and mendacity which can claim credit for actions never performed, or discoveries never made. At the same time, it cannot be denied, that too many travellers have unnecessarily exposed themselves to the attacks of hostile critics by a deficient chronological arrangement of their narratives, by exaggerated statements, and a neglect to properly discriminate between mere hearsay and actual observation.

It is against the statements of the great geographers and historians of antiquity, that modern critics have specially delighted to break a lance, and condemn as more or less fabulous and untrustworthy. Upon this subject Sir Emerson Tennant has made some just observations in his work upon "Ceylon."

In recent times many of the suspected statements of ancient writers have been strikingly corroborated. The *gorillæ* of Hanno have been rediscovered, probably upon the same coast upon which the Carthaginian explorer found them; the remains of that prodigious bird, the Æpyornis, have been disinterred in Madagascar—the very country in which Eastern tradition located the monstrous *roc*, so well known to all readers of the "Arabian Nights;" and the gold-fields of California and British Columbia are situated precisely in that portion of North America in which the traditions of the American aborigines placed the *El-Dorado* of the Spanish conquerors.

It is curious that after an interval of some two thousand years, a people should still exist in Southern and Central Africa, almost exactly answering to the description which Pliny, Aristotle, and Herodotus gave of the Ethiopian *Troglodytes*. Yet the Bosjesmen of to-day have the same croaking speech, the same cave-dwelling and reptile-eating propensities. These Bushmen have generally been considered to be a deteriorated branch of the Hottentots; but I believe that, on the contrary, it will be found that the former is the purer race, and that the Hottentots, who, thanks to the Dutch Boers, are now nearly extinct, are an improved and hybrid race formed by some slight admixture of Kaffir blood.

Aristotle and others mention *four* peculiarities of the dwarfish Troglodytes, who, apparently, then dwelt in Abyssinia, a country from which they have been since driven or extirpated by the Gallas, Kaffirs, Mayintu, and other Asiatic-African races. First, *they left the sick and aged to die alone, oftentimes of hunger and thirst.* This the Hottentots did when first discovered by Europeans. Secondly, *some of them ate their parents when they attained old age.* Kingsley has defended this act as dutiful and religious, and without going quite so far, it may be

observed that the Calanti and Pœdæi of ancient India and the Battas of the interior of Sumatra did the same. Thirdly, *they fought battles with cranes*. This may have been merely a playful way of satirising their diminutive stature; but Winwood Reade tells us, on the authority of some old Jesuit missionaries, that enormous birds once dwelt in Abyssiuia, and your correspondent "B." of Melle, has observed that the Maori traditions record an analogous fact, viz., that their ancestors had to contend with (may this phrase not bear the meaning of "to hunt?") the moas and other gigantic birds which formerly inhabited the islands of New Zealand. Fourthly, *they buried the dead under heaps of stones, and accompanied these burials with loud shouts of laughter*. We nowhere read that the Bushmen retaiu these peculiarities; but how strongly these stone-heaps resemble the cairns, and these festivities, the wakes or funeral revels of our Celtic ancestors!

The traveller Bruce was very generally disbelieved when he described the "feasts of living animals" in which the Abyssinians indulge; but the literal truth of the statement has siuce been amply vindicated. Nor is the custom, barbarous as it may appear, entirely unprecedented, for a sect existed till very recently in Bengal who were "sheep-eaters," and devoured those animals piecemeal while alive; a representation of one of these people in the act of devouring a sheep, faces the title-page of the third volume of the "Proceedings of the Asiatic Society."

Most of the curious and mythical animals of antiquity really exist or have some foundation in natural history. Thus the idea of the *Mermaid* is evidently derived from the strong resemblance which the upper part of the bodies of some of the seal tribe bear to the human, and especially the female, figure; this resemblance is stated to be most fully developed in the Cow-fish of Brazilian rivers.

Again, it is extremely doubtful whether the *Unicorn*, which figures so conspicuously in our royal arms, is an extiuct animal, a rare animal, an ideal derived from the appearance of some antelope seen in profile, or from the rhinoceros. The inhabitants of Thibet assert that a creature of this character is known in the unexplored tracts of Mongolia, and the skull of an unknown animal of this type may be seen at the Museum of the African Missionary Society.

That the *Sea-Serpent* and Norwegian *Kraken*, or Gigantic Polyp, really exist, I am firmly convinced; and I think that any one who takes the trouble to read two very ingenious and interesting articles upon the subject, which appeared in Beeton's *Boys' Monthly Magazine* in the course of 1864, will become a convert to my opinion.

Eveu the *Centaurs* of ancient Greece were no myths; they were, beyond doubt, the first horse-riders. The Aztecs, it may be remembered, who had never seen a horse before the invasion of Mexico by Cortes were with difficulty persuaded that the horse and man were not one animal.

It seems also very probable that the *Fairies*, so frequently mentioned in our literature and folk-lore, were in reality the Druids and their votaries, who, driven into concealment by the persecutions of the Roman governors and the spread of Christianity, long performed their mystic rites under cover of night, in the depths of their sacred groves. The peasantry, seeing them thus engaged, would naturally regard them as supernaturals—a belief which the dread of Druidic enchantments might increase. A mingled affection for the old faith and dread of the powers of the Druids would procure for them the name of the "good-folk," so universally applied to the fays, and explain the origin of the curious legends which the native Irish so implicitly believe.

Thus, whilst the flippant and superficial condemn all ancient authors as mere story-tellers, and all ancient traditions as apocryphal, the painstaking may extract from them most interesting and valuable information, thereby exemplifying the old proverb, "that what is one man's meat is another man's poison." The works of Captain Cook and Dr. Livingstone afford examples of the scrupulous truthfulness which distinguishes the highest class of travellers. Captain Cook's charts and observations are so accurate that mariners still use them on the coasts of Tasmania and New Zealand; while it has been remarked that Dr. Livingstone, the discoverer of the vast Victoria Falls on the Zambesi River, committed the rare error of under-estimating their extent. If all travellers were as cautious in their statements, there would be little point in the practice of stigmatizing improbable stories as "Travellers' Tales."

F. A. Allen.

Voracity of the Starling.—During the snow-storm of last week, Sergeant-Major Collins, of the Dorset Militia, observed a common starling (*Sturnus vulgaris*) perched upon the top rail of a fence in the neighbourhood of the barracks. Suddenly it pounced upon something in the snow, and evidently swallowed it. The serjeant-major resolved to see what this was, and immediately shot the starling, when, on wringing off the head after the most approved style of doing execution ou these peculiar birds, what was his surprise to find projecting from the thorax of the bird thus decapitated, the sharp head and eyes with the two fore-claws of a nimble lizard (*Lacerta agilis*), three or four inches in length, which the starling had swallowed entire. The serjeant-major exhibited the lizard alive in Dorchester market on Saturday; for, strange to say, after remaining dormant for 24 hours, it revived.—*Weymouth and Dorchester Telegram*, Jan. 10.

THE BLOOD-BEETLE.

IT was in the month of October several years ago that I first became acquainted with the Blood-Beetle. It was crawling over some herbage at a very sluggish pace, totally different to the hurrying race of a Sun-Beetle across your path, or a Weevil over the leaves, and I took it up to examine it. While turning it over, I found my fingers were covered with what I at first took to be blood; recollecting, however, that none of the other beetles with which I was acquainted afforded the sanguineous fluid, I looked a little closer, and discovered a rich scarlet bead, very translucent in appearance, emerging from the creature's mouth. Upon taking up several others they behaved in the same way, and the habit appeared evidently a defensive one, although the fluid was to me perfectly harmless; it might not be so, however, to the enemies of the Beetle. This habit, together with the firm ovate appearance, and the worse than snail's pace at which it crawled along, made the insect very interesting to a neophyte in Natural History; and not knowing its name, I called it *pro tem.* the Blood-Beetle, which, perhaps, is slightly more refined than its common English cognomen, "The Bloody-nosed Beetle." As it was then rather late in the year, there was not much opportunity for discovering many of its peculiarities; it soon retired from observation, probably burying itself among thick moss or herbage. Early in January, however, it was abroad in the sunshine under the hedges, and my interest was again drawn to it. In April I noticed another curious creature—very common: it appeared to be some kind of larva. It was about ten lines in length, of a dull metallic green above and pinkish beneath, the whole body very wrinkled, and in general appearance convex. It was feeding on bed-straw; and, where one specimen was seen, plenty of others were sure to be found. It was not until I had taken several up to look at that some of the well-known fluid appeared, and the thought at once struck me that the creature was the larva of my new friend, the Beetle. It fed, too, on the same food, *Galium aparine*, and more rarely on *G. mollugo*. I at once collected the larvæ and caged them, and after a time found my suspicions correct, for they produced some very fine imagos.

This was one of my first entomological discoveries; and, like every other beginner, I felt a good deal of satisfaction at having made it myself without the aid of a book. I mention this simply as an illustration of the pleasure awaiting any one who chooses to search for it in the insect world. A few of the notes I have since made on the same species may, perhaps, prove interesting to some of our readers.

The Beetle itself is, at least round High Wycombe, the most plentiful of the larger coleoptera, being found on every bank and under every hedge; it appears also to be the most hardy, for there is probably no season of the year when it may not be seen—I have caught it in every month except December. The larvæ are to be found in April and May on bed-straws, looking when young merely like small black protuberances on the leaves. At first sight it would appear that they do not possess the usual number of prolegs or claspers—so prominent among the lepidopterous caterpillars—having apparently only one at the tail. Although Westwood mentions this as single, it is evident to the naked eye, and much more so through a glass, that it is a double one, quite as much as that of a hawk-moth larva; the other four pairs are present in the shape of small tubercles on the abdomen, and are seen quite plainly if the creature be allowed to cross the hand held up horizontally to the light each is then seen to be brought into full play in the act of walking; they are not so easily detected when it is crawling over the herbage. When seized it rolls itself up like a hedgehog, not being proportionally long enough to do so after the fashion of larger caterpillars. When alarmed, I have known it, in various instances, to emit the scarlet fluid, but it is not done so freely as by the imago. It changes its skin at regular intervals, appearing immediately after of a reddish hue, particularly about the head and legs: it gradually darkens in colour. The larva is quite as sluggish in its movements as the perfect insect.

All my specimens were buried by June 10th, but some had gone down into the earth a fortnight before. On July 4th I disinterred one or two; they were then of a very light pink colour, very jelly-like in appearance; the legs were perfectly formed, and the wings lay loosely by the side of the body, which was on its back. A small cavity had been formed in the soil in the usual way, the sides of which were made quite compact by the pressure of the body, and at one end lay the cast-off skin; the antennæ were full size; but these, like the legs, were pink, much deeper in shade than the body. On July 22nd I disinterred another almost perfect, but the body was still soft and pink, while the elytra were of their proper hue: a second specimen was still without the wing cases. The first imago emerged July 30th, and this was soon followed by the others.

The perfect insect is very ovate in appearance and firm in consisteney, the under-surface and also the legs are of a glistening metallic dark blue, the elytra are nearly black, as is also the head and thorax. It is placed in the family Chrysomelidæ, and in the genus *Timarcha*, though formerly it was called a *Tenebrio:* the specific name is *tenebricosa*, or more lately *lævigata:* the latter term is preferable, as it serves more directly to contrast it with the other species in the same genus—*coriaria*. The elytra are soldered together longitudinally; and

when they are forced open, the Beetle is found to be wingless; it is thus totally incapable of flight, and is the largest vegetable-feeding insect in England so constituted. The tarsi are very broad, and afford it the power of taking a firm hold of the herbage over which it crawls. At night it rests clinging to stems with its head downwards; they are difficult to discover in the early morning, being covered with heavy dew, and looking more like dry seeds than anything else; as soon as the heat of the sun has caused all the moisture to evaporate, they begin their peregrinations. The antennæ look like strings of small beads, very beautiful; and, when the insect is moving, they are in constant motion from side to side, tapping the ground or stem over which it is travelling, as if to test its safety. The scarlet fluid is said by Westwood to be emitted both from the mouth and the joints of the limbs; I have never, however, been able to detect the smallest particle flowing from the latter places. Country people say it is a specific for the toothache; and, having once tried it, I am inclined to believe them: I found relief from rubbing it over the tooth and gums; but, perhaps, one is not entitled to state it as a general fact from one trial.

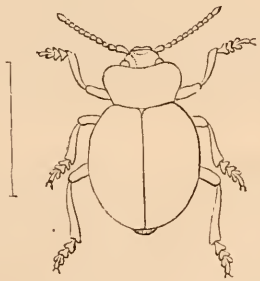

Fig. 10. The Blood-beetle (*Timarcha lævigata*).

The Blood-Beetle is often figured and spoken of in old works as the Catch-weed Beetle, no doubt from its being commonly found on *Galium aparine*.

Folkestone. Hy. Ullyett.

WHAT IS DERMESTES?

At the December meeting of the Quekett Microscopical Club, a question was asked, "What is the insect called 'Dermestes,' the hairs of the larva of which are employed as test-objects?" During the discussion which ensued, the figure in Science Gossip (vol. i., p. 230) was alluded to as being that of the larva intended. The following observations may tend to elucidate the subject:—

The Dermestidæ are a small family of Necrophagous Beetles, of which six genera, containing fifteen species, are recorded in Great Britain. This number may be reduced for our purpose to eleven species, the other four being doubtful or disputed natives. Of the foregoing, four species, including the Bacon Beetle, belong to the genus Dermestes. In this genus the larvæ are *not* possessed of the peculiar tail and tufts of hairs believed to be found on the larvæ used for microscopical purposes. This reduces the number to seven, amongst which the desired insect is to be found.

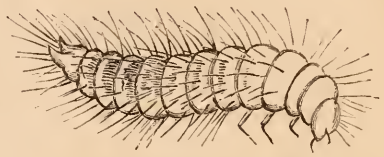

Fig. 11. Larva of Bacon-beetle.

In the genus Attagenus, Latreille informs us, the larva is long, of a reddish brown colour, and shining, clothed with hairs, those at the extremity of the body forming a tail. Its motions are very irregular, creeping along by fits and starts.

In the genus Megatoma, Professor Westwood states that in the larva the extremity of the body is furnished with two bundles of hairs, which it expands like a fan, and to which it imparts a tremulous motion, so rapid as scarcely to allow the fans of hair to be perceived while it lasts.

In Tiresias the larva is of an elongate, ovate, and depressed form, narrowed towards the tail, and, covered with long brown hairs, the terminal segment of the body being also furnished with a long brush of hair, and destitute of the two spines

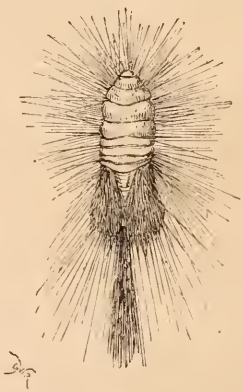

Fig. 12. Larva of *Tiresias serra*.

observed in the larva of Dermestes. It is found during the winter under the loose bark of elm-trees, in company with a small spider, which spins a web-like case, in which it resides.

Thinking that to this genus, which contains only one British species, the so-called Dermestes belonged, we forwarded a copy of Mr. McIntire's article, with its woodcuts, to an eminent authority on kindred subjects; and he refers the figure of the larva and its hairs to some species of the following genus.

Professor Westwood, writing of the genus Anthrenus, states that "in the larva state they are

most injurious in neglected museums, devouring the integuments uniting the bones, which soon fall from each other, skins, hairs, and the feathers of birds. The larva is elongate-ovate, thick, somewhat leathery in its texture, and very hairy, especially towards the posterior extremity; the jaws are very strong, and horny; the six legs are of small size. The hairs upon the body of these larvæ are arranged in small bundles along the sides, and the tail furnished on each side with a pair of tufts of larger size, which are laid when at rest upon the back; but

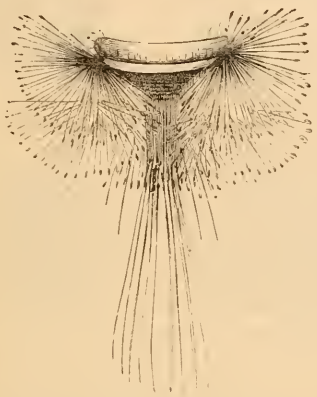

Fig. 13. Tail of Larva of *Anthrenus*, from De Geer.

when the insect is disturbed, it spreads these out, so as somewhat to resemble a shuttlecock. These hairs are of great service to the larva, enabling it to glide between the fingers when handled, as though covered with oil. The appearance of these larvæ under the microscope is very pleasing, the hairs upon the body being discovered to be furnished with still more minute hairs; whilst those forming the terminal bristles are individually formed of a series of minute conical pieces placed in succession, the base being very slender, and the extremity of each hair forming a large oblong knot, placed on a slender footstalk."

It is to this genus of Anthrenus that the larva called Dermestes at page 230 of vol. i. is referred. There are certainly three British species, but the most common is *Anthrenus museorum*.

We have given the characters of the larvæ in all the four closely-allied genera, three of which contain only one species each, under the impression that it may lead to the closer examination of those also, as it is not improbable that some of the "hairs of Dermestes" mounted for the microscope may be derived from one or other of them. It is pretty clear that none are obtained from the Bacon Beetle, or any other species of the genus Dermestes.

We take advantage of this opportunity to correct an error in the scientific name of the "Pencil-tail" (also described in vol. i., p. 230). It should have been *Polyxenus*.

THE DEATH WATCH.

In the number of *Nature and Art* for October will be found a very interesting article "concerning insects, commonly called Death Watches," by the Rev. W. Houghton. I was much surprised on reading the paper, that so many entomologists of note should have been unaware of, or altogether denying the fact of, *Atropos pulsatoria* being the author of the ominous sound that has filled so many superstitious folks with dread. Mr. Houghton says that "being anxious to ascertain whether any living entomologists had personal experience of the noise asserted to be produced by the *Atropos pulsatoria*, in the writings of some naturalists and denied in those of others, I wrote to Mr. Frederick Smith, to ask whether he had any knowledge of the matter." The subject was brought by that gentleman before the notice of the Entomological Society, "but no one had any knowledge of *Anobium*, *Atropos*, or any insect tapping," and he himself "was inclined to think that the ticking said to be caused by *Atropos pulsatoria* was scarcely substantiated, as he could not conceive it possible that so soft and delicate a creature could produce any sound whatever." (Science Gossip, Feb. 1866.) The same opinion seems to have been shared by our most eminent entomologists, as on referring to Swainson and Shuckard's "Natural History and Classification of Insects," page 357, I find that Mr. Shuckard, in describing the genus *Atropos*, says, "which contains the so celebrated book-louse, famous for its reputed ticking, whence it has also been called the death-watch; which is doubtless a fable, as it is more than probable that the noise is produced by an Anobium, for it is scarcely possible that so small and delicate an insect as the Atropos should cause so loud a sound." Mr. Westwood also, in his Entomologist's Text Book, page 307, in the article on the "Sense of Hearing," describes the noise made by the death-watch *Anobium striatum* "by beating the front of its head against the surface upon which it is stationed," but no notice is taken of Atropos; and at page 368 of the same work, in general description of the order Neuroptera, a figure of *Atropos pulsatoria* is given, the only notice concerning which is that it "is ordinarily found amongst books and papers."

On the other side we have the evidence of that celebrated entomologist Mr. Doubleday, who in a communication to Mr. Houghton says, from his own observation he felt no doubt that Atropos was one of those insects that produced the sounds in question. There is also the paper by Mr. Noble in Science Gossip for April of this year, in which the "circumstantial evidence" is very strong and almost conclusive. But from the time of Derham up to the present, no naturalist appears to have *seen* the insect in the act of producing the sound,

which has given rise to such a diversity of opinion. It is for this reason that I have brought forward these few observations, and also to give my own experience in this matter.

My first acquaintance with Atropos, or, as it is generally called here, the wood-louse, commenced about thirteen or fourteen years ago; at that time I lived in an old house in Brompton, near Chatham, and in my bedroom, which was also my library and museum, I had a very *olla podrida* of Natural History hanging about the walls; among the rest was a honey-comb. It was soon after the introduction of this to my list of curiosities that the strange ticking sound (which at the time sorely puzzled me) commenced, and that led me eventually to the investigation of the cause. I soon found that the noise proceeded from the comb, and on closer examination I saw a number of wood-lice travelling about from one cell to another, and appearing very busy in their explorations. After a while the ticking commenced, which I quickly traced to a particular cell, and by the aid of a common convex lens I could perceive Atropos beating with its head against the side of the cell, the noise produced being quite as loud as the tick of an ordinary watch; thus confirming Mr. Derham's observations, "and, viewing them with a convex lens, I soon perceived some of them to beat or make a noise with a sudden shake of their body," &c.

From this time the honey-comb, which perhaps from its peculiar sonorous nature, suited them so well, became the head quarters of Atropos, and night after night, and sometimes by day, might be heard the tick, tick, tick, by the hour together; sometimes one, sometimes two or more, ticking away with all their might, as if to out-tick each other. At any time, by carefully approaching the comb, and waiting a second or two quietly, they might with the aid of a lens be seen at their peculiar pastime. Since then I have lived in my present house, a comparatively new one, for about twelve years, and during that time have constantly heard the familiar tick from time to time, twice during this last week, October 8th and 10th. Atropos is very numerous here, seeming to prefer the mantelpiece, upon which are several vases filled with paper artificial flowers, and any night they may be seen by the dozen prying into any little crevice, or minutely surveying petal after petal of their floral habitation.

I hope I have thus assisted to settle the much-vexed question of *Atropos pulsatoria*.

W. Chaney.

Edible Larvæ.—Dr. Livingstone states that in the valley of Quango, South Africa, the natives dig large white larvæ out of the damp soil adjacent to their streams, and use them as a relish to their vegetable diet.

WHAT'S IN THE HONEY?

Mr. E. GILL has called our attention to a series of sketches, which he has made at different times, of the objects found by him, not only in Jamaica, but also in English honey. The

Fig. 14.

Fig. 15.

Fig. 16.

Fig. 17.

majority of these objects are certainly pollen grains, and that our readers may have the opportunity of forming their own opinion on the subject, we have figured a number of those derived from English

Fig. 18.

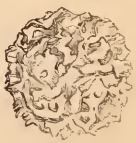

Fig. 19.

Fig. 20.

Fig. 21.

Fig. 22.

Fig. 23.

honey. It is possible that during the examination of the pollen of various plants in the coming summer, some one or other of our correspondents may be able to identify these granules with the plants from which they are derived. Mr. Gill [also

detects other forms which, from their branched and slender, threadlike character, he is disposed to regard as the mycelium of fungi. There are objects of which Mr. Gill writes, "in placing some of this honey in water, in about three weeks very beautiful

Fig. 24.

Fig. 25.

masses of elongated cells are formed from groups of these objects. Each of the cells has divisions with four or more granules in each. The cells after breaking up, the granules being free in the water, have a slight movement, and appear in every respect to be like the parent bodies in a gradual state of development. These objects have a great resemblance to some of the Desmidiaceæ. The colours vary from deep golden to pale yellow, some of them having a faint rose tint." For our own part, we must confess that we can find in all the sketches submitted to us far greater affinities with pollen grains than any unicellular algæ.

AMIDST THE RUINS.

WE take it for granted that every person, though resident in far-off countries, has by this time heard or read of the late fire at the Crystal Palace. Two-thirds of the stately edifice fortunately remain uninjured; but the North Transept, or that portion of the building which was usually designated "the tropical end of the Palace," must be numbered amongst the things that were.

It is sad to contemplate the destruction of unique and costly works of art, very many of which are beyond the power of money, or even human skill, to reproduce; quite as pitiful is it to see trees, shrubs, and flowers, that were brought from tropical countries, at an incalculable outlay of capital and labour, reduced to dust and ashes; yet I assert without fear of contradiction that it is ten times more harrowing to gaze upon the black and cindered remains of all sorts of living things, which we know were roasted alive, like human martyrs were wont to be, chained to stakes, or so securely fastened into cages of iron as to forbid the faintest chance of escape from the greedy flames.

Thoughts akin to these passed through my mind as I wandered, with saddened heart, over the ruins of the tropical department, a short time after its ever-to-be-lamented destruction. It may interest you, courteous reader, to follow me in fancy, as I briefly recount my stroll amidst the ruins.

It will be as well, perhaps, in the first place to recall to your remembrance that the Crystal Palace building, above the basement floor, consists of a central nave, two side aisles, two large galleries, three transepts, and two wings; that it is constructed principally of iron and glass. We must except in this general statement a considerable portion of the west front, which is made up of wood panelling. The extreme length of the building is 1,608 feet: add to this the wings, each 574 feet, and the colonnade, which is 720 feet, and we get as the total length of the palace 3,476 feet, or, in round numbers, nearly three-quarters of a mile. It is rather startling to think so large a piece of ground, should be completely covered in by a roof of glass.

If all the columns employed in the building and wings, were laid end to end in a straight line, the distance covered would be sixteen miles and a quarter. The weight of iron used in the main building and wings, amounts to the incredible quantity of 9,641 tons, 17 cwt., 1 quarter.

The superficial quantity of glass used in this monster edifice is 25 acres, and its weight 500 tons. If the panes were laid side by side, they would extend a distance of 48 miles; if end to end, 242 miles. The bolts and rivets weigh 175 tons, 1 cwt., 1 quarter; and the nails employed for a variety of purposes 103 tons, 6 cwt. All this is apart from the colonnade, which has a superficial area of 15,500 feet, and has in its construction 60 tons of iron and 30,000 superficial feet of glass.

The plan practised for raising the temperature of this mammoth building is by using hot water. The pipes for the conveyance of the hot water, run in all directions underneath the floor of the building and wings; these pipes, if arranged in a straight line, would reach to a distance of more than 50 miles, and the heated fluid flowing from and returning again into the boilers, travels one mile and three quarters. When all the fountains are playing, 11,788 jets are in operation, throwing 120,000 gallons of water per minute. A single grand display of the fountains consumes 6,000,000 gallons of water. The towers at each end of the Palace, built by Mr. Brunel for the purpose of raising the tanks for the supply of the fountains, contain 800 tons of iron in their substance; the tanks are calculated to hold 357,675 gallons of water. The engine-power required to do all the work is that of 320 horses.

Having refreshed our memories with this brief summary of statistics, we will quit the grand central nave and enter a door beneath the large screen that shuts off the tropical end from the rest of the building. On our left, we first notice scattered masses of coloured arabesque and mosaic work, splintered columns and damaged walls—all that remains whereby we can recognize the once splendid Alhambra, the Hall of the Abencerrages, the Court of Lions, and Tribunal of Justice.

As we scramble about over broken mouldings, and

fragments of masonry, threading our way through the shattered palace of the Moors, we unexpectedly arrive at a heap of arms and legs, bodies without heads resting by the side of others whose faces are so battered and bemauled, that recognition is impossible; some are clad in chain-mail, others are draped in priestly vestments, and very many are not clad at all. By a little play of fancy we might easily suppose all the statues must have recently gone in for a sanguinary battle, and that we had stumbled upon the remains of the fallen, gathered together, awaiting the grave-digger. We find, however, on inquiry, the workmen bring all the odds and ends they discover, and deposit them at this spot.

A short distance further down the ruin, brings us beneath the two colossal figures from the Temple of Rameses the Great, at Aboo Simbel, in Nubia. Towering sixty feet above our heads, their monstrous features, never very comely, are so altered by the action of fire, that one might readily suppose two sinful giants had been made to suffer death by fiery martyrdom. A friend of the writer's, who was present at the time these figures were partially burnt, observed a column of flame pour through the tops of their heads, giving to them the quaint semblance of wearing plumes of fire. We scramble past the avenue of Sphinxes, or rather where it was once shaded by plants of the stately Papyrus, the leaves of which, in bygone times, supplied the Egyptians, as well as other nations, with sheets whereon their manuscripts were inscribed; here, where we now tread, grew the Sabal Palmetto, Cocos, Wine Palms, Date Palms, Cabbage Palms, immense ferns, the Cinnamon, Peruvian Bark, and Tea-tree. We can likewise remember the silvery-leaved Looking-glass plant, and the graceful Black Bamboo, a shoot of which has been known to add twelve inches to its height in a single day. Not far from us, the great Palm-tree, from the Isle of Bourbon, forty feet high, spread its feathery fronds alike over the Ficus Roxburgii, which bears its figs on the stem close to the ground, and the Mahogany-tree from Honduras. We may not tarry to recall many other species of rare and beautiful plants, mostly of Eastern growth, no trace of which remains save the black dust beneath our feet. Where is the Nineveh Court? Why, all that remains of it is to be found in that heap of fragments before us. The stupendous winged bulls, with their uncanny faces and impossible beards, are now blackened, headless, wingless trunks; and the giants, together with the lions they were for ever strangling, lie buried beneath the gorgeous ceilings, richly painted cornices, and sculptures graven with arrow-headed inscriptions, that covered the walls of the Assyrian hall. As we cross over to the opposite side of the ruin, we note that Monti's fountains are not so very seriously damaged, although the pond surrounding them is dry and filled with dirty rubbish—broken glass and iron; and we learn with sorrow, from a man at work there, that the poor little fish were nearly boiled alive in the miniature lake, in which scores of them had grown from infancy to a goodly maturity. And now we are at the spot whereon the Mammoth-tree stood, known to botanists as *Wellingtonia gigantea*. It was the bark only that represented the tree which stood when alive, in California, and was about 400 feet in height. I have often stood beneath the shadows of these forest monarchs in California. The best plan to realize mentally the average height and size of these stupendous trees, is to look at the monument on Fish Street Hill, and picture in your mind what a grove of trees must look like, every one of which is taller, and many of them equal to the Monument in girth. When Lady Franklin visited California, only a few years since, Archdeacon Wright read the morning service to a numerous congregation; his church was the stump of a single tree, this stump is sometimes used as a ball-room on festive occasions. Each tree has some fanciful name bestowed upon it:—Hercules is 326 feet high, and 97 in girth; the Hermit is 320 feet high, and 60 in girth; the Old Maid, a substantial, portly lady, is 266 feet high, and 60 feet round her waist. Addie and Mary are buxom damsels each in height about 300 feet, and in circumference over 60 feet. The most forlorn looking of the group, with rents in his bark, and a general air of seediness and shabbiness, is the Old Bachelor, 300 feet high, and 70 feet in girth. We fear this representative of the Mammoth-trees, burnt in the Crystal Palace, will never be replaced. The cost of removing the bark in narrow bands, or rings, was enormous; and the transport of so bulky a matter from California to the United States, and thence to England, was far greater than any company or individual will be likely ever to outlay a second time.

Not far from the site of the tree, just a little to our left, the brilliantly-plumaged Cockatoos and Macaws passed their lives, dividing their time pretty equally betwixt screaming, eating, and coaxing philanthropic visitors to scratch and tickle them. How very sad to recall the fact to our minds that these poor birds were literally, and not in mere figure of speech, roasted alive whilst chained to their perches; we can almost in fancy, even now, hear the piercing screams of the imprisoned Monkeys, and the frantic cries of the Chimpanzee, as they clutched hold of, and in desperate agony hurled themselves against, the iron bars of their cages until the iron grew too hot to hold, and suffocation put an end to their miseries. Here, too, resided the "happy family" of opposites; in one cage, living amicably together, were cats, rabbits, Guinea pigs, and the delicate musk-deer from Java—as they had lived so they died, to the last unable to part company. Nightingales that were wont to make the building vocal on summer evenings with their

mellow notes, together with Mocking-birds from the States; Canary birds direct from their native islands; Finches, rare and curious, from Australia and Tasmania; Grosbeaks from North America; Sparrows from a variety of localities; a case of Doves presented by the late Lola Montes; the Zebra, and other exquisitely-plumaged Paroquets, talking Parrots, together with the ingenious little weaver-bird, were alike devoured by the greedy flames. A few only were set at liberty, the greater number are burnt; Blondin's present, a Florida Parrot, was saved from death by smoke and fire through the kind interference of his Grace the Duke of Sutherland. The baby Hippopotamus had his residence not far from where we now stand; the most strenuous efforts were made to rescue the quaint little beast, though in vain; the fire ruthlessly did its work, until at length the floor of the animal's dwelling gave way with a crash, and through it went the half-roasted hippopotamus; we can see for ourselves where its remains were subsequently dug out. The poor little fellow was discovered lying on a printing-press, its appearance bearing a comical resemblance to that of a huge sausage over-fried.

We could willingly have lingered very much longer "amidst the ruins," but time and space forbid. We could have contemplated with interest the remains of the class-room and its adjoining orangery, where 110 orange-trees grew and throve, some of them 400 years old, once the property of the late Louis Philippe, and originally brought from his château of Neuilly—their loss is irreparable. The school of art, the reading-room, and library, wherein was burnt a valuable collection of rare books, the rarest of them all, perhaps, the copy of "Das Neue Testament," which was printed in 1851 for the King of Prussia, 25 copies only of which were ever struck off. The ruins of the Byzantine court, too, would have amply repaid us, could we have rambled over its remains to recall and chat about the many interesting incidents connected with the statues, models, and various works of high art that flourished from the 6th to the 15th centuries. Every part of this splendid court was replete with interesting relics, now little other than charred, broken, shapeless fragments, destroyed by the withering flames beyond every possibility of restoration.

It would take a good-sized volume to contain a detailed account of all the treasures consumed in this disastrous fire. We have certainly one consoling thought as we shut the door upon the chaotic heaps and piles, and inextricable confusion of smashed glass, twisted iron, broken columns, masses of masonry, and fragments from Moorish, Assyrian, and Byzantine structures, mixed with, and half-buried in, the dust and débris of a miniature tropical forest:—no human being perished in the blazing pile.

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

ON THE EXAMINATION OF MELICERTA WITH HIGH POWERS.

My attention was drawn to these interesting objects for the microscope by finding, in October last, a colony of them on some weed, taken from a pond in the Hampstead Fields, near the Swiss Cottage. A bath, 3 inches by 2, and ½ inch wide, was constructed for their accommodation, and placed on a shelf in the window, in front of a binocular, provided with a 1-inch power. The intention was to watch their reproduction; but though they increased rapidly, and the commencement of the tube was frequently seen, in other respects this effort was unsuccessful.

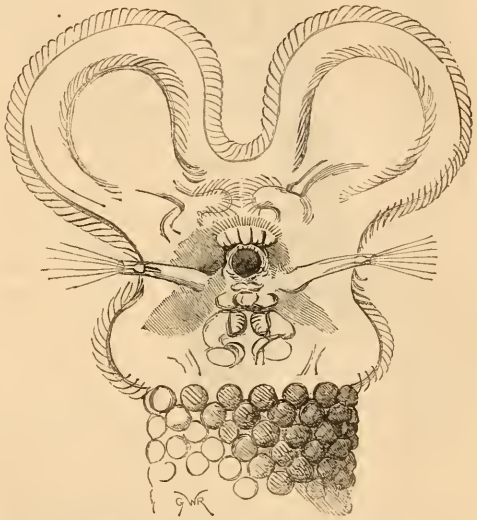

Fig. 26. *Melicerta ringens.* Front View of the Disc.

A fine specimen very near the front glass formed an inducement to try a $\frac{4}{10}$, but it proved just beyond the focus; so a smaller bath was made, having a front of thin microscopic glass, and a space of about $\frac{1}{8}$ of an inch between the slides.

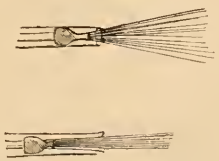

Fig. 27. Sheath-like character of the horn.

In this several bits of weed were placed; and when a specimen happened to be in a favourable position, near the first glass, the $\frac{4}{10}$ worked excellently. But the whole affair was clumsy; and it was soon abandoned for another, formed entirely of thin glass, with a space of the $\frac{1}{16}$ of an inch

between the surfaces, and with this success commenced. A specimen, once inserted between the glasses, could be kept in good working order for several days, a power of $\frac{1}{4}$ employed, and the condensers brought to bear with great convenience. Added to this, the bath was readily reversed, and that without danger to the object. The slimness of the glass also proved of further value, as, in consequence of its flexibility, the sides could be brought into contact without fracture!

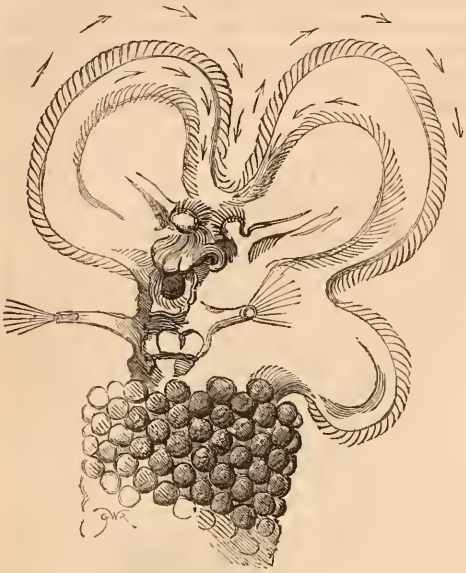

Fig. 28. Disc of *Melicerta ringens*. The arrows show the direction of the currents.

On using the $\frac{1}{6}$, my attention was immediately drawn to the great extent of the ciliated surfaces; the whole of the upper portion of the creature seemed to be alive with their action. Not only were the lobes fringed with cilia, but a second row was found to exist on the inner surface of the two upper lobes, the action of which was for some time mistaken for currents of water. This inner series is in connection with the two finger-like valves, which protect the entrance to the gullet; and its especial office is to pass forward to them all particles brought within its influence; these are then inspected by the cilia covering the valves, and if considered fit, are allowed to enter the passage leading to the gizzard. From this a ciliated surface extends to the lintel or chin over the mould; its action creates a strong back current, by which all that is unfit for food is thrown off, with the exception of certain particles, which appear to be selected for the pellet; these are directed to a side-channel leading to the mould. Here the cilia are again seen in full activity—its hollow may be said to be lined with them; and it is by their action that the spinning motion of the pellet is set up and continued.

The following drawings will serve to assist the description:—Fig. 28, exhibits the inner row of cilia, the action of which is indicated by the arrows. The finger-like valves are shown; and over the mould is seen, in profile, the surface by which the back current is produced. Fig. 29 gives a side view of this surface (*a*), the direction of the current being shown by the arrows; and the channel leading to the mould is seen at *b*.

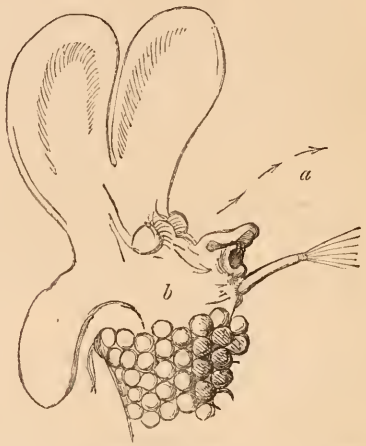

Fig. 29. Profile of disc of *Melicerta ringens*.

It is very possible that all which has been described has been noticed before, but it is equally possible that it has never been so clearly and continuously observed. Nothing that I have ever seen has surpassed the definition of the mould under the $\frac{1}{6}$, assisted by the condenser; the eye seemed to enter within its walls, and there to witness the coming in of the first particles after a pellet had been deposited. Curious, indeed, was the action of the cilia, playing like fingers, with the nucleus, and turning it first in one direction and then in another till the rotatory motion was commenced. My pleasure was indeed of the highest degree; and this paper is written with the hope that it may be the means of adding to the pleasure of others, and not only this, but that, while contemplating these wonders of creative power, our minds may bow in silent adoration of that Great Being for whose pleasure more especially "they are and were created."

The manufacture of this kind of bath is so simple that a few instructions are added, by which any one of moderate ingenuity may make several in the course of an hour or two.

The requirements are a stock of thin glass, a sharp *writing* diamond for cutting it, and a tin trough in which to melt some of the best red sealing-wax. Cut first a piece of glass about 2 inches

by 1½, then another piece ½ inch narrower, the extra size of the first being required as a ledge, on which to drop the water or rest the object previously to inserting it between the glasses. Now prepare a piece of cardboard or cartridge-paper, half an inch less in width than the length of the bath; this is to be placed between the two glasses, and withdrawn after the bath is complete. Upon its *thickness* depends the *depth* of the water between the glasses; and, therefore, if a high power is to be employed, cartridge is better than cardboard.

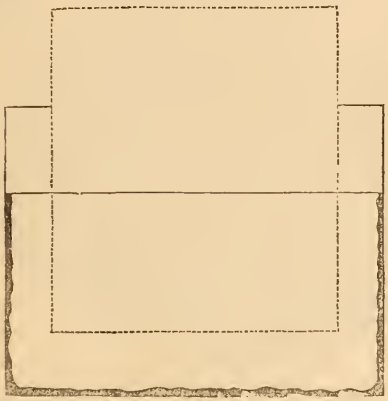

Fig. 30. Cell used in the observation of *Melicerta* with high powers.

When all is prepared, and the wax melted, the edges of the glasses which project beyond the cardboard are to be dipped into the wax, which soon forms a union between them; and in a few minutes the card may be withdrawn, and the bath is ready for use. It should then be filled with water by a dipper, and a specimen selected for insertion. Before doing this, it is advisable to remove as much of the weed as possible, so that the piece which is left may be flat, or it will not pass between the glasses. This is effected by first resting it on the projecting ledge, and then moving it gently forward with a needle or any thin object, till it is fairly positioned for observation. The water evaporates slowly, and must be renewed occasionally with the dipper. The peculiar advantage of this bath in the case of *Melicerta* consists in the free supply of water, as without this these delicate creatures will close or work so fitfully that sustained observations are impossible. It would also be found highly valuable for Zoophytes, or any creatures of a similar character. N. E. Green.

[The above is an abstract of a paper read at the Quekett Microscopical Club.]

Pliny tells us that Cato of Utica was one time reproached for selling poison, because when disposing of a royal property by auction he sold a quantity of Cantharides at the price of 60,000 sesterces.

RHIZOSOLENIA.

A CURIOUS genus of Diatoms was introduced to notice by Mr. Brightwell in the sixth volume of the *Microscopical Journal*. This was called Rhizosolenia, and with a view to its better acquaintance, we have given figures of two species, and a brief summary of the rest.

Five British species are on record, and besides the singularity of their forms, they are remarkable for being only found in the interior of marine animals, chiefly Ascidians. *Rhizosolenia styliformis* is figured to the left hand (fig. 31), that on the right being *Rhizosolenia imbricata* (fig. 2), so named from the imbricated appearance of the valve. *Rhizosolenia setigera* has a terminal bristle, sometimes nearly as long as the frustule. *Rhizosolenia alata* is a curious little species, with a short bristle seated at the base of the hood-like cap which ends the frustule. And *Rhizosolenia robusta* is more anomalous in its form, being broad, somewhat sigmoid, and terminating at each extremity in a short bristly point. The latter was found by Mr. Norman in Ascidians from the northern coasts of England, the rest were all found by Mr. Brightwell. We should be glad to hear from any of our correspondents who are fortunate enough to meet with specimens of these rare and singular Diatoms.

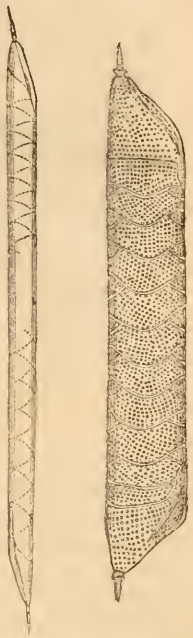

Fig. 31. Fig. 32.

The Plane-tree.—Pliny records the particulars of several remarkable plane-trees, and tells us of one in Lycia, that had a cave or hollow in the trunk, which measured 81 feet in circumference, in which were stone seats covered with moss; and that Licinius Mutianus, when consul, with eighteen of his friends, used to dine and sup in the cavity of the tree, the branches of which, we are told, spread to such an extent, that this single tree appeared like a grove; and this consul, says our author, preferred sleeping in this hollow tree to his marble chamber, where his bed was composed of curious needle-work, and canopied with beaten gold.—*Sylva Florifera.*

FORAMINIFERA IN CHALK.

I HAVE for some years past successfully practised a simple method of obtaining Foraminifera, &c., from chalk.

Fig. 33. Gravesend Chalk.

As many persons are desirous of obtaining a good supply of these interesting objects, the following directions may prove useful.

Having procured a lump of fresh chalk, break it into pieces of about the size of a large walnut; then, with some heavy instrument, *crush*, not pound nor grind, these pieces into a coarse powder; when a sufficient quantity (say one or two pounds) has been thus prepared, either pass it through a sieve, or remove the large pieces, crush them, and return them to the powder; next procure a piece of stout calico, into which place the chalk, and tie it up as a housewife would a pudding. A large vessel of clean water should now be obtained, and the crushed chalk, having been allowed to become saturated with the fluid, the bundle should be kneaded, *in the hands* only: the contents will soon become a thick pasty mass, the milky water gradually ooze through, and the bulk of the chalk become considerably diminished. From time to time, after allowing the fluid to drain off, the cloth should be untied, and retied closer to the mass, and when the contents are reduced to about one-third, or less, of their original bulk, all large pieces of chalk, portions of spines of Echini, &c., should be removed, as the attrition of these hard bodies would greatly injure the delicate and beautiful little fossils.

When the greater portion of the chalk has escaped through the cloth, much greater care must be used, and at last the bag should be merely shaken, until the water which flows from it is almost clear; the contents of the cloth may then be transferred to a bottle of clear water, which should be violently shaken, the organisms occasionally allowed to subside, the milky fluid poured off, and fresh added: this operation to be repeated until the water remains clear when agitated. The white powder should be dried and sifted; the coarser will be found to consist of minute corals of great beauty, sponges, shells, and the larger foraminifera, &c., and the finer of the smaller foraminifera, &c.

So far from this apparently rough mode of proceeding injuring these delicate organisms, the majority of even the most fragile are quite uninjured: this, no doubt, is owing to the semifluid contents of the bag not being allowed to escape too quickly; if too coarse a cloth be used, not only do the more minute fossils pass through, but the softer part of the chalk being at the same time removed, the hard pieces of some portions of shells and spines would be brought into a more immediate contact with these minute bodies, and their inevitable destruction would be the result. The operation is

Fig. 34. Chalk of Meudon.

a tedious one, not more so, however, than the preparation of most microscopic objects, and the result will richly compensate one for the pains bestowed,

Fig. 35. Chalk of the Isle of Möen, Denmark.

as a vast number of beautiful forms are obtained. Some practice is required, a little judgment must

Fig. 36. Chalk of Cattolica, Sicily.

be exercised, and the result will vary, according as the chalk used is prolific of fossils, or otherwise.

I have now before me sixteen small boxes, containing as many different kinds of shells, spines, &c., one holding about thirty sorts of corals, many of exquisite beauty; the whole of these specimens, weighing with those not yet sorted nearly one ounce and a half, were obtained from about one pound weight of chalk. I have also another box of small foraminifera, prepared from a like quantity of chalk; these are equally beautiful, but weigh somewhat less than 3 drachms, and no corals can I find. It must, however, be very poor in fossils, if 2 lb. of chalk do not yield a sufficient quantity to satisfy any microscopic observer. Edward H. Robertson.

[*Note.*—The woodcuts, Figs. 33 to 36, from Figuier's "World before the Deluge," were kindly placed at our disposal by Messrs. Chapman & Hall.]

SPIDER'S NEST.

A SPIDER'S nest of an unusual kind has been built in a peony bush, this summer in my garden. A description of it may possibly interest some of your readers.

It is a conical bag of fine close web, nearly four inches long; the point rested in a crutch of five leaves, two of which, of equal size, about two inches long, were fastened up the back of the bag; the three smaller leaves were attached slightly to the front of the bag *only* at the bottom of each leaf.

The top, or mouth of the bag, about two inches in diameter, was kept open in a perfect circle by strings of strong web, fastened to leaves an inch or two off. From those leaves more web was stretched to leaves or branches, and repeated until the supports, woven sideways, upward, and downward, spread over the bush sixteen inches square or more. When this was finished, a triangular piece of thick web, like the bag, was woven on the top, reaching about one-quarter of the circumference, and stretched and suspended like a beautiful arched canopy over half the mouth of the bag; when that was completed, another was woven by the side of it, and suspended in the same way: consequently the mouth of the

bag was so covered that nothing could fall in; but the canopy was not closed down along the front half of the bag by nearly an inch.

A leaf was then drawn down on the canopy, and woven over about half-way down the leaf; in like manner five other of the surrounding leaves were woven down, and made a perfect cover. The edge of the canopy was then let down, and woven to the other half of the bag. I suppose he had shut himself in, for I saw him no more. He used to sit on the edge of the bag, under the canopy, but if I stooped or moved a hand toward the nest he darted instantly to the bottom. Snails used to get under the shelter of the nest; I frequently removed them by passing my arm under the bush, but it was not possible to do that without breaking some of his ramifications.

After it had been closed about three weeks I cut off the branch and brought it in-doors, but was prevented attending to it until the surrounding leaves had become dry. When I moved them the spider lay dead outside the nest: on removing the three small leaves at the point of the bag there was a small hole through which I imagine he must have come out. I cut the bag from the point upwards; it was quite empty for more than two inches. I cut another inch and a half, and found a bag fully an inch long, and nearly as wide, suspended by twelve arms of close web to the outer bag or nest. I then cut the inner bag: it was with difficulty that a sharp pair of scissors went through it, it was so remarkably tough. As soon as an opening was made, a young one ran out, but soon returned into the hole, through which you may see a bunch of little black things huddled together. Perhaps they have hatched before the proper time, through being indoors; at present they keep quiet in the nest.

The old one was what may be called a fierce repulsive-looking creature (though I do not like to call anything so), nearly black legs, strong and hairy, and brilliant eyes.

I saw a nest of the same kind in a bush four or five feet from the ground about the year 1816, and have wished to meet with another, but have not seen one till now; therefore I conclude they are not common. No mention is made of it in "Homes without Hands."

Streatham Hill. H. C. R.

Anobium.—M. Peignot mentions an instance, where, in a public library that was but little frequented, twenty-seven folio volumes were perforated in a straight line by one and the same larva of a small insect (*Anobium pertinax*, or *A. striatum*) in such a manner that on passing a cord through the perfectly round hole made by the insect, these twenty-seven volumes could be raised at once.

FRESH-WATER STICKLEBACKS IN SEA-WATER AQUARIUM.

It is perhaps undoubted that sticklebacks (*Gasterosteus aculeatus*), born and bred in fresh water, are able to live, apparently without inconvenience, in sea water. It may, however, not be uninteresting to some of the readers of Science Gossip, to hear a short account of an endeavour to establish fresh-water sticklebacks in a marine aquarium. Without fish of some sort, an aquarium lacks one of its greatest attractions; but to keep them, it needs not only a well-constituted balance of animal and vegetable life, but also a careful selection of the sorts of animals. As the aquarium of which the following account is written is not near the sea, difficulty is found in obtaining salt-water fish; and the innumerable fresh-water sticklebacks in the mill-streams near Newport suggested the plan of introducing some of them to the society of their foreign brethren. My aquarium has now been in existence for some fourteen months, and until the 29th September last without any change of water. In this respect it has been more successful than any that I have previously had. I believe that very much depends on obtaining thoroughly pure water to begin with.

During the last year, I have on several occasions placed fresh-water sticklebacks in the aquarium. Once I put in, I think, five, and the next morning only one was to be seen—and that one dead in the arms of an anemone. The same day I put in another seven, and afterwards five or six more, and similar numbers at other times, but always with the same result,—none survived the second day, and most of them disappeared after the first night. After the new sea-water had been placed in the aquarium, I obtained five sticklebacks of different sizes, one a tiny fish not more than half an inch long, and the other four varying from one inch to an inch and a half; two of these I placed at once into a basin of sea water, and the other three into a basin of fresh water, to which I gradually added sea water. As they seemed to be perfectly at ease in their new element, I transferred them on the second day to the aquarium, and I then sat myself down to watch, to see if I could discover the enemy that destroyed these brilliant little fish.

Within a very few minutes one of two prawns (*Palæmon serratus*), which were in the aquarium, came from its hiding-place, and with great eagerness began searching for the new comers, whose advent was, I suppose, announced to it by a strange and delightfully new "fish-like smell." It soon found one of my little ones, and, seizing it with its nippers, was carrying it off to kill and eat, or rather, I expect, eat and kill, when I came to the rescue of my pets and sent the crystal dragon jerking away.

It was, however, of little use to stand on guard with my knitting-needle, I could hardly shield the whole five from harm; and to divert the attention of the enemy I dropped large pieces of meat into its claws, and so for a time succeeded in quieting him. Being then called away I could only leave my poor fish with too sure a dread that havoc would be made amongst them soon.

Returning a few hours after, I found that one fish was missing, and although I could not see any remains of it either in the jaws of the prawn or in the aquarium, I had little doubt now as to the secret of the disappearance of it and its predecessors, and soon I had conclusive proof. I came suddenly upon Master Prawn greedily eating another of the fish, quite a third of it being already nibbled up. Each day has seen another fish victimized, and this evening I could not find the last solitary survivor, and so must conclude that all have vanished in the same way. I do not believe that a single fish of this last lot was caught by an anemone, although my anemones of each kind have been widely expanded—luxuriating in the new water. Even the fish whose body I found in the grasp of an anemone was, I think, either driven to its fate by the pursuing prawn or was dropped dead into its clutches. I account for the more rapid destruction of my previous lots of fish by the fact that there were then nine or ten prawns in the aquarium.

I have given thus full an account of my trials and failures, because to my mind two things are pretty well proved—first, that sticklebacks will live and thrive in sea water; but, second, that if you wish to keep them, you must either not have prawns with them, or else select very young prawns, and sticklebacks of a superior size and strength to them. I should be very sorry to banish prawns from my aquarium, as they are both handsome and useful,—handsome in their varied movements, and in their amber crystal bodies heightened with gold and brown at the joints, and exceedingly useful as seavengers.

Before concluding, I should like to ask if any philosophical or other reason has been found out wherefore some few fresh-water fish will do well in sea water, whilst the greater number, I believe, perish almost instantaneously. F. S.

The Bereaved Dog.—A poor disconsolate dog has been wandering about the scene of the late catastrophe in Regent's Park, disdaining all food, and refusing to be comforted. His late master was undoubtedly one of the drowned, but hitherto the animal has owned no one, and is owned by none. He excites pity from all who are led by curiosity to the spot, not only on account of his faithfulness, but from his intelligent appreciation of his loss, and the manifestations of his grief.

ZOOLOGY.

A Prolific Anemone.—In October, 1866, a brief paragraph was inserted respecting a prolific anemone, *Sagartia Bellis*, which I then had in my aquarium. In the paragraph referred to it is stated that the anemone had at one birth produced upwards of 100 young. I have now to state that in the following week it produced about 150 additional; about four weeks after that it added 50 to the number of its young; and in the month of December it again increased its numerous progeny by giving birth to 50; immediately after which it sickened and died. It had lived healthy and well in my aquarium for about four years.—*T. P. Barkas, Newcastle-on-Tyne.*

The Edible Bird's Nest so much prized by the Chinese for making soup (and of which I have several specimens) resembles a mass of fibrous isinglass matted together, and forming a small shallow cup which the bird lines with feathers. Large quantities of these nests are collected in Java, the coasts of Papua, and the islands towards the north end of Australia. The material with which the bird builds this nest has always been a mystery to Europeans. Charles Waterton would not venture to hazard a conjecture whence the bird obtains it. I can however set the matter at rest. Some years ago, when passing northwards through Torres' Straits, the ship was daily anchored soon after noon, as the sun's light then began to fall on the submerged coral reefs at such an angle as to obscure them, and render the navigation dangerous. Landing on the reefs and islets in search of shells, I found at low water great numbers of the hideous looking mollusc called "Trepang," and "Beche-de-mer;" it looks like a gigantic slug, varying from 2 to 5 feet in length, and is as thick as my wrist; it is collected and smoke-dried for the China market, to be made into soup. On taking up one of these animals it is found to be covered with a *very* tenacious slime, like white birdlime, which however readily comes off the animal's skin, and floats up to the beach in long streaks with the froth of the rising tide. One afternoon my attention was attracted to a flock of little brownish, ash-coloured birds, who were busily engaged all along the edge of the rising water, and as they were very tame, I approached to within a few feet of them to see what they were doing; and could distinctly see them gathering with their beaks the white slime thrown off by the "Trepang;" numbers of them flying off with it on their beaks, and new-comers twittering and settling down at the edge of the water. The bird is a diminutive martin, and builds its nest against the face of the rock, just as the English martin constructs its mud nest under the eaves of

our houses. As these little martins, with all the swallow tribe, are insectivorous, they were no doubt collecting the exuviæ of the Trepang, not for food, but as the material wherewith to construct their nests, the slime being moist and plastic, when first thrown off, and hardening into a kind of dry isinglass when put into shape by the bird.—*H. Kelsall, M.D.*

An Eagle in Hylands Park.—On Thursday, an eagle made its appearance in Hylands Park, causing great consternation among the rooks and other birds. It was seen again the next day, and was observed to leave the ice-house clump. The keepers, expecting the rare visitor to roost in the high trees of the clump, posted themselves with guns towards dusk on each side of the ice-house, and had scarcely taken up their position when he came soaring over, and was knocked down by one of the keepers, and, with some difficulty, secured alive. It proves to be a white-tailed, or cinereous eagle (*Haliætus albicilla*). It is a bird of this year in fine plumage, and measures 7 feet across the wings. On the 11th it was alive and likely to recover from its wound, which appears to be only in the wing. I should like to know if this species is common on the Eastern coast.—*H. Wiglesworth.*

Nest of the Trapdoor Spider.—New-comers into the country which the Trapdoor Spider inhabits are often surprised by seeing the ground open, a little lid lifted up, and a rather formidable spider peer about, as if to reconnoitre the position before leaving its fortress. At the least movement on the part of the spectator, back pops the spider, like the cuckoo on a clock, clapping its little door after it quite as smartly as the wooden bird, and in most cases succeeds in evading the search of the astonished observer, the soil being apparently unbroken, without a trace of the curious little door that had been so quickly shut.—*Rev. J. G. Wood's "Homes without Hands."*

Torpidity of the Snail.—The following instance of prolonged torpidity in *Helix nemoralis* is so remarkable that I think it worth putting on record. In August, 1863, I was staying for a few weeks at Swanage, in Dorsetshire, and in one of my walks on the road between Swanage and Studland, I picked up some very pretty specimens of this species. These I put into a chip box and brought home, placing them in a drawer of my cabinet, where they were forgotten until about a fortnight since. On opening the box I found them dead, the bodies being dried up and shrivelled, in some instances having fallen out into the box, in others remaining in the mouth of the shells. I picked out all these, and placed the empty shells in my cabinet. Having occasion to look at them yesterday (Nov. 28th, 1866), I saw, to my intense surprise, a black head and a pair of horns protruding from one of the shells which I had supposed to be empty. Presently the animal entirely emerged, and walked about in as lively a manner as when first picked up. The ordinary period of their torpidity is, I believe, about six or seven months, but I am aware of an instance in which a supposed empty shell had been glued down to a block in one of the table cases in the British Museum for two years, when the unsuspected tenant made its appearance. But my prisoner had never been removed from the box in which it had been first placed for three years and a quarter! Is not this a remarkable instance, or have any of the readers of Science Gossip known it to be exceeded?—*W. J. Sterland.*

The Poisonous Spider of Russia.—We have received the following account of a poisonous black spider, which has of late years made its appearance in Russia. We are indebted for the information to a traveller, who passed the greater part of last year in the province of Berdiansk. The appearance of this insect amongst the wheat at harvest time, created for a few days a panic among the labouring classes, and, indeed, one of so threatening a character, that wages rose to double their ordinary rate, and it was with difficulty that the labourers could be induced to work. More than 300 persons were bitten by this venomous insect, but only three cases are reported to have proved fatal, and these deaths, it is supposed, are not to be attributed solely to the bite of the spider. Fortunately, this visitation was restricted to one part of the town lands, otherwise the consequences might have been very serious. The bite of this insect was indicated by a hard, white spot. The first symptoms experienced were alternate violent heat and cold, shortness of breath, bordering on suffocation, and increased pulsation of the heart, and pains in the chest and back, then weakness in the legs, and dizziness in the head. After a few hours these symptoms diminished, and in two days the patient was able to resume his work. The general remedy employed was to cup the poisoned part, and liberally wash it with cold water. Some cauterized the place; but this remedy was not so efficacious, and it created besides a fresh wound. The first time this spider was seen at Berdiansk, was in 1864; but a very few persons were bitten by it. Last year, however, it increased to a most alarming extent. It was remarked that the spider was very active in killing locusts, on which it seemed principally to feed, and it was only when disturbed that it stung persons. The majority of the persons bitten did not know the cause of their illness, and it was only the same symptoms in each case that proved it to be the sting of the spider. This poisonous insect has again visited Russia this year, but we understand it has done but *little mischief.—Technologist.*

Crocodiles near London.—A circumstance came under my notice the other day, which may be interesting as having some bearing on the question. Some time after seeing Mr. Wright's paper in *The Gentleman's Magazine*, I happened to go into the Welsh Harp Hotel, in the Edgware Road, where there are a good many preserved specimens of natural history; among these I observed a case containing a reptile, very similar in appearance to that described by Mr. Wright. I at once inquired its history, and ascertained from the persons in the house, who were anxious to give me every information, that it was a young alligator, brought over to this country by Heenan, the well-known American prize-fighter; that it was presented to the landlord alive, and that it lived with them for six months: indeed, as they said, it might have been alive still, had it not come to an untimely end at the hand of some evil-disposed angler, who, seeing it on the bank of the reservoir, terminated its existence with a blow from the butt-end of his fishing-rod. From their account it appeared to have been tolerably tame, as although when it first came into their possession it was kept confined, it was after a time allowed to go at large, when it used to crawl about the margin of the large reservoir at the rear of the house, returning regularly for its meals to its old quarters; and they further said that it was well known to all who frequented the house. The little creature was not well preserved, and it was therefore very difficult to get a correct estimate of its proportions. As far as I could judge, however, it seemed to be about a third size larger than the crocodile described by Mr. Wright. It seems to me clear from the history of this alligator, and from its having existed for some months in a semi-wild state in this country, that there can be no difficulty in believing that a creature of similar habits and organisation might also exist under the same or the like conditions, although it would seem that the high authority of Professor Owen is against this view of the subject.—*The Gentleman's Magazine.*

Mice as Destroyers of Birds' Eggs.—In my experience as a bird-nester, I have frequently found the eggs of birds broken in the nest, and this destruction of eggs I have attributed to the weasel. I have a cat, a noted bird-destroyer; but I never knew her to take young ones out of the nest, nor to destroy the eggs; but several times she has grievously disappointed me by destroying the old birds on the nest. I have frequently, at the latter end of the breeding season, found mice in nests; but I never could find, though I have diligently looked for them, any traces of the eggs, which I should unquestionably have done, had the mice been the destroyers. I am of opinion that deserted nests are frequently taken possession of by mice, and used by them as homes. I found four young mice (blind) in a chaffinch's nest; I also found a litter in a blackbird's nest; and last year, whilst looking for the nest of a tree-sparrow, I found two mice, probably a male and a female, in the deserted nest of a hedge-sparrow. When I suddenly withdrew my hand, they ran along the branches of the hawthorns with as much ease as if they had been used to it all their lives.—*John Ranson, Linton-on-Ouse.*

The Anchovy (*Engraulis encrasicholus*).—I have just received a specimen of this fish, above 6¼ inches long, caught with the sprats on the Lincolnshire coast, near Boston. According to Mr. Yarrell, this fish is very rare on that coast, although well known in the West of England. Yarrell says (vol. ii., p. 219), "In a series of notes on the occurrence of rare fish at Yarmouth, and its vicinity, with which I have been favoured by Dawson Turner, Esq., there is mention of a specimen of the *Anchovy* taken on the beach, which measured six inches and a half in length. Mr. Couch says he has seen it in the Cornish seas of the length of seven inches and a half, additional proofs of the large size acquired by this fish on our shores."—*C. Adcock, Birmingham.*

Alas! poor Atropos!—In a recent communication to the *Ent. Mag.* (pp. 180), Mr. McLachlan proposes that *Atropos pulsatoria* should henceforth be called *Atropos divinatoria*, and denies it the power of making a noise. He says, "That various species of Anobium cause this sound, is proved beyond doubt; but that a creature with a body so soft that the least touch annihilates it can in any way produce a noise sensible to human ears, seems to me impossible. I look upon it as a perpetuated superstition commenced centuries ago, at a time when the human mind was peculiarly sensitive to impressions of the supernatural, and having its origin in the habitat of the creature; the real producers of the sound, species of Anobium, were not seen or suspected, and Atropos, as being the only insect supposed to frequent the spots whence the sounds proceeded, was naturally accused. The apprehensions excited by what is only the love-call of a small beetle, still exist with the uneducated."

On this subject see prior communications (S.G., vol. ii., pp. 77 and 254).

Great Spotted Woodpecker (*Picus major*).—Perhaps you may be interested to know that on Monday, the 31st of December, I shot a female specimen of the Great Spotted Woodpecker. I killed it in an open country, away from any wood.—*J. R. B. Maxfield, Stone, Staffordshire.*

Rein-deer Bot.—At a recent meeting of the Zoological Society, Dr. J. Murie read a notice of the occurrence of *Œstrus tarandi* in a Reindeer in the Society's Gardens, and made some remarks on the summer dress of the Llama and Alpaca as exhibited in the Gardens during the past summer.

BOTANY.

Primroses.—While shooting at East Hothley, in Sussex, on Saturday, the 8th of December, I picked a fine bunch of Primroses; and on the following day, one of my little boys found a bunch of the ripe fruit of the Wild Strawberry (*Fragaria vesca*) in this parish.—*W. N., Uckfield.*

Proliferous Hart's-Tongue.—During the end of last summer, a plant of the curly-leaved variety of the hart's-tongue fern (*Scolopendrium vulgare*), which I had frequent opportunities of seeing, put out on the surface of an oldish frond two little brown specks, which grew and developed just as the similar outshoots of the *Asplenium bulbiferum* do. In a little time, the mother frond began to wither, was cut off and planted in soil; the two young ones flourished, put out roots, and are now healthy growing plants.—*Leonard W. Sedgwick, M.D.*

The True Papyrus.—The Rev. H. B. Tristram has communicated to the Linnean Society that he found the true *Cyperus Papyrus* L. in Palestine, by the shores of the Lake of Galilee, sometimes growing to the length of sixteen feet. He afterwards found, in the almost inaccessible marshes of Huleh (the ancient Merom), many acres of the same plant. The stems are cut down by the Bedouins for thatching their huts and for mats. This plant was only known to occur in the marshes of the White Nile, in Nubia, prior to this discovery, it having disappeared from Egypt.—See *Journ. Linn. Soc.*, No. 38.

Cocoa-nut Milk.—A tropical sun soon makes one thirsty. I wanted "a drink," and, for the first time in my life, tasted iced cocoa-nut milk. Never in my life have I drunk anything half as delicious. Do not imagine that in the least degree it resembles the small teacupful of sweet insipid stuff dribbled out from the cocoa-nut as we buy it here in England. What we eat as kernel is liquid in the young nut, and the outer husk soft enough to push your thumb through. Surely the cocoa-nut palm must have been specially designed for the dwellers in the tropical world. It supplies everything uncivilized man can possibly need, to build his ships, rig, paddle, and sail them; from its products too, he can make his houses, and obtain food, drink, clothing, and culinary utensils. Strictly littoral in its habits, the cocoa-palm loves to loll over the sea, and let the frothy ripple wash its rootlets. This also looks like another link in the chain of Divine intentions. The nuts necessarily fall into the sea—winds and currents carry them to coral reefs, or strand them on desert shores, there to grow, and, by a sequence of wondrously ordered events, in time make it habitable for man.—*J. K. Lord's "The Naturalist in Vancouver Island."*

Holly in Flower.—I observed a holly-tree (*Ilex aquifolium*) in flower last month, at Pickersleigh, near Malvern. It still continues in flower, at a very unusual time of the year, when other trees are bearing ripe fruit.—*Arthur D. Melvin*, Dec., 1866.

The Moss-rose.—Madame de Genlis tells us that, during her first visit to England, she saw moss-roses for the first time, and that she took to Paris a moss rose-tree, which was the first that had been seen in that city; and she says, in 1810, "the cultivation of this superb flower is not yet known in France."—*Sylva Florifera.*

The Jordan Almond-tree was first planted in England in the reign of Henry VIII., 1548 (*Hortus Kewensis*). Dr. Turner notices it in the year 1645, and says, "Almond-trees growe muche in hyghe Germany beside Sypre in a cytie called Newstat, and great plentye in Italye, and some growe in England, but I have hearde of no greate store of the fruyte of them that growe in England."

The Myrtle.—It was upon a memorable occasion that the myrtle was introduced into this country,—as it is said to have been brought from Spain by Sir Walter Raleigh and Sir Francis Carew, in 1585, when they resided in Spain, and discovered the preparations for the Spanish Armada against us.—*Sylva Florifera.*

The Sweet-Pea, the emblem of delicate pleasures, was unknown in the British gardens until the first year of the eighteenth century, when it blossomed in the garden of Dr. Uvedale, at Enfield, in Essex (*sic*), who is supposed to have been the first cultivator of this favourite flower in England, which has now spread itself over the whole of Europe,—entering every garden where the florist is disposed to

——"Lend a staff to the still gadding pea."

Flora Historica.

Holy-Ghost Plant.—The Orchid described in your last number under the foregoing title is the *Peristeria elata* of our stoves. It may be seen in flower during the months of July and August, at Messrs. Veitch & Son's, Royal Exotic Nursery, or at any other nursery of eminence in the vicinity of London. —*W. J. D. A.*

Dove-plant.—It may be interesting to some of your readers to know that the "*Flor del Espirito Santo*," or Dove-plant, *Peristeria elata** (Hooker), is in cultivation in this country. It was introduced as early as 1826, and flowered for the first time in 1830, and a figure and description of it appeared in the *Botanical Magazine*, vol. lviii., p. 3116.

W. B. H.

* From περιστερα, a dove, from the resemblance in the shape and colour to that bird.

MICROSCOPY.

Polariscopic Objects.—I desire to direct attention to a beautiful series of polariscopic objects which may easily be obtained from prawns, and possibly from shrimps and other crustaceans. Underneath the shell of these may be found, at certain times, a very slight, incomplete, and fragmentary deposit of crystals not much unlike the scales on some fish. The crystals are of irregular forms and various sizes, and are probably carbonate or oxalate of lime, and when united they appear to form the new shell of the prawn which is ready for use when the older shell has been cast away. On mounting the crystals or scales on balsam, and placing them under a polariscope, they will be found to exhibit the most beautiful iridescent colours; and so thoroughly and essentially polariscopic are the crystals, that even without a selenite plate their colours are gorgeous.—*T. P. Barkas, Newcastle-on-Tyne.*

Hardening Canada Balsam.—At the December meeting of the Quekett Microscopical Club, during a discussion on this subject, Mr. Hislop described the following simple and effective plan which he had adopted with great success. He had two plates of brass, 2¼ inches wide by 5 or 6 inches long, and $\frac{1}{16}$ of an inch thick, which were placed on a tripod over a gas flame turned down to the blue, so as to keep the plates hot enough to be unpleasant to the hand. After mounting the objects, he places the slides on the brass plates; and on taking them off again in an hour's time, he finds the balsam in nine cases out of ten to be hard enough to scrape off and finish. No difficulty is found to arise from air-bubbles, and those which form of themselves disappear as the balsam becomes hard.

The Quekett Soirée.—The first *soirée* of the Quekett Microscopical Club was held at University College on the 4th of January, and, notwithstanding the inclemency of the weather, about 400 persons were present. Amongst the "attractions" of the evening were Dr. Mary Walker, a living *Stephanoceros*, Quekett's own microscope, and a curious microscope exhibited by Mr. Burgess, which gave a field of apparently eighteen inches. These divided a lion's share of attention amongst them. A large number of microscopes were exhibited by the members, including the principal makers.

Acari.—Any correspondents willing to aid in the investigation of British Acari, with a view to the publication of a work on the subject, are invited to send specimens of mites, water-mites, or ticks, inclosed in quills, addressed to "Acarus," care of the Editor, 192, Piccadilly, London, W.

Asphalt Cement. — The number of communications you have on the subject of making asphalt cement from Mr. Davies's receipt, shows that many fail in their attempts to dissolve the asphaltum in naphtha, and are driven to other expedients, such as dissolving it in benzoli, turpentine, &c. Having myself at once succeeded in this, I have since made some experiments, with the view of finding out the cause of disappointment. Procuring naphtha from four different places, I found that two of the samples dissolved the asphaltum readily, after its being broken up, allowed to remain in the naphtha 24 hours, and then heated to about 190°; the other two had no more effect upon it than is described by Mr. Rowley in Science-Gossip, vol. ii., page 263; clearly showing that the only difficulty is to get the right quality of mineral naphtha, when it is very easy to dissolve the asphaltum in it. I may say the same with regard to the india-rubber: if the sheet or any other kind is used which has been previously dissolved, two or three days, occasionally shaking the bottle, will generally effect a solution; the thick lumps sold for erasing pencil-marks are not suitable for this purpose, being very difficult to dissolve. Before making the quantity required, it is better to put a spoonful of the naphtha in a small bottle, with a few bits of asphaltum as a test, which will soon show its dissolving power. Mineral naphtha and pure india-rubber can be procured of Mr. Woolley, 69, Market Street, Manchester, with which the operation may be begun and finished in two days, with the application of heat, or in four days without it.—*E. Greenhough, Matlock.*

Bricks of Dashour.—A celebrated botanist and palæontologist of Vienna has recently published some remarks on the bricks of the pyramids of Dashour, which was built about 3,400 years before our era. One of them being examined through the microscope by the Professor, he discovered that the mud of the Nile, out of which it was made, contained not only a quantity of animal and vegetable matter, but also fragments of many manufactured substances; whence we may conclude that Egypt must have enjoyed a high degree of civilization upwards of 5,000 years ago. Professor Unger has been enabled by the aid of the microscope to discover in these bricks a vast number of plants which at that time grew in Egypt.—*Boston Post, U.S., Dec.* 8, 1866.

Separation of Vegetable Cells and Cuticles.—The quickest and easiest method for obtaining isolated cells is the plan devised by Schultz, viz., boiling in a mixture of nitric acid and chlorate of potash. After being thus treated, boil in alcohol, and afterwards in distilled water. Cuticles of leaves separate readily, even if they have been dried for many years. Mount in glycerine, chloride of calcium, or weak spirit.—*Fredk. Kitton, Norwich.*

GEOLOGY.

Preservation of Fossils.—Owing to the loose mineral character of the Tertiary deposits, in which most of the Mammalian and other vertebrate remains are found, consisting as these deposits chiefly do of sands, gravels, clay, or peat, their fossils are necessarily in a more or less friable condition, difficult to preserve entire, or to handle for scientific examination with safety. The substances generally used are glue or gelatine. For the bones of the larger Mammalia there is nothing better than the best glue; whilst for the more delicate bones of the smaller Mammals, Birds and Fishes, gelatine is the best, being purer, dissolving more easily, and imparting but little, if any, colour to the fossil. The consistency of these substances when used will have to be varied according to the structure of the bone; and as they also differ greatly in quality, it is impossible to lay down any definite rule as to the exact proportions to be used with a given quantity of water; this must be left to the judgment of the operator. As a general rule, however, all bones which have a coarse cellular structure, as the ends of large limb-bones, deer-antlers, &c., and also specimens from some deposits—for example, the peat-bed near Colchester, the fossils from which have their internal cellular structure either totally or partially destroyed—require the glue-solution to be of a consistency which will form a stiff jelly when cold; whilst for bones of a compact structure a much thinner solution, about the consistency of ordinary size, will suffice; if the solution is too thick, it clogs the absorbing power at the surface, and prevents its penetrating to all parts of the bone. The fossils should be thoroughly dried and cleaned from as much of the matrix as can be removed with safety; and if it can be managed, *warmed* before being placed in the solution. When the glue is all dissolved, and the liquid nearly at boiling heat (ebullition should be avoided, if possible), it is ready for the immersion of the fossils, and they should remain in it as long as air-bubbles rise to the surface; when these cease they will be sufficiently soaked. When taken out, they should not be drained, but laid in a position to retain as much as possible of the imbibed solution, until they are cold, when the glue will have set. Their position must then be shifted, to prevent their adhering to the board on which they may be laid. Any glue that may have drained from them may be then removed with a wet sponge. The vessels required are of the simplest kind. The common domestic utensils will answer for most purposes. The ordinary house-copper, saucepan, or, better still, a large-sized fish-kettle with its strainer. But whatever the vessel used, a strainer of some kind, on which to place the bones for immersion and withdrawal, is indispensable; for the copper nothing is better than a wire-sieve. For bones too large for the vessel used, the treatment will have to be varied. For long limb-bones, strong enough to bear their own weight when saturated, it is only necessary to place one end in the vessel, and ladle the solution over the other end for a short time, and then reverse their position. But for bones which will not bear such treatment, the only plan is to securely fix them to a board, and place them in a slanting position in the solution, and well saturate them with it by ladling. For these, and for long portions of tusks of the Mammoth, and horn-cores of the large species of Bos, a special vessel, about three feet long, one foot wide at the top, nine or ten inches wide at the bottom, and nine inches deep, made of stout tin or galvanized iron, with a handle at each end, will be found most useful. Occasionally fossils are found which are either too large or too friable (as skulls and tusks from their natural construction frequently are) to be placed in the solution: for these a different method must be adopted to preserve them entire. Cover the fossil with thin paper, over which—on the sides and underneath if possible—put a coating of plaster of Paris, just thick and strong enough to keep together; when firmly set, gently pour the solution boiling-hot over the fossil as long as it continues to absorb, to assist which it may be necessary to remove in a few places some of the surface-bone, which can be carefully replaced; in two or three days the plaster may be partly removed by sawing and in small pieces, taking care not to injure the fossil by jarring it; the paper will prevent the plaster adhering to it. But this process is never so effective as submersion in the solution, and may require to be repeated. Some bones are better for being dipped a second time, but not allowed to remain long enough in the solution to melt the glue they had previously imbibed. Delicate shells from the same kind of deposits may be treated, with care, in a similar manner with advantage.—*W. Davies, Brit. Museum, in Geological Magazine.*

Petroleum.—During the past six years the United States of America have produced about 450 millions of gallons of petroleum. The average daily yield for 1866 has been at least 12,000 barrels. The business of collecting, transporting, and refining it, employs as many hands as either the coal or the iron trade.—*Professor Hitchcock.*

Fossils of the Lias.—Mr. Ralph Tate, Curator of the Geological Society, Somerset House, London, being engaged in the preparation of a monograph of the gasteropoda of the lias, for the Palæontographical Society, begs to request the kind assistance of private collectors by the loan of specimens for examination and description. He would be pleased to exchange fossils of various formations for those of the lias.

NOTES AND QUERIES.

Relations at Sea.—A very interesting paper was recently read by Dr. Günther, at the Zoological Society, on the Fishes of Central America, in which he brought zoological research to bear upon the history of earth-changes. It had been supposed that the existing fauna of the Atlantic was quite distinct from that of the Pacific; but Dr. Günther finds (in a collection recently made by Mr. Salvin), of the total number of species taken on both sides of the Isthmus of Panama, 30 per cent. to be specifically identical. Nay, they do not even appear to vary enough for Dr. Günther to be able to tell whether any given individual came from the Atlantic or the Pacific side. There was, therefore, no doubt, a communication between the two oceans, since the existing species of fish came into being; and the land across the isthmus near Panama is nowhere more than 400 feet high; while to the north, through Lake Nicaragua, there is another tract, nowhere more than 150 feet above the sea-level. That these low tracts of land mark the site of former sea-channels, is rendered still more probable from the fact that in the Lake Nicaragua a sea-fish still exists, the ancestors of which were probably imprisoned by the land's upheaval. Dr. Günther believes that there has been no such interoceanic communication since the latter part of the Pliocene period; in which case, the persistence of these piscine specific forms would be very remarkable. It is well known that, in ancient Miocene times, one fauna extended on both sides of what is now the separating land; but the *specific* identity of so many *existing* forms is quite a new fact.—*British Medical Journal.*

Insects in Cabinets.—S. L. B. remarks, having read that camphor by its evaporation obscured and injured specimens in cabinets, and should never be used, desires a substitute. The caution originated in a "mare's nest," for the volatility of camphor, which causes it to evaporate and deposit again on insects, will also cause it in turn to evaporate from them until no trace is left. Let S. L. B. try a lump of camphor under a tumbler, and after it is all evaporated, report to us how much residue he finds anywhere. He may try "benzole" for a change, but will without doubt return again to camphor.

Frog in Oolite.—I beg to submit the following certificate and observations to those who are interested in natural history:—

"I, William Munton, of Waltham, in the county of Leicester, quarryman, hereby certify that I was witness to the discovery of the stone and frog, now before me (in possession of Mr. Simon Hutchinson, of Manthorpe Lodge, Grantham), in the stone quarry, at Waltham, from ten to twelve feet below the natural surface of the ground, in solid rock. When the stone was split, the frog appeared alive; in size equal to the cavity therein. It continued to live about ten days after its release, and was afterwards preserved in spirit by the late Mr. Stow, of Waltham. Before the stone was broken, no crack or crevice was anywhere visible. As witness my hand this 1st day of December, 1866.

William Munton."

This discovery is familiar to persons now living at Waltham, besides Mr. Munton; therefore, personal inquiry can be made by the sceptical, or silence, in future, will be most becoming. The skeleton of the frog and the stones, also, are open for inspection. It is natural to exclaim, how could a helpless frog penetrate solid stone? It is not difficult, however, to imagine a live frog first enveloped in mere mud, which afterwards hardens into solid stone, ever remaining sufficiently porous to admit air and moisture enough to maintain torpid existence; and which, like seed of natural vegetation buried immensely deep in the *outer* crust of the earth, from its first formation, remains dormant, until some accident brings it within the influence of the sun to re-animate or develope, and ultimately exhaust its vitality. As to the age of the animal, I offer no theory.—*Simon Hutchinson, Manthorpe Lodge.*

The Apple.—The English name of this valuable fruit is evidently derived from the Saxon word *æppel;* and from which circumstance we may safely conclude that the fruit was cultivated in this country under the Saxon government, if not previously by the Romans.—*Phillips's "Fruits of Great Britain."*

Last and Next November Star Showers.—A comparison of the whole number of meteors observed, with the numerical results of previous showers, shows that this shower was far less significant than some of its predecessors. Whether other parts of the world witnessed a grander phase in the display than we in England did, we cannot say, for there is at present no authentic information on the point. M. Coulvier Gravier, who ought to be an authority, at a recent sitting of the French Academy of Sciences, suggested that the maximum display of the epoch might be expected in November, 1867; because, he said, the really great showers are thirty-four years apart instead of thirty-three, and the last of these was that of 1833. Moreover, he called attention to the fact that every very grand shower is preceded by one not so grand in the year before it. This was the case in 1832-33; whether it will be so this time we must wait till next November to learn. —*The Gentleman's Magazine.*

Is it Podura?—While searching for poduras very lately, a black individual made its appearance which I immediately recognized as a species new to me. Its motions were far more rapid than those of poduras generally, and its antennæ, which were longer than usual, extended out straight instead of curved over, as is mostly the case. On microscopic examination I found it had twelve eyes, while all the poduras I have met with have, I think, sixteen; but it possessed the curious forked tail, and was in other respects a good deal like the black podura (*Macrotoma nigra*). I killed it with chloroform, and on examining the scales, found to my surprise they were not like podura scales at all, but were more like lepisma scales, pleated like those of *Lepisma saccharina* and cross-striated like those of the sea-side species, *Petrobius maritimus*,—both of which are figured in Science Gossip, vol. ii., p. 56. The scales are minute and very finely marked; many of them are pentagonal, more or less regular, and many of the form of those of *Lepisma saccharina.* I have some recollection of having seen for sale, slides of Lepisma-like scales labelled "Podura scales," but I thought this an error on the part of the mounter. Is the insect known, and what is its name?—*J. McIntire.*

[In the genus *Orchesella*, the individuals are characterized as particularly agile, and with six eyes on each side. See Templeton in Transactions Entom. Soc., vol. i., p. 93, Pl. xi.—Ed.]

Movements in Diatoms.—On the forenoon of December 25, 1866, I took a small gathering of diatoms, comprising *Campylodiscus spiralis* and *Pinnularia viridis*. In several specimens of the latter, I noticed an unmistakable movement of large oily-looking globules, or granules, of which I counted from two to six in each half of the several individuals I examined. This movement was of a trembling and oscillating character, not unlike the granular movement which may be seen going on in the ends of *Closterium lunula*, except that in the diatoms in question the granules did not retain the grouping and rapid motion which distinguish them in the former, but passed at slow intervals through about one-fifth the length of half the cell. This granular activity could not, I think, be an error of observation; for I noticed it in many specimens, some of which were watched by me very closely for a considerable length of time. Nor could it be occasioned by the diatom's proper movement through the water, because some of the forms in which I observed it were not moving, but were perfectly stationary at the time. I shall be glad to know if any other readers of Science Gossip have observed this movemeut?—*B. Taylor.*

Daisy Anemone (*Sagartia bellis*).—I have had two very curious specimens of Daisy Anemone, born in one of my aquariums lately, one having three distinct heads, each with its proper amount of tentacles, which I have named Cerberus, and another two. Is this an unusual circumstance? I think it must be, as Mr. Gosse does not mention it in any of his books.—*E. J. J.*

Lopping Trees.—Can any of your readers tell me if the following lines in Tusser's "Five Hundred Points of Good Husbandry" are founded upon fact; and if so, what is the scientific explanation?—

> "In lopping old locham, for fear of mishap,
> One bough stay unlopp'd, to cherish the sap;
> The second year after then boldly ye may,
> For dripping his fellows that bough cut away."

And again,—

> "For sap, as ye know,
> Let one bough grow;
> Next year ye may
> That bough cut away."

Also the reason for the following assertion:—

> "Pluck broom, broom still;
> Cut broom, broom kill."

F. A. A.

Cat and Cockroaches.—Our house was perfectly free from cockroaches till June last, when we got a kitten, and immediately the cockroaches appeared. The cat showed peculiar enmity to them, and used to hunt and eat them by the dozen every day; and always after being fed, she would go under the grate to hunt for them. Some weeks back she, having been ill for a long time, was taken away; and from that very day the cockroaches disappeared also, one solitary individual having been seen on one occasion since; and since he came to grief, not one has appeared. Can there be any connection between their disappearance and the removal of the cat? It seems more than a coincidence, and her enmity to them makes it remarkable.—*M. A.*

Cats and Rain.—"Cats sitting with their backs to the fire an indication of rain." Can you inform me in your next number if the above statement is but vulgar gossip, or whether it is a scientific truth? If the latter, on what grounds?—*W. B. B.*

Blackbirds.—Whilst my children were feeding the birds yesterday morning, our cat came down upon and devoured a fine cock blackbird. Three hen blackbirds (I believe of the same brood) witnessed the circumstance from neighbouring trees. As soon as Tom had finished his meal and departed, they gathered up the scattered feathers of their brother, and carried every one of them away amongst the trees of the garden. Was this done from sisterly affection, or from an instinctive feeling of reverence for the dead?—*Ben. Snow.*

Halo of a Shadow.—Permit me to corroborate the statement of the Rev. J. S. Tute, as to the halo of a shadow. I experienced a remarkable instance of this, one fine spring morning in 1865. Two friends and myself had started at five o'clock for a walk, just as the sun rose above a hill on our right, casting our shadows on to the slope to the left below, some fifty yards off. Our gigantic figures seemed to be surrounded by a "nimbus" of brilliant light, exteuding at least a foot and a half all round. The young wheat on which our shadows were projected was drenched with dew, and the reflection from the drops, each sparkling like a diamond, no doubt produced the appearance described. I have frequently seen it since, but never to equal this occasion.—*Daydon Jackson.*

Halo of a Shadow.—This curious phenomenon (Science Gossip, p. 23) is quoted also in "Kæmtz's Meteorology," chap. xix., under the name of *Anthelie;* and J. S. T. is quite right in attributing it to diffraction:—"When the sun is near the horizon," says K., "and the shadow of a person falls on grass, a field of corn, or any surface covered with dew, an aureola is observed around this shadow, the light of which is the strougest at the head; this light is owing to the reflexion by the stalks or straws, the dew-drops, or the vesicules of a mist lying in low strata on the sea. It is the brightest around the head, because the stalks situated in the proximity of that part of the shadow show all their enlightened sides, while other stalks that are farther show enlightened parts and others that are not; the stalks being cylindrical, the aureola is somewhat larger in the vertical sense." Fraunhofer attributed all this to diffraction, and observations confirmed his theory. When reflected beams pass through other vesicules, these beams are also diffracted, and coloured riugs are the result. Anthelies were observed in the Polar seas by Captain Scoresby, &c. (more particulars *vide* Kæmtz).—*B. Melle.*

Double Shell of Eggs.—A gentleman in Cumberland had a hatching of the eggs of the Moscovy duck sent him; one, from its very large size (it weighed over five ounces), was supposed to contain a double yolk, and was therefore broken for domestic purposes, when a second shell was discovered inside. The enclosed egg was of the ordinary size and appearance. The interval between the shells was filled with a fluid resembling the ordiuary white of egg, but rather thinner.—*W. Gain, Tuxford, Notts.*

Cordon Bleu.—In answer to a query, Science Gossip, vol. ii., p. 262, I said, p. 283, *Ampelis cotinga* was cordon bleu; I fouud since, another bird has also that name, viz. the Sucrier gamtocin, *Cyniris collaris*, Vieil.—cordon bleu of Levaillant (*vide* Lev., "Hist. des Ois. d'Afrique," Pl. ccxcix., pp. 1, 2).—*B. Melle.*

Terns inland.—A correspondent writing from Kelvedon, Essex, informs the readers of Science Gossip for January, that he has "succeeded" in *shooting* a Tern in that neighbourhood. Surely it would have been a far more estimable feat if he had succeeded in *preventing* the bird from being shot, so that it might have been seen by other people besides himself. I have constantly visited, the spot and have taken others thither. I believe that most of our large ponds would be ornamented by these most elegant birds, were they allowed to live when they came. In 1865 I saw one skimming over the pond on Wisley Heath, Surrey. It was shot at by the landlord of the "Kut" tavern there (who has already three stuffed specimens in his parlour): although he did not "succeed" in killing it, he so wounded the beautiful creature, that it flew away heavily, soon to be brought down by somebody more "successful" than himself. Every naturalist should do all in his power to prevent this cruel and stupid practice of destroying all our most beautiful birds, or at least not himself join in it. Our rural districts would then be enlivened by many species of birds, which now only occasionally come, to be shot.—*W. R. Tate, Grove Place, Denmark Hill.*

A Curiosity of Nature.—A house-wife of Ringmer, Sussex, in breaking eggs for the Christmas pudding, broke one out of which, to her no small astonishment, dropped another egg, completely shelled, and about the size of a wren's egg. This latter she has preserved as a curiosity of nature.—*Brighton Observer.*

Poor Fellow!—A squirrel, which I have had for nearly two years, was attacked a few weeks ago with what seemed to me to be a stroke of paralysis—causing him to lose the use of his hind legs—which on Sunday last proved fatal. On looking at the body about an hour after death, I found a number of full-grown gentles issuing from it. Were they the cause of death, and of his losing the use of his limbs some weeks before? If not, what was the cause of the gentles appearing so soon after death, as there was no smell or other sign of decay?—*C. L. C.*

Cat-Fleas.—Being desirous of exhibiting the larva of the cat-flea at the Soirée of the Quekett Club, on the 4th January, I proceeded to collect eggs. A cloth was laid for puss to sleep upon late at night, and early in the morning the eggs were gathered. The first night gave 62 eggs, the second 78 eggs, the third 67, and the fourth 77. From these numbers, an idea of some of the troubles which puss experiences may be gained. Fortunately the eggs require very great fostering care to hatch them (our own brood all died two days after the *soirée*), or the owners of cats would soon find their pets an intolerable nuisance, because the species, to our certain knowledge, will attack man. Probably not a twentieth part of the eggs laid reach their full development.—*S. J. McIntire.*

Left no Address.—E. A., Chippenham, Wilts, would feel obliged by any reader furnishing him with the address of W. Winter, who, on Feb. 23rd, 1866, was residing at Mulbarton, near Norwich, and who advertised in Science Gossip late in the year 1865, through the medium of his friend H. Balls, Needham, offering to supply subscribers, at one guinea each, with thirty microscopic specimens, to be collected by him in his own and adjoining districts, in the course of the following year.

Mice eating Pupæ.—I have just had twenty fine pupæ of *Sphingidæ* eaten by mice. Is it generally known that they are to be numbered among the entomologist's foes? I went to put some fresh moss over the box they were buried in, and found the earth scattered about, and not a skin, or a piece of one, left.—*Henry Ullyett, Folkestone.*

[We have heard and read of such propensities in mice, but cannot remember in what journal recorded.—Ed.]

Hyalonema.—At the meeting of the Zoological Society, January 18, 1867, an interesting paper was read by Dr. Bowerbank, F.R.S., on *Hyalonema mirabile*, in which he adduced many arguments in support of his statement, that the whole of this beautiful structure was a true sponge, and that the so-called "polypheads" on the crust which surrounds the long "glass whip" (as it has been termed), are, in reality analogous to the oscula of some British sponges, specimens of which he exhibited. This opinion has been vigorously disputed by Dr. J. E. Gray. Dr. Carpenter was present, and remarked that, having entered the room free from prejudice, he was convinced by the evidence brought forward by Dr. Bowerbank, that his view of the question was correct. The following amusing lines on the discussion appeared in *Land and Water*:—

A FIGHT AT THE "ZOO'" ABOUT A ZOO-PHYTE.

When doctors the views of each other deride,
It is often exceedingly hard to decide
On the weight of the arguments offered by each
In support of the doctrines they sev'rally teach.
And whether their difference belong to Geology,
Divinity, Chemistry, Physic, Zoology,
When two masters in science are pleading their cause
(Be they doctors of medicine or doctors of laws),
Outsiders can only be modestly silent,
And judge him in the wrong who appears the most vi'lent.
Men of science well know there has been a contention
'Twixt two eminent men of right honest intention,
As to whether a "thing" in the national collection
Stands nearest allied and in closest connection
With the sponges; or whether it's really no lower
In Nature's great scale than the class Polyzoa;
And this question of "Sponge or *Zoophyte* new,"
Very nearly occasioned a *fight* at the "*Zoo*"
(One of words, of course, only: I hope you'll excuse,
For the sake of the pun, the expression I use).
The "bone of contention" was placed on the table,
Around which were seated some men the most able,
From their ardent devotion to Natural History,
To decide on the point and unravel the mystery.
'Twas "*Hyalonema mirabile*" dictu,
And had long flinty spicules so sharp that they pricked you;
(The Chairman pronounced the penultimate long,
I thus use it, although it's decidedly wrong),
These fibres, which looked like spun-glass, formed a core,
Which measured in length fourteen inches, or more.
And around which was gathered a dark-looking crust,
Which Dr. Gray always has taken on trust,
To be what he calls "*Polypigerum corium*,"—
That is, he believes it to be an emporium *
Inhabited, made, and secreted by creatures
Possessing the polyps' distinguishing features.
Dr. Bowerbank soon of this view made a clearance,
And proved to the meeting how, spite of appearance,
The dark-looking crust and the sponge at its base,
With the long flinty spicules which both these encase,
Were all formed by a creature with sponges identical,
And that no part of either had ever borne tentacle,
Demonstrated, in fact—(which has always been my "idee")—
That the whole thing belonged to the genus "*Spongiadæ*."
This appears to be settled; but if his opponent
Again of *his* views should become the exponent,
And the two should once more into argument plunge,
Dr. Bowerbank never need *throw up the sponge*.

H. L.

* I don't like employing this queer word "emporium,"
But I can't find another to rhyme well with "corium."

NOTICES TO CORRESPONDENTS.

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

H. D. C.—The number of microscopists is so great that we fear we could not devote the space required to carry out your suggestion of publishing their names and addresses.

S. B.—See our reply to D. R. in the December number.

J. H. M.—The first complaint of the kind which has reached us. Our copy for last year was bound at the close of the year, and there is not the least trace of the type "setting off" on the opposite page.

T. H.—Shere and Abinger for some species. Anywhere for the commonest. A large number of species of mosses mountainous districts alone will furnish.

E. W.—A complete list of British insects has been promised to the public for twelve months, but is not yet published. Rye's "British Beetles" (Reeve & Co., 10s. 6d.) contains the Coleoptera, so also does Waterhouse's "Catalogue of British Coleoptera" (7s. 6d.). The only cheap work, with descriptions, is Stephens's "Manual" (about 6s.), now almost out of date.

F. A. A.—Thistles will grow from seed as other plants.

A. G.—The water beetle is *Agabus bipunctatus*, Fabr., very common throughout the country. The small beetle, *Niptus hololeucus*, Fald., is also common, and apparently very destructive.—*R. G. K.*

G. W. F.—Corky development of the bark, very common in the elm and hedge maple.

C. F. W.—Lists of British Mosses, 4d.: Mr. Dixon, Great Ayton, near Stokesley, Yorkshire.

W. B. M.—It is the ordinary commercial seal-skin which is derived from some species of *Phoca* inhabiting the Arctic seas.

W. R. T.—Your bog plant is *Narthecium ossifragum*.—*W. C.*

S. M. P.—Your plant is hemp (*Cannabis sativa*).—*W. C.*

Lepidoptera.—*E.* wishes for larvæ or pupæ, and will send stamps and address to any one who will assist.

M. C. C.—Tate's "Land and Freshwater Shells," 6s., coloured: R. Hardwicke, 192, Piccadilly.

E. W.—The fossils are—1. *Ammonites bifer*, Quenst.; 2. *Corbis supra-liassicus* (n. s.); 3. *Vermicularia polygonalis*, Low. Send address to R. Tate, Esq., Geological Society, Somerset House, London.

W. H. R.—The query was inserted in our first volume and never answered.

J. C.—The bodies on Sallow-Bark are a *Coccus*, but what species is not so easy to tell.

H. H. M.—The larva of one of the Bombycidæ (Lepidoptera), but it is impossible to identify it, from the condition in which sent.

W. S. G.—The shell is a purple-coloured *Lacuna puteolus*.—*R. T.*

G. D.—We really cannot devote a column to answering your queries, which any book on British Birds would do for you.

H. B.—We do not dabble in mesmerism.

J. J. F.—Did you read the article on Wheat Mildew in our last?

H. R. L.—Of Mr. King, Great Portland-road, London.

T. W.—For British Ferns, consult Mrs. Lankester's book; and for a list of Foreign Ferns suitable for cultivation, see Smith's "Ferns, British and Foreign," both published at 192, Piccadilly.

W. W. S.—That subject is undergoing investigation.

F. B. W.—A similar instance has already been recorded.

W. L. H.—Toynbee's "Hints for Local Museums, &c.," published by R. Hardwicke, 192, Piccadilly, at 1s.

J. B. G.—1. We should decline. 2. "Our Reptiles," p. 166. 3. We know of none.

F. Horton and A. Badger.—Please send addresses, as letters await you.

EXCHANGES.

Bryum roseum in fruit for *Buxbaumia aphylla*.—E. M. Holmes, 2, Arundel crescent, Plymouth.

Ornithorhynchus paradoxus (stuffed) for shells, corals, or other objects of interest.—George Potter, 7, Montpelier-road, Upper Holloway, N.

Ovules of Orchis, showing the embryo, mounted, for other objects.—J. H. Campbell, Royal Infirmary, Edinburgh.

Paulonia imperialis.—A few seeds for distribution.—Stamped envelope to B., care of the Editor, 192, Piccadilly.

Cowage.—Hair from pods of *Mucuna pruriens* for other good (unmounted) objects.—W. H., Stamp Office, Fordingbridge.

Mounted Objects in exchange for other equally good slides.—Send lists to E. G. Towell, 10, Norfolk-street, Strand.

Palates of Whelk, mounted, for other objects of interest.—G. E. Q., 109, Long-lane, Southwark.

Flint Flakes, Diatomaceous Earth from Toome Bridge, and Rock specimens, for fossils, shells, or microscopic objects.—William Gray, Mount Charles, Belfast.

Phyllactidium pulchellum offered for *Heliopelta* or *Actinocyclus undulatus*.—R. P. Aylward, 15, Cotham-street, Strangeways, Manchester.

Birds' Eggs (British) offered for British Land and Freshwater Shells.—T. Hedworth, Dunston, Gateshead.

Quinine, Santonine, Salicine, &c., offered for mounted Microscopic Fungi.—F. W. C., 36, Hall-street, Birmingham.

Diamond Beetle (mounted) for other objects of interest.—J. R., 172, George-street, Aberdeen.

Fern Scales from stem of *Cyrtomium falcatum* for other unmounted objects.—W. H. Reid, 12, Bonaccord-lane, Aberdeen.

Mane-hair of Lion for other unmounted objects of interest.—E. M., 6, Holford-square, Pentonville, W.C.

Astronomical Objective, 4¾ in. diameter, 5 ft. 6 in. focus, and portion of brass mountings, offered for a complete 4 ft. telescope of smaller aperture.—H. Davis, 24, Cornhill, E.C.

BOOKS RECEIVED.

"The Popular Science Review," January, 1867. London: R. Hardwicke.

"The Technologist," No. 6, New Series, January, 1867. London: Kent & Co.

"The Quarterly Journal of Microscopical Science," No. XXV., January, 1867. London: Churchill & Sons.

"Intensity Coils, how made and how used." By "Dyer." London: Suter, Alexander, & Co.

"The Distinctive Characters of the principal British Natural Orders of Plants." Arranged in Tables by William A. Tilden, F.C.S. London: 17, Bloomsbury-square.

"The Life of a Salmon." The Autobiography of the late Salmo Salar, Esq., comprising a Narrative of the Life, Personal Adventures, and Death of a Tweed Salmon. Edited by a Fisherman. London: Day & Son (Limited). 1867.

"Hooper & Co.'s General Spring Catalogue for 1867." Hooper & Co., Covent Garden Market. 1867.

Communications Received.—E. M. H.—T. P. B.—M. D.—S. H.—J. H. M.—S. B.—H. B.—G. P.—E. R.—H. W.—H. K.—R. T.—W. H. B.—H. S.—H. D. C.—F. K.—W. W. G.—C. A.—T. H.—E. W.—S. F. C.—W. C. U.—F. W. C.—F. A. A.—W. H. B.—A. B. C.—J. R. B. M.—W. M. C.—E. J.—E. W.—W. W. F.—E. G. T.—W. F. H.—L. W. S.—M. A.—W. B. W.—J. B.—B. (Melle).—W. A. G.—W. L. H.—W. B. M.—C. L. C.—G. A. W.—J. B. G.—S. J. M. I.—H. B.—J. J. F.—P. B.—S. M. P.—W. F. H.—D. J.—C. W. F.—W. B. H.—C. F. W.—A. B.—H. U.—T. O.—S. U.—H. R. L.—T. W.—G. W. F.—W. G.—E. A.—W. R. T.—E. G.—A. F. W. B.—W. G.—E. G. Q.—M. C. C.—J. E. P.—T. D.—H. C. W. A.—T. J.—H. H. M.—W. B. B.—J. C.—G. A.—W. R. T.—J. R.—W. J. D. A.—W. H. R.—J. R.—F. W. C.—T. H.—B. S.—J. W.—H. P. A.—M. M.—A. A.—W. W. F.—H. D.—H. L.—J. W. M.—W. W. S.—A. G. W.—G. D.—F. H. W.—H. C.—H. E. E.—T. G. P.

THE RHYTHM OF FLAMES.

A light in sound, a sound-like power in light,
Rhythm in all thought, and joyance everywhere.
COLERIDGE.

IN days of old what a beautiful fable would have been added by the poets to the mythology of Paganism in describing the elder and more gentle of the offspring of Fire and Vapour, had they but dreamed of the strong attractive powers of music over flame. In our matter-of-fact days no rival to Orpheus and Eurydice will spring into being, and yet the myths would be so far kindred as proving—

That things inanimate have moved,
And, as with living souls, have been inform'd
By numbers and persuasive sound.

In a recent lecture, delivered by Professor Tyndall at the Royal Institution, on "the rhythm of flames," or, as the more familiar title expresses it, on "sounding and sensible flames," a flame of marvellous sensibility was exhibited, some twenty inches long, which fell down to eight upon the slightest tap on an anvil, placed at a considerable distance, and which responded to every tinkle of a bunch of keys, or a few pence shaken together in the hands. The slightest vibration of sound affected the flame, which gave recognition sensibly when the lecturer walked across the floor, and was set in violent commotion by the creak of his boots, the rustle of a silk dress, or even the crumpling of a bit of paper. In that true London "Cave of Mystery," the laboratories beneath the lecture-room, this flame, said the Professor, "is called the 'Vowel Flame,' because the different vowel sounds affect it differently." Thus, to begin at the wrong end of the "gamut," at U, pronounced, *more Germanorum*, with open mouth from the throat, and not affectedly like *yew*, its gentle nature feels no response; so it passes it by, as a vulgar sound, without recognition. At O the flame quivers, and if you give I the Continental sound of our *e*, it is strongly affected. A, as we pronounce it, is again a dead letter, but let it sound full, like *Ah!*, and it oscillates violently and convulsively. Then in combined sounds it has its favourites. At the words "boot," "bout," and "beat," uttered in succession, it passes the first by without notice, at the second it gives a start, but at the third, as if conscious of the threatened indignity, it is fairly thrown into violent commotion.

The Professor's heart is evidently bound up in his favourite. How would it respond to Longfellow's definition of love—should he utter it?—

Love is the root of creation: God's essence. Worlds without number
Lie on His bosom like children: He made them for His purpose only—
Only to love and to be loved again. He breathed forth His Spirit
Into the slumbering dust, and upright standing it laid its
Hand on its heart, and felt it was warm with a flame out of Heaven.
Quench, O quench not this flame! It is the breath of your being!

For be it known the flame follows the recitation of verse as keenly as a critic, oscillating at intervals more or less violently, according as it picks out sounds to which it can respond. With true feminine instincts it is startled by the plashing of a drop of rain, and sibilation, or even the sound of a sibilant, in however distant part of the lecture-room, throws it immediately into violent convulsions.

It is always difficult fairly to adjust to each pioneer in opening up new sources of scientific investigation his share of the merit and of the gratitude due to him. Trivial discoveries at first,

often cast aside as soon as brought to light, and contradictions piled up upon no better foundation, are in general the germs of every branch of science; so the world, wisely perhaps, awards to the master-mind that unravels the tangled web and makes all clear, the full title of an original discoverer. The sounding of a hydrogen flame in a glass tube was first noticed by Dr. Higgins, in 1777. Since then the subject has been investigated by Chladni, De la Rive, Faraday, Wheatstone, Kundt, and others. The action of sounds of a definite pitch on flames inclosed in tubes has been investigated by Count Schaffgotsch and Professor Tyndall. Indeed, under the latter, "The Philosophy of Flame" has for years been one of the leading subjects of investigation in the laboratories of the Royal Institution. The jumping of a fish-tail flame in response to musical sounds was accidentally discovered by Professor Lecomte at a musical party in America. In passing a candle with steadily burning flame rapidly through the air, an indented band of light is produced, and a slightly musical vibration indicates the rhythmic character of the motion. The solution of this problem, and of those which follow, is the subject of Professor Tyndall's lecture, and, as like another Columbus, he has broken the egg, by his aid we shall comprehend another of these ideas which cluster round that comprehensive phrase, "the conservation of force," as clearly as he has laid before us "heat as a mode of motion." But to proceed: a gas flame having been introduced into a tube sufficiently long and wide, the current of air passing over the flame produces a vibration, which, by the aid of the tube's resonance, becomes a musical sound. Thus, from a tube three feet long the musical note will be rich; from one six feet long it will be an octave lower; and in a tube fifteen feet long the deep bass vibrations have an intensity of such power that in the lecture-room, filled by an audience of some six hundred persons, pillars, floors, seats, gallery, and audience are all sensibly shaken. The note rises in pitch as the tube diminishes in length, and the intense heat of the sounding column produces a greater number of vibrations than any organ pipe of the same length. The flame in a tube $17\frac{7}{8}$ inches long vibrated 459 times in a second, and another in a tube $10\frac{3}{8}$ inches long 717 times in a second. These vibrations consist of a series of partial extinctions and revivals of the flame, forming, when viewed in Wheatstone's rotating mirror, a series of flame images of transcendent beauty.

Other equally interesting experiments served to illustrate the subject: one, which recalled the way in which boys teach jackdaws and jays to speak, by splitting their tongues; and another, as more plainly showing the cause of the phenomenon, must, however, suffice. The bright flame of a fish-tail, which appeared perfectly insensible to all sounds, musical or not, and to which Handel's Harmonious Blacksmith would apparently have hammered away to no purpose, was severed in two by a stream of air. This done, no sooner was a whistle sounded than the flame started; a knock on the table caused the separated flames to re-unite and form for an instant a flame of the ordinary shape. In the second experiment, a steady, clear flame, issuing from a circular orifice, four inches in height, was insensible to sound. Raised to ten inches, it responded by a slight quiver to the whistle; at sixteen inches, the increased quivering showed the flame to be on the brink of roaring, and with a little increase of the pressure it roared, shortening itself at the same time to eight inches; reducing the pressure, the flame was again extended to sixteen inches. It did not roar, but was on the point of roaring, standing, as it were, on the brink of a precipice, and the whistle then forced it over, upon which it roared, simultaneously shortening itself, as it did before under the increase of pressure. "And herein," says Professor Tyndall, "is the true explanation of all the phenomena of these 'sounding or sensitive flames,' that the sonorous pulses furnish the supplement of energy or force necessary to produce the roar and shorten the flame." The pitch of the note chosen to force this flame over the brink of the precipice on which it rests must be equal to the occasion. Four tuning-forks, vibrating respectively 256, 320, 384, and 512 times in a second, produced no effect on a certain flame. But besides these fundamental notes these forks will sound a series of notes of very high pitch, producing 1,600, 2,000, 2,400, and 3,200 vibrations per second; and to each of these the flame jumped in response, but most energetically in response to the highest note.

THE SWALLOWS.

UNDER this heading appeared in a recent number a most interesting letter from E. L. Simmonds, telling us that early in November, 1865, when at the month of the river Niger, in West Africa, "innumerable swallows passed for a whole day together over his head *from seaward*, flying in a *northerly* direction," and he asks, "could they be coming from *America?*" Now, as the several habitats of these most interesting birds, and their periodical migrations in the different parts of the world, have engaged my attention for many years past (as indeed the columns of the *Field* and your own Science Gossip pages will attest), I will condense, in as few lines as I can, all the information which I have been enabled to collect from French and English works, regarding the hirundines of Africa. Now these may be classed geographically as four distinct species—according to what I learn from that Ornithological text-book, the Ibis—and those again may be subdivided latitudinally into north

and South African hirundines, as respects the equator (their divisional line of *habitat* demarcation). Now swallows, like all migrant birds, regulate their yearly emigrations and immigrations by that conservative instinct which impels them to seek ever for the most genial climate, and to escape from the extremes of the different atmospheric conditions of cold and heat, rain and drought. Now these conditional states of the atmosphere are reversed yearly in Africa, according to the sun's position in the ecliptic; and the monsoon rains are regulated by the solar declination, according as that luminary is north and south of the equator; whilst that equatorial belt of perpetual condensation, 300 or 400 miles broad (as described by Captain Maury in his great work on physical phenomena), and which vibrates latitudinally, agreeable to the sun's position, between latitude 5° south and latitude 15° north, is ruled by the same influence. What then are these climate repellents, and how do they operate locally, as regards the great African peninsula? Why thus. On April 13th, the sun is yearly vertical to Sierra Leone, Katunga on the Niger, and the southern uplands of Abyssinia; and what is the result of the sun's declination being then at nine degrees over this belt of Africa, from west to east? Why, that the deluging monsoon rains, following the sun as they do, inundate the countries south of latitude 9° to the extent of 500 miles, and 300 miles to the north thereof—embracing thus to the southward, Fernando Po, the Cameron Mountains, the mouths of the Niger River, the Gold, Slave, and Ivory Coasts; to the westward, Sierra Leone, and the Gambia Settlements; to the northward, the mountain sources of the rivers Gambia and Niger, and the affluents of Lake Tchad, with the vicinity south of Timbuctoo; and to the eastward, on the other side of Africa, Magadoxo, Afan, Somauli, Gallas, Abyssinia, and Nubia, collectively. Now this solar movement regulates all the hirundines that *hybernate* north of the equator, and which emigrate yearly to Europe, and Asia, and the Azores, in April, earlier or later, according as the monsoon rains set in.

Now what occurs six months afterwards, namely, on 13th October, when the sun having re-crossed the line, and become vertical to those parts of Southern Africa that lie north and south of latitude 9° south? Why this! The same advancing climatic foe (the sun's attendant ever), the deluging rains which drove the swallows to the north, as he moved towards the tropic of Cancer in April, now chases them to the south, when that luminary is moving in October, towards the opposite tropic of Capricorn. And thus the migratory movements of the African hirundines are reversed geographically; for when the sun is advancing northward in April, the Senegambian and Abyssinian swallows seek their temperate, food-abounding countries, Europe and Asia, for comfort and nidification; whilst the swallows of the Cape, Natal, and the Mozambique Coast, are driven to the south, for their temperate climate and generative purposes, in October or thereabouts, yearly; which accords, indeed, with Dr. Livingstone's narrative, and the accounts of Le Vaillant and other naturalist observers and writers. Now, I have always assumed that the equatorial calm belt of constant precipitation, as referred to above, divides permanently the North African from the South African swallow as to migratory movements, and the periods of moulting and incubation, and all I have read on the subject confirms this my conviction; for, as the climatic conditions of North and South Africa are reversed, so are the animal phenomena depending thereon (as it is in India, Australia, and the two American continents). Whence then were the swallows seen by E. L. Simmonds coming, and whither proceeding, in November, 1865? Why—*selon moi*—they were the hirundines of Lower Guinea, the same as Dr. Livingstone speaks of in 1855, as seen at Loanda in June (but not those he saw in migratory transit at Kuruma in December, 1852; for these last were Cape of Good Hope swallows); and as the S.W. monsoon—which blows on the coast of Upper Guinea, and into the Gulf of Guinea—is over about the end of October, these birds were returning thither for their winter hyberuation, south of the mountains of Kong, as the European swallows do to the north and north-east of that chain, but 500 miles and more to the northward.

H. E. Austen,
Lieutenant-Colonel and M.B.M.S.
St. Helier's, Jersey.

N.B. — The Abyssinian swallows pass into Eastern Europe, Syria, and Turkey in Asia, in summer; and the swallows of Lower Guinea oscillate migratorily between Cape Frio in latitude 68° south and latitude 8° north probably.

ATROPOS.

THE insertion, in the last number of Science Gossip, of an extract from my Monograph of the British *Psocidæ* ("Ent. Month. Mag."), wherein I avow myself a sceptic as to the ability of *Atropos* to produce an audible sound, following Mr. Chaney's article in which he distinctly claims for the insect the attribute of causing a ticking, induces me to say a few words on the subject. Without wishing to call in question Mr. Chaney's powers of observation, I still think that some error has occurred, and shall remain an unbeliever until I catch *Atropos, flagrante delicto*. I shall be only too glad if Mr. Chaney will forward to me living examples of the insect which have been seen and heard in the act of "ticking." Having been as a boy brought up in a then wild part of Essex, which, though actually not twenty miles

from London, was, so far as the inhabitants were concerned, ten times that distance, I became fully initiated into all the popular superstitions arising from various natural phenomena, so prevalent in agricultural districts, and among them was duly impressed with the belief that the ticking noise heard in the house, in the still evening, was a portent of some domestic calamity; and further, that the said ticking was produced by the little creature to which the fates (and Leach) have applied the name of *Atropos*. We all know how difficult it is to shake off an impression deeply rooted in childhood, and it was not until I came to reflect upon the structure of the creature, that I for a moment doubted the power of *Atropos* to send the country folk sighing at the trouble which its supposed ticking was sure to foretell. Mature consideration has forced me to the conviction that it is *not* in the power of *Atropos* to produce any sensible sound. The integuments of the creature are so soft that the fine wetted point of a camel's hair brush is sufficient to rupture them, and nowhere, not even in the thickened femora, is there a surface which, being sharply applied to a sonorous opposing one, could occasion an audible sound; even *Anobium*, encased as it is almost in a coat of mail, can only cause a little more than perceptible noise. I cannot imagine, therefore, how *Atropos* can possibly be the culprit. In the house in which I am now writing, I have far too many of *Atropos* in my insect-room; yet during ten years I have never heard the "death-watch" there, whereas in my bed-room it is sometimes so loud and constant as to become a positive nuisance, its frequence in the latter room being pointed to significantly by the numerous drillings of *Anobium* in an old-fashioned bedstead. My credulity in astonishing freaks of Nature is pretty considerable; even, on ocular evidence, I will believe in the protracted existence of ancient toads in blocks of compact stone; but, as before said, until I see *Atropos* making certain movements, and a sound proceeding from the spot, and keeping time with the movements, I elect to discard what I now consider a deeply-rooted superstition. It seems to me possible that in the case of both Mr. Derham's and Mr. Chaney's observations an *Anobium* has been concealed in the same spot with the *Atropos*, but was not discovered. I ask your readers to take any substance of the same consistence as the head of *Atropos*, and try if by any means they can produce a ticking as loud as that of a watch, or any ticking at all, by striking it against a sonorous surface.

With one other remark I conclude. Owing to the whole of my remarks in the "Ent. Month. Mag." not having been extracted, it is made to appear that I have arbitrarily changed the familiar specific name *pulsatoria* to that of *divinatoria* (O. F. Müller in "Zoologiæ Danicæ Prodromus," 1776). This is not so. I have reluctantly dropped the Linnæan name, because a glance at his description of *Termes pulsatorius* will suffice to show that the insect intended is an allied creature, described by Westwood as *Clothilla studiosa*, with similar habits and general appearance, but differing, *inter alia*, in the possession, when mature, of small, rounded, coriaceous, readily deciduous wing-scales. Our common *Atropos* is most probably the *Termes fatidicus* of Linnæus, but the description, probably by a slip of the pen, indicates a very much larger creature.

Forest Hill. R. McLachlan.

THE DODO.

If you, Mr. Editor, or your readers, care to pursue the subject of the *Dodo* further, the subjoined quaint description of this extinct bird, from a copy in my possession of the "Travels into divers parts of Africa and Asia the Great," of Sir Thomas Herbert, Bart., may be acceptable. The passage is taken verbatim from the earliest edition, published in 1638.

"Here [Mauritius] and in *Dygarrois* (and no where else that ever I could see or heare of) is generated the Dodo (a Portuguize name it is, and has reference to her simpleness) a Bird which for shape and rareness might be call'd a Phœnix (wer't in *Arabia*:) her body is round and extreme fat, her slow pace begets that corpulencie; few of them weigh lesse than fifty pound: better to the eye than stomack: greasie appetites may perhaps commend them, but to the indifferently curious nourishment, but prove offensive. Let's take her picture: her visage darts forth melancholy, as sensible of Natures injurie in framing so great and massie a body to be directed by such small and complementall wings, as are unable to hoise her from the ground, serving only to prove her a Bird, which otherwise might be doubted of: her head is variously drest, the one half hooded with downy blackish feathers; the other perfectly naked; of a whitish hue, as if a transparent Lawne had covered it: her bill is very howked and bends downwards, the thrill or breathing place is in the midst of it; from which part to the end the colour is a light greene mixt with a pale yellow; her eyes be round and small, and bright as Diamonds; her cloathing is of finest Downe, such as you see in Goslins: her trayne is (like a *China* beard) of three or foure short feathers; her legs thick and black, and strong; her tallons or pounces sharp, her stomack fiery hot, so as stones are easily digested in it; in that and shape not a little resembling the *Africk* Œstriches: but so much, as for their more certain difference I dare to give thee (with two others) her representation."—Folio. London, 1638. P. 347.

As a later edition contains some emendations, the following extract is given from the "Fourth Impression," to which "are added (by the Author now

living) as well many additions throughout the whole work, as also several Sculptures, never before printed." Folio. London, 1677.

"This noble Isle [Mauritius] as it is prodigal in her water and wood, so she corresponds in what else a fruitful Parent labours in: not only boasting in that variety, but in feathered creatures also; yea, in the rareness of that variety: I will name but some, and first, the Dodo; a Bird the Dutch call Walghvogel or Dod Ersen: her body is round and fat which occasions the slow pace or that her corpulencie; and so great as few of them weigh less than fifty pound: meat it is with some, but better to the eye than stomach; such as only a strong appetite can vanquish: but otherwise, through its oyliness it cannot chuse but quickly cloy and nauseate the stomach; being indeed more pleasurable to look than feed upon. It is of a melancholy visage, as sensible of Natures injury in framing so massie a body to be directed by complemental wings, such indeed as are unable to hoise her from the ground, serving only to rank her amongst Birds: her head is variously drest; for one half is hooded with down of a dark colour; the other half, naked and of a white hue, as if Lawn were drawn over it; her bill hooks and bends downwards, the thrill or breathing place is in the midst, from which part to the end, the colour is of a light green mixt with a pale yellow; her eyes are round and bright, and instead of feathers has a most fine down; her train (like to a *Chyna* beard) is no more than three or four short feathers: her leggs are thick and black; her tallons great; her stomach firey, so as she can easily digest stones; in that and shape not a little resembling the Ostrich: The Dodo, Cacato or Parrat and one of the Hens take so well as in my Table-book I could draw them."

This description is worthy of respect, inasmuch as it is from the pen of a well-known old traveller, who saw the ungainly bird in its native *habitat;* but as for the "sculpture" of the male and female of the species with which the garrulous baronet accompanies his text, one is compelled to add that, if his drawing of the pair of *Dodos* resembles the originals no more faithfully than that of the "Cacato [cockatoo] or Parrat" resembles that well-known bird, his pictorial memoranda from his "Table-book" are a "world too wide" from nature to serve any useful purpose. Henry Campkin.

Reform Club.

Work.—As in travelling so in thinking; he who has started must work with the means which he owns, however small the stock may be. There is a time for gathering such mental gear; when it is gone, the time comes for using engines or expedients. If grammar, logic, and mathematics be mysteries, the rule-of-thumb must serve their turn.—*Frost and Fire.*

PODURÆ.*

I have often been asked by friends interested in microscopical pursuits where Poduræ were to be obtained, and I myself was puzzled over the problem once. Mr. Hogg's work on the Microscope, and Dr. Carpenter's more elaborate treatise, had sharpened my curiosity on the point, and I regretted I did not count among my acquaintances some one to whom I could apply for the *entrée* of a wine-cellar, there to put in practice the plan recommended for the capture of these insects by means of oatmeal and a basin—a plan which I was led to think would produce abundant results. Soon, at Smith and Beck's, I bought a slide of the scales, and to my great disappointment found I could not see them satisfactorily in my microscope. But there is no wonder in this, for beginners are not usually furnished at the outset with the best class of objectives, by means of which alone can the markings on this microscopic test-object be plainly seen.

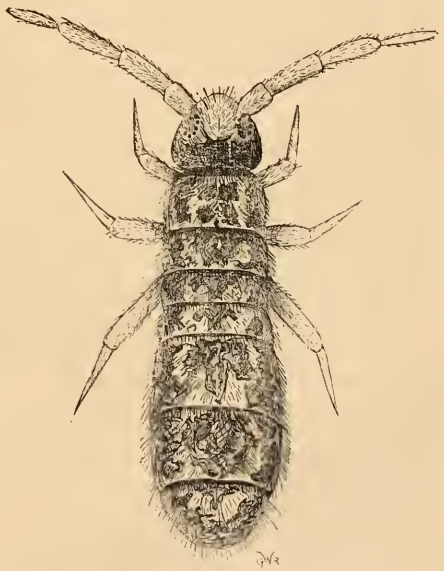

Fig. 37. Podura, without scales; common under stones.

However, though I had obtained a slide of the scales, I wanted to see a living Podura. "Surely," thought I, "if they are *so common* in cellars, there is a chance of their being found in the lower regions of the house in which I live." So I took a candle, and commenced a search on the outside of a beer-barrel. Peering into its seams, I soon discovered in these localities, and on the wall, tiny creatures of a leaden hue, with purplish reflections in those parts where the light chiefly played. "Can these be

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* Read at the Quekett Microscopical Club, Nov. 23, 1866.

Poduræ?" The question was soon settled in the affirmative after the examination had been made under the microscope of two or three captured specimens. The scales were, however, smaller and more transparent than those on my bought slide, and the markings far less distinct. Having paid some attention to these insects since then, I proceed to record my notes.

With regard to the habits of Poduræ, and the places where they may be successfully sought, I may say they all love damp situations. Some prefer an excessively moist condition, such as the surface of a puddle in the open country or by the roadside. These are destitute of scales, and sometimes occur of considerable size. (See figure in "The Micrographic Dictionary," page 554.) They may also be found under stones in damp places, and often are abundant at the edges of weedy ponds. Others are content with the humid atmosphere under the broad leaves of a dock, or at the roots of a dandelion; and others again show their aversion to daylight by taking up their abode under a stone, or amid the cobwebs and the darkness of a damp cellar. In these latter localities more particularly do the scale-bearing species delight.

They feed upon decaying animal and vegetable substances, such as a stale cooked potato, decaying leaves or vegetables, a rotten bone or an egg-shell. All these form capital baits. In addition I find oatmeal is moderately successful in a cellar, and an old shoe has been recommended to us as possessing special attractions. The easiest mode of capturing Poduræ, when found, is one told me by Mr. Powell, the eminent optician. A small glass tube a quarter of an inch in diameter, and about two inches long (a quill will do nearly as well), open at one end and corked at the other, is placed over the insect, which most probably takes a leap into it instantly. The open end can then be closed, and you have your prisoner safe. In order to obtain the scales I administer chloroform vapour, and then, with the side of a needle, press the Podura gently on the thin glass cover, which has been previously cleaned. I sometimes find they leap into the glass tube so violently as to die on the spot from their self-inflicted injuries.

The Podura belongs to the order *Thysanura*, the characteristics of which, as extracted from the "Micrographic Dictionary," are as follows:—"Wings absent; not undergoing metamorphosis; not parasitic; mouth furnished with mandibles and maxillæ; eyes simple, in two groups; abdomen mostly terminated by setæ or a bifid tail."

The Podura possesses about sixteen simple eyes, arranged in two groups, one on each side of the head. Each group, containing eight, looks like a cluster of beads.*

* It would appear that some species have 14 or only 12 eyes: there is often much difficulty in counting them.

The forked tail is not less curious in its structure than in the use to which it is applied. When at rest it is kept in a groove under the abdomen, but it is brought into operation very effectively in case of danger threatening its possessor. If the alarmed

Fig. 38. Tail of Podura, expanded, × 40.

insect finds its legs cannot carry it into safe quarters quickly enough, it suddenly straightens out its tail horizontally, thus striking a smart blow with it on the ground. The force of the blow is sometimes so great as to cause the creature to rise into the air some twelve inches or so, and then it alights in an unexpected place, whence it crawls away in security. I think a curious organ (situated between the third pair of legs), which I also saw, on one occasion, used as a sucker, when the Podura was walking in an inverted position on the under-side of the cell-cover, assists the tail in the operation. The whole apparatus bears some resemblance to the ingeniously contrived wooden toy frog, which, by means of a string, a piece of wood, and a bit of cobbler's wax, can be made to leap for the amusement of children. The antennæ are four-jointed, and the whole body is covered with a series of scales arranged very much after the fashion of those on the wings of moths. The antennæ, as well as the legs, which terminate in two claws or toes, are clothed with fine hairs, and also in some cases with scales.

My experience refers *especially* to two kinds of scale-bearing Poduræ; one of them black or leaden-coloured (*P. plumbea*?), and another of a fawn-colour, somewhat speckled. I shall speak of it as the Speckled Podura, for want of knowing its scientific name. I do not think it has been described; its scale certainly has not, and I shall allude to it presently. The former is of frequent occurrence under some boards at the back of our house, and also in similar situations in a cellar at Brixton; the latter occurs in the same cellar, but inhabits the woodwork and the whitewashed wall, rarely being

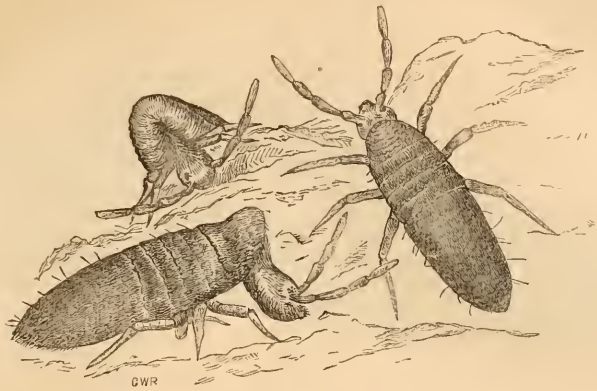


Fig. 39. Black Podura.

seen on the floor, except during the winter months. I can catch a black Podura occasionally by means of oatmeal, but have to trust to my eyes and fingers alone in the case of the speckled. Both kinds will, however, eat oatmeal when kept in confinement. I have had numbers of them both enclosed in roomy, wooden cells, and have derived much pleasure while watching their habits. The floors of the cells were covered with moistened blotting-paper, in order that the humid atmosphere in which the insects live might be imitated.

Fig. 40. Black Podura, front view, × 40.

The Black Podura* is a most superb object under the microscope, because the scales decompose light strongly; hence brilliant colours, especially purple, play over the surface of the little creature when it is well illuminated. I do not succeed well in the preservation of dead specimens. One only has hitherto afforded me a somewhat satisfactory slide: it is mounted in the dry. If fluids are used, all the scales come off directly. The application of fluid, however, enables the examination of the mode of attachment of the scales to be performed very readily.

On one occasion a fine colony of this species was found on a rotten chip of wood, and deposited in a deep cell for observation. They disliked their position exceedingly, and made vain attempts to get away, but ultimately accommodated themselves to circumstances pretty well. I noticed that they often cast their skins. One was observed shortly previous to, and immediately after, the operation. During the process its colour became much paler, almost white, and large drops of fluid adhered to it in various places. In the course of a couple of hours I looked again, when lo! it had extricated itself from the old coat, and was busy turning round and round in a bran new one (which was many shades darker than the old), as if to try how it fitted.* The exuvid (scales, antennæ, portions of the tracheæ, &c.) were all attached to the cell-cover, which I removed in order to identify the various parts under high powers. The full size of the insect is about one-eighth of an inch in length.

This family produced, while in confinement, a brood of young ones. The eggs were not noticed because they were concealed under the rotten chip of wood, but on the 18th June about twenty tiny white Poduræ were seen, apparently just born. They were clothed with hairs and rudimentary scales, the head was large in proportion to the body, the eyes red, and the general resemblance to the parents great. They seemed to feed greedily on the fungoid growths which had arisen in the cell, owing to the conditions existent there, and were very active. Soon they betook themselves to an oatmeal diet, and in course of time grew, so that on the 3rd of July there was little except their size to distinguish between them and the old ones. They had then acquired iridescence, doubtless by casting off their skins several times, and behaved just like their parents, running hither and thither, meanwhile

* The colour varies much: some specimens are dull grey, and others have bronze reflections. It has been suggested to me that possibly the correct scientific name of this species is *Macrotoma nigra*.

* The process has been repeatedly witnessed since then. The tail is the last part drawn out of the exuviæ. I have some now (Feb. 1), which were confined at the close of last November, and they appear to be in perfect health.

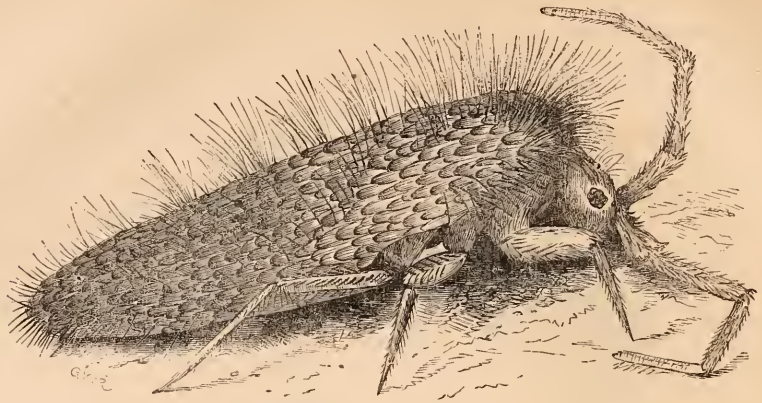


Fig. 41. Speckled Podura, × 30.

rapidly waving their antennæ, and making active efforts to escape whenever I opened the cell. All Poduræ are very attentive to personal cleanliness, and their constant habit of preening themselves is very curious to witness. They suddenly double their antennæ under the head, passing them through the mouth many times, and treat every part of their bodies that may be within reach in a similar manner.

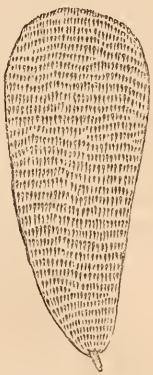


Fig. 42. Scale of Black Podura; $\frac{1}{5}$ objective, A eyepiece.

The scale of this Podura is very like that supplied to me as the real "test scale." The markings, though clear, are much finer, and I suspect that the test scales are only found on the oldest Poduræ, but I am open to correction. Accurate information about Poduræ seems at present difficult to obtain. The adult insect should be selected in preference to the young specimen, the tegumentary appendages of which appear to me to be imperfectly developed. I notice that the small ones are more iridescent than the full-grown insects.

The other species of Podura which has come particularly under my notice is rather larger than the black species. Its colour is very light brown, often speckled with black, and there is no symptom of iridescence. The antennæ are much longer in proportion to the body, which is liberally furnished with hairs, especially near the neck, and its head is not carried so low as in the case of the black kind (see figure). It also inhabits a drier situation, and in my experience is not nearly so often met with. I only know of one place where I may calculate with some certainty on finding a specimen (viz., on

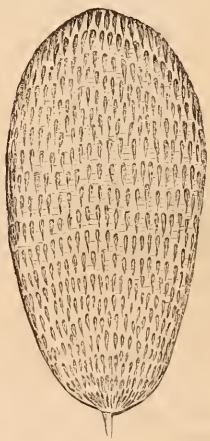


Fig. 43. Scale of Speckled Podura; $\frac{1}{5}$ objective, A eyepiece.

the whitewashed door, or similarly treated wall of the cellar at Brixton); but I have unexpectedly caught stray ones in other places, chiefly indoors; hence I suspect it inhabits the decayed woodwork of houses. Under the microscope, this sort displays a speckled or banded appearance—the back and sides being clothed with scales, mostly dark brown or black, arranged in transverse rows. The individual scales are exceedingly beautiful and much more easily resolved than the standard test scales. They also possess faint transverse striæ on the elevated portions. Hitherto they have seldom, if

ever, been mounted for sale, but they well merit attention; and though on close examination their markings are found to be similar to those on the test scale, omitting all consideration of the

Fig. 44. Damaged Scale of Speckled Podura, opaque; ⅓ objective, B eyepiece and Beck's patent illuminator.

striæ, yet at the first glance most persons to whom I have shown them seem to have a difficulty in recognising them as Poduræ scales at all.

Fig. 45. Scale of Speckled Podura, by reflected light, small side; condensing lens, ⅓ objective, C eyepiece.

About the 6th of June nine of these insects were inclosed in a cell, and on the 16th I noticed that about sixty globular eggs were laid. On the 24th of the same month, the eyes of the contained young might be perceived through the shells, which burst on the 27th, and permitted the young to make their exit.

These are lively from the first, and resemble their parents in all, saving that they appear to be very delicate and destitute of scales.

While the young of the black Poduræ seemed to be quite comfortable in the damp cell, these appeared soon after to be in an unhealthy condition, and many died. I therefore liberated those remaining in the cellar whence their parents were obtained, lest the species should be exterminated. I have tried several times since, without success, to keep this species in confinement: they always pine away and die; and though they will eat oatmeal, they do so but sparingly.

The progeny of both kinds of Poduræ were very numerous in their native haunts on the 1st of October. Possibly the dampness of the past summer had promoted their increase. In several places the under sides of certain boards swarmed with the black species, and their exuviæ were equally abundant in the same situations.

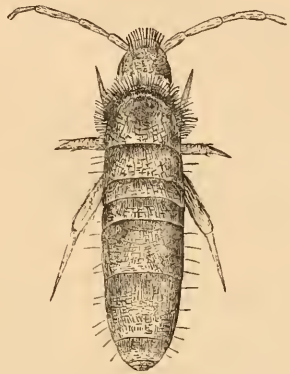


Fig. 46. White Podura (*Lepidocyrtus Albinos?*).

I have lately noticed another Podura—pearly-white in colour, with red eyes, small, having rather long antennæ, and furnished besides with long hairs somewhat like the speckled. I am told its name is Lepidocyrtus Albinos, and that it is the smallest

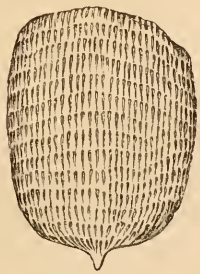


Fig. 47. Scale of White Podura; ⅓ objective, A eyepiece.

of the scale-bearing Poduræ. It seems to be very partial to the vicinity of flower-pots, and underneath them it may often be found. One specimen was damaged in being captured, two of the joints of one antenna being broken; but in the course of ten days the damage was repaired, and the one antenna was almost the counterpart of the other. The scales, which were first described to me by the late lamented Mr. Richard Beck, are very thin; but notwithstanding this the markings are very

distinct, and have a great tendency to follow each other in longitudinal rows. In order to give a rough idea of their appearance comparatively with others we attach a figure, exhibiting them as seen under an $\frac{1}{8}$th object-glass. In Mr. Beck's beautiful paper in the *Microscopical Journal*, on the subject of

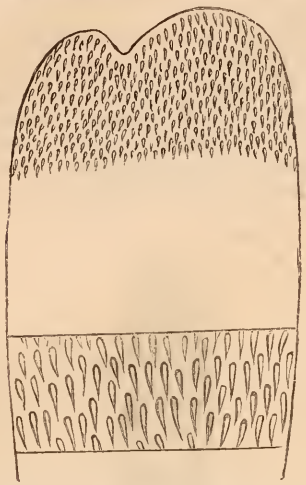


Fig. 48. Test Podura Scale; upper portion, $\frac{1}{8}$ objective, A eyepiece; lower portion, $\frac{1}{10}$ objective, C eyepiece.

the Scale of Lepidocyrtus, he says: "The best scales are obtained from the insects found in comparatively dry places." So far, and in some other particulars, I find our experiences agree. His speciality (which we figure as the "test scale") is either a variety of the black Podura or a distinct species; most probably the latter. The outlines of Podura scales are very different in different species; and although there are many erratic shapes, those drawn will, we think, be found to be the forms which predominate. The drawings of the scales have all been made with the aid of Ross or Beck's object-glasses and Powell and Lealand's achromatic condenser (170°). The markings can be seen without an achromatic condenser; but the view is infinitely more satisfactory when this apparatus is used. I have also employed Smith and Beck's, which is admirably adapted for exhibiting them. A moderate aperture only is requisite, both in the object-glass and the illuminating apparatus, for their perfect display; but the workmanship of the objective must be of the best description. Any error in the correction of the lenses, whether in the manufacture or in their adjustment for penetrating the thin covering glass, is immediately betrayed by the peculiar appearance which the markings present. Mr. R. Beck has dealt with this subject so thoroughly in the paper I have alluded to, that I hardly feel competent to speak on it.* I have seen the markings moderately well with a good half-inch objective, assisted by the condenser and a deep eyepiece; but, although they are said to be visible with a *one-inch*, it is only, to quote from Dickens, when you "make believe very much" that the mottlings then seen are comfortably resolved.

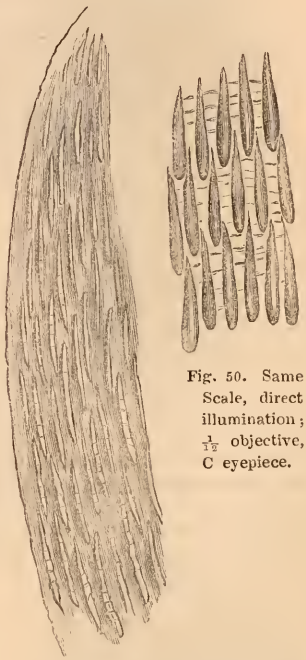


Fig. 50. Same Scale, direct illumination; $\frac{1}{12}$ objective, C eyepiece.

Fig. 49. Scale of Speckled Podura, oblique illumination.

An object-glass, which will show the Podura scale perfectly, may be predicted to be capable of being employed satisfactorily on the easier diatoms, such as *P. angulata* and *P. hippocampus;* but it does not follow that another glass, which will show the striæ on the *N. rhomboides*, *Surirellæ*, *P. fasciola*, *N. cuspidata*, &c., will perform equally well on the Podura scale. It is possible, however, for a good high-power glass to be equal to both these requirements. Amateur mounters should cover the scales they put up with the thinnest possible glass, so that, when opportunity offers for an examination of the slide under a remarkably good $\frac{1}{12}$th or $\frac{1}{18}$th, they may not find themselves doomed to disappointment, owing to the inability of the objective to penetrate the thick cover.

In conclusion I beg to offer a few remarks on the scale of the Speckled Podura. As I have stated above, it possesses transverse striæ, and these are rendered most distinct when the central rays of the achromatic condenser are stopped out. I believe that the structure of Podura scales in general may be best studied in this one. From very careful examinations I have no doubt that the

* I refer more particularly to the accepted standard test scale.

surface is uneven, and believe that its irregularity is the result of both upper and lower membranes being folded into a number of minute pleats or wrinkles, which have a tendency to overlap each other—a difference in detail only, not in plan, between these markings and those on the scales of

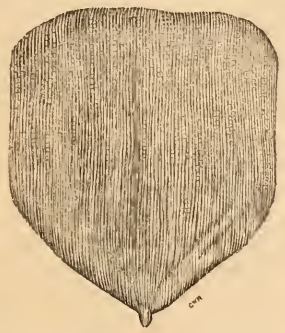


Fig. 50. Scale of Podura, unknown species, × 450.

all other insects. This is best shown by oblique illumination; but when the illuminating ray is in a direction corresponding to the axis of the microscope the appearance is totally changed, and the wedge-shaped markings, which I believe to be hollows between the pleats or corrugations (and not *particles*, as stated in the "Micrographic Dictionary" and elsewhere), come into view directly. Their dark outlines, I think, represent the shelving sides of the little pits, and the bright space in the centre of each is the deepest portion, which from its position with regard to the ray, obstructs the least amount of light.

By moving the diaphragms of Powell's condenser a little backwards and forwards, so as to obtain alternately direct and oblique light, the appearances represented in the figure attached are given. The conclusion I have arrived at seems still further supported, if one of the most strongly-marked scales be examined with a $\frac{1}{8}$th objective, and Smith and Beck's patent illuminator for opaque objects under high powers. The wedge-shaped markings are then distinctly seen to be little pits.

Opaque illumination by means of the side-condensing lens and a $\frac{1}{5}$th object-glass shows the tops of the ridges of pleats illuminated, and the spaces between in very strong shadow, provided the beam of light strike the scale sideways. If it strike lengthways, the view is too indistinct to be satisfactory. My opinion on the subject differs slightly from that of Mr. Beck, who regards the wedge-shaped markings as elevations, and argues accordingly. The question as to whether they are hollows or elevations is of no great importance, and it is exceedingly difficult of resolution. Mr. Beck's remarks refer to the test scale.

S. J. McIntire.

ANALOGY OF SMELL.

An article on the "Analogy of Form" in the last number of Science Gossip, brought to my mind the very remarkable instances which are to be found in the *Analogy of Smell* among the Fungi. I have lately been turning my attention to these interesting productions of nature, and have often been quite astonished at the exact resemblance which the odours of certain species have borne to something extremely familiar to me, but of a totally different nature.

During the month of October last, as I was ascending one of the rising slopes of the Cotteswold hills, in the vicinity of Cheltenham, I thought I perceived the peculiar but agreeable scent of Russian leather, and recollecting that there was a fungus reputed to possess that odour, I immediately directed my search for it. Several specimens were growing around me where I stood, and thus I had been led to detect this little white fungus by its scent, as we sometimes do the violet in the spring of the year, before the eye reveals its whereabouts.

The Rev. M. J. Berkeley says of this species (*Hygrophorus Russo-coriaceus*), that it is rare; but I have a suspicion that it may have been overlooked as the young, or a small state of *Hygrophorus virgineus*, which at a distance it somewhat resembles. It may, however, be readily known from that species by its delightful scent alone, which it retains after drying, and to such an extent, that I think it might be made available for the scenting of drawers, &c.

In the same pasture I gathered *Hygrophorus murinaceus*, which possesses the odour of aquafortis—far less agreeable, but perhaps equally remarkable. The collector of the larger fungi is frequently reminded of this singular similarity of odour to a series of odd things, both of a disgusting and agreeable nature, as the following brief enumeration will illustrate, viz., cinnamon, garlic, heliotrope, cucumber, gas-tar, tarragon, new flour, mice, bugs, ripe apricot, putrid flesh, &c. The similarity of form and colour which some insects bear to portions of the vegetable kingdom, would lead one to suppose that they were designed to protect them from wholesale destruction by birds, &c.; but as regards the odour of fungi, it seems more difficult to form an opinion. The mycologist, however, often finds that they serve him as valuable aids in the determination of species, and without which, his conclusions might be more exposed to error.

H. Beach.

Marks.—A delta is a water-mark; a round crater a fire-mark; and every force which acts on a surface makes a tool-mark which may be learned. Each mark is like a letter. It has a form and a meaning, but only for those who learn to read.—*Frost and Fire.*

THE WASP'S STING, ITS POISON GLAND.

THE discussion relative to the fang and poison gland of the spider, which has appeared, from time to time, in the pages of Science-Gossip, and in which I have taken a part, has led me to examine the stings of bees and wasps, with a view to satisfy myself as to their structure, and to observe what similarity there might be between them and the fangs of spiders, especially in reference to their poison glands. Accordingly, I cut out the sting of a wasp with all its attachments, in as unbroken a state as possible. I spread out the whole on a glass slide, and washed the parts with lukewarm water, without using liquor potassæ. I then allowed the water to evaporate gradually, and the sting, &c., to become quite dry on the slide; and finally, having moistened the object with turpentine, I mounted it in balsam.

I found that in wasps, as in spiders (Science-Gossip, for 1866, page 229), the poison gland is attached by a hollow cord of about the length of the gland itself, and that the course of the cord could be traced down the body of the sting. The gland is similar in shape and size to that of the spider, and when examined under the microscope, with ordinary transmitted light, did not exhibit anything remarkable, except that there was a kind of knot in its extreme end, and attached to it, which seemed to be ramified with a structure of tracheæ. Upon examination with polarized light, nothing particular demanded attention, until this knot came in the field of view, when brilliant star-like crystals blazed forth on the dark ground. The crystals were small, each had a dark cross in its centre, and with selenite gave the usual appearance of complementary colours.

If I would indulge in a deduction from the above appearances, I would say, that the gland contained a fluid poison, in which the crystals were in solution, the evaporation of the fluid poison leaving the crystals as observed.

It would be interesting to try whether a similar treatment of the poison glands of the spider would lead to similar results. This I may attend to, on a future occasion, if I be not anticipated by a more diligent observer.

The slide containing the sting and the gland with the crystals, I have in my possession, and I have no objection to lend it for the examination of any reader of Science-Gossip, who may be sceptical, because unable to verify the appearances I have related.

Armagh. Lewis G. Mills, LL.B.

A Landsman who has only seen a puddle in a storm, has no clear notion of the Atlantic in a gale; and so it is with a man who has never been far from home.—*J. F. Campbell.*

SPIROGYRA.

THE various species of Spirogyra are found, during the spring and summer, in open exposed pools of water, or in slowly moving streams, and are all remarkable for the beautiful manner in which the bands of chlorophyll are disposed within the cells. They consist of bright green filaments, varying from the hundredth part of an inch to a yard in length, made up of cylindrical cells, joined end to end. Some of these occur in nearly every pool, and appear on the top of the water in green or brownish patches, with bubbles of air entangled in their mass. In streams, they attach themselves to weeds, and the long green filaments, waved to and fro by the current, are very pretty.

When viewed under the microscope, with a power of one or two hundred diameters, the bands of chlorophyll are seen disposed in various elegant spirals. In some species these bands are single, in others there are two, three, or four. Upon these bands, which are generally slightly jagged along their edges, are grains of brighter green, disposed at pretty regular intervals, and adding greatly to the beauty of the plant. Sometimes the larger grains are surrounded with smaller ones, and the bands appear like two festoons of exquisite green flowers (fig. 3).

In some cells, but by no means in all, a nucleus may be seen, clinging to the side of the cell or apparently held in its position by strings of protoplasm (figs. 1, 5). In the terminal cell the rotation of the protoplasm is frequently observable, the current seeming to flow down the middle of the cell, and return by the sides.

A young plant is represented in fig. 6, the whole number of cells in which was 20, but only those at each end and in the middle are represented, in order to show the root-like termination, and the manner in which the spiral bands are gradually developed. In the two lowest cells the chlorophyll appears in a shapeless mass, in the third, the spiral bands begin to be marked, and in the middle of the filament they appear as at *b*. At the growing point, they are distinctly marked, but somewhat compressed. In the ordinary cells of this species, the spiral bands, which are rather lax at the ends of the cell, in the middle run close up to one another, and give a peculiar character to the filament.

The cells of different species are not always terminated in the same manner. In some a cell separated from the rest exhibits a rounded outline, in others it is at first slightly constricted, and then rounded (fig. 10). In the former case, the junction of two cells is flat, but in the latter the cell-wall is folded back. This may be readily observed, when the plant is treated with iodine (fig. 10, *f*).

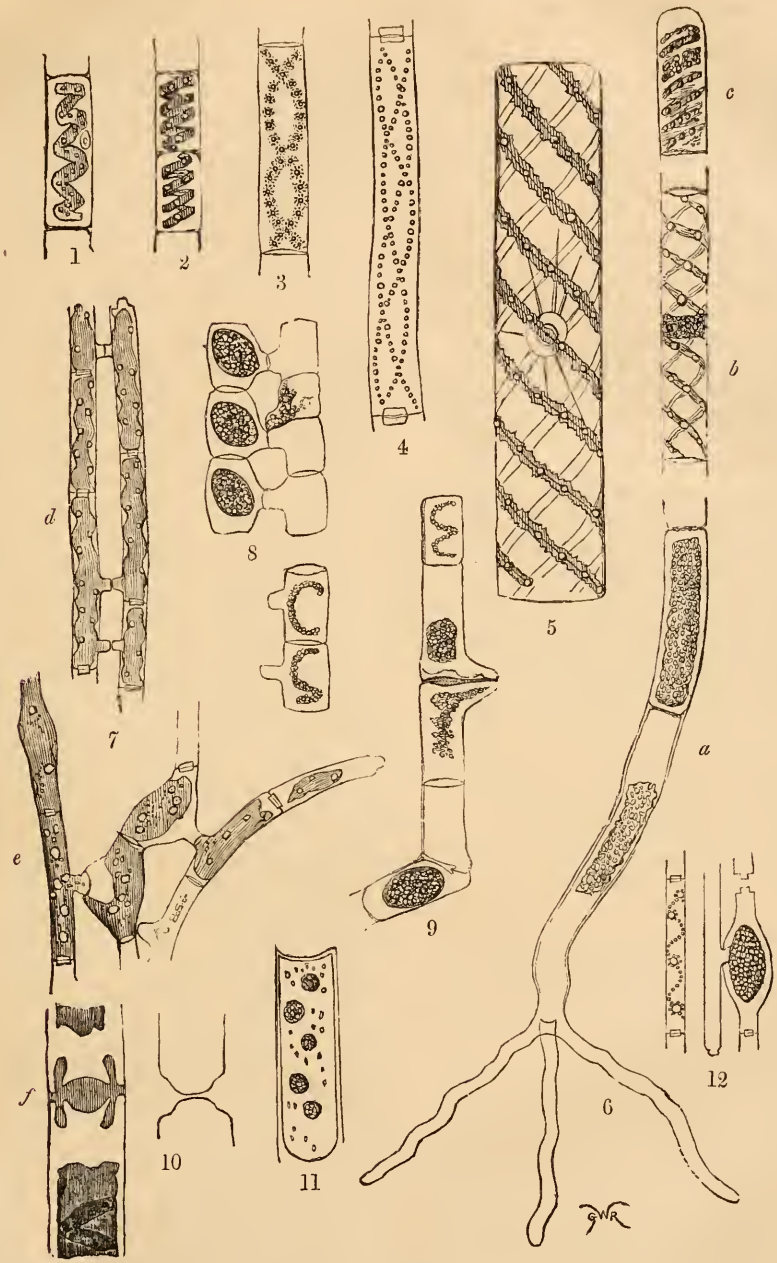


Fig 51. Spirogyra.

All the species of Spirogyra exhibit the process of conjugation. Two neighbouring plants throw out from the sides of their cells little processes (figs. 7, 8); when these meet together a union is effected, the intervening cell-walls are absorbed, or ruptured, and the contents of one cell pass into the other. Before, however, this takes place, the spiral coils are relaxed, and their curves turned towards the process; then the contents lose their symmetrical form, and become altogether shapeless (figs. 7, 9).

When the conjugation is complete, the combined contents of the two cells become an oval spore (figs. 8, 12), from which a new plant eventually springs.

Fig. 7 represents a curious instance of a filament, which has conjugated with *two* others.

In ordinary cases the conjugation takes place as has been just described, but in some cases it takes place in two contiguous cells of the same filament (fig. 9), and the contents of one cell pass over into the next and form a spore.

When the plants have been kept a considerable time in the same vessel, the contents of the cells are sometimes changed into brown moving bodies (fig. 11), but whether these are zoospores or not, seems a little uncertain. The contents of the cells are also changed into green zoospores, which escape from the ruptured cell. J. S. Tute.

The Blood-Beetle.—That the scarlet fluid said by Westwood to be emitted from the joints of the limbs of this beetle is a fact, I can assure Mr. Ullyett from personal observation. The beetle is rather common on our "down," and often, on taking it between my fingers, it has emitted this scarlet fluid from the leg-joints next the body, as well as from the mouth.—*Eliza C. Jellie, Redland, Bristol.*

Fig. 52. Triple Jargonelle Pear (greatly reduced).

Triple Pear.—In September, 1856, I picked in my garden, from a jargonelle pear-tree, a curiously formed triple pear. In looking over an old folio a day or two since, I found a drawing of it I made at the time, and thinking it may have some interest for the readers of Science-Gossip, I enclose you a copy. It would seem as though three blossoms had formed their fruit one within the other.—*J. R. Keene, 4th February*, 1867.

ZOOLOGY.

Parr or Salmon.—As thus buoyant, elated, and self-confident, I proceeded onwards, I observed a boat, with a young man in it, anchored in strange fashion a little on one side of the main stream down which I was passing. The anchor consisted, in fact, of another individual, older than the occupant of the boat, who, standing in the water as deep as his somewhat long legs would allow, leaned his weight upon the stern of the boat, and so held it fast in its position. I passed them carelessly, and when but a few yards in advance, my attention was attracted to a small, struggling, brown fly, which had apparently just dropped into the water. Rushing towards it, and rising suddenly to the surface, I greedily seized, and was preparing to swallow, the delicate morsel; but scarcely did it touch my lips when a slight but smart sensation, as of a thorn pricking my mouth, was felt by me, and I found myself dragged by some invisible but irresistible force against the stream, until, half choked, I approached the boat, into which, by the aid of a light net, I was instantly lifted. I found myself clasped by a dreadfully warm hand, and held, in spite of my struggles, firmly until the hook, attached to the treacherous fly I had seized, was extracted, not untenderly, from my wounded jaw. I was already more than half dead, limp, faint, and bleeding. "It's just a wee parr beastie," said the elder of the two, preparing to slip me into the water. "It's of no use putting it back," said the other; "parr or not, it's dead." "It may dee and be dom'd; I wash my hands of it," was the reply with which my profane friend placed me in the water, carefully enough. I felt sick and helpless; without power to sustain my proper position, I floated, with my back downwards, until I rested against some long floating grass, a few yards from the boat, to which the eddy of the stream had carried me. Although too weak to move, I retained my senses, and heard the younger man say to his companion—"Why, John, what made you throw that poor little dead beast into the water again?" "Deed," was the reply, "yon beastie's just a smolt, an' there's a fine for killing sich like." "But you killed a parr just now?" "Ay." "But you call this a parr?" "'Deed, an' it's the fau't of those who gie the same name to twa different fishes." "What do you mean?" "A' mean that there's a wee fish ye killed just noo ca'ed 'the parr,' an' it's a fish of itself,* an' has melt an' roe as every ither fish has,

* I have opened hundreds of the *Burn* Parr, *Salmo Salmulus*, male and female. I have seen them on their spawning-beds, and taken them out of burns where salmon never yet ascended, nor could by possibility ascend. I have baited hooks with the tough little beggars, and released them alive after they had towed a trimmer for six hours about a loch; the salmon parr being as soft as a pat of butter, and endowed

an' ye'll find it in rivers an' burns, an' abune waterfalls, an' in mountain tarns, where no saumon ever yet was seen or could get, an' it's streekit an' barred all the same as the young saumon-parr; and it's just the confusion of ca'ing the twa by the ae name that's raised a' the fash that's made about the 'edentity,' as they ca' it, of the parr with the young saumon." "Then you believe that the parr is not the young of the salmon?" "If ye ca' the young saumon the parr, the parr is the young saumon; but there's anither parr that has a better right to the name, an' it's a pity that twa fish should be bund to hae but ae name betwixt them."—*Autobiography of a Salmon.*

Dog in Trouble.—A singular mishap befel a young Retriever of mine when he was about four months old. Up to that time he exhibited all the playfulness, and distinguished himself for mischief as much, if not more, than the majority of pups, but at the age of four months he suddenly became serious; the change was so sudden I could not account for it. If I attempted to draw him out with a bit of his favourite carpet, which in his younger days was his delight, he would only survey it well with his head, first on one side and then the other, and sometimes attempt to seize it, but he would recollect himself and turn away, evidently disgusted with it. At first his behaviour was a source of amusement to me; he appeared at times half inclined to play, and at the same time as if he had made up his mind not to do so; in fact, he became quite a *droll dog*. After he had been in this state for about a week, I was patting and caressing him one day when I chanced to touch him rather roughly on his left side, which made him wince and howl, which drew my attention more closely to the spot, and on examination I found a slight swelling just beyond the last rib. I concluded he had been wounded, bathed the place with warm water, and examined it carefully every day. I began to get rather anxious about poor *Rover*, as he was evidently in great pain, and the least touch on the swelling made him whine piteously. He continued in this state for about three weeks, and by this time the swelling had increased considerably, when one morning my attention was called to the dog, and on going out to look at him I observed a slight discharge from his side, and on examining it I slightly bent his body, when to my astonishment the point of a wood-skewer protruded from his side. I immediately took hold of it and drew it forth. I thought it would never end; it came out at last, a perfect unbroken skewer *five-and-a-half inches* long. I could scarcely believe my own eyes; but there was the skewer in my hand, and poor *Rover* was quite conscious of the relief, as he began frisking about and licking my hands with great delight. He stood quite Christian-like while I bathed him well with warm water. He soon resumed his old tricks, and returned to the forsaken fragments of carpet with increased vigour; and I am happy to say Rover is himself again. I can account for the skewer finding its way there from the fact that the dog was in the habit of having meat occasionally from the "cat's meat man," which is sold on skewers, and he must have had a lot thrown to him before it was taken from the skewer. I have since compared the skewers, and find they are not like the common butcher's skewer, but are made of pine.—*James Rowley.*

Hen with Cat and Kittens.—At Falkingham, Lincolnshire, in the early part of last October (1866), was daily seen the following curious instance of maternal affection. A hen was sitting upon her eggs for hatching; she had them taken away from her, but still she persevered in keeping on her nest. One day, when away to feed, an old pussey took possession, and kittened five kittens within it. On the hen's return, instead of being disconcerted at the intruders, she took to both cat and kittens, and with the same assiduity as if her own chickens began and continued to regularly brood them, always pulling any stray kitten under her wings, and, if any curious person, on viewing them, displaced one, would make as great a disturbance as if one of her own chickens had been taken from her. During this singular attachment she would always make room for the old cat to suckle them. She was allowed to have them under her care for three weeks; then she was prevented going to them, and apparently suffered a great loss by the privation.—*J. Ward.*

Spawning of the Frog.—Perhaps the following fact may be interesting to some of your readers. It is, I believe, generally stated in works on Natural History that the frog spawns about the middle of March. Now, although such may be the case in other parts of England, certainly here in the South of Devonshire the spawning takes place at a much earlier period. For the last fifteen years I have observed that in *the absence of frost* the frogs in this immediate neighbourhood spawn on the 14th or 15th of January, *and so punctual are they to the day*, that I have always succeeded in capturing some dozen for observation on those dates. The spawning takes place in the night, and the little creatures, being subsequently weak and exhausted, remain for the next twenty-four hours immediately under and covered by the cake, or else slightly buried in the mud in the immediate vicinity; hence it is very easy to catch them, as they generally select very shallow water for the purpose; but after recruiting their strength for twenty-four hours, they move off and are no longer to be found. This year the severe

with about as much power of sustaining hardships. Doubtless the young salmon is the parr, but the parr is not *always* the young salmon.

weather has retarded their operations, but the night before last the thaw set in, and yesterday the ice had nearly disappeared. Supposing that froggy might require twenty-four hours to recover from his torpidity, I, this morning, sallied forth to my accustomed hunting ground (for they always appear to frequent the same place year after year), a road-side gutter or small ditch not having more than three or four inches of water in the deepest part, and scarcely two feet broad. Here I found about a dozen cakes of spawn which had evidently been deposited during the night, and I immediately caught ten frogs for my fernery in a distance of less than thirty yards. Now as most persons having microscopes are always glad to be provided with a few frogs for observation, I think if they note the days on which the frog begins to spawn in their neighbourhood, they will, another season, be able to secure an ample supply.—*George Dansey, Devonport.*

Silk.—Heliogabalus was the first Roman who wore a garment all silk, which must have been about the year 220 A.D. The Emperor Aurelianus, who died in 275, denied his empress a robe of silk because it was too dear. In the year 555, some monks, who had been in India, brought some eggs of the silkworm to Constantinople, where, in time, they produced raw silk, which was manufactured at Athens, Thebes, Corinth, &c. Charlemagne sent Offa, king of Mercia, a present of a belt and two silken vests, in the year 780, which is the earliest account we have of silk being seen in this country. —*Phillips's "Fruits of Great Britain."*

The Shrike (*Enneoctonus collurio*).—There is a popular idea that this bird always has *nine* impaled creatures at hand, and that when it eats one it catches another, and with it replaces the one which has been eaten. In consequence of this notion, which prevails through several counties, the bird is called nine-killer. The generic name, *Enneoctonus*, is composed of two Greek words which have a similar signification. So strongly is this idea held by some persons, that I have seen a treatise upon instinct, where the shrike was gravely produced as an example of arithmetical powers possessed by birds. These theories generally fail when confronted by facts. I have seen numberless shrike's nests, and though in some cases there may have been nine impaled animals, in some there were more, and in others less.—*Rev. J. G. Wood's "Homes without Hands."*

"Cardinals."—A large and hideous species of spider, said to be found only in Hampton Court Palace, is known by the name of "Cardinals." This name has been given them from a superstitious belief, that the spirits of Cardinal Wolsey and his retinue still haunt the palace in their shape.—*Notes and Queries*, vii., 431.

Swallows in Algeria.—I saw lately a book advertised with the title "A Winter with the Swallows," and having procured a copy, I was surprised to find that the locality of the swallows' winter residence was Algiers. I had always imagined that the supposed winter residence of swallows was somewhere in the centre of Africa; and Rev. H. B. Tristram, in his interesting work entitled "the Great Sahara," states that in that region the Arabs informed him that "for one Swallow in winter they have twenty in summer. The natives are perfectly familiar with the fact of the swallow's emigration, as they say they go to visit Timbuctoo, the El Dorado of Arab and Swallow" (p. 398). I myself have passed twenty-five successive winters in Algeria, either at Algiers or Oran, and from repeated observations I found that the swallow arrived on the 6th March, but an occasional swallow may be rarely observed flitting about in the month of January, if the day be very fair and warm. Swallows, and quails, and corncrakes arrive at Algiers almost simultaneously, although the great emigration of these birds may be put down at the end of March.—*G. Munby, Wood Green.*

Insect Pests.—Can we wonder at the increase of the insects which destroy our fruits, and at the great loss sustained by those who have extensive orchards and gardens? The birds are the only possible agents to counteract the deadly unseen insects which are every hour being bred almost everywhere. Nature has formed the bird's eye for detecting insects where the eye of man is useless. Wholly destroy the birds, and the fruit is wholly destroyed.—*The Gentleman's Magazine.*

Nesting of the Grey Wagtail (*Motacilla boarula*).—During the last season I found a nest of this little bird in a hole on the banks of the Ouse, a position, to me, quite new. Another was found in a barn. This nest was of a curious construction. The nest from top to bottom was six inches in height, and much clay was woven in among the bents. That portion of the nest in which the eggs were deposited was unusually neat.—*John Ranson, Linton-on-Ouse.*

Male Gall-Flies.—Startling as the announcement really was in the first instance, it still appears that we have a want of evidence to prove that a male in the genus *Cynips* has any positive existence. —*F. Smith, in Ent. Mon. Mag.*

Diamond Beetle.—At Rio Janeiro the brilliant Diamond Beetle, *Eutimis nobilis*, is in great request for brooches for gentlemen, and ten piastres are often paid for a single specimen.—*Cowan's Curious Facts.*

Domestic Spiders.—Sir Hans Sloane says that the housekeepers of Jamaica keep large spiders in their houses to destroy the cockroaches, with which they are infested.

BOTANY.

Dombeya angulata.—The stamens in this plant, as in all the Malvales, may be looked upon as compound, while the ordinary stamen corresponds to a simple leaf; the gronps of stamens in the Mallows and allied orders may be regarded as the equivalents of compound leaves, united together at their bases. Some of the lobes or leaflets of these componnd leaves bear anthers, while others are destitute of anthers, and constitute the barren stamens or staminodes. Some light is thrown on the nses of these barren stamens by an examination of the plant now under consideration. In the fully expanded flower, the inner snrface of the upper angle or point of each petal is about on a level with the stigma and with the tip of the barren stamen, the outer flat surface of which latter, as well as the adjacent portion of the petal, are often dusted over with pollen, the trne stamens, nevertheless, being at a considerable distance beneath these organs. In less fully developed flowers the barren stamens may be seen curving downwards and outwards, so as to come in contact with the shorter fertile stamens, whose anthers open outwardly, and thus allow their contents to adhere to the barren stamens. These latter, provided with their freight of pollen, uncoil themselves, assume more or less of an erect position, and thus bring their points on a level with the stigma, whose curling lobes twist round them and receive the pollen from them. The use, then, of the long staminodes seems to be to convey pollen from the short fertile stamens to the stigma, which, bnt for their intervention, could not be influenced by it. The presence of pollen on the upper and inner corner of the petals is readily explained by the fact that, owing to their position and peculiar form, they all come in contact with the ends of the staminodes and the stigmas, and hence they too get dnsted with pollen. These arrangements wonld therefore seem to favonr self-fertilisation, and they show how an organ spoken of sometimes rather contemptuonsly as barren, rudimentary, imperfect, or the like, may yet play an important part both in the architectural plan of the flower, and in its life history.—*M. T. M., Gard. Chron., Jan.* 26, 1867.

Ferns Buried with the Dead.—An urn, dng up in the island of Anglesea, was, with its contents, brought to me for examination by Mr. Albert Way. After having determined the presence of human bones belonging to an adult and to a child, probably to a mother and her offspring, certain filaments were fonnd adhering to the inner surface of the urn; these were of a brown colour, and arranged in definite order like the veins of leaves. Upon microscopically examining sections of these, scalariform vessels were noticed precisely similar to those occurring in the Bracken. This fern is very abnndant in the district in which the nrn was discovered, and most probably portions of fronds were placed in the receptacle before the ashes of the deceased persons were deposited in it.—*Queketf's Lectures on Histology.*

Papyrus in Europe.—The trne Papyrus grows abundantly on the banks of the river Anapas in Sicily, not far from Syracnse, fully 10 or 12 feet high, with stems 6 or 8 inches in circnmference, and with large tufts on the top. This is the only instance of the free growth of the Papyrus in Europe.—*M. H.*

Enormous Boletus.—My friend, Mr. F. C. Penrose, has just sent me a tracing of the section of an enormons specimen of *Boletus luridus*, found by him. The circumference is exactly three feet, and the pileus and stem, are stont in proportion. It was at first mistaken for a milking stool left out by accident all night, but on closer acqnaintance turned ont to be a gigantic fnngus of the Boletns tribe.—*W. G. S.*

The Evening Primrose.—This North American flower was first sent from Virginia to Padua, in the year 1619, bnt at what exact period it reached England is uncertain, since Parkinson is the earliest author who notices it; but it must have been some time previons to 1629, as in his "Garden of Pleasant Flowers," which was published in that year, he speaks of it in a more familiar style than he wonld have done had it been of late introdnction. This author calls it *Tree Primrose* of Virginia.—*Flora Historica.*

Divination by Rib-grass.—It was once, and perhaps still is, a cnstom in Berwickshire to practise divination by means of "kemps" (*Plantago lanceolata*). Two spikes were taken in full bloom, and being bereft of every appearance of blow, they were wrapt in a dock leaf, and put below a stone. One of them represented the lad, the other the lass. They were examined next morning, and if both spikes appeared in blossom, then there was to be "aye love between them twae;" if none, "the course of trne love" was not "to rnn smooth."—*Johnston's "Eastern Borders."*

Plants in Australia.—A number of Enropean genera of plants indigenous to the conntry, or at all events from their sitnations giving reason to suppose so, grew in the vicinity of this river (Murrumbidgee); among others the "sow-thistle" (the young tops of which are eaten by the natives just before the plant commences to blossom), a small red poppy, the crow-foot, a dock, geranium, and "shepherd's purse" were abundant, and they are seen very far in the interior, beyond this place.—*Bennett's "Wanderings."*

MICROSCOPY.

Glass-cells.—I beg to enclose a rough sketch of a simple and inexpensive form of an instrument, now made, but in a most complicated way, and at *a cost* which many would not care to incur. The one figured below can be made at the cost of about a shilling. The advantages of this instrument are

Fig. 54. Glass slide drilled with three holes.

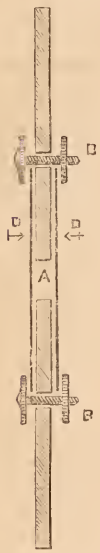


Fig. 55. Side view.

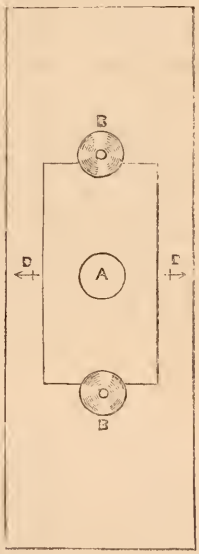


Fig. 56. Upper view.

A, cell drilled in the slide. B B, common paper screws. D D, thin glass covers above and below.

great, enabling an insect (say a Daphnia or Cyclops) to be kept in water in the field of an inch-and-a-half, or two-inch objective, while the thin covering plates enable circulation of blood, &c., to be clearly seen under even these low powers. A $\frac{4}{10}$th works well also with this instrument. I trust that this may be of service to my fellow microscopists.—*J. W. Mencher.*

P.S.—The drilled slides can be obtained of Mr. Charles Baker; the screws at nearly any stationer's.

Vibrio Tritici.—Allow me to add a supplement to Mr. Fox's remarks on the Wheat Eel, contained in Science-Gossip for January. The rearing of these curious creatures has been a favourite amusement with me for a number of years, and as the process is simple, and the results highly interesting, some of your readers may perhaps be disposed to put my plan in practice. I proceed thus:—After selecting about eight grains of *good* wheat, and an equal number of the infected ones, I wrap them in pairs in small pieces of paper, and thus plant them in my garden. Here the damp earth causes the good grain to vegetate, and at the same time resuscitate the eels; and as the wheat plant grows, they enter the fibrous roots, and passing up the stem, enter the ear and deposit their eggs. It is somewhat difficult to detect them in the stem; for this purpose I take a stem long before there is any appearance of the formation of the ear, and cut very short sections, which I bruise in a drop of water, or a glass-slide; but the more easy and pleasing part of the process is to watch them in the infected grain from the first entrance till their maturity. To do this, it is requisite to have the wheat growing close at hand, so that daily access to it can be had, and the time I recommend for commencement is as soon as the grain begins forming in the ear. The first object to be sought is the parent eel filled with eggs. These, when first extruded, are of a dark colour, and opaque, but gradually become more transparent, at which time the young eels will be seen curled up in various figures, and slowly moving round in their shells, from which they ultimately break forth and continue to live on the farinaceous matter of the grain till all is consumed, when they become torpid, and so remain till brought again to life by means similar to those which gave activity and instinct to their parents. With a low power, no difference can be seen between these and the Paste Eel, except the greater activity and varied sizes of the latter. But the difference is very marked when carefully examined with a high magnifier.—*A. Nicholson.*

Tourmaline.—This is a true Proteus among stones: it imitates almost all the gems by the variety of its colours. Thus there are brown, green, blue, yellow and red Tourmalines, and of these there are a great variety of tints. It is principally in Ceylon that the brown and hyacinth-red Tourmalines are found, sometimes mixed with those of some other colour. In Spain they are chiefly brown; and in other parts of Europe a variety is found of a dark-brown approaching to black. Of late years it has acquired additional importance from its application in the examination of objects by polarized light; for if a plate of brown Tourmaline be cut parallel to the axis, it absorbs one of the polarized pencils of light.—*Jackson's "Minerals."*

Solvent for Caoutchouc.—I recommend the *best* benzole as a solvent for *asphaltum* and india-rubber, the best I found after experimentalising for months.—*H. B.*

GEOLOGY.

Fish Beds.—Fish have been found floating dead in shoals beside submarine volcanoes—killed either by the heated water or by mephitic gases. There are, however, no marks of volcanic activity in connection with the ichthyolite beds. They abound, as has been said, in lime, and the thought has often struck me that calcined lime cast out as ashes from some distant crater, and carried by the winds, might have been the cause of the widely-spread destruction to which their organisms testify. I have seen the fish of a small trouting stream, over which a bridge was in course of building, destroyed in a single hour, for a full mile below the erection, by the few troughfuls of lime that fell into the water when the centring was removed.—*Miller's "Old Red Sandstone."*

Human Remains.—Human bones have been found in the Lelim of the valley of the Rhine, at Engisheim, near Colmar, in a marly deposit, in which the bones of a large stag were also found, with a molar tooth of the mammoth, and a metatarsal bone of a bison. M. Faudel records this in the *Comptes Rendus*, and concludes that man lived in the valley of the Rhine contemporaneous with the fossil stag, bison, and mammoth, and that the appearance of man in the country would have been *previous* to certain movements of the earth, which took place after the deposition of the "diluvium," and which have given the ground its present physical configuration.

Submarine Action.—In the year 1783 a submarine eruption took place six or eight miles from Reykiavick, which gave birth to a new island a mile in circumferenee, which, however, the following year again disappeared. A submarine eruption also took place about the same time seventy miles from the same cape, which is said to have thrown up pumice sufficient to cover the sea for a space of one hundred and fifty miles around.—*Daubeny's "Volcanoes."*

Anthracite Coal.—A correspondent of the *Times* writes that,—"From constant experience of this coal in furnaces he believes it is capable of being applied as a perfect substitute for smoky bituminous coal in houses." Now as I have had constant experience, for seven years, of Anthracite coal in houses, perhaps the readers of Science-Gossip may like to know how to render this invaluable, smokeless fuel available in their own residences. I used anthracite in every room in the house during the time I lived in South Wales, from the top bedrooms down to the outer kitchens. We resided in the vicinity of anthracite, or, as they are there called, stone-coal mines—the Gwendraeth Works—and had we failed to use the hard coal, must have sent many miles for soft. All our grates were arranged for it, with fire-brick sides (cheeks) and backs; for there is something in the ordinary *iron* sides and backs that effectually prevents anthracite fuel from showing to the best advantage. The grand essential is a thorough draught through the fire; and to ensure this we had round holes drilled in the fire-brick back communicating with a chamber, or flue, at the back of the grate, so as to convey the current of air through the fire and up the chimney. Anthracite coal is invaluable for cooking purposes; our English servants were charmed with it,—we never had to complain of smoked viands. Cooks were satisfied with their own efforts in the frying and boiling line, and, better still, we were satisfied with their skill. I strongly advise all married ladies, whose lords and masters are, in servants' phraseology, "very particular" on the subject of good dinners (a few men are so perfectly angelic as not to be affected in temper by a badly-dressed dinner) to immediately institute anthracite coal fires in their kitchens. Our housemaids never complained of "the horrid smoke," nor the laundrymaid of those "nasty blacks." An anthracite fire gives out great heat, is clear, smokeless, and healthy All common grates can be fitted with brick backs and cheeks at a very moderate expense. We altered a large kitchen-range so as to burn anthracite effectually.—*Helen E. Watney.*

A Stone Standard.—In Iceland, the marks of Frost are on a vast scale, but they are mingled with the work of Fire. These denuding and upheaving forces are working natural engines—air, water, ice, and steam, side by side,—and their marks are mingled. Marks made by glaciers upon igneous rock are the same as those which are made by land ice, in Norway and Switzerland, on rocks of all kinds; but the chips are different. Here ice-ground glens are partially filled with lava; water-worn boulders, pebbles, and sand, are smothered under sand which fell from the air; great stones have been cast through the air, and rest among glacial rubbish. Snow is often blackened with ashes; ashes are whitewashed with snow; water flows under the lava, and there freezes and forms subterraneous glaciers. Glacier rivers carry fine mud, which glaciers grind; but it is mixed with volcanic dust, sulphur, cinders, sticks, and all things which rain can wash from such a land into the sea. The sea-beach is strewed with lava and Arctic shells; American drift timber, mahogany, strange sea-weeds of great size; "horse-eyes" from the West Indies; dead puffins from the Aretic ocean; fish-bones and seals; and sometimes the Arctic current brings an ice-fleet—it may be freighted with stones and mud picked up at Spitzbergen, Jan Mayen, or Greenland. The surface of the land is a stone standard by which to read geological hieroglyphics elsewhere.—*"Frost and Fire."*

NOTES AND QUERIES.

Pollen in Honey.—Fig. 15 of your Illustrations in Science-Gossip is evidently the Pollen of "Passiflora," and 25 that of "Œnothera;" the rest I cannot make out. Your paper is very interesting.—*W. T., Iliff.*

Woodpeckers' Eggs.—In my cabinet I have two woodpeckers' eggs which, during the last few months, have become thickly speckled with ash-coloured spots. Can any reader inform me of the cause, and how I can remove them? The eggs have been in my cabinet more than two years.—*H. Tasker.*

Fifteen-Spine Stickleback.—I have made several attempts to keep the fifteen-spined stickleback (*Gasterosteus spinachia*) in my aquarium, but have always failed to keep it alive for more than a month or so at the most, and even for this short time only in the latter part of spring and beginning of summer. I have never managed to keep it over the winter. I attribute my failure solely to my not knowing the proper food to give them. In the spring and earlier part of summer I used to get a small fly about the windows which they swallowed quite easily, and upon which they seemed to thrive; but as the seasou advanced these became scarce and latterly disappeared altogether. I then tried them with the common house-fly, which, almost without an exception, they were unable to swallow, although they made great efforts to do so, and gradually they pined away and died. The other fish (*Blennius pholis, Cottus bubalis, Gobius,* &c.) I fed upon beef which the sticklebacks never attempted to touch; the reason of which I take to be the want of any signs of life in the beef as it fell to the bottom of the tank; so they would not even bite at a fly unless it happened to be making some motion on the surface of the water. Perhaps some reader who has been more successful in keeping them than the subscriber, may be able to say something on the subject.—*J. C. H., Glasgow.*

Unknown Object.—I should be greatly obliged to any of your readers who would give me information respecting the following beautiful and interesting object, which I had an opportunity of observing in my microscope the summer before last. It was, I suppose, the larva of a fly or beetle; and the breathing organ was probably the part I noticed. The creature was but a small speck on the leaf of Anacharis, on which it quietly rested, looking like a minute slug. Under the microscope it showed a very ugly head. At the tail was a wonderful apparatus, consisting of a number of loops. These were alternately drawn up or down, producing the effect of an ordinary paint brush, at one moment wetted and drawn together, the next showered out and each hair curling back at the tip. It is not easy to describe, but most beautiful to behold. I should be glad to learn what this larva becomes in its perfect state, in the hope of obtaining specimens.—*L. S. M., Ryde.*

Black or White.—A friend of mine has a hen of the Polish breed, which, six months ago, was of a glossy black colour, but which has undergone a complete change, and is now of a snowy white. This transformation was not done by moulting, but by a gradual change of colour.—*H. L., Rose Hill, Old Trafford.*

Waterton's Process.—Do you know if the process by which Mr. Waterton preserved his natural history collection, is known? From a paper written by Rev. J. G. Wood, in the *Intellectual Observer* for July, 1863, it seems it was not at that time. If it has since been discovered, and you can give it to the readers of Science-Gossip, you will be conferring a great favour on many, who are disgusted with the old mode of wire and stuffing.—*H. M. G.*

Queen Apple.—The correspondent, E. W., Manchester, in the December number, wishes to know about this fruit. In Disraeli's "Curiosities of Literature" (article "Introducers of Exotic Flowers Fruits, &c.") is a quotation from Peacham's "Emblems," 1812—

> And red queen apple, so envide,
> Of school boles, passing by the pole;

and in a note it is stated to have been probably named after Queen Elizabeth; and it is added that apples had become red by being grafted on a mulberry stock, known to Pliny. Mr. Disraeli says further that the race is not extinct. The only apple I can hear of approaching the above is a red-fleshed fruit, called hereabouts "red ripe," no doubt well known in the London markets.—*W. D., Brenchley.*

The Papuans.—Has any reader of S. G. ever noticed the following passage in Captain Cook's account of his first voyage? It seems extraordinary, but from his remarkable truthfulness is probably quite reliable. After saying that Messrs. Banks, De Solander, and others, landed on the coast of New Guinea, near the Cape de la Coltade San Bonaventura, he proceeds:—"After they had advanced about a quarter of a mile from the boat, three Indians rushed out of the wood with a hideous shout, and as they ran towards the English, the foremost threw something out of his hand, which flew on one side of him and burned exactly like guupowder, though without making any report.

* * * *

"While the Euglish gentlemen were viewing them, they were shouting defiance, and letting off their fires by four or five at a time. Our people could not imagiue what these fires were, or what purpose they were intended to answer. Those who discharged them had in their hands a short piece of stick, which they swung sideways from them, and immediately there issued fire aud smoke, exactly resembling those of a musket, and of as short a duration. The men on board the ships who observed this surprising phenomenon were so far deceived by it, as to believe that the Indians had fire-arms. To the persons iu the boat it had the appearance of the firing of volleys without a report." Can this be some unkuown engine of war of a pyrotechnic character? Have the Dutch, who have a settlement in Papua, or any subsequeut navigators, observed the same phenomenon? These are interesting questious, which some one may possibly be able to solve.—*F. A. A.*

Marmalade.—There is a tree in India known to botanists as *Ægle marmelos*. It belongs to the orange family, and yields a fruit about the size and appearance of an orange, which makes a delicious preserve. The Dutch for many years imported this preserved fruit into Europe under the name of "marmelos," a name by which it is known in Ceylon. In imitation of this preserve, and in corruption of its name, originated "marmalade."—*E. Waring, M.D.*

Squirrels.—The disease described by C. L. C. as having killed his squirrel is known as the "Rot." It is caused by too moist food. Bread and milk in the shape of "pap" will mostly prove fatal. I was applied to for advice in a similar case by a young lady who had a favourite grey squirrel, whose hind limbs were so paralyzed. I prescribed dry food, in the shape of hemp-seed and gingerbread, which was a perfect cure. When a squirrel dies of the rot the maggots appear externally; and, I presume, are engendered during life. The squirrel may be kept in health on a diet of hemp-seed, varied by a piece of bread dipped in milk *only* (not soaked), nuts, and green buds. Let him drink his fill of water *once* daily, and stuff his bed box quite full of nice dry hay, he will then amuse himself by biting it to pieces and making a very cosy nest.—*John Hunter, New Malden, Surrey.*

Shooting Rare Birds.—I feel sure that every true naturalist will agree with Mr. Tate in condemning the shameful practice, which appears to be sorely on the increase, of killing every rare bird, which, unfortunately for it, is led towards our shores. It is almost impossible to take up any paper on natural history without meeting with numerous instances. Take, for example, the Waxwing (*Bombycilla garrula*), which has appeared in great numbers during the few weeks past. Where possible, every flock has been exterminated, and the birds have been sent to the nearest stuffer. In the last number of Science-Gossip there is an account of a country correspondent shooting a female Great-spotted Woodpecker (*Picus major*). The gentleman who sends the information is not quite sure in his own mind as to how it will be received, for he commences to say, "*Perhaps* you may be interested, &c." (p. 41). How such wanton persecution can in any way be interesting is a mystery to me! It *would* be very interesting if instead of shooting the birds your correspondents would watch their habits, and give us the particulars; by so doing they would add to our knowledge of ornithology, whilst at the same time they would have the satisfaction of knowing that they had saved the lives of rare visitors. I wish, with Mr. Tate, that this "stupid practice of destroying all our most beautiful birds" *could* be stopped; but I cannot see how it is to be done, because the temptation of shooting a rare bird to add to a collection is too great to be resisted by many who *call* themselves naturalists.—*Edward Simpson, Chelsea.*

Frog in Oolite.—In speaking of the discovery of a frog in the oolite, Mr. Simon Hutchinson says: "Personal inquiry can be made by the sceptical, or silence in future will be most becoming." Why should personal inquiry be made? What will it prove more than Munton's letter proves? I suppose no one would care to doubt that he truthfully describes what he saw. But why should Mr. Hutchinson wish to compel people to a belief in his explanation of the phenomenon, or else to silence? One had thought that rational men had given up such bigotry as this. Surely no sane person would now-a-days try to uphold such an absurdity as the existence of a frog in oolite mud. Why, how would salt water agree with him? To say nothing of minor difficulties. If Mr. Hutchinson will take the trouble to examine the stone quarries around Grantham, and especially those at Ancaster, he will find plenty of fissures through which poor froggy might have come to grief in his wooing expedition. I think, sir, this is a much more rational mode of explaining the presence of the "apple in the dumpling" than by supposing the crust to have been raised and baked some hundred thousand years ago.—*L.*

Conochilus Volvox.—Mr. McIntire, in the January number, remarks that the "Conochilus Volvox" will not live in confinement. Knowing this, I was surprised to find that *large* numbers made their appearance in my aquarium in October, 1865, and continued for nearly two months to the delight of myself and microscopic friends. The aquarium is rectangular, holds about seven gallons of water, and is exposed to a north light. At that time it had six gold fish in it, and the plants were *Anacharis alsinastrum, Chara vulgaris, Valisneria spiralis,* and a species of rush (I don't know the name). Pump-water was used for filling. Now, in dipping for Conochilus, the most likely place to find them is amongst rushes. Could the rushes in the aquarium have had anything to do with their production in this instance? Through an accident I had last spring to remodel my aquarium, and suppose I did not fulfil the same conditions, as they did not again favour me.—*John Davis, Stowmarket.*

Microscopic Camera.—In vol. ii., p. 233, Science-Gossip, is a description of a "Microscopic Camera Obscura." Whilst waiting for the Prism there mentioned, any one can obtain an excellent result by using a common looking-glass hung inside the box, and made moveable by an attached string passing through a small pulley on the top of the box. After removing the eye-piece and adjusting the glass, so that it may form an angle of 45° with the axis of the microscope, a beautiful image is visible upon the paper underneath, which image is, of course, made to vary in its brilliancy by altering the intensity of the light.—*H. W.*

Object for Microscope.—In the January number J. S. Tute mentions varnish evaporating as an object. Another interesting one is a small quantity of powdered charcoal mixed with a little spirit of wine, and put between two glasses. The regular movement of the charcoal in the current of the evaporating spirit is curious. A bit of chalk or zinc dissolving in weak acid is a capital object for the gas microscope.—*E. T. Scott.*

Dust on Aquaria.—I dare say many of your readers who keep aquaria have been, like myself much troubled by the collection of dust on the surface of the water. This is a fertile source of annoyance, especially in shallow aquaria where everything depends on the clearness of the surface. I have adopted a plan which may not be original, although I have not seen it mentioned anywhere. It is to take a small gallipot, and to hold it just below the surface of the water. In the other hand I hold a funnel with a piece of rag in it, into which I throw the contents of the gallipot as often as it fills. This I find speedily and effectually skims off all the dust and leaves the water as clear as a looking-glass.—*George Gatehouse.*

Barn-Rat and Marsh-Worm.—Have any of your correspondents seen the barn-rat feeding on the marsh-worm (*Lumbricus minor*)? Last summer I saw several in the day-time feeding on this worm, which they gathered up in their paws and eat like a squirrel, sitting up on their hind-quarters. They often went below the surface of the water whilst seeking for the worm.—*H. Smith.*

A Boy Charmed by Serpents.—The *Maysville* (Kentucky) *Eagle* says that a boy, four or five years of age, in Bracken county, was in the habit, during the whole of last summer, of going out in the woods near his home to play with his "pretty things," as he called them. After much persuasion one day, his mother was induced to follow him to his playgrounds to see what attracted him so much, when, to her horror, she discovered her little darling playing with a trio of huge black snakes, wholly unconscious of his peril. The boy was completely fascinated, and would advance and retreat, and sport and dally with his hideous comrades as if he were in the charmed circle of his brothers and sisters. The mother, in terror, ran to the house crying for help, when the father of the child rushed to the rescue of the boy, and, after some difficulty, killed the snakes. Wonderful to relate—and we have this information from a gentleman of unquestionable veracity—the little boy soon took to his bed, from which he never arose. He pined away and died, an early victim of the fascination of the serpents.—*New York Times.*

Can the above be true?—*J. B.*

Twin Trout.—I paid a visit the other day to Mr. King, of Portland Road, whose name is so well known to the public for his exertions in connection with the recent calamity in Regent's Park. He has just now—or had when I called—a curious *lusus naturæ*, a sort of Siamese twin trout, hatched on the premises. This extraordinary joint-stock fish (limited) finds it as difficult to get on, apparently, as some of his brother Co.'s. There are two distinct bodies, but only one tail; and as the two bodies don't always take the same thing into their respective heads, the common tail has its work cut out to steer them. I have never heard of a case of the sort before. I also saw the curious parasites, found in the gills of a salmon, which were recently exhibited at the meeting of the Quekett Club. Mr. King is an ardent naturalist, and has devised a scheme for the employment and amusement of the young, which I for one should be glad to see taking the place of purposeless postage-stamp collecting. He suggests that schools, or the young people of various neighbourhoods collectively, should make gatherings (in duplicate) of the natural objects of their districts. A central bureau should be established, where prizes would be given for the best collections, and where exchanges might be effected. By these means, the study of natural history would be promoted, and museums established in various parts; not to mention other advantages. The idea seems to me a very good one.—*Town Talk, in "Fun," Feb.* 9.

Shell Money.—It is somewhat curious, that these shells (*Entalis sp.*) should have been employed as money by the Indians of N.W. America, that is, by the native tribes inhabiting Vancouver's Island, Queen Charlotte's Island, and the mainland coast from the straits of Fuca to Sitka. Since the introduction of blankets by the Hudson's Bay Company, the use of these shells, as a medium of purchase, has to a great extent died out, the blankets having become the money, as it were, or the means by which everything is now reckoned and paid for by the savage. A slave, a canoe, or a squaw, is worth in these days so many blankets; but it used to be so many strings of *Dentalia*. In the interior, east of the Cascade Mountains, the beaver-skin is the article by which everything is reckoned, in fact, the money of the inland Indian.—*J. K. Lord, F.Z.S.*

Frederick J. Foot.—Those of our readers who remember the interesting chapter on Sea-Anemones (Science-Gossip, vol. i. p. 155), by F. J. Foot, M.A., will regret to learn from an obituary in the *Geological Magazine* for February, that on the evening of the 17th January a number of people were skating upon the ice of Lough Kay, near Boyle, in Ireland. Two of them having ventured upon a weak portion of the ice, it gave way, and they fell into the lake. Seeing their extreme danger, Mr. Foot came to their assistance, and in a noble effort to save their lives, lost his own. They were both rescued, but he was drowned. Mr. Foot was attached to the Irish Branch of the Geological Survey, and though only thirty-six years of age, had communicated many useful and interesting papers to the Natural History Society of Dublin, on botany and zoology, as well as written several geological notices.

Birds breeding in Confinement.—Can any of your readers give me any information so that I may get my birds to breed? I have pairs of the following birds:—Siskin, Snow Bunting, Bullfinch, Goldfinch, Brown Linnet, Lesser Redpole, and Canary. I have them in a room, and feed them on hemp, canary and rape-seeds, and in summer I supply them plentifully with green food, but for all that I cannot get them to build; the canary is the only pair that breed. If I could get any hints that would tend towards inducing them to breed, I should be very glad. They seem to be very healthy and tame, and very seldom fly against the netting or the window.—*A. Pickard.*

Aquarium Pest.—Last year some of your correspondents mentioned, under this name, the nests of the fresh water snails that are so apt to appear on the sides of an aquarium; others said there was no need to remove them, as they were "greedily devoured" by the fish. My children have a fresh-water aquarium, on the sides of which upwards of 100 of these nests have appeared within the last six weeks. So far from being "greedily devoured," not one has been touched either by fish, newts, or beetles; every tiny egg, moreover, contains a black spot, which must be the embryo snail. Why, then, do they never hatch? Some of them have been there more than a month; and last summer, being curious to see what would come from them, we removed from the aquarium some aquatic plants covered with them, and kept them for many weeks in a separate glass jar, with no living creatures to molest them. If they are the eggs of the snail, why does nothing come from them?—*L. H. F.*

Among Wasps.—One day last autumn I observed a small cluster of wasps on the ground, busily engaged in moving round some object in their centre. After a few moments' observation, their movements allowed me to discover that the object of their assiduous attentions was a queen wasp, which they were engaged in attacking, exactly in the same manner as the working bees do the drones, when about to lay up their winter stores. In both cases they attempt to tear or destroy the wing, especially at its attachment to the body, with their mandibles. The issue of the assault I cannot record, as the whole combatants soon took flight. I could only observe that, like the drones, the queen wasp's defence seemed very languid. Are these struggles usual?—*G. A. W.*

Blood Beetle.—In your interesting periodical for this month appears a short paper signed "Hy Ullyett," on the natural history of the "Blood Beetle." From his description I imagine it to be that kind known more generally as the "Oil Beetle," numbers of which may be found in most hedgerows in the early months of spring. The figure he gives appears to be a male insect, the broad tarsi of which are not, as he supposes, for merely holding on to vegetation, but chiefly for the fulfilment of higher duties belonging to its sex. The female has the tarsi slender and narrow: an example is given in a woodcut, indifferently executed, in "Wood's Common Objects of the Country," Plate J., fig. 11. It is a matter of regret to me, and perhaps to others, that in Rye's "British Beetles" many of the most familiar, and by no means least interesting, varieties are not figured.—*J. Hawkes, M.D.*

Left no Address.—In your last number, E. A. inquires the address of W. Winter, late of Mulbarton. Like E. A., I was induced to subscribe for entomological specimens, and not having heard from Winter, I wrote to a gentleman in Suffolk named by him as a reference. From this gentleman, I learn that Winter left his home last spring, ostensibly to go to London, since which time he has not been heard of. He left behind him his books and instruments, a very few debts, and a wife and family, who have since been obliged by distress to have recourse to parish relief. I am informed that Winter, who was a parochial schoolmaster, and always bore a high character for honesty and integrity, had up to this time always fulfilled his engagements. If his friend H. Bales be likewise "non est inventus," I fear the case looks suspicious; but any how, the wife and children are the greatest sufferers. I have sent them a trifling help, and if any charitably disposed reader will give them a few stamps, I shall have pleasure in forwarding the contribution.—*H. W. Livett, M.D., Wells, Somerset.*

We are sorry to add to the above that, from letters which we have received, we are in a position to state that Winter's engagements for 1863–4 are some of them still unfulfilled, as well as those of last year.—*Ed.*

Bulbul of the East.—In reply to S. M. P., there are several Asiatic birds known by the name of "Bulbul." *Pycnonotus pygæus* is the Bulbul of Hamilton, and *Pycnonotus hæmorrhous* is the Bulbul of Jerdon. Another species is called the Hill bush Bulbul, and another the yellow Bulbul. *Phyllornis Jerdoni* is the common green Bulbul, and a species of thrush (*Merula Boulboul*) is sometimes called Bulbul. The name probably belongs more strictly to one of the first two species above named.

Orchil Weed.—The dyer's lichen was first exported from the islands of the Archipelago to Venice, Genoa, France, and England, for the use of the dyers. Towards the commencement of the last century it was discovered in the Canary Islands, and was soon placed among the regalia of the Spanish Crown. This excited the attention of the Portuguese, who collected it without restriction in the Cape de Verd Islands, Madeira, Porto Santo, and the Azores. In the year 1730 the Jesuits asked of King John V. the privilege of collecting the *Hervinha secca;* but the Crown took advantage into its own hands, and farmed the right of collecting it. At a later period the lichen was ceded to the mercantile company of Gram Pará and Maranhão; and lastly, in the year 1790, the government again took this branch of commerce under its own care, because it had declined considerably under the bad management of the company.—*Spix and Martius' Travels.*

Napoleon's Willow.—Having been frequently asked the history and age of the tree called Napoleon's Willow, which grows in the Royal Botanic Garden at Kew, I send you the following account of it. Soon after the death of Napoleon I, in 1821, Thomas Fraser, then a young gardener at Kew, was engaged to proceed to St. Helena, for the purpose of growing vegetables to supply the East India Company's homeward-bound ships that touched at that island. He returned in 1825, bringing with him Tree Ferns and other interesting plants of the island, and amongst them a twig of the willow-tree which grew over the tomb of Napoleon. This twig on arrival was found to have become decayed at the lower part, but the upper portion, which was only a few inches in length, being green and fresh, I placed it under a bell-glass as a cutting, where it soon rooted and became an established plant. A paragraph having appeared in the newspapers announcing the fact that a plant had been received at Kew from Napoleon's tomb, and the far-famed names Bonaparte and Waterloo being still fresh in the public mind, many visitors came to see it, "especially on Sundays;" and on one Sunday, before the hour for opening the Gardens, the crowd was so great, that by its pressure the bolts of the gate gave way, and those who were foremost fell, others falling over them, so great was the eagerness evinced to get a sight of this willow. In 1827 the tree was planted where it now stands, near the walk, which was a continuation from the then public entrance, the willow in question being the first conspicuous object seen on entering the garden. For the first twenty years of its growth it had the advantage of being sheltered by a high trellis fence and shrubbery, which passed near it. It is now forty years old, and although it grows in dry, light soil, it has attained the height of 40 feet, the spread of its branches being 44 feet, the circumference of the trunk near the ground 8½ feet, and its height 5 feet, at which point it divides into three main stems. Coming from St. Helena, it was at first thought to be a distinct species, but it soon became evident that it was the common Salix babylonica.—*J. Smith, Gard. Chron., Feb.* 2, 1867.

West-Indian Ticks.—Mr. Sells has stated that in Jamaica dogs as well as cattle and horses are very subject to the attacks of ticks of large size, and which are occasionally so injurious to the latter as to cause their ears to drop down without the horses having the power of raising them again; indeed it is a regular custom once a week, whilst the horses are out at grass, for them to be driven home to be "licked," the parts infested being rubbed over with lamp oil, no other remedy having been discovered.—*Journ. of Proc. Ent. Soc.*, vol. i., p. lxviii.

Bedeguar.—H. W. K. desires to be informed of the origin and meaning of *Bedeguar*, as applied to the mossy galls of the wild rose.

Male Cockroach.—Can any of your correspondents tell me the use of wings to the male cockroach?—for I have never seen or heard of it flying. —*E. F. B.*

NOTICES TO CORRESPONDENTS.

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

A. R. W.—"Nichols's Dictionary of Scientific Terms" will perhaps suit you; price 12s. Reeve & Co.

M. H.—The hairs on your larvæ are simple, not compound, as in Anthrenus.

A. K. L.—Because heat and spirit will dissolve some crystals, either, or both, often accompany mounting in balsam.

J. A., Jun.—The Natural History division of the "English Cyclopædia" now publishing in parts or volumes by Bradbury & Evans.

G. W.—A good suggestion, and will be remembered.

J. C.—"Microscopic Fungi," 6s.; "British Fungi," 6s. Published by R. Hardwicke, 192, Piccadilly. To preserve fungi, consult these works.

M. G. F. asks the name of the "phosphorescent centipede." The "Apples of Sodom" are galls formed on a species of oak.

A. B.—If communications are not inserted within three or four months, it may reasonably be concluded that we have been unable to find room for them.

Lizzie.—See Notes and Queries in this present number for a full reply, headed "Squirrels."

J. W. W.—We have no knowledge of the method employed by Dr. Gregory with Glenshira sand.

A. E. M.—Only by continued practice and perseverance can you hope to equal the slides of selected Diatoms you name. Is it worth the labour?

T. J.—The fly is *Bibio Marci*, so named because it appears in abundance at the period of St. Mark's Day. The other insect is a Pimpla, family Ichneumonidæ, too much broken for determination.—*F. W.*

J. R., Jun.—Several kinds of Willow Galls, so that the query is vague. The covers *will* also hold the advertisements.

A. P.—The Waxwing has visited a great many localities this year. It is much to be regretted that they are so ruthlessly destroyed.

T. J.—There has been a parasitic fungus on No. 3, but it is all gone. It is old and exolete.

J. H. D.—See our answer to G. F. P. in January number, p. 24.

W. W. S.—It is *Torula herbarum*, sporcs globose, in chains.

S. L. B.—We do not hear of any maker of the section machine you name. A machine called "Topping's Machine" may be had for 15s.

J. M.—No. 1. *Cypræa pediculus* (L.); 2. *Oliva bullata* (Reeve); 3. *Conus* (Sp.); 4. *Lucina divaricata* (L.); 5. *Neritina viridis* (L.); 6. *Pecten vestalis* (Reeve); 7. *Cardium* (Sp.).—*R. T.*

Mosses (J. F.).—1. *Weissia controversa*; 2. *Pleuridium alternifolium*; 3. *Trichostomum rigidulum*; 4. *Hedwigia ciliata*; 5. *Didymodon rubellus*.—*R. B.*

J. H.—There is nothing strange in any of the Reptilia hybernating.

P. P.—Gardiner, High Holborn, or Cooke, Oxford Street, London. We do not know where Bermuda earth can be obtained.

M. R.—"Harvey's Synopsis of British Seaweeds;" Reeve & Co.; 5s. You may obtain "prepared skins" of either of the naturalists above-named (answer to P. P.).

S. G.—The best is *Val Diœneria spiralis*.

S. A. M.—It is such a common occurrence that we cannot afford it space.

S. M. P.—We object to giving very precise localities for rare plants, which may end in their extermination. There is war enough against rare plants and animals now, which we have no desire to increase. We would not, if we could, give the Dorsetshire station, and must be excused from inquiring.

E. G. M.—One of the curious Algæ, probably from the Southern Ocean, of the genus *Corallina*.

E. T. S.—The hard fungus is *Sclerotium durum*, with a mould (*Polyactis cinerea*) growing from it.

W. F. H.—Closterium, in such a miserable condition that no one would thank you for them.

D. C. B—Obtain "Gardner's Taxidermy" for one shilling or eighteenpence.

R. G.—Apparently *Podura* (*Achorutes*) *fimetaria*.—*I. O. W.*

EXCHANGES.

Birds' Eggs (British) for British Lepidoptera.—Apply to H. L., Rose-hill, Old Trafford, Manchester.

Chinese Beetles, &c., for injections or entomological slide.—W. T. Loy, 10, Rood-lane, Eastcheap.

British Mosses.—West country mosses offered in exchange for Devonshire or other species.—F. B., 19, Clarendon-place, Plymouth.

Foraminifera from Kentish chalk for other good objects (mounted).—W. Freeman, 2, Ravensbourne-hill, Lewisham-road, Greenwich, S.E.

Oran Earth and seeds of *Paulownia*.—J. W. Leakey, 3, Prince of Wales Avenue, Malden-road, Haverstock-hill.

Mummy Cloth (genuine from Luxor), unmounted, for sections, animal or vegetable.—W. Spicer, Itchen Abbas, Alresford.

Hair of Tiger, Leopard, &c., and corallines, for mounted palates of mollusca, except whelk and periwinkle.—E. C. Jellie, Eldon Villa, Redland, Bristol.

Epithemia turgida or *Coscinodiscus* (mounted) for *Arachnoidiscus* or *Triceratium*.—G. Moore, Dereham-road, Norwich.

Ferns.—Seedling *Gymnogramma Chærophylla* for seedling *G. leptophylla*.—H. J. Charlton, 2, Richmond-grove, Queen's-road, Everton, Liverpool.

Smut in Wheat.—Send stamped envelope (with address) to J. J. Fox, Devizes.

Fish Scales offered for unmounted specimens of the same.—J. H. M., 17, Walham grove, St. John's, Fulham, S.W.

Land and Freshwater Shells (British) wanted in exchange for land and freshwater shells of Maine (U.S.).—Address, Rev. E. C. Bolles, Portland, Maine, U. States.

Fibrous Copper offered for other mineral objects (unmounted).—A. S., 2, Hanover-place, Rye-lane, Peckham.

Microscopic Objects for bat hairs from named specimens.—Geo. Potter, Montpelier-road, Upper Holloway, N.

BOOKS RECEIVED.

"The Technologist." No. 7, New Series, February, 1867.

"The Quarterly Magazine of the High Wycombe Natural History Society," January, 1867. No. 3.

"Catalogue of Ferns." R. M. Stark, York-road, Trinity, Edinburgh.

"A Fox's Tale: a Sketch of the Hunting Field." Day & Son (Limited). 1867.

Communications Received.—F. B.—A. P.—J. R.—W. T. L.—S. L. B.—S. G.—F. W. C.—J. S. T.—S. J. M. I.—A. E. M.—L. S. M.—H. M. G.—G. G.—J. W. W.—Lizzie G.—H. L.—A. B.—C. S. B.—H. H. A. F.—M. G. F.—E. F. B.—E. T. S.—G. C. D.—J. B.—J. C.—W. G. S.—G. W.—J. A., Jun.—R. McL.—J. H.—L (Lynn).—H. L.—L. H. F.—E. G. J.—A. K. L.—M. H.—J. B. K—A. R. W.—H. W.—T. G. P.—R. H.—F. B.—J. H. M.—H. H. K.—C. D.—H. W. L.—E. M. H.—E. C. J.—J. D.—J. C. H. (Glasgow)—W. F.—J. W. L.—W. W. S.—W. T. L.—G. M.—G. E. C.—H. W.—J. W.—T. B.—W. A. L.—W. P.—H. J. C.—G. M.—R. G.—A. M.—A. N.—J. J. F.—J. H.—M. R.—P. P.—E. J.—J. F.—E. G. M.—E. T. S.—W. F. H.—S. M. P.—A. M. B.—F. M. B.—E. C. B. (Portland, U.S.).—C. H.—S. A. M.—H. T.—G. P.—W. W.—J. M. C.—W. L. H.—G. G.—D. C. B.—A. S.—J. R., Jun.—B. T.—E. D. B.—J. R.—E. S. W.—E. D. C.—J. B.—J. P.—H. G. G.—W. A. L.—A. P.

Paulownia sent to T. L. B.—E. B.—C. B.—J. B. (Cockermouth).—J. B. (Euston).—G. E. C.—J. F. C.—J. C. D.—M. F.—E. G.—G. G.—W. H. H.—J. C. H.—H. (Sheffield).—H. (London).—A. L.—J. H. M.—S.—G. E. S.—J. S.—E. W.—F. W.—J. T. Y.—A. B.—F. B.—D. H.—R. H. M.—W. H.

HOW TO STUDY NATURAL HISTORY.*

By PROFESSOR HUXLEY, F.R.S., &c.

NATURAL HISTORY is the name familiarly applied to the study of the properties of such natural bodies as minerals, plants, and animals; the sciences which embody the knowledge man has acquired upon these subjects are commonly termed Natural Sciences, in contradistinction to other so-called "physical," sciences; and those who devote themselves especially to the pursuit of such sciences have been, and are, commonly termed "Naturalists."

Linnæus was a naturalist in this wide sense, and his "Systema Naturæ" was a work upon natural history in the broadest acceptation of the term; in it that great methodizing spirit embodied all that was known in his time of the distinctive characters of minerals, animals, and plants. But the enormous stimulus which Linnæus gave to the investigation of nature soon rendered it impossible that any one man should write another "Systema Naturæ," and extremely difficult for any one to become a naturalist such as Linnæus was.

Great as have been the advances made by all the three branches of science, of old included under the title of natural history, there can be no doubt that zoology and botany have grown in an enormously greater ratio than mineralogy; and hence, as I suppose, the name of "natural history" has gradually become more and more definitely attached to these prominent divisions of the subject, and by "naturalist" people have meant more and more distinctly to imply a student of the structure and functions of living beings.

However this may be, it is certain that the advance of knowledge has gradually widened the distance between mineralogy and its old associates, while it has drawn zoology and botany closer together; so that of late years it has been found convenient (and indeed necessary) to associate the sciences which deal with vitality and all its phenomena under the common head of "biology;" and the biologists have come to repudiate any blood-relationship with their foster-brothers, the mineralogists.

Certain broad laws have a general application throughout both the animal and the vegetable worlds; but the ground common to these kingdoms of nature is not of very wide extent, and the multiplicity of details is so great, that the student of living beings finds himself obliged to devote his attention exclusively either to the one or the other. If he elects to study plants, under any aspect, we know at once what to call him; he is a botanist, and his science is botany. But if the investigation of animal life be his choice, the name generally applied to him will vary, according to the kind of animals he studies, or the particular phenomena of animal life to which he confines his attention. If the study of man is his object, he is called an anatomist, or a physiologist, or an ethnologist; but if he dissects animals, or examines into the mode in which their functions are performed, he is a comparative anatomist or comparative physiologist. If he turns his attention to fossil animals, he is a palæontologist. If his mind is more particularly directed to the description, specific discrimination, classification, and distribution of animals, he is termed a zoologist.

For my present purpose, however, I shall recognize none of these titles save the last, which I shall employ as the equivalent of botanist; and I shall use the term zoology as denoting the whole doctrine of animal life, in contradistinction from botany, which signifies the whole doctrine of vegetable life.

Employed in this sense, zoology, like botany, is

* The substance of these remarks was embodied in a lecture on Zoology delivered at the South Kensington Museum in 1860.

divisible into three great but subordinate sciences—morphology, physiology, and distribution, each of which may, to a very great extent, be studied independently of the other.

Zoological morphology is the doctrine of animal form or structure. Anatomy is one of its branches, development is another; while classification is the expression of the relations which different animals bear to one another, in respect of their anatomy and their development.

Zoological distribution is the study of animals in relation to the terrestrial conditions which obtain now, or have obtained at any previous epoch of the earth's history.

Zoological physiology, lastly, is the doctrine of the functions or actions of animals. It regards animal bodies as machines impelled by certain forces, and performing an amount of work, which can be expressed in terms of the ordinary forces of nature. The final object of physiology is to deduce the facts of morphology on the one hand, and those of distribution on the other, from the laws of the molecular forces of matter.

Such is the scope of zoology. But if I were to content myself with the enunciation of these dry definitions, I should ill exemplify that method of studying this branch of physical science, which it is my chief business to recommend. Let us turn away, then, from abstract definitions. Let us take some concrete living thing, some animal (the commoner the better), and let us see how the application of common sense and common logic to the obvious facts it presents inevitably leads us into all these branches of zoological science.

I will suppose that I have before me a lobster. When I examine it, what appears to be the most striking character it presents? Why, I observe that this part which we call the tail of the lobster is made up of six distinct hard rings and a seventh terminal piece. If I separate one of the middle rings, say the third, I find it carries upon its under surface a pair of limbs or appendages, each of which consists of a stalk and two terminal pieces.

If I now take the fourth ring I find it has the same structure, and so have the fifth and the second; so that in each of these divisions of the tail I find parts which correspond with one another, a ring and two appendages; and in each appendage a stalk and two end pieces. These corresponding parts are called, in the technical language of anatomy, "homologous parts." The ring of the third division is the "homologue" of the ring of the fifth; the appendage of the former is the homologue of the appendage of the latter. And as each division exhibits corresponding parts in corresponding places, we say that all the divisions are constructed upon the same plan. But now let us consider the sixth division. It is similar to, and yet different from, the others. The ring is essentially the same as in the other divisions; but the appendages look at first as if they were very different; and yet when we regard them closely, what do we find? A stalk and two terminal divisions exactly as in the others, but the stalk is very short and very thick, the terminal divisions are very broad and flat, and one of them is divided into two pieces.

I may say, therefore, that the sixth segment is like the others in plan, but that it is modified in its details.

The first segment is like the others, so far as its ring is concerned; and though its appendages differ from any of those yet examined in the simplicity of their structure, parts corresponding with the stem and one of the divisions of the appendages of the other segments can be readily discerned in them.

Thus it appears that the lobster's tail is composed of a series of segments which are fundamentally similar, though each presents peculiar modifications of the plan common to all. But when I turn to the fore part of the body, I see at first nothing but a great shield-like shell, called technically the "carapace," ending in front in a sharp spine, on either side of which are the curious compound eyes, set upon the ends of stout moveable stalks. Behind these, on the under side of the body, are two pairs of long feelers or antennæ, followed by six pairs of jaws, folded against one another over the mouth, and five pairs of legs, the foremost of these being the great pinchers or claws of the lobster.

It looks at first a little hopeless to attempt to find in this complex mass a series of rings, each with its pair of appendages, such as I have shown you in the abdomen, and yet it is not difficult to demonstrate their existence. Strip off the legs, and you will find that each pair is attached to a very definite segment of the under wall of the body; but these segments, instead of being the lower parts of free rings, as in the tail, are such parts of rings which are all solidly united and bound together; and the like is true of the jaws, the feelers, and the eye-stalks, every pair of which is borne upon its own special segment. Thus the conclusion is gradually forced upon us that the body of the lobster is composed of as many rings as there are pairs of appendages, namely, twenty in all, but that the six hindmost rings remain free and moveable, while the fourteen front rings become firmly soldered together, their backs forming one continuous shield—the carapace.

Unity of plan, diversity in execution, is the lesson taught by the study of the rings of the body; and the same instruction is given still more emphatically by the appendages. If I examine the outermost jaw, I find it consists of three distinct portions—an inner, a middle, and an outer, mounted upon a common stem; and if I compare this jaw with the legs behind it or the jaws in front of it, I find it

quite easy to see that in the legs it is the part of the appendage which corresponds with the inner division, which becomes modified into what we know familiarly as the "leg," while the middle division disappears, and the outer division is hidden under the carapace. Nor is it more difficult to discern that, in the appendages of the tail, the middle division appears again, and the outer vanishes; while on the other hand, in the foremost jaw, the so-called mandible, the inner division only is left; and, in the same way, the parts of the feelers and of the eye-stalks can be identified with those of the legs and jaws.

But whither does all this tend? To the very remarkable conclusion that a unity of plan, of the same kind as that discoverable in the tail or abdomen of the lobster, pervades the whole organization of its skeleton, so that I can return to any one of the rings of the tail, and by adding a third division to each appendage, use it as a sort of scheme or plan of any ring of the body. I can give names to all the parts, and then if I take any segment of the body of the lobster, I can point out exactly what modification the general plan has undergone in that particular segment; what part has remained moveable, and what has become fixed to another; what has been excessively developed and metamorphosed, and what has been suppressed.

But I imagine I hear the question, how is all this to be tested? No doubt it is a pretty and ingenious way of looking at the structure of any animal, but is it anything more? Does Nature acknowledge in any deeper way this unity of plan we seem to trace?

The objection suggested by these questions is a very valid and important one, and morphology was in an unsound state so long as it rested upon the mere perception of the analogies which obtain between fully formed parts. The unchecked ingenuity of speculative anatomists proved itself fully competent to spin any number of contradictory hypotheses out of the same facts, and endless morphological dreams threatened to supplant scientific theory.

Happily, however, there is a criterion of morphological truth, and a sure test of all homologies. Our lobster has not always been what we see it; it was once an egg, a semifluid mass of yolk, not so big as a pin's head, contained in a transparent membrane, and exhibiting not the least trace of any one of those organs whose multiplicity and complexity, in the adult, are so surprising. After a time a delicate patch of cellular membrane appeared upon one face of this yolk, and that patch was the foundation of the whole creature, the clay out of which it would be moulded. Gradually investing the yolk, it became subdivided by transverse constrictions into segments, the forerunners of the rings of the body. Upon the ventral surface of each of the rings thus sketched out, a pair of bud-like prominences made their appearance—the rudiments of the appendages of the ring. At first all the appendages were alike, but as they grew, most of them became distinguished with a stem and two terminal divisions, to which in the middle part of the body was added a third outer division; and it was only at a later period that, by the modification or abortion of certain of these primitive constituents, the limbs acquired their perfect form.

Thus the study of development proves that the doctrine of unity of plan is not merely a fancy; that it is not merely one way of looking at the matter, but that it is the expression of deep-seated natural facts. The legs and jaws of the lobster may not merely be regarded as modifications of a common type,—in fact and in nature they are so,—the leg and the jaw of the young animal being, at first, indistinguishable.

These are wonderful truths, the more so because the zoologist finds them to be of universal application. The investigation of a polype, of a snail, of a fish, of a horse, or of a man, would have led us, though by a less easy path, perhaps, to exactly the same point. Unity of plan everywhere lies hidden under the mask of diversity of structure—the complex is everywhere evolved out of the simple. Every animal has at first the form of an egg, and every animal and every organic part, in reaching its adult state, passes through conditions common to other animals and other adult parts; and this leads me to another point. I have hitherto spoken as if the lobster were alone in the world, but, as I need hardly remind you, there are myriads of other animal organisms. Of these, some—such as men, horses, birds, fishes, snails, slugs, oysters, corals, and sponges—are not in the least like the lobster. But other animals, though they may differ a good deal from the lobster, are yet either very like it, or are like something that is like it. The cray fish, the rock lobster, and the prawn, and the shrimp, for example, however different, are yet so like lobsters, that a child would group them as of the lobster kind, in contradistinction to snails and slugs; and these last again would form a kind by themselves, in contradistinction to cows, horses, and sheep, the cattle kind.

But this spontaneous grouping into "kinds" is the first essay of the human mind at classification, or the calling by a common name of those things that are alike, and the arranging them in such a manner as best to suggest the sum of their likenesses and unlikenesses to other things.

Those kinds which include no other subdivisions than the sexes, or various breeds, are called, in technical language, species. The English lobster is a species, our cray fish is another, our prawn is another. In other countries, however, there are lobsters, cray fish, and prawns very like ours, and

yet presenting sufficient differences to deserve distinction. Naturalists, therefore, express this resemblance and this diversity by grouping them as distinct species of the same "genus." But the lobster and the cray fish, though belonging to distinct genera, have many features in common, and hence are grouped together in an assemblage which is called a family. More distant resemblances connect the lobster with the prawn and the crab, which are expressed by putting all these into the same order. Again, more remote, but still very definite, resemblances unite the lobster with the woodlouse, the king crab, the water-flea, and the barnacle, and separate them from all other animals; whence they collectively constitute the larger group, or class, *Crustacea*. But the *Crustacea* exhibit many peculiar features in common with insects, spiders and centipedes, so that these are grouped into the still larger assemblage or "province" *Articulata*, and, finally, the relations which these have to worms and other lower animals, are expressed by combining the whole vast aggregate into the sub-kingdom of *Annulosa*.

If I had worked my way from a sponge instead of a lobster, I should have found it associated, by like ties, with a great number of other animlas into the subkingdom *Protozoa;* if I had selected a fresh-water polype or a coral, the members of what naturalists term the subkingdom *Cœlenterata*, would have grouped themselves around my type; had a snail been chosen, the inhabitants of all univalve and bivalve, land and water shells, the lamp shells, the squids, and the sea mat would have gradually linked themselves on to it as members of the same subkingdom of *Mollusca;* and finally, starting from man, I should have been compelled to admit first, the ape, the rat, the horse, the dog, into the same class, and then the bird, the crocodile, the turtle, the frog, and the fish, into the same subkingdom of *Vertebrata*.

And if I had followed out all these various lines of classification fully, I should discover in the end that there was no animal, either recent or fossil, which did not at once fall into one or other of these subkingdoms. In other words, every animal is organized upon one or other of the five, or more, plans, whose existence renders our classification possible. And so definitely and precisely marked is the structure of each animal, that, in the present state of our knowledge, there is not the least evidence to prove that a form, in the slighest degree transitional between any two of the groups *Vertebrata*, *Annulosa*, *Mollusca*, and *Cœlenterata*, either exists, or has existed, during that period of the earth's history which is recorded by the geologist. Nevertheless, you must not for a moment suppose, because no such transitional forms are known, that the members of the subkingdoms are disconnected from, or independent of, one another. On the contrary, in their earliest condition they are all alike, and the primordial germs of a man, a dog, a bird, a fish, a beetle, a snail, and a polype, are in no essential structural respects, distinguishable.

In this broad sense, it may with truth be said, that all living animals, and all those dead creations which geology reveals, are bound together by an all-pervading unity of organization, of the same character, though not equal in degree, to that which enables us to discern one and the same plan amidst the twenty different segments of a lobster's body. Truly it has been said, that to a clear eye the smallest fact is a window through which the Infinite may be seen.

Turning from these purely morphological considerations, let us now examine into the manner in which the attentive study of the lobster impels us into other lines of research.

Lobsters are found in all the European seas; but on the opposite shores of the Atlantic and in the seas of the southern hemisphere they do not exist. They are, however, represented in these regions by very closely allied, but distinct forms—the *Homarus Americanus* and the *Homarus Capensis*, so that we may say that the European has one species of *Homarus;* the American, another; the African, another; and thus the remarkable facts of geographical distribution begin to dawn upon us.

Again, if we examine the contents of the earth's crust, we shall find in the later of those deposits, which have served as the great burying grounds of past ages, numberless lobster-like animals, but none so similar to our living lobster as to make zoologists sure that they belonged even to the same genus. If we go still further back in time, we discover in the oldest rocks of all, the remains of animals, constructed on the same general plan as the lobster, and belonging to the same great group of *Crustacea;* but for the most part totally different from the lobster, and, indeed, from any other living form of crustacean; and thus we gain a notion of that successive change of the animal population of the globe, in past ages, which is the most striking fact revealed by geology.

Consider, now, where our inquiries have led us. We studied our type morphologically, when we determined its anatomy and its development, and when comparing it, in these respects, with other animals, we made out its place in a system of classification. If we were to examine every animal in a similar manner we should establish a complete body of zoological morphology.

Again, we investigated the distribution of our type in space and in time, and, if the like had been done with every animal, the sciences of geographical and geological distribution would have attained their limit.

But observe one remarkable circumstance, that, up to this point, the question of the life of these

organisms has not come under consideration. Morphology and distribution might be studied almost as well, if animals and plants were a peculiar kind of crystals, and possessed none of those functions which distinguish living beings so remarkably. But the facts of morphology and distribution have to be accounted for, and the science, whose aim it is to account for them, is physiology.

Let us return to our lobster once more. If we watched the creature in its native element, we should see it climbing actively the submerged rocks, among which it delights to live, by means of its strong legs; or swimming by powerful strokes of its great tail, the appendages of whose sixth joint are spread out into a broad fan-like propeller; seize it and it will show you that its great claws are no mean weapons of offence; suspend a piece of carrion among its haunts, and it will greedily devour it, tearing and crushing the flesh by means of its multitudinous jaws.

Suppose that we had known nothing of the lobster but as an inert mass, an organic crystal, if I may use the phrase, and that we could suddenly see it exerting all these powers, what wonderful new ideas and new questions would arise in our minds! The great new question would be, "How does all this take place?" the chief new idea would be the idea of adaptation to purpose,—the notion that the constituents of animal bodies are not mere unconnected parts, but organs working together to an end. Let us consider the tail of the lobster again from this point of view. Morphology has taught us that it is a series of segments composed of homologous parts, which undergo various modifications—beneath and through which a common plan of formation is discernible. But if I look at the same part physiologically, I see that it is a most beautifully constructed organ of locomotion, by means of which the animal can swiftly propel itself either backwards or forwards.

But how is this remarkable propulsive machine made to perform its functions? If I were suddenly to kill one of these animals and to take out all the soft parts, I should find the shell to be perfectly inert, to have no more power of moving itself than is possessed by the machinery of a mill, when disconnected from its steam-engine or water-wheel. But if I were to open it, and take out the viscera only, leaving the white flesh, I should perceive that the lobster could bend and extend its tail as well as before. If I were to cut off the tail I should cease to find any spontaneous motion in it—but on pinching any portion of the flesh, I should observe that it underwent a very curious change—each fibre becoming shorter and thicker. By this act of contraction, as it is termed, the parts which the ends of the fibre are attached are, of course, approximated; and according to the relations of their points of attachment to the centres of motion of the different rings, the bending or the extension of the tail results. Close observation of the newly-opened lobster would soon show that all its movements are due to the same cause—the shortening and thickening of these fleshy fibres, which are technically called muscles.

Here, then, is a capital fact. The movements of the lobster are due to muscular contractility. But why does a muscle contract at one time and not at another? Why does one whole group of muscles contract when the lobster wishes to extend its tail, and another group, when he desired to bend it? What is it originates, directs, and controls the motive power?

Experiment, the great instrument for the ascertainment of truth in physical science, answers this question for us. In the head of the lobster there lies a small mass of that peculiar tissue which is known as nervous substance. Cords of similar matter connects this brain of the lobster, directly or indirectly, with the muscles. Now, if these communicating cords are cut, the brain remaining entire, the power of exerting what we call voluntary motion in the parts below the section is destroyed, and on the other hand, if, the cords remaining entire, the brain mass be destroyed, the same voluntary mobility is equally lost. Whence the inevitable conclusion is, that the power of originating these motions resides in the brain, and is propagated along the nervous cords.

In the higher animals the phenomena which attend this transmission have been investigated, and the exertion of the peculiar energy which resides in the nerves, has been found to be accompanied by a disturbance of the electrical state of their molecules.

If we could exactly estimate the signification of this disturbance; if we could obtain the value of a given exertion of nerve force by determining the quantity of electricity or of heat of which it is the equivalent; if we could ascertain upon what arrangement, or other condition of the molecules of matter, the manifestation of the nervous and muscular energies depends (and doubtless science will some day or other ascertain these points), physiologists would have attained their ultimate goal in this direction; they would have determined the relation of the motive force of animals to the other forms of force found in nature; and if the same process had been successfully performed for all the operations which are carried on, in and by, the animal frame, physiology would be perfect, and the facts of morphology and distribution would be deducible from the laws which physiologists had established, combined with those determining the condition of the surrounding universe.

There is not a fragment of the organism of this humble animal, whose study would not lead us into regions of thought as large as those which I have briefly opened up; but what I have done, I trust, has not only enabled my readers to form a conception

of the scope and purport of zoology, but has given an imperfect example of the manner in which, in my opinion, that science, or indeed any physical science, may be studied. The great matter is to make the study real and practical, by fixing the attention on particular facts; but at the same time it should be rendered broad and comprehensive by constant reference to the generalizations of which all particular facts are illustrations. The lobster has served as a type of the whole animal kingdom, and its anatomy and physiology have illustrated for us some of the greatest truths of biology. The student who has once seen for himself the facts which I have described, has had their relations explained to him, and has clearly comprehended them, has so far a knowledge of zoology, which is real and genuine, however limited it may be, and which is worth more than all the mere reading knowledge of the science he could ever acquire. His zoological information is, so far, knowledge and not mere hearsay.

MOSQUITOES.

"En avant, Monseigneur Maringouin!"

READERS of Science Gossip, permit me to make you acquainted with a Madam and Monseigneur Mosquito, recently from North-western America. At the same time I can assure you, from a past and painful experience, that an introduction to them in these pages is infinitely preferable to being on terms of greater familiarity.

To obstinate, self-willed, persistently persevering persons, whose sole end and aim is to pester all with whom they are brought into collision, it is a common custom, "down South," to say, "en avant, Monseigneur Maringouin!" Individuals such as these are for all the world like to Mosquitoes, and the admonitory warning just quoted is as good as it is truthful. Who ever knew a Mosquito give up? Determined obstinacy is the very substance and stamina of its existence. Fret and work yourself into a state of irritability bordering upon frenzy, stamp, scratch, slap, rub—it is not of the slightest use; after every rebuff, the inveterate persecutors only buzz the more loudly, and stab their blades the deeper into one's flesh.

As regards Monseigneur, we have not much to say: he takes things very easily, does pretty much as he likes, dines and sups as best befits his inclinations—finding amidst the nectar-making flowers everything suited to his requirements. Having paid his addresses to the ladies, and flirted to his heart's desire, he grows rapidly old, and very soon dies.

With Madam it is altogether a different affair; she has important duties to perform: publicly, to annoy and persecute every man, woman, and beast within her reach; privately, to deposit her eggs safely in a fitting situation, to insure the perpetuation of her species. Madam and all her kindred have a disagreeable fondness for my blood, why or wherefore is not easy of explanation, and invariably make me their especial victim. So surely as I am enjoying myself, it matters not how many persons are present, I always observe these blood-loving amazons prefer to leave the rest, and, with self-satisfied hums, make straight for me, to crowd into my ears and up my nose, and, as though they were "ile seekers," each one there and then bores a hole, and greedily pumps up the much-coveted fluid. They have even a more detestable habit than this: they seem to delight in taking refuge in my whiskers, and to rout them from this ambush is as difficult a job as that of routing bears and peccaries from out a cane-brake, which can only be accomplished by setting the place on fire—a stratagem that would in all likelihood prove quite as disagreeable to me as the Mosquitoes; in this dilemma I patiently await their movements, and deftly press my finger on every offender as the prick of the lancets reveals its whereabouts. Now this suspense, metaphorically waiting for a bite, is tantalising in the extreme, if you are trying just at that critical moment to say something more than usually impressive to some favoured fair one, and distrust the stability of your nerves. Mentally I exclaim, "En avant, Madam Maringouin!" bite a person with a more delicate skin, or feast upon one of your own sex, or

> Try some plump alderman, and suck his blood,
> Enriched by generous wine and costly meat;
> On well-filled skins, sleek as thy native mud,
> Fix thy light pump and press thy freckled feet.
> Go to the men for whom, in ocean's halls,
> The oyster breeds and the green turtle sprawls.

Whether the female Mosquito has in all cases the same number of lancets, it is difficult to determine. Leuwenhoek says four, Réaumur five, Swammerdam and Latreille mention six, and there are others who stand out for seven; but of one thing I am positive, some Mosquitoes are able to inflict a puncture in less time, and of greater depth, than others. Will any one be bold enough to say, the stab of a summer gnat, or even that of the full-sized Mosquito we are ordinarily familiar with, is inflicted by an instrument identical with that which enabled the "Skeeters" to pierce through the military boots of the Father of the States, in the Jersey marshes, and, if history is truthful in its record of that event, caused that usually exemplary man to indulge in bad language, or, as we read it, "swear like a trooper;" or that attacked the army of Julian the Apostate, and drove him back; or that compelled Sapor, king of Persia, to raise the siege of Nisibis, stinging his elephants and camels into a state of fury; or that render the banks of the river Po at some places uninhabitable; or, as Humboldt tells us, oblige the

people residing at the mouth of the river Urare to sleep in pits dug for the purpose, buried up all but their heads, which they cover with a rug; and last, though not least, that drove the Boundary Commission, one and all, to quit the prairies and take up their quarters in the mountains—stopping the work

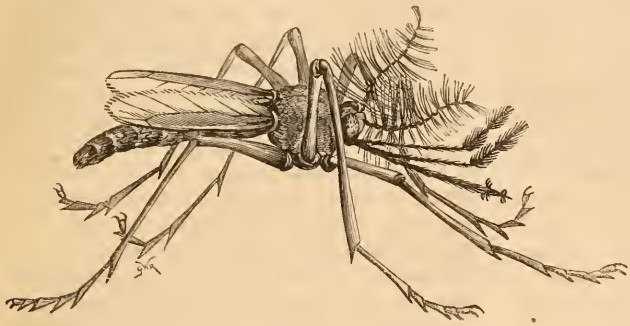


Fig. 57. East Indian Mosquito* (male) × 8 diameters.

of nearly a hundred men. No, I cannot but think the lancet-blades in some Mosquitoes are longer, sharper, and better fitted to inflict pain, than are similar weapons in other species. The Californian Mosquitoes are not half so bad as the thorough-bred British Columbians.

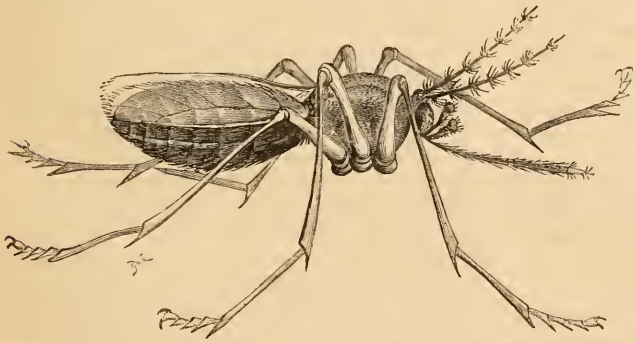


Fig. 58. East Indian Mosquito* (female) × 8 diameters.

The above portraits greatly resemble a goodly number that perished betwixt the leaves of my note-book.

When we were marking the boundary line, our camp was on the Sumass prairie, but the Mosquitoes became so formidable at last that the camp had to be abandoned. It is no exaggeration to state, that the swarms were as dense as an ordinary fog; and, if possible, more bloodthirsty during the night than in the daytime. Sleeping was utterly impossible, unless one could manage to shut up the tent so that no Mosquitoes could gain admission, and then set to work and kill every one within the canvas prison. Coming out in the morning was anything but a joke; unless your dress was quite Mosquito-proof you did not stand a chance, the legions were upon you—thrusting, humming, and pumping out your blood, despite all your efforts at self-protection. We used to tie our sleeves tightly at the wrists, our trowsers round the ankles, wear thick leather gloves, and a gauze-bag over the head and face, tied in round the throat. The poor dogs suffered frightfully, and would soon have died from the irritation caused by the punctures, had we not removed the animals up into the mountains. During this reign of terror, I started with the Chief Commissioner to visit Fort Hope, about four days' canoe-voyage up the Fraser river; three Indians and the Commissioner's servant made up the crew. The first day we were terribly beset by Mosquitoes, having to keep close to the river bank to gain the advantage of the slack water. Each person armed with a wisp of leafy twigs kept up a continuous flogging, to beat down and drive off our foes. About sundown, we neared a sandy island, situate in the middle of a wide lake or expanse of the river; landing, and seeing no Mosquitoes, determined us at once to camp; there being plenty of drift-wood, a fire was soon kindled, supper cooked, and preparations made for sleeping. All at once, I suppose attracted by the fire-light, clouds of Mosquitoes swooped down upon us. There was nothing to be done but to bear it. The Commissioner tried all he could to get a doze, and rolled himself so tightly in his rugs, as to defy the Mosquitoes to find an entrance; vain hope: the pests soon found a hole, and poured in through it like a crowd to see a pantomime on Boxing-night. I could trace the outline of the Commissioner, as the pale moonlight slanted on the island, writhing about beneath his rugs, as if suffering from violent choleraic cramps. The Red Men crouched in the smoke, and at short intervals plunged into the river like seals, to return to the smoke dripping wet, and shining as though made of highly burnished metal. I did not try to sleep, but lighted my pipe and paced up and down the island until daylight came, and with it, release from our miseries. I could recount endless stories of Mosquito adventures, if space permitted me to do so.

The darkies down South relate the following story, to account for the origin of the name Mosquito:—

"De white man he come, he settle down, he grow

* From native drawings in the India Museum.

de corn and cotton; den come de leetle fly—cry golly! how he bite! Whoop! whoop! white man, slap him face, and stamp like mad. He say 'must—quit—oh!' He shout louder den ebber, and whop de tother side, 'must—quit—oh!' Den behind, den before, dis side, dat side, all de time, 'must—quit—oh! must—quit—oh!'"

This is by no means a bad derivation. I felt I must—quit—oh! if I did not say it during the memorable short night on the sandy island.

Scientifically the Mosquito family belong to the order *Diptera*, family *Culicidæ*, genus *Culex*. The species brought from North-west America turned out to be new to science, and was named *Culex pinguis*, because it was fatter, rounder, and more obese than any other of its known kindred; the specific description is appended as a foot-note. We read the following description in Westwood's "Insects," page 509, vol. ii., explanatory of the system by which the fly extracts or sucks up the blood:—"Taking its station upon an uncovered part of the skin, it lowers its rostrum and pierces the skin by means of its exceedingly slender needle-like lancets, which are barbed at the tips, and, as by degrees it pushes these deeper into the skin, the lower lip or sheath, in which they are enclosed when at rest, becomes more and more elbowed towards the breast, until the whole length of the lancets are introduced into the skin. It is supposed that, at the same time, it instils into the wound a venomous liquid, which, while it enables the blood to flow faster, is the chief cause of the subsequent irritation." Kirby and Spencer give many interesting and curious details relative to the attacks of these insects in various parts of the world. The larvæ of the Mosquito are entirely aquatic, very active, swimming with great rapidity, frequently diving to the bottom of the water, and again ascending to the surface.

During this stage of their existence, they undergo several moultings, to assume the pupæ form. The pupæ take no nourishment, although brisk and active in all their movements. Space does not allow of my describing the beautiful arrangement observable in the respiratory systems of the larvæ and pupæ, but compels me to skip these interesting details, and to refer only and very briefly in conclusion to the system adopted by the female to insure the safety of her eggs, and the singular way the mature insect extricates itself from the pupæ case.

The female Mosquito, when the proper time arrives, selects some quiet eddy in a murmury brook, or the tranquil waters of a lake, buoyed up on a leaf or floating spray. She crosses her hind legs and begins building her boat, which, when finished, contains usually over four hundred eggs. The eggs nearest the ends are said to contain the males, those in the middle the females. So admirably is this boat constructed that to upset or sink it, is an impossibility. One would almost be disposed to think the eggs were indestructible: though they remain frozen during the winter, they still retain their vitality unimpaired. Many species do not build boats of their eggs; one, I may instance as an example, is found in the swamps of the Southern States. The female sinks a hole in the soft mud with the end of her tail, and leaves her suspended eggs in the holes by long slender ropes or stalks. When the larvæ come from out the eggs, there is always a sufficiency of water for their sustenance collected at the bottom of the hole, and to support life until the time arrives for the grub to disappear into the mud therein, to undergo its final change. An American writer speaks of a Mosquito that deposits its eggs in the sandy plains of the Carolinas and Georgia: "She selects a spot exposed to the fury of the sun, and drops her eggs among the grains of sand. The larvæ, when hatched, must penetrate very deep to obtain moisture. Their proceedings and habits are yet to be tested. All you can see is the mother fly dropping her eggs. Twelve or fifteen days from this time the metamorphosis is complete. Place the hillock betwixt you and the sun as he is setting: the flies ascend in such numbers that you would think it must be smoke from a boiling spring. These are the genuine 'stingers' and contain more venom than ten other tribes amalgamated."

When the period for the final transformation is at hand, the pupæ float on the surface of the water, and should the day prove bright and sunny, each pupa case splits, and the little fly with extreme care and deliberation draws out her front legs from their casings. The insect mariner has to be wary now: to tilt on one side is certain death from drowning. Her two front legs are next placed on the water (for be it known, a Mosquito walks easily upon the water), and the other four bent underneath her body, in order to support the boat on an even keel, so to speak; let the insect but capsize it, and all chance of righting again is at an end. The wings at this stage of the proceedings are wet and lumpy, and would turn the insect over, boat and all, but for the support afforded by the bent body and the legs held firmly down beneath it; slowly the crumpled wings separate, the air blows freely through them, and as the gauzy structures dry, so they become additional aids in maintaining her balance. The long, taper body now elongates itself, the fragile wings assume their natural shape, and soon become thoroughly dry. The antennæ unfurl like miniature flags, the feathery plumes (if it be a male) float like pennants in the breeze. Lastly, the legs are drawn forth, the body nicely poised, then a few strokes of the wings are given to test their strength and fitness for service. Pausing for a few seconds, probably to admire its own image mirrored in the water, and to fall in love with itself, as did Narcissus of old,

the Mosquito plies its newly-acquired organs, rises like a fairy into the genial air, and bids adieu for ever to the tiny barque it owes so much to, left to drift away—an empty, useless wreck.

We may not follow Madam's or Monseigneur's proceedings any further, you know them both, I am sure, by the introduction I have given you; more especially Madam: her unwearying solicitations, her ill-manners, and ill-temper, her greed and thirst after blood, her peevish, crying requests—you are familiar with them all, and methinks I hear you say as you lay down Science Gossip, "En avant, Monseigneur Maringouin!"

John Keast Lord, F.Z.S.

Culex pinguis, N. S.

Fœm.—Cervinus, robustus; rostro apicem versus nigro; abdominis pube subaurata, pedibus robustis pallidioribus; alis cinereis, venis fulvis subpilosis.

Sp. Ch.—Fawn colour, stout; proboscis, much longer than the head, and the throat black towards the tip; abdomen with slightly gilded down; legs stout, paler than the body; tarsi darker; wings cinereous; veins tawny, slightly pilose; radial and subapical veins with long forks. Length of the body 3½ lines; of the wings, 7 lines. Habitat, British Columbia.

Vorticella and Cyclops.—This morning, wishing to mount a few specimens of *Cyclops quadricornis*, I captured some examples with the dipping tube, and transferred them to a small cell about half an inch diameter and a tenth of an inch deep. While they were swimming in about four or five drops of water, I introduced a single drop of pure alcohol, which caused wild commotion for a moment, and in a few seconds—certainly less than half a minute—the Entomostraca lay dead. After three or four minutes, the cell was filled up by the addition of one or two drops of water, a thin cover put on, and all made secure with asphalte. After two hours the slide was placed under the microscope, when I found that several of the dead Entomostraca bore colonies of Vorticella, or some allied genus, all alive. Every now and then an individual jerked back with the movement generally thought indicative of the seizure of prey, though no living prey were visible, nor would one imagine they existed in this dilute spirit. The Vorticellæ, however, not only existed in the alcoholic bath, but vibrated their cilia and seemed to pursue their ordinary avocations. After five hours some were still living, but many had detached themselves from their stalks and lay motionless at the bottom of the cell. When seven hours had elapsed, one or two showed feeble signs of life, but after eight hours, the last of the infusoria had departed their lives and foot-stalks. They not only survived the treatment that proved almost instantly fatal to the Cyclops, but maintained life for many hours in the more dilute solution.—*George Guyon, Ventnor, I.W.*

COCCONEIS.

If the figures which we give in illustration of this group are consulted, it will be observed that the valves are elliptical, with a central longitudinal line, and to this character is generally added "and having a central nodule." It is not always that the central nodule can be clearly made out. This is a large genus, containing, at the least, twenty-five British examples. These are grouped for convenience in two sections: in the smaller of these, the disc is either smooth or striated longitudinally; and in the other, and larger section, the

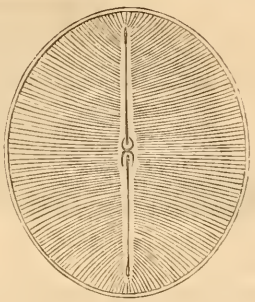


Fig. 59. *Cocconeis major.*

disc has radiating or transverse markings. Both our illustrations are from the latter section. *Cocconeis major* was discovered by Dr. Gregory in dredgings from Lamlash Bay, and though remarkable, is rare (fig. 59); and *Cocconeis nitida* was also first found by the same observer in dredgings from the same locality, and also from Loch Fine (fig. 60).

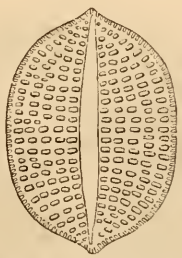


Fig. 60. *Cocconeis nitida.*

More than half the number of British species were discovered by Dr. Gregory, either in the Glenshira Sand or the Frith of Clyde and Loch Fine. It is only our wish in the present instance to indicate the characters by which the members of the genus Cocconeis may be known, and *not* to give a list of the names of species which may be found in Mr. Carruthers' catalogue, included in Dr. Gray's handy "Handbook of British Water-weeds or Algæ."

SKELETON OF PURPLE URCHIN.
(*Echinus lividus*).

THE Purple Urchin of our shores is so common an object that few, if any, of my readers—scientific or otherwise—can have failed at some time or other to have seen and admired it. Not many, however, I believe, who have seen it know—to use a hackneyed but expressive phrase—what a world of wonder is wrapped up in its prickly box. A little of this wonder I propose to reveal, confining myself, however, entirely to its skeleton. To commence with the shell or *test*, as it is called: This is made

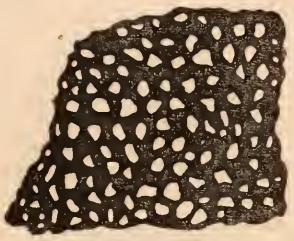


Fig. 61. Portion of Shell, × 230.

up of numerous polygonal plates jointed together in so perfect a manner that the seams or divisions between them can be with difficulty detected. The structure of this shell is everywhere the same; it is composed of a network of carbonate of lime, with a basis of animal matter. The interspaces or *areolæ* of this network vary greatly in size, form, and number, as is shown in fig. 61, which represents a portion of the shell of the Purple Echinus magnified.

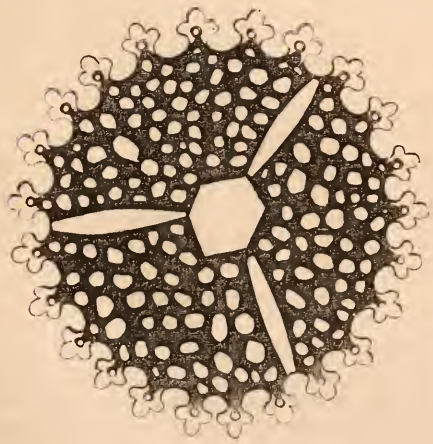


Fig. 62. Ambulacral Disc, × 180.

Every one who has ever kept an Echinus in the aquarium alive must have noticed its mode of locomotion—how it protrudes from orifices in its shell sundry curious suckers, by means of which it clings to the smooth surface of the glass or stones. Each of these suckers is terminated by a disc, the skeleton of which presents the same calcareous network as the shell, but in a more beautiful and symmetrical form. Fig. 62 gives a magnified representation of this ambulacral disc, as it is called.

In many foreign species of Echinus the spines, when examined in section under the microscope, present a very beautiful appearance, somewhat similar to that of exogenous wood. This appearance is produced by successive rings of open spaces and solid pillars, which mark the yearly growth of the spine.

Although the spine of *Echinus lividus* does not present this beautiful ringed appearance, doubtless, as has been suggested, from its being the result of only one year's growth (being exuviated and reproduced annually), still it presents a very striking appearance. It is, in common with the species of other echini, composed of solid calcareous ribs, alternating with bands of an open calcareous network.

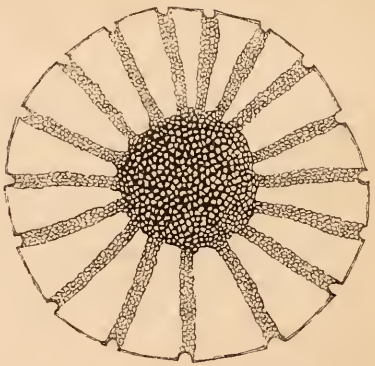


Fig. 63. Transverse Section of Spine, × 60.

These ribs and bands in section appear as alternating rays, and the network being coloured purple, they are very striking. Fig. 63 represents a transverse section of the spine, and exhibits the alternating bands of solid ribs and open network.

Attached by a peduncle to the spines are to be found the curious bodies called Pedicellariæ. These, at one time supposed to be parasites, are now generally considered as simple appendages to the spine, although their function is somewhat doubtful. Each of these consists of a thin calcareous stalk, surmounted by a curious pincer-like apparatus, the whole being invested by the general animal membrane of the Echinus. Fig. 64 represents the head of a pedicellaria. The pincers are double, and are formed of a fine calcareous network, resembling that of the shell. The edges of each limb of the pincers are serrated.

Thus much for the external portion of the skeleton. Internally, the only part of the animal requiring

the support of a skeleton is that connected with the movements of the teeth and jaws.

This oral skeleton consists of the teeth, the plates to which they are attached, and the processes for the attachment of the muscles. From its curious form it was compared by Aristotle to a lantern, and hence is now often called the *Lantern of Aristotle;* it is a well-known seaside specimen. The teeth resemble somewhat the front teeth of a

Fig. 64. Pedicellaria, × 60.

Fig. 65. Section of Tooth.

rodent; they have the same chisel-shaped form, but they have an addition in the shape of a keel which runs along the back. If a longitudinal section of one of these teeth be examined, it will be seen to bear a striking resemblance in its structure to the teeth of the higher animals.

The keel is composed of rods of carbonate of lime, lying obliquely to the axis of the tooth. The chisel-shaped edge consists firstly of a series of triangular calcareous plates, called the "*primary plates;*" these constitute a framework with which the other parts become connected. To these plates, at some distance from the base, are attached a

Fig. 66. Longitudinal Section of Tooth.

series of lappet-shaped laminæ, called by Mr. Salter the "*secondary plates.*" To these again are added a third set of appendages named the "*flabelliform processes;*" these last consist of reticulations of calcareous fibres, having a fan-shaped termination. The flabelliform processes are succeeded nearer the apex by an appearance closely resembling the tubuli of bone or dentine. This is caused by the different portions of the tooth being more or less closely cemented together by minute particles of calcareous matter, which bear the name of the "*soldering particles.*" Thus a longitudinal section of the tooth presents somewhat the appearance of bone with its lacunæ, canaliculi, and laminæ. The edge of the chisel-shaped portion of this tooth is coated with a layer of enamel. The tooth is shown in longitudinal section in Figs. 65 and 66.

The plates and processes of the "*lantern*" partake of the general network structure of the shell, and therefore call for no particular remark.

Thomas Graham Ponton.

HARDY FOREIGN FERNS.

THE question is sometimes asked—what hardy foreign ferns are there, which could be obtained at a nursery, and which would succeed in an open-air fernery? It shall be our endeavour briefly to enumerate those of which we have any knowledge, with a few of their characteristics interspersed, so as to redeem our notes from condemnation as a mere list. It may be premised that April or May is a very good month in which to transplant ferns, and therefore a few hints will be opportune. Need we repeat the caution that if ferns are to succeed they must not be planted in too dry a spot, or much exposed to the sun. A shady sloping bank, and good specimens will soon result in a good fernery.

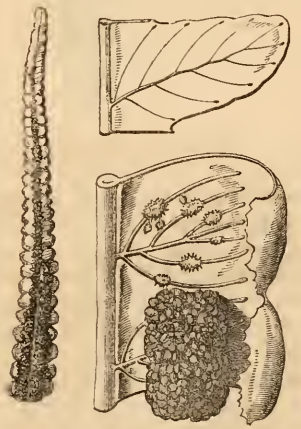


Fig. 67. Ostrich Fern.

The Royal Fern is a great favourite, and so would be its foreign relatives if they were better known. The Cinnamon Osmund (*Osmunda cinnamomea*) from North America, is equally beautiful, and quite distinct in appearance. So also is Clayton's Osmund (*Osmunda Claytoniana*), another hardy North American species. Either of these would flourish in the open air, and prove a great acquisition to any one with room to grow them.

The prince of hardy exotics is the Ostrich Fern (*Struthiopteris Germanica*), which is not half so well known as it deserves to be. The erect pale-green fronds, about two feet in height, stand around the crown like the feathers in a shuttlecock, forming an inverted cone. Every one who aspires to an out-door fernery should obtain this species, which is as hardy and easy of cultivation as the Male Fern.

Fig. 68. Virginian Fern (*Woodwardia Virginica*).

There are also two North American ferns, belonging to a genus of which we have no British representative, with fronds about eighteen inches in length. These are the Virginian Fern (*Woodwardia Virginica*) and the Florida Fern (*Woodwardia areolata*). They are both of them hardy enough to stand the winter out of doors.

Our own Lady Fern is so beautiful that a knowledge of it is sufficient to induce any one to purchase a Lady Fern on trust, and if it should be Michaux's Lady Fern (*Athyrium Michauxii*) they will not by any means be disappointed. This North American species does not attain more than half the size of the British, which perhaps is in itself a recommendation.

Amongst the Spleenworts there is a hardy species which may be called the Narrow-leaved Spleenwort (*Asplenium angustifolium*), which may be grown on a rockwork out of doors.

The Maiden-hair Fern is often made the subject of complaint that it is too delicate for the out-door fernery, except in the extreme south. Such complainants ought to know that there is a North American species, equally beautiful, easily grown, and more hardy than the European Maiden-hair. This deserves the name of Hardy Maiden-hair, but it is known to gardeners and nurserymen as *Adiantum pedatum*. There is also an Australian species (*Adiantum assimile*), but it is not more hardy than the indigenous species, and very much resembles it in size and appearance.

Fig. 69. *Onoclea sensibilis.*

A very commonly cultivated fern is *Onoclea sensibilis*, with fronds two feet in length, and with the fertile and barren fronds differing in form. There is no great care required in its cultivation, and its appearance is very different from any other hardy fern.

Another genus which has no representative amongst British ferns, furnishes a hardy species with a character somewhat resembling the Marsh Fern. The fronds are about two feet in length, and its name nearly as long, if written large enough; this is *Diplazium thelypteroides*.

There are also two species of Buckler Ferns belonging to the same genus as the Male Fern, which are certainly hardy enough for out-door culture. One of these is a native of China, and is known as *Lastrea decurrens;* the other is a North American species called by cultivators and botanists

Lastrea marginalis. The last named has the cover (indusium) of the spore-cases white.

Fig. 70. Siebold's Fern (*Lastrea podophylla*).

Two other species of the same genus may be named as worthy of attention,—Goldie's Fern, (*Lastrea Goldiana*) and Siebold's Fern (*Lastrea podophylla*). The latter is from Japan, and probably would hardly endure the winter's frosts unharmed.

Our two rare little Woodsias have representatives in the United States and Mexico, with fronds one foot and upwards in length. The Mexican Woodsia

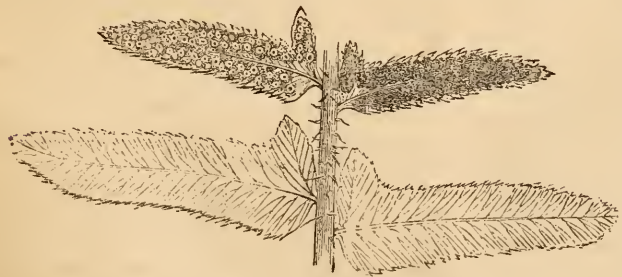


Fig. 71. American Shield Fern (*Polystichum acrostichoides*).

(*Woodsia mollis*) and Perrin's Woodsia (*Woodsia obtusa*) are both hardy, and very desirable for an open-air fernery.

Finally we might commend an American Shield Fern (*Polystichum acrostichoides*) as affording a pleasing associate with our native Shield Ferns, and equally capable of standing the climate. And an evergreen species of Cyrtomium from Japan (*Cyrtomium falcatum*), with rich dark fronds more than eighteen inches in length, with large leaflets.

Fig. 72. *Cyrtomium falcatum*.

It is the more desirable as it serves to illustrate a genus of which we have no indigenous species.

It is quite possible that some species has been omitted which is equally hardy, and equally worthy with the foregoing for out-door culture; but we have named sufficient to prove that an excellent collection of exotic ferns may be grown out of doors, many of which are probably unknown to amateurs. It has been a necessity to employ the botanical names, because without them it would be very difficult to order them from a nurseryman, should any of our readers be so disposed. The majority of the above are too large to be grown in a closed case. The woodcuts illustrate the fructification, but hardly give any idea of the appearance of the fronds.

RURAL NATURAL HISTORY.

MY friend "B." will, I hope, pardon me for "cribbing" the title of his interesting paper in the April number of the Science Gossip; but I do so, because I am going to write upon the same subject, and because if some of our correspondents in different parts of the country were to collect the curious and superstitious remedies that are in vogue in their neighbourhood, and the strange ideas about plants and animals that prevail amongst the people, and were to record them under the same head, what a book full of amusing—perhaps, now and then, of instructive—matter we should have! It would be interesting to find that the same things were believed in remote places; more interesting still to trace them to their origin, and find the one grain of truth that very often really exists, and has served as the foundation upon which a fantastic structure of ignorance and error has been built. Since I wrote about "Strange Remedies," in one of the early numbers, I have met with many more that are curious, and many I had already collected, but whether peculiar to Cheshire or not, I cannot tell.

We have three infallible cures for whooping-cough, or, as it is called, "Chink" cough. (The drawing in of the breath in laughing is also called, "Chinking.")

Receipt No. 1.—A lock of hair is to be cut from the *back* of the head of the child that is suffering from the ailment. A hole must be bored in the stem of a wicken tree (mountain ash), the lock of hair stuffed into it, and the hole be plugged up again. The patient will *sometimes* recover in two or three days. That the charm may work well, however, it must be done secretly, or, as we should say in Cheshire, "unbeknown," and the charmer must *not* be the father of the child; any one else can perform it.

Receipt No. 2.—A woman whose married name is the same as her maiden name has the gift of curing whooping-cough. She has simply to give the child something to eat or drink (it is generally a "sugar butty") and it will get well. I have a neighbour who married her cousin, and did not change her name, who, I believe, thus practises.

Receipt No. 3.—A portion of hair from the cross on a donkey's shoulders is in great demand, and is thought to be very efficacious; and very lately a man came to our house, and begged some from a donkey that our children ride, in order to cure his child. The hair is wrapped up in flannel, and the flannel sewed round the child's neck, and it is sure to get well.

In the article upon "Rural Natural History," above referred to, "B." speaks of the dock being used in Buckinghamshire as an antidote to the sting of the nettle. It is also used here, and is, I think, really efficacious; but here children make use of a sort of charm when applying it, saying—

"Dock go in, nettle come out."

Is it possible that a grain of truth may even be found in the following superstition? If a lock of human hair should be thrown out of doors, and a toad should happen to get it entangled round its leg, the person from whose head it came will have perpetual headache for the rest of his life. What a dreadful contingency!

It is considered very unlucky to cut a child's nails during its first year; and Cheshire mothers are very careful not to do so, lest it should cause the child to be "light-fingered." We should think it would be a good deal *lighter* fingered after a twelvemonth's growth of nail was cut off.

Ointment should never be spread with the *first* finger, which is supposed to be venomous.

Freckles on the skin are called "fawn-freckles," and are supposed to come at the same time as, and be in some way consequent on the building of birds' nests. Is this because so many eggs are spotted with brown? or are the spots on the skin and those on eggs supposed to be caused by the same influence, whatever it may be?

A child during its first month is supposed to see all that is to happen to it through life. If it laughs much, it is a sign that its life will be happy. Every one *must* have the "frog" (thrush) once in his life. If not in infancy, then certainly before death. I may remark that in books this disease is called thrush or "*throg*," and that "*frog*" appears to be a corruption of the word "*throg*." It may be, however, not unlikely that "*frog*" is the older word, and "*throg*" the corrupted pronunciation. In the same way many of our country people call thistles, '*fistles*," as if derived from the Latin "*fistula*." If this be the true derivation, it shows that the name "fistle," in common use still, is as old as the time of the Romans in England; and I am inclined to think that it also shows us that the Romans had local names for plants, "fistula" being a local Roman name for "carduus," the classical word for thistle.

It is thought to be very unlucky to have money bidden for anything, especially a live animal, that you do not wish to sell. It is sure to go wrong in some way or other. This, however, is a general belief, and not, I think, confined to Cheshire.

Bees should never be *bought*, or if bought, should be paid for in gold, otherwise they will do no good. They should be either begged, or borrowed, or stolen. It is the custom in Cheshire, when any one wishes to begin bee-keeping, for some neighbour who already keeps bees, to give him a swarm, with the understanding that it is to be paid back *if required*. I have, however, seen bees bought, and for a good deal less than gold, and I recollect an amusing episode happening at a sale, where an old woman

had two hives of bees, stand included, knocked down to her for six shillings. Some of our old-fashioned auctioneers demand a shilling per head for all live stock, as a sort of deposit, and no sooner did the hammer fall, than the auctioneer, a merry old fellow, and almost as fat as Daniel Lambert, demanded from the old woman a shilling a piece for every bee in the hives. But he got his answer instantly, "Then yo' mun count 'em."

The pretty rye brome-grass (*Bromus secalinus*) and the Darnel (*Lolium temulentum*) are both *very* common in some parts of Cheshire. The former is known by the name of "Drook." A labourer once told me that Drook was degenerated oats, and as a convincing proof said that it was only found growing amongst that grain, and that Darnel was degenerated wheat, and was never found amongst oats, but I do not know whether this belief is very general in Cheshire. I could not persuade him that he was mistaken, but a very little observation would at least have shown him that drook is quite common amongst wheat, and darnel amongst oats. Our labourers, although they have nature's works constantly spread out before their eyes, only distinguish plants (unless it may be medicinal ones) by very superficial characters; but they may be pardoned for thinking that a drooping panicle of brome-grass is somewhat akin to oats, and the stiff spike of grain-bearing darnel is related to wheat.

Robert Holland.

STICKLEBACK IN SALT WATER.

In answer to your correspondent F. S., I have myself tried similar experiments last year on both the three and ten-spined Sticklebacks, and found both species alike would live and thrive in salt as well as fresh water. I was induced to try these experiments from having obtained several full-grown specimens of the three-spined out of the sea in shrimp-nets (*vide* Couch), which in two cases were full of well-matured roe, but never met with a ten-spined one under those circumstances. There are several small streams which contain these fish, running into the sea, and probably they were thus carried down.

But the last part of your correspondent's letter deserves much attention and close investigation as of much interest to ichthyologists. I shall not pretend or presume to offer any opinion on the subject, but will submit for consideration the following remarks:—Let it be taken for granted that all *true* fish breathe through gills, that is, life is supported by the blood being renovated by coming in contact with the oxygen contained in the water, by means of innumerable laminæ on the surface of the gills. Such being granted,

I. Why do most fresh-water fish die in salt water, and *vice versa?*

II. Why can a few of each sort live equally well in either?

1. In the case of fresh-water fish. Submitted:—Cannot the component parts of salt water, or particles of the different salts, so affect the gills that they get incrusted (if I may use the word) therewith, and thus prevent the required amount of oxygen coming in contact with the blood? Or, is it not possible that the blood itself may become impregnated with saline particles, which prove fatal to life? or, if impossible for such salts to enter thus into the system, may not these particles on coming in contact with the gills, decompose and unite with the oxygen, and thus cause death?—Next, as to salt-water fish dying in fresh water. May not the very absence or want of these salts in the system destroy life? or, the action of these soluble particles on the laminæ may cause a muscular irritability indispensable for the exhaustion of oxygen, and if deprived of which the active principle ceases, and death ensues?

2. Where fish live in either fresh or salt water, such as the salmon, stickleback, eel, mullet, &c., is it not possible that with these and a few others, they may have the power of disengaging or throwing off those salts from the gills when exposed to their action? or, if admitted into the system, absorb them without functional derangement? Or else, will the salt-water fish, when deprived of these salts, be able to exert more muscular power and increased respiration, and thus obtain the necessary supply of oxygen?

I am aware that objections may be raised to placing the above-named fish under the same category, as the salmon and eel are essentially migratory and require both conditions for their well-being, whereas the mullet is a salt and the stickleback a fresh-water fish. But I have done so advisedly, to bring under notice the difficulties (at least to me) of fixing a theory where different conditions have to be brought under the question—"How do these fish live in either water without visible inconvenience?" Might not the microscope reveal that the gills of different species of fish vary; and, if so, even in an infinitesimal degree, taking into consideration the immense area exposed to the action of the water,* that variation might produce entire change in the natural economy of the fish?

Again. Has the blood of those fish now under consideration been analysed; and if not, might it not tend to show if any or what salts are necessary to the one, absent in another, or present or absent in the migratory ones at the period of migration to and from the sea?

Bridlington. H. H. Knocker, R.N.

* Mr. Couch says the surface of the whole gills of a large skate is equal to 2,250 square inches, or more than fifteen square feet.

ZOOLOGY.

Black Spider of Jamaica.—There is a spider in Jamaica the bite of which is venomous, being speedily followed by inflammation, with pain and swelling of the wounded part; the natives are consequently much afraid of it. It is of small size, the body not being larger than a small pea, with short legs. It is entirely black, except a spot of bright scarlet upon the head, rendering it so conspicuous, and at the same time so repulsive, that a person unacquainted with its venomous properties would instinctively shrink from it; a peculiar and interesting provision of nature, observed in many obnoxious animals, whereby, as St. Pierre and others have remarked, mankind are put on their guard against their attacks, from some peculiarity of form, colour, sound, or other disgusting quality.—*W. Sells, in Journ. Ent. Soc.*, I. p. xlviii.

Rose-chafers.—A very pretty species of the *Cetoniadæ*, the *Agestrata luconica*, is of a fine brilliant metallic green, and found in the Philippine Islands. These the ladies of Manilla keep as pets in small bamboo cages, and carry them about with them whithersoever they may go.—*Baird's Cyc. Nat. Sci.*

Little Bustard (*Otis tetrax*). — A female specimen of this rare bird was shot by Mr. Araham, of South Clifton, Notts, December 21st, 1866. The bird was purchased by Mr. Adrian, naturalist, of Monson Street, Lincoln, by whom it is being preserved.—*H. T.*

The Redstart (*Phœnicura ruticilla*).—The sill of my study window being very much decayed, a pair of redstarts chose it to rear their young ones in. During the time that the young ones required their parents' attention, I frequently timed the parent bird, and found that she came to the nest twice in five minutes. Before she flew into the nest, she always rested on an espalier, and flew from it direct to the nest, so that I could always have a fair view of what she brought, which was chiefly caterpillars. As far as singing went, the male did his duty, for he sat for an hour together, in the cherry-tree, pouring out his song; but he did little in way of feeding the young. From early dawn to dusk did the hen labour for her brood, and she could not bring less than 350 caterpillars to the nest in a day; and thus she did good to that extent; and living, as they do, exclusively on insects, I think they deserve to be classed among our benefactors, and protected accordingly. The cock is a very beautiful bird, in my opinion the most handsome bird we have in England. The hen is a much plainer bird than the cock, and when she flies, she shows the hazel-red feathers on her rump, and is from that peculiarity called here the "brand-tail" and "jenny red-tail."—*John Ranson, Linton-on-Ouse, York.*

Glaucous Gull (*Larus glaucus*).—A fine Glaucous Gull was shot near Dunbar on January 2nd, 1867, by a fisherman of that place. It was a young bird of the first year, and measured six feet across the extended wings. Its total length was twenty-seven inches. A Green-shank (*Totanus glottis*) was also shot near Dunbar with some difficulty, owing to its being very shy, on December 4th, 1866. —*F. M. Balfour, Whittinghame, Prestonkirk.*

The Shipworm (*Teredo navalis*).—Destructive as it may be, the Shipworm will ever be an object of interest to Englishmen, inasmuch as its shell-lined burrow gave to Sir I. Brunel the idea which was afterwards so efficiently carried out in the Thames Tunnel. And, though from the alteration of surrounding circumstances, that wonderful monument of engineering skill has not been so practically useful as was anticipated, it has proved of incalculable value as pioneer to the numerous railway tunnels of this and other countries.—*Rev. J. G. Wood's "Homes without Hands."*

Value of the Starling to the Farmer.—A pair of starlings having built their nest in our roof, I frequently timed the parents, and found that they returned to the nest, on an average, once in five minutes, and that their labours extended over seventeen hours a day, *i.e.* from three in the morning until eight in the evening. This would make the number of visits to the nest 204 in a day: thus, a single pair of birds in the breeding season would destroy 204 slugs, worms, or noxious insects a day, and 5,712 during the month of attendance on their young. In addition, it is to be remembered that they live the whole year through on the same food. Yet there are farmers who destroy them because they build in the pigeon-cot; but we are glad to find them very much on the increase, and the old prejudices giving way to sounder and more truthful opinions; for nothing could be more absurd than the half-exploded idea, that because they built in the pigeon-cot, they were injurious to the doves. During the last five years, they have increased fifty-fold in this village, and nearly every cottage has its pair. This is in part owing to natural history having some attention paid to it in the village school. The starling is locally known as the "shepoter."—*J. Ranson, Linton-on-Ouse, York.*

"Cardinals."—These spiders, although undoubtedly first introduced at Hampton Court Palace, probably in some piece of furniture from abroad, have spread thence for several miles round. They are frequently taken in old houses and cottages at Cobham, seven miles from Hampton Court in a straight line.—*W. R. Tate.*

Spawning of the Frog.—It may interest Mr. Dansey and others to know that the earliest date on which I noticed frogs spawning last year in the vicinity of London was March 17th—in 1865, April 4th. About the best place to which microscopists can repair for finding frogs in spring is the market-garden ground by the Thames, between Chelsea and Fulham. The gardens are intersected by numerous ditches cut from the river for the purpose of affording a ready supply of water for the ground, and in these ditches the frogs spawn. The walk through these gardens is a very pleasant one; as the orchards afford shelter for numerous yellow-hammers, greenfinches, and other interesting birds. —*W. R. Tate.*

Testacella Maugei is a snail not often found in England. It is said to be a native of the Canary Islands, and more than fifty years ago was transported into the nursery grounds of an eminent firm in business at Clifton, near Bristol, and is naturalized in several localities in the West of England, probably sent out from the said nursery in the earth with plants, in the same way in which it is supposed to have been imported. It differs very much in appearance, habits, and character, from our common garden snail (*Helix aspersa*), or, indeed, from any of the other varieties of land or water snails. It is a ground snail of strictly carnivorous habits, penetrating the soil to the depth of two or three feet or more, and preying voraciously upon earthworms; they are sometimes dug up in the act of devouring a worm of large size, and admirably adapted is their grinding apparatus (the *palate*) for this purpose. When once the teeth are fixed in the worm, there is no chance for its escape; the teeth are long and sharply pointed, and so numerous and strong, that its victim is certain to meet with its death. The palate differs from those of all other species, which, by the bye, are all beautiful as microscopic objects, but none are so peculiar, so extraordinary as this, except perhaps that of the *Doris tuberculata*. It polarizes very nicely when well mounted, which should not be done in balsam. Deane's gelatine is not an unfit medium in which to mount it, and Remington's (of Bradford) glycerine jelly answers well; sometimes it is mounted dry, but I prefer the jelly. They are sometimes found in Devizes, but not in large numbers, and only when the gardeners are preparing their ground for crops, or digging up their crops, the demand here for them, for the sake only of their palates is great, and the price high, comparatively. I have bought them at a penny each, but since the demand has increased, so has the price; I have paid lately sixpence each for them. Four or five years ago I turned a few into my walled-in garden, with an expectation and hope that there they would colonize, but I have not since seen one; nor is this remarkable, as they are seldom seen above ground, and they are so much the colour of the ground that gardeners would not be likely to notice them in digging unless they were looking especially for them. They have no house on their back as others have, but are provided with a small shell near the posterior extremity, about one-fourth of their length—a mere apology for a covering for its body. When gliding along, the Testacella looks more like a slug; but on close inspection it will be seen that it has an appendage as above described. Their interior structure appears to differ considerably from others; but I have not made a comparative examination of their anatomical structure generally, but of their palate only, which really is very remarkable, and very large. I have no objection to exchange one for a palate of either of the varieties of Testacella.—*J. J. Fox, Devizes.*

Winter Butterflies.—The Brimstone Butterfly (*Gonepteryx rhamni*) made its first appearance here on Wednesday, the 28th of February; when I saw it fly past my drawing-room windows. I hear, however, that it was seen at Uckfield, our post-town, four miles off, some days previously. On Saturday, the 2nd of March, one of my female servants caught a fine specimen of the peacock butterfly (*Vanessa Io*) behind some newspapers in a storeroom, where it had probably been hibernating. It was very lively when first captured, and flew about in the sun; but, as the day declined, it became very sluggish, and finally died in the afternoon. The mean thermometer on the day in question only reached 33·9°, while that on the grass descended to 24°.—*W. N.*

Water Boatman.—As a microscopist, of course I possess an aquarium, need I say aquaria, if a 2 oz. bottle to a two-pailful glass tank are either of them worthy of the name. At present I will treat only of one in which I grow *Vallisneria*, *Anacharis*, &c., &c.; but independently of my vegetable life, I must bring under notice one of the most interesting little chaps in the animal line that I know of. I allude to the water boatman, *Notonecta glauca*. The one in my tank, however, does not appear to always swim on his back, but uses his paddles in the truly legitimate way; he seems to find plenty to live on, and the way in which he apparently rubs his nose and then cleans his back, finally patting his own stomach, would really do good to any of our city functionaries. Altogether, let me recommend *Notonecta* to possessors of aquaria.—*John Bockett.*

Stag Beetle (*Lucanus cervus*). — A popular belief in Germany is that the Stag Beetle carries burning coals into houses, by means of its jaws. and that it has thus occasioned many fearful fires.—*The Mirror*, xix., p. 180.

Origin of Crickets.—The Mormons say that crickets are the produce of a cross between the Spider and the Buffalo.—*Remy and Brenchley.*

BOTANY.

Poison and Antidote.—For the first time I gathered the poison-oak (*Rhus toxicodendron*), a pretty plant, that climbs by rootlets like the ivy, and trails gracefully over both rocks and trees. Some persons are most seriously affected by it, especially such as are of fair complexion, if they only venture near where it grows. It produces swelling about the eyes, dizziness, and fever; the poisonous effects are most virulent when the plant is bursting into leaf. I picked, examined, and walked amidst the trees over which it twined thickly, but experienced not the slightest symptoms of inconvenience. Still I know others that suffer whenever they come near it. Where the poison-oak thrives, there, too, grows a tuber known to the settlers as Bouncing Bet, to the botanist as *Saponaria officinalis*, the common soap-wort. The tuber is filled with a mucilaginous juice, which, having the property of entangling air when whisked up, makes a lather like soap. This lather is said to be an unfailing specific against the effects of the poison-oak—the poison and its antidote growing side by side.—*J. K. Lord's "Naturalist in Vancouver Island."*

The Larch-Tree.—Amongst the timber which was brought to Rome for the purpose of building the bridge called Naumachiaria, about the 20th year A.D., was a Larch that measured two feet square in thickness throughout, from end to end, and was of the extraordinary length of 120 feet; the tree must, therefore, have been not less than from 130 to 150 feet in height. Tiberius Cæsar would not allow this wonderful trunk to be used in the erecting of the bridge then building, but commanded it to be placed where all persons might see it as a curiosity, and where it remained for about thirty years, until Nero employed it in building his vast amphitheatre. Dr. Pallas, in his survey of the Russian dominions in Asia, observed several tumuli in Kamtschatka, reared at a period so remote that none of the present inhabitants had any tradition respecting their origin. The platform was covered by larch-wood, over which the mound of earth was raised, and the wood was found to be incorrupted.—*Sylva Florifera.*

Ancient Names of Plants.—Much information about them will be found in the "Cruydt boek, or Herbarium" of the Belgian botanist, R. Dodonæus, of which there are existing five Flemish, one French, two Latin, and five English editions; the latter, 1st ed. 1578, under the name of "A new Herball," translated by Henry Lyte, printed by Van Der Loe at Antwerp, and "to be sold at London in Powels Churchyarde, by Gerard Dewes," the second English edition (1586), and the 3rd (1595), only have plates; 1st, 4th (1600) and 5th (1619) have none. The edition of 1595 was "imprented at London by Edmund Bollifant." In 1850, Dr. Alavoine, of Malines, and Prof. Charles Morren, of Liège, published a concordance of the names given by Dodonæus, with the Linnæan denominations.—*B., Melle.*

The Birch.—Christopher the Third, King of Denmark, in 1450, received the unjust surname of *Berka Kanung*, which signifies King of Bark, because in his reign there was such a scarcity that the peasants were obliged to mix the bark of this tree with their flour.—*Sylva Florifera.*

Patthur-ke-phul.—Under this name two lichens found in Britain, *Parmelia perlata* and *Parmelia perforata*, are sold in the bazaars of India, and are employed medicinally by the Hakeems, or native doctors.

Pith.—The economic uses of pith have not been numerous, but amongst them must be mentioned the rice-paper used in China, and prepared by Kieung; the pith of the *Æschynomene*, and the *Aralia papyrifera*, cut in a circular manner, so as to obtain large thin and evenly-cut sheets. It is used for drawing, and for writing. The cellular pith-like stems of the *Æschynomene aspera*, called "shola," have been forwarded to this country, from India, and have been made into various ornaments, models of buildings, hats, boxes, and life-buoys. Its lightness and non-conducting property of heat, render it very fitted for the manufacture of hats.—*Dr. Edward Smith.*

Babeer.—In the February number there is a notice of the true papyrus having been discovered in the marshes of the Hûleh, by the Rev. H. B. Tristram. Dr. Thomson, in his "Land and the Book," speaking of the same locality, says,—"It is an impenetrable jungle of ordinary cane, mingled with that peculiar kind called 'babeer,' from whose stems the Arabs make coarse mats for the walls and roofs of their huts. This cane is the prominent and distinctive production of these marshes, both at the north and south end of the lake. I have seen it also on the banks of brooks on the plain of Sharon, north of Jaffa. The stalk is not round, but triangular. It grows eight or ten feet high, and ends above in a wide-spreading tuft of stems like broom-corn, shooting out in every direction with surprising regularity and beauty. It imparts a singular appearance to the whole marsh, as if ten thousand thousand brooms were waving over it." Is this "babeer cane" another, or merely local, name for the true papyrus? If so, it would appear to be more widely distributed in Palestine. Du Chaillu, I believe, mentions the papyrus in Western Equatorial Africa, as also Speke, in one of the lakes near the source of the Nile.—*E. D. C.*

MICROSCOPY.

Hints to Object Mounters.—The following few hints on mounting objects for the microscope may possibly be of service to the large number of amateurs who are engaged in the study of that instrument. These remarks refer to Canada balsam, the medium used for all, excepting certain classes of objects which require to be mounted dry or in some fluid. First, with reference to bottles used to contain the balsam and turpentine, I should recommend the wide-mouthed bottles with covers which fit outside the neck; this effectually prevents the recurrence of a constant source of annoyance to those who close their bottles with corks in the ordinary way, for in withdrawing a drop of balsam with the glass rod or wire while mounting an object, it frequently happens that the inside of the neck is smeared with it, the cork is presently inserted and when next it is used is stuck fast, and in removing it some small fragments are torn off and probably fall into the balsam, and perhaps sometime or other get into a good mounting and materially injure it; by adopting the above method this accident will be impossible. It will also be advisable to use the same sort of bottle for the turpentine, as it prevents dust and dirt accumulating round the neck, and getting into the preparations. These bottles may be obtained at any glass bottle warehouse; they are manufactured by the York Bottle Company, either with screw covers (which are preferable), or merely tightly fitting covers lined with cork, which answer the purpose perfectly. Turpentine is a most important article in mounting in balsam, and too much care cannot be used in obtaining it pure; the compound sold in the oilshops is generally a vile mixture, containing but a very small portion of pure turpentine, and quite unfitted for use in mounting; it may, however, be procured of good quality of any respectable chemist, at a cheap rate, and is known as "spirits of turpentine." The following is a method of proceeding which I adopt in mounting in Canada balsam objects of great delicacy, which will not bear drying on slides without great risk of damage in removing. The object, on being taken out of the potash or other solution, is thoroughly washed in clean, warm water, and when perfectly clean, immersed in spirits of wine (the ordinary methylated spirit answers perfectly). It should remain for some little time, say half an hour or so, and may then be removed, slightly dried on blotting paper, transferred to the turpentine, remaining there as long as necessary, and then mounted in balsam in the usual way. In this plan of proceeding it will be seen that the object is never once dried, and is therefore not so liable to get damaged as in the ordinary way of drying on a slide and then removing. I might here mention that I do not think the plan of drying on slides and then immersing the whole in turpentine is altogether satisfactory; for however well an object may be washed, it always leaves a trace of impurity on the slide on which it is dried, and without removing it of course this cannot be got rid of. The balsam I prefer is that usually sold at the shops, thinned when necessary with pure spirit of turpentine; the chloroform and balsam I have no liking for, and must say I have not found it as satisfactory as the unsophisticated article.—*G. E. Cox, F.R.M.S.*, 9, *Mincing Lane.*

Whelk Eggs.—Are the readers of Science-Gossip generally aware of the extreme beauty of the membrane enclosing the eggs of the common Whelk (*Buccinum undatum*), when placed under the polarizing apparatus? The softness of the colouring and the delicate blending of the tints are equalled by few, and surpassed by none, of the polarizing objects with which I am acquainted. The bunches of whelk's eggs are (as every seaside visitor knows) a "common object of the seashore." I have a few by me, and shall be happy to supply them, as far as they will go, to any one sending a stamped envelope to *Rev. W. Spicer, Itchen Abbas, Alresford.*

The membrane must, of course, be mounted in balsam.

Genera and Species of Diatoms.—At the meeting of the Quekett Microscopical Club, held February 22nd, an interesting communication was read from Mr. F. Kitton, of Norwich, on the construction of genera and species upon insufficient data. The illustrations and application of the remarks were chiefly confined to the Diatomaceæ; and the writer contended that it was very unwise to accept a single specimen, or a portion of a frustule, as a type, and constitute thereupon a new species or new genus. Instances were quoted in which this course had been adopted, to the great confusion of the student; and he further affirmed that it would be better to throw such unique or imperfect specimens into the fire, and not attempt to name a new form as a distinct species until a good gathering had been made. In further confirmation of his views, he adverted to the variation in contour of well-known forms, derived from different localities, and the difference in the markings, or striæ, in the secondary layer of the silicious shields, which had on some occasions been accepted as distinct species. The tendency had been greatly to multiply both species and genera of Diatoms, without regard to the mutability of form, resulting from the influence of external conditions, and consequently, to create almost inextricable confusion by a formidable array of synonyms. The limits of species and genera have of late attracted so much attention, that the subject of the above paper acquired thereby additional interest.

GEOLOGY.

"Giants in those Days."—There is a widely-spread popular tale, common to Ireland and Scotland, and told with many variations. The gist of it is, that in the days of Fionn there were deer and birds far larger than any which now exist. Ossian, it is said, when old and blind, lived in the house of his father-in-law, or in the house of St. Patrick, and they were busily writing down all he had to tell them of the history of the Feinne. But no one would believe what he said about the strength of the men, and the size of the deer, the birds, the leaves, and the rolls of butter,—that these were in the "Feinne," the country and age of Fionn. To convince the unbelievers, the last of the old race prayed that he might have one more day's hunting, and his prayer was heard. A boy and a dog, the worst of their class, came to him in the night, and with them he went to some unknown glen. There, with many strange incidents, it is told how they found a whistle and a store of arms, and a great caldron; and how the blind hero collected deer and birds by sounding his whistle, or horn, or "dord." Deer came as big as houses, or birds as big as oxen. Guided by the boy, his hand drew the bow and slew the quarry, and when the chase was done, they dined as heroes used to dine. A hind-quarter was brought home, and the bone of an ox went round about in the marrow-hole of the shank of the creature which Ossian had brought from the "Feinne." With endless variations this story is told all over Scotland and Ireland; and it is firmly believed by a very large class of her Majesty's Celtic subjects in Ireland, Scotland, and Wales, that there were giants and monstrous animals in the days of King Arthur and of Fionn. There is no geological evidence yet for gigantic men, but peat-bogs, gravels, and caves, are full of the bones of beasts as big as a small haystack; and the word used in the tale, "con," means "elk" as well as bird.—*Campbell's "Frost and Fire."*

Ancient Nuts.—I am in possession of some hazel nuts (*Corylus Avellana*), of the filbert variety, which were procured with many others, and the antlers of a deer, from the remains of a forest between forty and fifty feet below the bed of the River Trent—this was bored through in excavating for a foundation for the piers of the railway bridge at Keadby. The nuts, as regards the shell, are in a perfect state of preservation, blackened of course by age, and without any kernel; whether naturally so, or as the effect of time, I am unable to say, but in all probability the latter. Now, as it is well known that at the period of the Roman invasion, upwards of 1,900 years since, an immense forest existed in this part of Lincolnshire (Isle of Axholme), and the adjacent Yorkshire district, west of the river Don, and that as a place of refuge for the Brigantes and Coritani, it was destroyed by the invaders, either by fire or the axe; the inference is tolerably certain that the date at which these nuts grew, could not be posterior to that event, but in fact might have been anterior to it. It is manifest, however, that since that time, great changes must have taken place in the relative level of land and water, for at the depth where we now find the remains of these trees, none could at present grow. It is obvious, too, that the river must have altered its course, and that in all probability, its channel was more easterly, and at the base of that range of hills of the secondary and oolitic formation, known now as the cliffs, and which from the enormous quantities of fossil shells, such as, *Gryphæa, Unio, Terebratulæ*, &c. found there, must have formed the bed of an ancient sea. To return, however, to the nuts, I am in a position to state that many have been recently found at Hull, of probably greater antiquity even than those I have by me.—*Henry W. T. Ellis.*

Ancient Sea-marks on the coast of Sweden.—At the meeting of the Geological Society, held 6th March, 1867, a paper was read by the Right Hon. the Earl of Selkirk, F.R.S., F.G.S., which contained a detailed description of some observations made in the month of July, 1866, upon certain marks placed so as to show the level of the sea on the coast of Sweden, which were seen by Sir Charles Lyell thirty-two years ago, and which were supposed to indicate a gradual and equable rise of the land of about three feet in a century. Two of these marks were off the harbour of Gefle, and one on the Island of Gräsö, off Öregrund, on the east coast of Sweden; the rest were on the west coast, a little to the north of Göteberg. The conclusion arrived at was that these marks do not afford any very certain proof of such rise of the land; the fluctuation of the level of the water being so great that any difference of the level of the land in thirty-two years is lost in comparison with the daily and weekly changes owing to shifts of wind and other causes affecting the *water*, not the land. The marks off Gefle gave most indication of a change of level; but there were various elements of uncertainty connected with them.

The Use of Fossils in geological investigations is very considerable. They tell us of time elapsed, as well as mechanical changes effected, and of conditions of existence of animals and vegetables different from the present. They are also, by their specific character, by their mode of grouping, and by the succession observable with regard to them, characteristic of geological formations. They are, in fact, the very hieroglyphics of nature, marking the condition of the earth at the time and place of their deposit; and thus they are the true materials from which we deduce the earth's history.—*Prof. D. T. Ansted.*

NOTES AND QUERIES.

Bird Slaughter.—In almost every number of Science Gossip and other similar journals, some energetic naturalist announces the "interesting" fact of his having "succeeded" in shooting some rare or beautiful bird or birds,—in one case no less than 41. In fact a bird has only to possess these qualities, which one would think ought to insure its preservation, and every gun in the locality appears to be pointed at it. If the present system of destruction continue, many species of our existing birds, which now give an additional charm to nature's handiwork, will soon become a matter of history, represented only by a few stuffed specimens, or, like the Dodo and Moa, by a skeleton or solitary egg. I am pleased to read the remarks of Mr. Tate on this subject. So far from being interesting, the exploits of these bird-killers are distressing to all true lovers of nature.—*E. Greenhough, Matlock.*

Wind Courses.—Wherever a tree grows on the western coast of Ireland, it bows its head to the north-east. Every exposed Welsh tree bends towards the dawn. Every exposed tree on the west coast of Scotland seems to be driven by a furious wind on the calmest day. About Edinburgh it is the same. On the east coast, in North Berwick Law, an old thorn-tree streams towards the north-east, and every tree in that neighbourhood that dares to peep over a wall, straightway assumes the form of an old broom, and points eastwards.—"*Frost and Fire.*"

Polarizing.—Mr. Bestall, of Camberwell New-road, has for some time past been in the habit of making an interesting apparatus for the exhibition of the effects of polarized light. It consists of two or three plates of glass about six inches square, some objects, as a flower, parrot, butterfly, &c., prepared and mounted, about three inches square, and a little "box of mystery," about an inch square, to be held in the fingers and peeped through. Though not announced as anything new, it well deserves to be better known, as a good popular mode of exhibiting the effects of polarized light.

A Boy Charmed by Serpents.—"Can the above be true?" asks "J. B." in Science Gossip, after quoting from an American paper a long account of a child having been fascinated by serpents. With a vivid recollection of a Welsh tale told me in my youthful days, I should say decidedly not. The *Maysville Eagle* has only Americanized a Cambrian fable which ran thus. A little boy of five years old was observed by his mother to carry off his bowl of bread and milk into the garden every morning, and on being questioned, said he shared his breakfast with two "pretty things." His father followed him the next day, and saw to his horror two large snakes (all the Welsh, in the lower ranks of life, regard every snake as venomous) eating out of his boy's basin. The visitors were rather greedy, it would appear, for the boy had occasionally to give one or other of them a pat on the head with his wooden spoon. Breakfast over, a game of play ensued, and at last the child was allowed to return to the cottage unharmed; but on being prevented from again joining his playfellows, the snakes, he "pined away and died."—*H. E. Watney.*

Pork Measles.—A few days ago, a man brought a piece of pork to me for microscopical examination. In cutting up the carcase, of which the piece brought me was a portion, his attention was attracted by certain small, almost round, fat-like bodies, which were profusely scattered through the whole of the flesh, but most abundant in that of the shoulders. They were imbedded in elongated cavities about three times their own size. They are clearly parasitic organisms. I have examined many of them and find them alike. The part I take for the head is very curious—it appears to be composed of five circular parts; four of which, looking like suckers, are arranged round a centre one containing a great number—perhaps from fourteen to twenty claws, very like those found in the fingers of *Ophiocoma*. The interior I take to be a sack or cell, whose inner membrane is gathered in folds. And it is filled with an immense number of spore-like granules, some of which are elongated—constricted several times, as though they had been growing.—*B. Taylor.*

The specimens above alluded to were forwarded to Dr. Cobbold, who has kindly furnished the following reply:—I have carefully examined the parasites forwarded by Mr. Taylor. They are well formed and highly characteristic examples of the so-called pork-measle, or *Cysticercus telæ cellulosæ*. Mr. Taylor's description, so far as it goes, is very good; but should he desire further particulars relating to the structure and economy of these organisms, you will please to refer him to my large treatise on the "Entozoa" (p. 216, Plate 12), or to my smaller work on "Tapeworms," in which (at p. 19, *et seq.*) he will find a popular exposition respecting the origin and development of this minute larval parasite. I may mention, as a fact likely to interest your readers, that only yesterday I examined a portion of human brain, which, strange to say, contained an astonishing number of these *Cysticerci*. If any ardent sewage-distributor should read your useful little journal, I hope he will duly reflect on the importance of this fact, and console himself with the thought that his benevolent designs may not unfrequently be the (undesigned) means of hurrying some fellow creature into eternity.—*T. Spencer Cobbold, M.D., F.R.S.*

Cleaning Reflectors.—At a time when so many of the microscopical lamps are fitted with reflectors which require constant cleaning, I would beg to recommend that all parties possessing some, should obtain a small bottle of negative photographic varnish; that called Sœhnœ is the best; and warm the underneath side of the reflector until the hand can only just bear the heat, and then, with a slight rotatory motion, coat the silvered side with varnish. I used to clean all my reflectors once every week with very fine jewellers' rouge and water, using my little finger as a polisher, just the same as I do in the case of my Lieburkuhns and side reflectors, but as the lamp reflectors are so thinly coated with silver the copper soon appears through. Since I have adopted this varnishing plan, not a single cleaning has taken place for now six weeks, and their brightness is unimpaired.—*John Bockett.*

Drilling Glass.—A ready and inexpensive mode of drilling glass slides may be of use to some of your numerous readers. Obtain a small three-sided saw file, grind the apex into a triangular sharp point—not too acute, as it will be apt to break if the steel is, as it should be, very hard—

apply the sharp point of the file (previously wetted with turpentine) to the glass to be perforated, with firm pressure, keeping the point of the file in the same spot, and giving the upper part a motion from side to side, and also circular. The moment the surface of the glass is abraded the action will go on rapidly, keeping the point still wet with spirit of turpentine. When half way through it is best to begin on the other side of the glass. When the aperture is made sufficiently large, it may be increased by using a small "rat-tailed" file, kept wet with the turpentine.—*J. B. Spencer.*

Sensitive Plants.—There are said to be three plants of the British Flora that give manifestations of sensitive properties, of which the Berberry is one. Pray oblige by supplying the names of the two others.—*J. L. B.*

An Egg within an Egg.—I saw to-day a rather large hen's egg; the interior had been eaten at breakfast; at the pointed end inside was found a smaller egg, about the size of a ringdove's, and joined on one side to the shell of the outside one. This, I believe, differs from previous communications.—*C. A. J.*

A Confiding Chaffinch.—I constantly see anecdotes of birds in Science Gossip, so the following instance of tameness on the part of a chaffinch may not be uninteresting, and as it was related to me by an eye-witness, the gentleman to whom the house and garden belonged, I can vouch for its being a fact. Sir R. and Lady N. were staying in Hertfordshire last spring, and they noticed a chaffinch's nest in a low alcove in the garden. The hen bird was sitting when they first observed her, but in a few days the young birds were hatched, and Lady N. amused herself by feeding them. The mamma chaffinch did not approve of this at all; at first, she perched on an adjoining tree out of reach, evidently in much alarm, but became in a short time so bold that she positively would remain on the side of the nest, and, after her young family had been fed, open her own beak for a dainty morsel. The male bird was always within sight, and used to sing while the meal was going on, but never conquered his shyness so far as to come and partake of Lady N.'s hospitality.—*Helen Watney.*

Destruction of Small Birds.—Mr. C. Roach Smith, F.S.A., offers a plea for small birds in the *Gentleman's Magazine*. He concludes thus:—"Can we wonder at the increase of the insects which destroy our fruits, and at the great loss sustained by those who have extensive orchards and gardens? The birds are the only possible agents to counteract the deadly unseen insects which are every hour being bred almost everywhere. Nature has formed the bird's eye for detecting insects where the eye of man is useless. Wholly destroy the birds, and the fruit is wholly destroyed. At Hartlip, some years ago, in the face of truth and facts, the sparrows were exterminated entirely as being injurious! The orchards were immediately covered with the webs and nests of innumerable caterpillars and other insects; and in two years it was calculated that over £1,000 was lost in consequence of this insane slaughtering. But far more startling instances could be adduced; and yet we see no steps taken to stay the evil! I, sir, look more to youth than to the hardened man, who has steeled himself into erroneous convictions, and will never part with them but with life. It is not so with boys—they are to be reasoned with; and if the country gentry and clergy would make friends of them, and explain the nature and use of birds, and their importance in the great scheme of Providence, I am assured they would soon be induced to be protectors, instead of destroyers, of the birds; and they would thus find doing good much more grateful and profitable than working evil."

Bedeguar (p. 71).—Johann Leunis, in his "Synopsis der Naturgeschichte des Thierreichs," says that the name is "Aus dem Hebräischen Bedeguaeh, Rosenapfel, gebildet (formed from the Hebrew Bedeguach, or Rose Apple)." I am not aware whether the Rose Apple (*Jambosa vulgaris*, Dec.) was known to the Hebrews. If it was, there is perhaps sufficient similarity between its feathery stamens and the filamentous coating of the Bedeguar to have led them to transfer the name from the flower to the gall.—*W. W. S.*

Santonin.—Can any correspondent tell me how to procure good slides of this salt? I have tried fusion on the slide itself, and solution in boiling spirit, with indifferent success. Is Canada Balsam the best medium for mounting?—*E. M.*

The Blood Beetle (p. 71).—The simple fact that the Beetle described by Mr. Ullyett at p. 26 exuded a "sanguineous fluid" would in itself be sufficient to shield him from the suspicion of having mistaken the Oil Beetle for it. As far as my experience goes, the Blood Beetle is very much commoner than the Oil Beetle. The English name of each species ably indicates its distinctive peculiarity.—*B.*

The remarks of Mr. Hawkes in your last number caused me to look very carefully over the description of the Blood Beetle which I had given, for they made me wonder what egregious mistake I had made. I must confess, however, that I can see none, and that I am utterly at a loss to conceive how any one that had ever seen the beetle could confound it with the Oil Beetle (*Melöe majalis*), which belongs to a totally different family. This latter is the one represented (and very well, too) in Wood's "Common Objects." The male and female of both *majalis* and *lævigata* differ in little else but size. I am quite willing to acknowledge that the broad tarsi serve more particularly for the purpose he mentions, but must request him to catch and examine the female of the latter, as he will find the tarsi are not "slender and narrow," but almost as broad as those of the male. It certainly does appear necessary to have our very commonest beetles figured as well as described.—*Hy. Ullyett.*

Early Wasp.—On the 3rd of March I found on one of the windows in my dining-room, a wasp (*Vespa vulgaris*), of course a female, in a semi-torpid condition, but which, on being placed under a glass-shade in a warm situation, speedily revived, and soon began to feast on some sugar placed near it. The weather for the three previous days had been cold, with light easterly winds, sharp frosty nights, but a brilliant sun, and to this last circumstance may, probably, be attributed the fact of the insect having emerged from its retreat, at a period considerably earlier than has been recorded by White, Markwich, or any other observer, except Jenyns, who gives somewhere about the same date for its first appearance.—*Henry W. T. Ellis.*

Halo round Shadow. — I have observed a phenomenon (and probably others have noticed the same) which appears to me to be of interest, when taken in connexion with the *note* in your January number, entitled, "Halo of a Shadow," and with two others in the succeeding number. If an individual stands in the rays of strong sun-light, his shadow falling on a white ground, say a white marble slab, the shadow will be seen to present around, or without its margin, an appearance like mist or smoke in motion, or rather of the shadow of one or the other. The appearance is seen where the naked body gives its shadow, and also in a less degree where the shadow is cast from a portion of the body covered with clothes. I myself have set down this wavy or smoky appearance to the transpiration from the skin, but am I right?—*R. G.*

The Phosphorescent Centipede.—"M. G. F." asks the name of this. As I was coming home one evening last August, I found several among the herbage, and took one home. It proved to be that represented in "Wood's Natural History," vol. iii., p. 693, *Arthrouomalus longicornis.—Hy. Ullyett.*

False Hair as a Cause of Disease. — On Thursday evening at the Harveian Society of London, the scientific points involved in the "chignon question" were commented upon by Dr. Tilbury Fox in a paper which had reference to the influence of parasites in the production of diseased conditions of the skin. It has been asserted, first, that false hair contains the germs of pediculi, which are developed by the warmth supplied by the human head; secondly that bodies called "gregarinæ" exist in false hair, and may become pediculi. The first statement is wholly incorrect, but the so-called "nits" are nothing but empty shells, whence the young pediculi have escaped. The female pediculus lays her ova at the part of the hair close to the scalp; in six days the young are hatched, the empty shell is carried forward by the growing hair, and as this is cut from the head at the distance of from one to two inches, no true ova are brought away with it. The inference is clear that no false hair ever contains the materials from which pediculi develop, and where these are present their existence must be accounted for by uncleanliness. The second statement is equally untrue; gregarines are only found in Russian hair, which does not enter the English market; they have vegetable affinities, and never give rise to any form of insect. In his large experience of diseased states Dr. Fox stated he had never seen them once on the hair. Lastly, he described a real source of danger as yet unnoticed by any observer. On some of the light brown or reddish false hair of German origin, he had found a species of "mildew" fungus, which unquestionably would, if implanted upon the surface of weak persons, give rise to "ringworm" and he produced microscopic evidence and instanced cases in which he had apparently seen mischief result in this way. Cleanliness is a great preventive of evil, and such hair should be subjected to proper processes to insure protection against the production of disease. While the great majority of the statements that have been made recently about "chignons" are wholly untrue and absurd, there is no doubting the fact that without proper precaution the use of false hair may give rise to certain uncomfortable conditions of the part next which it is worn, but that even this source of evil may be remedied.—*Times, March* 9.

Aquarium Pest.—My experience (of many years' standing) with aquariums is that the snail spawn *does* hatch, and the young, if allowed, grow to a good size, but with much thinner and brighter shells than their pond relatives. Also that the fishes, particularly the sticklebacks, *do* eat, not the spawn, but the young snails, to an extent that prevents most of them from arriving at maturity. The jelly is sometimes gnawed in holes; I think by the beetles.—*Henry Faulkner, Jun.*

Aquarium Pest.—Can any of your numerous correspondents suggest a plan by which the *Aniscus* —an insect that devours the roots of the Valisneria —can be destroyed without disturbing the aquarium? Do any of the smaller water-beetles feed upon them? If so, what variety? Any practical suggestion will be thankfully received by *J. S.*

We have also received communications on this subject from L. A. G. and H. M., which want of space compels us to postpone.

Waterton's Process. — Your correspondent "H. M. G." will find this fully described in the last edition of "Lee's Taxidermy" (Longman & Co.). It is described as performed by Mr. Waterton himself in the presence of the writer.—*Jas. W. Impey.*

Hyalodiscus. — I do not find that Pritchard gives the pretty diatom, *Hyalodiscus subtilis*, var. *lævis*, as a British species. I find it in the washings of weeds and stones, procured from under Bangor Suspension Bridge. I have a slide to spare, and shall be happy to send it, to any one who studies their forms, through the Editor of Science-Gossip. —*R. G.*

The Rhythm of Flames. — In the Gossip for last month there is an inaccuracy or an omission which I wish to correct. A palm is assigned to Dr. Tyndall, which he has not claimed for himself, and which belongs to another. In the *Philosophical Magazine* for February, Dr. Tyndall has published an abstract of his lecture; and in it he alludes to Mr. Barrett (the lecturer on Experimental Science at the International College) as having independently observed not only the effect of sound upon flames, but also the increase of light which accompanies the shortening of a flame by a musical sound, and the superior effect of high notes. In the same magazine for March, Mr. Barrett gives the history of his discovery, and an account of his experiments. He observed the extreme sensitiveness of a tall and tapering gas-flame while producing the higher notes on a vibrating plate. He found this flame shrank down several inches at a sharp and shrill sound. Subsequently, having intensified this phenomenon, he made a number of beautiful experiments on similar flames. The jumping of a fish-tail flame in response to musical sounds, an effect the reverse of the above, had been observed in 1858 by Professor Leconte. To Leconte, therefore, is due the discovery of the spasmodic projection of tongues of flame by a fish-tail jet; and to Mr. Barrett we owe the observation of the sensitiveness of a long and slender flame. In Mr. Barrett's article above referred to, he says he was made aware for the first time of Leconte's discovery by the article of Dr. Tyndall. The discovery may or may not lead to more important results, yet to correct an inaccuracy so often repeated cannot be unimportant.—*R. W., Brixton.*

NOTICES TO CORRESPONDENTS.

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

F. A. C.—*Menyanthes trifoliata* grows on Hampstead Heath; the others are American plants. Not stated whether dried or growing plants are required.

W. A. L.—As C. B. resides in Vienna, he cannot answer for himself. We know of no place in England where the articles can be obtained.

J. P. and T. H. N.—As there must be a limit somewhere, we have resolved not to admit apparatus into our Exchange column, which is designed for objects in Natural History.

E. D. C.—Most probably.

E. T. S.—*Macrosporium sarcinula.*

R. G.—The Podura, doubtfully referred to *Achorutes fimetaria* at p. 72, accords with the *Desoria viatica* of Nicolet; but his descriptions are so concise that it is difficult to speak positively.—*I. O. W.*

A. B. P.—A great deal of nonsense has been written about "Gregarines" developing into Pediculi. There is more romance than truth in the newspaper reports.

R. H.—The book you mention is probably Daniel Cooper's "Flora Metropolitana; or, Botanical Rambles within Thirty Miles of London" (S. Highley, 1836); or possibly the Middlesex portion of Turner & Dillwyn's "Botanist's Guide." Both these, however, have been superseded by Watson's "New Botanist's Guide; but Dr. Trimen's announced "Flora of Middlesex" will be likely to give you the most recent information.—*N.*

T. H., Jun.—1. *Hypnum (Brachythecium) rutabulum*; 2. The same, *var.* β *longisetum*; 3. *Atrichum undulatum*; 4. *Hypnum (Brachythecium) Velutinum.*—*R. B.*

A. N.—Forwarded to E. H. R. as requested.

H. M. G.—"Taxidermy made Easy" (Gardiner, 52, High Holborn, W.C., price 1s. 6d.) contains Waterton's Method of Stuffing Birds, reprinted from his "Wanderings."

W. H.—See answer to H. M. G. above. For insects, "The Butterfly Collector's Manual" (Kent & Co.), or the volume of "Insect Miscellanies."

H. P. A.—We cannot judge from the *name* alone. Send drawing and description.

Acarus.—Letters and specimens from the following duly received:—W. W. S., A. S., W. T. I.

W. C.—See our oft-repeated notice at the head of this column.

J. G.—Thanks for your offer. See the reply to H. M. G.

A. J. and R. H. N. B.—Compel us *again* to say that we cannot notice communications where the name of the writer is not given.

T. P.—*Thuidium tamariscinum*, Br. and Sch. (*Hypnum tam.* Hedg.), Common.—*R. B.*

H. G. G—1. *Omphalodes verna*, a Boraginaceous plant, nearly allied to *Cynoglossum*, of which genus it was formerly considered a species. 2. Not frequent. 3. The white-flowered variety of *Lamium purpureum* is not uncommon.—*B.*

C. H. G.—1. No. 2. We cannot say. 3. Question is not clear. 4. None specially. 5. Dr. Carpenter's work on the Microscope, pp. 618, second edition.

Waterton's Process.—We have to thank numerous correspondents who have sent manuscript directions for this process, or indicated in what books it is to be found.

J. S. K.—Your Lichens are common species, and may be found in any old orchard. We cannot undertake to return specimens; duplicates must be kept, with corresponding numbers. 1. *Ramalina fraxinea*; 2. *Ramalina fastigiata*; 3. *Evernia prunastri*; 4. *Borrera ciliaris*; 5. *Usnea hirta.*—*R. B.*

J. E. T.—*Tortula fallax.*—*R. B.*

A. W. C.—They may be found in a recent number of the *Microscopical Journal.*

M. A. B.—We should think one of the large silk-houses in the City, but much depends upon the quantity you have to dispose of.

Youghal.—Your specimen is a portion of a *volcanic bomb*, probably introduced with ballast.—*R. T.*

W. M.—The report is unfortunately derived through too trustworthy a channel to leave much hope of its being untrue that Dr. Livingstone, the celebrated African traveller, has been murdered by natives.

EXCHANGES.

Salicine and Seeds (20 varieties), mounted, for Entomological or other mounted slides.—E. M., 6, Holford-square, Pentonville, W.C.

Podura Scales (*Podura plumbea*), mounted as test-objects, for other unmounted objects.—E. Histed, 3, Great Bourne-street, Hastings.

Mosses.—Fifty capsules of *Bryum calophyllum* for one of *Zieria demissa*, and ten of *B. lacustre* for one of *Webera acuminata.*—J. Whitehead, 17, Shaw-street, Dunkinfield, Cheshire.

Dicranum crispum for other British mosses.—Send lists to G. E. Wright, 18, Brunswick-street, Manchester.

Microscopic Objects (mounted or unmounted) for Spicula or other objects.—Lists to W. H., Stamp Office, Fordingbridge.

Washings from Wiltshire Chalk (unmounted) for other objects.—W. F. H., D. Harding & Son, Winchester-street, Salisbury.

Kentish Glory, and other rare Insects, for British or Foreign Shells.—J. W. Taylor, 7, Freehold-street, Leeds.

Fossil Earth from Toome Bridge, or mounted Diatoms, for lehaboe guano (unmounted), old deposit, 1844.—E. W., 48, Tollington-road, Holloway, N.

Foraminiferous Sand from Smyrna.—Stamped envelopes to G. E. Q., 109, Long-lane, Southwark, S.E.

BOOKS RECEIVED.

"The Technologist," No. 8, New Series. March, 1867.

Hardwicke's "Bibliographical and General Index to Current Literature," No. 1. Oct. to Dec., 1866.

"The Twin Records of Creation," by G. W. V. Le Vaux. London: Lockwood & Co.

"Second Annual Report of the Bolton Scientific Students' Association." Bolton. 1866.

Communications Received.—F. A. C.—T. H., Jun.—B—J. J F.—E. T. S.—J. L. B.—J. P.—R. H.—J. V.—E. D. B.—T. R.—E. S. W.—F. S.—A. B.—J. B. S.—W. T. I.—F. A. A.—C. R. D.—A. L.—W. R. T.—W. N.—W. H.—E. A.—G. E. H.—F. S.—R. H.—T. R. C.—C. A. J.—T. P.—H. W.—W. J. G.—B. T.—J. B.—E. D. C.—J. V.—H. S.—A. N.—H. P. A.—J. S.—E. S.—W. C.—J. W.—J. G.—G. E.—H. L.—J. B. B.—J. B. (Birmingham).—W. J. D. A.—R. G.—H. M.—A. W. C.—M. A. B.—L. A. G—H. U.—H. F.—C. H. G.—J. H. A.—J. W. I.—W. J. S.—W. W. S.—S. A. S.—F. R. R.—F. W.—H. W. (Jarrow).—D. H.—B. (Melle).—T. P. B.—G. E. B. (Bangalore).—H. B. H.—L. G. M.—J. E. T.—H. W. T. E.—H. G. B—H. R. W.—R. P.—R. B.—H. H.—H. B.—R. R.—A. G. H.—H. Smith.—E. A. (Norwich).—J. M.—Mrs. D.

A VOICE FROM PARIS.

DOWN the Champs Elysées flows the tide of fashionable Paris, and a pair of solitary rooks have built their nest on the top of a plane-tree at the corner of Rue de Morny, to contemplate at their leisure the ever-flowing human stream between the Tuileries and the Arc de l'Etoile. I wonder what these rooks think of Paris, and how they came to establish themselves in such a spot. That may be a problem, but there is a greater problem yet unsolved in the Champs de Mars. It is the Great Exposition of 1867. Let the stranger cross the Pont de l'Alma, and obtain his first glance at the extraordinary mausoleum in which lie entombed so many of the fondest hopes and the rarest achievements of Science and Art which the Great Fair of 1867 has collected together from all parts of the civilized globe, and he may well ask himself if that is indeed the temple which the most artistic of civilized nations has dedicated to universal genius. It might have been designed for a big gasometer, or an elliptical railway station, but, spoilt for both these purposes, it has become the Great Exposition.

What is it possible to say, even yet, of the contents of such a chaos as the interior exhibits? And yet there are a few objects of interest which have already emerged from the packing-cases, to which an allusion may be acceptable. Everybody knows that, although the "show" is opened to the public, it is not half complete; and what is unknown and hidden always acquires a mysterious importance; hence it becomes a feasible excuse to plead that the most wonderful things are not yet exhibited. It is reported that the Chevalier Bonelli, of Milan, has produced or invented a novel optical instrument, called a Photobioscope, which depends for its effect upon the property possessed by the retina of the eye of retaining for a brief space the image of any object after the withdrawal of the latter from the visual range. But its great efficacy is said to result from the alliance of microscopic photography, which, by reproducing the delicate gradations of any given movement, produces marvellous effects. The Photobioscope is a stereoscope which in addition to the appearance of solidity imparts that of life and motion to the object seen through it. "Ships are seen gliding on the surface of the deep, the waves twinkle in the merry sunlight, the cataract descends in glittering spray and foam from the brow of the jutting rock, cattle roam in search of pasture on the mountain skirts, the leaves are trembling in the breeze. Hands and arms are never still, mouths open and shut, the very eyelids wink." Such marvellous results are attributed to the Photobioscope, but as many of the treasures of Art and Science from Italy still slumber in their packages, it is impossible to verify the glowing account from actual observation, or even to affirm whether such a thing as a Photobioscope is exhibited in the Italian department of the Exposition of 1867.

Amongst the things that are really worth seeing may be mentioned one of the great attractions of the Rue des Indes—that is, the avenue of the building in which the contributions from British India are exhibited. This is a most masterly and lifelike group of stuffed animals, consisting of the body of a deer, over which a lion and tiger are engaged in deadly conflict. The grouping is happy in conception, and in execution leaves nothing to be desired. All day long a crowd blocks up the passage in front of this group, the work of Mr. Edwin Ward, of Wigmore Street, London; and it promises to be literally one of the "lions" of the Exhibition. Nearly opposite are Messrs. Smith and Beck's and Mr. Ross's microscopes, almost the

only first-class microscopes I have yet seen in the Exhibition. But more of this anon. Microscopy is *not* one of the social institutions of France.

As a naturalist I was disappointed, after hearing the glowing descriptions at the "Silver Swan," which is located not very far from the above-named group. I was perhaps wrong in expecting too much of nature from art. Back again to the Indian Court I am accustomed to wend my way to take another look at the stuffed fishes which Captain Mitchell has sent for exhibition from the Madras Museum. They are certainly the most praiseworthy efforts at reproducing the natural appearance of these most difficult objects in Natural History which I remember to have seen, and are by no means the satires upon fish-life which most of the attempts at preserving fish, even in our best museums, have hitherto been. There is, however, one drawback, in that the glass eyes which have been employed are very convex, instead of being nearly plane.

Several allusions have been made in these pages to the gigantic extinct birds of New Zealand, and it may be of interest to allude in passing to the remains of one of these birds which Major Michael, of Madras, will exhibit in the New Zealand Court, as soon as that court is ready for their reception. They are portions of a bird which must have attained a height of not less than fourteen feet.

No one who has seen and experienced the kind of life in which the entire Parisian population indulge, can be surprised that they do not pursue more closely the study of minute life through the medium of the microscope. The habit of dining in the evening at the café or restaurant, and spending the close of the day out of doors,—the absence of anything approaching the domestic life of England —solitude, retirement, study, or even intellectual recreation,—whilst it surprises an Englishman, forces on him the conviction that it is not here he must look for improvements in that instrument which, of all others, is becoming so widely the source of amusement and instruction, and attaining the position of a national institution in his own country.

After carefully searching through Class XII. in the Exposition, I have found small microscopes exhibited by E. Gundlach, of Berlin, in the Prussian Department, and in the court devoted to mathematical instruments on the French side are Nachet's, Hartnach's, and Chevalier's small microscopes. The best of any of these, as they stand in their showcases, only remind me of the instruments furnished by good English makers at from five to ten guineas each. What they may be in operation is still a mystery, but the impression is anything but favourable. No one would suppose that the instruments shown under the name of Nachet are those which Frenchmen are in the habit of speaking of as the best and most expensive that are made in Paris. The stands are low, and by no means elaborate in construction; the stage is devoid of any movement, for it is observed that both French and Germans prefer moving the slide containing the object with their fingers, and at the same time declare that they do so with greater precision than with any mechanical motion. The mieroscopes are all small, say about nine or ten inches in the entire height, when ready for work, and look as if they had been constructed somewhere about twenty years ago. Certainly there are two binoculars which from peculiarity of construction have a most singular appearance. Moreover, microscopes are exhibited with two or three divergent tubes which all unite at the lower end in a nozzle containing the object-glass, and two or three observers are supposed to be able to see the same object at the same time, by looking down the respective tubes. How much light can be thrown upon the object under such circumstances never appears to have entered into the consideration of the designer. Under any circumstances they deserve a place amongst the curiosities of microscopy. The Germans are said to prefer an instrument which is permanently erect, and the facility of inclining the body at any angle is regarded as an innovation, and not as an improvement. This reminds me that a friend has informed me that an enterprising manufacturer at Hamburg constructed a large instrument on the English pattern two or three years ago, and has never been able to dispose of it, so that it remains in his window as a monument of disappointed hopes. Surely the continental microscopists cannot be addicted to bending their heads and stretching their necks over a microscope hour after hour as Englishmen sometimes do, or they never would be so infatuated with their erect bodies. Every one has his tastes, but mine does not include either French or German microscopes, as far as I have hitherto become acquainted with them.

Another evidence of the want of universality in microscopic pursuits on the Continent appears to be the entire absence of all the little contrivances for mounting and observation which are so common in all the opticians' shops in London. One sees none of the "knicknacks" which accompany the microscope at home, and my own travelling microscope is looked upon here, by all who have seen it, as a kind of curiosity. Microscopical societies are almost unknown. The Microscopical Society of Paris is confined only to a few members, and is not even known by name, save in a limited circle.

In the Belgian Court a large series of photo-micrographs are exhibited under the name of A. L. Neyt, of Gand; they are of a large size, but deficient in clearness, and are by no means equal to those which we are accustomed to see. The same photographs are exhibited also by agents in other

portions of the building. The objects selected are diatoms, acari, &c., many of them identical in subject with those produced by Dr. Maddox. At present I have been unable to find any exhibits of this kind in the American Court; but only a portion of the objects here are yet exposed, and photo-micrographs may repose still with other mysteries in the packing-cases.

Microscopic objects are exhibited in the British section by Mr. Topping and Mr. Norman, of London, Mr. Cole, of Liverpool, and Mr. Webb, of Birmingham; and in the French department by Messrs. Burgogne and Aliot. These require a more careful survey than I have yet been able to make, before any special objects can be indicated. Messrs. Burgogne's injections attracted much attention in 1862, but the display here is far inferior in number, though probably fully equal in quality.

The Exhibition catalogue contains, amongst other things which are scarcely possible to find, an intimation that microscopes are exhibited by N. E. Evrard, A. N. Lebrun, J. N. Wentzel, and A. Miraud, of Paris; by J. J. Van Zelst Zaalberg, of Amsterdam; F. A. Nobert, of Barth; S. Merz, of Munich; J. Cavalleri, of Milan; as well as microscopical preparations by J. Nacovich, of Padua, P. Marchi, of Florence, and E. Oehl, of Pavia. Time will, perhaps, reveal all.

Messrs. H. and W. Crouch and M. Pillischer have microscopes exhibited in the British section, but these are too well known to our readers to need description.

It does not enter into my province to discuss the system of classification which the Imperial Commission has established, or to indicate how here a country and there a country has a classification of its own,—how vainly some have struggled to follow out the indicated arrangement, and how others have apparently despised it, and consequently how exceedingly difficult it is to find anything which may be required, especially in some groups, though it was prophesied that it would be so easy to find everything, that all former exhibitions would, on this point, be left far behind. Alas! that all the prophets should have prophesied so falsely; for some of the juries cannot determine, in many cases, whether certain goods belong to their class or to anybody else's, and the same natural products in one or two instances are referred to three different classes.

There is certainly much to amuse, and there are many sources of instruction in the Exhibition of 1867; and when everything is in its place, it will undoubtedly, as a whole, prove a superior exhibition of what is excellent in Science and Art to any of its predecessors; and it may be added withal that it deserves the honour of being the ugliest and best abused of all the great collective fairs of the present century.

M. C. C.

SOMETHING TO DO.

"He would pore by the hour
O'er a weed or a flower,
Or the Slugs that come crawling out after a shower;
Blackbeetles and Bumble-Bees, Bluebottle Flies,
And Moths were of no small account in his eyes;
An 'Industrious Flea' he'd by no means despise,
While an 'Old Daddy Long-legs,' whose 'long legs' and thighs
Pass'd the common in shape, or in colour, or size,
He was wont to consider an absolute prize;
Nay, a Hornet or Wasp he could scarce 'keep his paws off'—he
Gave up, in short,
Both business and sport,
And abandon'd himself, *tout entier*, to Philosophy."

Ingoldsby.

SIR THOMAS THE GOOD, made famous by Ingoldsby, must indeed have been a model Naturalist. His tastes, as described in the above passage, were very comprehensive; and his observations must have embodied the fruits of long and careful study. It is quite clear that he could not have been a mere collector. None but a true Naturalist, and a patient one withal, would "pore *by the hour* o'er a weed or a flower;" and we shall find much in his example that we shall do well to imitate, although we may hope that his sad fate will not befall us.

Nature is now beginning to awake from her winter sleep. The Botanist hails with delight the Violet and the Primrose, the Pilewort and the Marsh Marigold, bright forerunners of the floral train which another month will unfold to our view; the Entomologist, when he sees the gay Brimstone Butterfly on the wing, instinctively gets his net in order, and prepares for "the pleasures of the chase;" and the followers of every branch of Natural History feel that it is indeed time to be "up and doing." It is delightful to a Naturalist to learn that every year witnesses an increase in the number of Nature's votaries, that each returning spring gives a fresh impetus to the desire of becoming better acquainted with the wonders of creation. And surely he must indeed be apathetic who can wander on a genuine spring day through lane, field, or wood without really *feeling*, as well as seeing, the general awakening of all around, without feeling that simply to *live*, is in itself a wondrous pleasure.

As in a former paper we attempted to show what might be done in the way of "Winter Work," so will we now hint at a few of the ways in which novices in Natural History may learn to appreciate the wonders contained in the fast-unfolding pages of the great book of Nature spread over the world.

One very common error into which such people are liable to fall is to be found in the idea that they can begin in the middle, as it were, and thus make

or themselves a "royal road to learning," forgetting that he who would read must first master the alphabet; and many, when they find that Nature, too, has an alphabet which all must learn, give up the whole affair in disgust. They won't begin to study Botany, for instance, in the early spring, when the Groundsel and Dead Nettle claim their attention. No: these are not sufficiently "interesting" for them; they will wait until the spring flowers appear, and *then* they will set to work. They forget the parable which tells us that he who was made "ruler over many things" was first "faithful in a few things;" but when every day brings with it a fresh flower, they begin to find this out—they have much more to do than they expected, and so the year is wasted. It is here that we would offer our first hint: the sooner in the year you begin, the better. Gather yourself a January posy—Shepherd's Purse, Groundsel, and Red Dead Nettle; study well each of these; find out the names of their various parts; and "when found," as Captain Cuttle says, "make a (mental) note of." If this seems a dry way of commencing, remember that nothing worth knowing was ever learnt without little trouble. You will have made a good beginning, and you will therefore stand a chance of persevering—not to the end, that is never attained, but to a more perfect degree of the knowledge of the wondrous, though neglected, works of God.

Novices in Natural History frequently suppose that, in order to become well acquainted with the branch which they have taken up, they must "collect;" that bundles of dried plants are necessary to the study of Botany; a drawer of insects to that of Entomology; and so on. This, too, is a great mistake. We are quite aware that a really good collection of dried plants, brought together by one's self, is both valuable and interesting, particularly when each specimen brings back to one's mind the circumstances under which it was gathered. But few, comparatively, have sufficient time at their disposal to form a *good* collection; and some, thinking that this is essential, give up the study simply on this account.

Now, a *mere* collector is, in a Naturalist's eyes, a creature of a very low order indeed: he it is who greedily seizes on every rare bird, plant, or insect, simply that each may be placed in his own "collection;" and then remains content in the knowledge that they are *his*. Nothing comes amiss to such an one: he is Geologist, Botanist, Entomologist, Ornithologist, all in one. The consequence is, that, being "Jack of all trades," he is "master of none;" he names his objects, certainly, but look over any one of his collections, and you will scarcely fail to find glaring errors. Such an one had much better turn his attention to Postage Stamps, or Trade Marks, of which he may form a collection which, if it does no good, will not, at any rate, destroy Life—that mysterious principle so easy to remove, so impossible to restore. For this reason, it is by no means advisable that every incipient Naturalist should be a collector; at least, he should restrict himself to common objects, so that, should he feel disinclined to pursue the study, he may not have deprived others, more persevering than himself, of their reward. Natural History is not a thing of books, or of preserved specimens; a mere museum, or *hortus siccus:* no, it is a *living* study, having its "sermons in stones," its "books in the running brooks."

And now for a word or two to those who are already professed Naturalists. Have we not a tendency to wander too far abroad in search of objects for our contemplation? Do we not often find that we are better acquainted with the Botany of a place, two or three miles distant, than we are with that of a mile round our own residence? Again, have we not too great a desire to obtain *rare* species? are not the common ones often neglected? because "we can get them at any time"—and is not *any* time too often *no* time? Are we always as careful as we should be, not to take more specimens than we really require of any plant or animal?—especially the latter—for we may well remember that many, both naturalists and divines, affirm that animals will be sharers with us "in the Land of the Hereafter."

To those who are not already acquainted with them, let us introduce the advantages of keeping a Kalendar, after the fashion of good old Gilbert White, in which should be recorded the dates of the appearance of birds and butterflies, or the leafing and flowering of plants. We ourselves have kept such a Kalendar for the last eight or nine years, and very interesting we find it. At first, our Kalendar was not only useful, but ornamental—an elaborate (not to say troublesome) arrangement showed, not only the Latin name of the plant, but its English equivalent, the date of its appearance, the locality in which it was gathered, with other particulars; while the pages were embellished with divers and sundry striking (not to say illegible) headings, in astonishing letters of red, blue, and black ink! But after a year or two, we gave up this style of thing; first, because the embellishments, etc., took up more time than we could conveniently spare; next, because we found it impossible always to remember on our arrival at home all that we had seen during our walk; and a book 8 in. long by 6½ broad is of an inconvenient size for the pocket. The plan which then suggested itself to us, and which we still follow, was this: a lined MS. book, 8½ in. long by 3¾ broad, has each page divided into five columns: the first of these is about 1⅜ in. broad, and allows ample space for the Latin name of the species, while the

remainder is divided into the four other columns, each being devoted to one year: thus—

	1865.	1866.	1867.	1868.
Leontodon Taraxacum	Jan. 4.	Jan. 2.	Jan. 24.	

This book slips easily into a side-pocket. The list of plants should be first made out at home, and should include all that are found, or may possibly be found, in the district. Only one side of the page should be used for the list; as the opposite one may be handy for brief notes, or local names, for each species. The saving of time effected in this manner is very great: besides which, each plant can be noted down with a pencil as soon as observed, so that the risk of forgetting it is done away with. The list is also a very useful companion when we are spending a day in a new district, and want to learn as much of its Botany as possible; as a pencil mark affixed to the name of the plant will be sufficient to indicate that it has been observed. Of course a table of birds or insects can be added at will: so that one's pocket-book may be made a useful *vade-mecum*.

On a botanical excursion, we must, of course, carry a good-sized vasculum, *alias* sandwich-case; but on a short stroll, we need not thus encumber ourselves. Some of Huntley and Palmer's biscuits are sent out in little flat tin boxes, about 4¼ in. long, by 3⅛ broad: one or two of these will travel very comfortably in our pockets, and the lids may be secured with a stout elastic band. Those who know Fry's Chocolate Paste, will find the neat little round tins, in which it is enclosed, very handy companions: if their shape is less convenient than that of the former, the tin is less flexible; and, if accidentally sat upon, does not sustain the same amount of injury which, sad experience convinces us, is suffered by the former; besides which, the lids fit closer. These boxes are suitable receptacles for beetles, snails, and many other objects; and are none the less useful because of their homely origin. The field Botanist will also find a small book of any description, which has a tightfitting clasp, very convenient for blossoms, such as those of Speedwells or Poppies, which are better pressed as soon as gathered; and specimens dried under such circumstances frequently retain their colour better than those with which more trouble has been taken. As a general rule, however, we do not think it advisable to dry plants while "on the march;" it occupies a great deal of time, with scarcely any compensating advantages. One of our botanical brethren used to sally forth, with an elaborate arrangement of paper, boards, and straps, at his back; but we remember that the wind, on several occasions, violently resisted his attempts to spread out his specimens satisfactorily; while the placing of specimen No. 2 interfered very materially with the comfort of specimen No. 1.

In conclusion, we may inform those who are as yet ignorant of the fact, that dried plants may be sent by book-post, according to the Post-office regulations. This was first ascertained a few years since by a friend, and we have frequently availed ourselves of the privilege. The name and, if wished, the description of the plant may be written on the sheet to which the specimen is affixed: though, of course, anything in the shape of a letter must be excluded. We would, however, advise our friends to see to the posting of packets of plants in this way, *themselves;* for district postmasters are not all aware of this privilege; and, although open to conviction, will occasionally, as we can testify, demur.

Let us, during the coming season, endeavour to become better acquainted with the inhabitants of our woods and fields: let us try to make our own district, as it were, a Selborne; and increase our knowledge, as well as that of others, of the wonders which it contains, remembering the words of the poet:—

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

B.

THE SWALLOWS.

BY way of an appendix to the elaborate and learned essay by Lieut.-Col. Austen which appeared recently in Science-Gossip, perhaps I may be allowed to say a few words in defence of the antiquated and now generally abandoned idea that a certain portion of the *hirundines* winter in the countries which they inhabit during the summer months. I have long taken an interest in this subject, because it is one upon which theory and experience seem to differ very widely. The most eminent naturalists deny the possibility of the hybernation of swallows; eye-witnesses innumerable have at different times declared that they have found them in the winter months in a torpid state. It is scarcely probable that science can lead naturalists far astray, now that our knowledge of and interest in nature have so much increased; but, on the other hand, it is incredible that all these witnesses can have been deceived. Only one course remains open, viz., to acknowledge both theories to be partially correct, and to attempt to discover the reasons for the migration of one portion of the *hirundines*, and for the hybernation of the other; by doing this we shall be rendering a far greater service to the cause of truth, than by hastily adopting one or the other theory, and branding the supporters of the opposite idea as ignorant and credulous.

When Cowper wrote in his "Invitation into the Country," addressed to the Rev. Mr. Newton, the lines—

> "The swallows in their torpid state
> Compose their useless wing,
> And bees in hives as idly wait
> The call of early spring,"

he undoubtedly expressed an opinion which has been held by all nations from the remotest antiquity. The Jesuit missionary Huc quotes an old Chinese naturalist named Luchi to this effect: "The ancients thought that swallows changed their climate, but it is difficult to imagine how they should have done so, since no one has ever seen them set out in the direction of southern countries, nor proceed in troops, like the migratory birds that come every year from Tartary, and return thither in the spring. These draw themselves up into regular armies, and their passage lasts several days; whilst the swallows when they disappear from one province are not seen in any greater numbers, in the other, even in the provinces nearest the sea;" and he concludes by saying that the swallows do not emigrate, but remain always about the same country, and during the winter merely hide themselves in holes and caverns. The naturalist Spallanzani saw swallows in October on the island of Lipari (near Sicily), and was told that when a warm south wind blew, they were frequently seen skimming about the streets. He thence concluded that the swallows did not all go over to Africa, but remained in the island, issuing from their warm retreats in quest of food on hot days. The Dutch naturalist Jonston says, "It is certain that in hollow trees, lying many close together, they (the swallows) preserve themselves by mutual warmth;" and the old ornithologists Albertus Magnus, Gaspar Heldelin, Augustine Niphus, and others held this idea also. In England, White of Selborne held the hybernation of swallows as an indisputable fact, and the Rev. W. T. Bree, who turned his attention to the subject, corroborated him. He says, after reviewing the circumstances of the case, "However far they may fall short of positive proof, they undoubtedly afford much probability to White's opinion, that the *hirundines* do not *all* leave this island in winter." Linnæus expressly asserts that "the chimney-swallow, together with the window-swallow, demerges, and in spring emerges." Baron Cuvier asserts of the bank-swallow as "well authenticated, that it falls into a lethargic state during winter, and even that it passes that season at the bottom of marshy waters." The objections to this theory of the torpidity of swallows are numerous; probably the most weighty are, firstly, that they are physiologically unsuited for the process, and, secondly, that experiments have failed to prove their powers of endurance either of cold, hunger, or submersion. With regard to the first objection, it may be replied that in the bat, dormouse, bear, and other hybernating animals there are no such structural peculiarities as would lead us to expect them to become torpid in winter; and with regard to the second, it must be remembered that it is impossible for us to simulate the exact conditions by which nature induces torpidity, and that in all probability if these experiments had been tried upon the bear or other creatures known to become torpid, they would have resulted in failure, and yet not have disproved the facts of the case.

I now come to the consideration of the all-important question, Have swallows ever been discovered during winter in this state by competent witnesses? This, Mr. Gould, Professor Owen, and others who discredit the old theory deny; and it is but just to confess that there is much difficulty in getting reliable evidence about it. To recur to China, M. Huc tells us: "It is recorded in the annals of China that the people being overwhelmed by the misfortunes that afflicted them during the reign of the Emperor Ngan-ty, more than a thousand families deserted their villages, and went to seek a refuge in the wildest mountain solitudes, in order to escape the horrors of insurrection and famine. As there were no vegetable crops, they were reduced to feed on rats and swallows, which they found collected in masses in the caverns and hollows of the rocks." Another historian reports an analogous fact: "The Emperor Yang-ty having ordered some repairs on the banks of the Yellow River, there were found immense multitudes of swallows collected in the holes and caves of the rocks, and wherever the shore was steep and solitary." These extracts are taken from a work entitled "The Chinese Empire," by M. Huc.

In one of Knight's Educational Series the following is recorded: "The Hon. Daines Barrington told Mr. Pennant, on the authority of Lord Belhaven, that numbers of swallows had been found in old dry walls and in sandhills near his lordship's seat in East Lothian; not once only, but from year to year; and that when they were exposed to the warmth of the fire they revived. We have also, he adds, heard of the same annual discoveries near Morpeth, in Northumberland, but cannot speak of them with the same assurance as the two former; neither in these instances are we certain of the particular species. In other places," he continues, "they have been found, but I will not vouch for the truth of it; as, first, in a decayed hollow tree that was cut down near Dolgelly, in Merionethshire; secondly, in a cliff near Whitby, in Yorkshire, where, in digging out a fox, whole bushels of swallows were found in a torpid condition; thirdly, the Rev. Mr. Conway, of Lychton, Flintshire, a few years ago, between All Saints and Christmas, on looking down an old lead mine in that country, observed numbers

of swallows clinging to the timbers of the shaft, seemingly asleep, and on flinging some gravel on them, they just moved, but never attempted to fly or change their place." The proverb "One swallow does not make a summer," which is common to almost every language, confirms the theory, since it is more reasonable to consider the isolated swallows seen on warm winter days to be members of the hybernating portion of the tribe tempted by the weather from their retreats, rather than as the forerunners of an immigration which often does not occur for weeks or months afterwards. Numerous cases have been adduced of lumps of torpid swallows having been found under ice, and in the mud-beds of lakes. Olaus Magnus, a Swedish Archbishop, says, in a work published in 1555: "From the northern waters swallows are often dragged up by fishermen in the form of clustered masses, mouth to mouth, wing to wing, and foot to foot, these having at the beginning of autumn collected amongst the reeds previous to submersion." And he goes on to say: "When young and inexperienced fishermen find such clusters of swallows, they will by thawing the birds at the fire bring them indeed to the use of their wings, which will continue but a very short time, as it is a premature and forced revival." Etmuller, a professor at Leipsic, a century after, asserts that he found "more than a bushel measure of swallows closely clustered under the reeds of a fish-pond, under the ice, all of them, to appearance, dead, but the heart still pulsating." The English naturalist Derham also cited in 1713, at a meeting of the Royal Society, the personal testimony of a Dr. Colas, who asserted just the same facts. Allowing for exaggeration, it is quite possible that the swallows which become torpid upon river banks should fall upon the ice or amongst the reeds, and that the fact of their being discovered, occasionally, in these positions, should have given rise to wild and visionary tales.

But it may be said, All these are old wives' fables; have you no modern testimony to adduce? In the third volume of "Kingston's Magazine for Boys," now defunct, on pages 267-8 will be found a very interesting communication from an anonymous correspondent signing himself M. K., stating that a friend of his father once found a bird-ball upon the banks of the Ribble, which sprang into life upon being placed near the fire. The pages of Science-Gossip itself will also afford confirmatory evidence of a very late date; for this I beg to refer my readers to pages 118 and 160 of vol. ii. In these very recent statements of eye-witnesses almost every one of the assertions of the old writers is reiterated. On which side, then, I ask, lie the credulity and ignorance? On the side of those who adapt science to suit facts, or with those who disregard facts because they are old-fashioned, and do not accord with their preconceived and arbitrary ideas of the laws which govern nature?

F. A. Allen.

PROCESSES AND INFLATIONS IN DIATOMS.

In the examination of diatoms it will be found that the double valves of those that have processes have these processes situated alternately on the valves. Thus in a double valve of *Auliscus Peruvianus*, if, upon focusing for upper valve, the two processes appear, one to the right and the other to the left, then, upon focusing for the lower valve, the processes of that valve will be seen, one at the top, and the other at the bottom.

This rule will be found to be of general application, no matter what may be the number of the processes. Again, in the diatoms that have inflations, the same rule applies. For example, in the *Aulacodiscus formosus*, of Upper Bolivian Guano, the four large inflations of the upper valve are alternate in position to those of the lower valve. It follows, therefore, that in the multiplication of these diatoms by duplicative subdivision, the raised processes and inflations of one valve fall into the hollows and depressions of the valve with which they are in contact; and thus there is an example of that economy of space so frequently to be observed in natural productions, and there is less likelihood of the processes and inflations being injured by the abrasion of their raised surfaces against each other.

As the above facts may have escaped the observation of some who are interested in the study of diatoms, I have considered them worthy of a note in Science-Gossip.

Armagh. Lewis G. Mills, LL.B.

A Leap for Life.—I remember on one occasion, how I saved myself, by a desperate manœuvre, from the jaws of a hungry trout. The savage brute singled me out from among all the rest of the shoal, and, hunting me round and round until I was well nigh exhausted, was on the point of making me his prey, when a bold and happy idea occurred to me: springing out of the water, six inches or more upon the dry shingle, I lay gasping and half dead with fear, but out of reach of my enemy. The refraction of the water enabled me to see him, though he could not see me; he beat up and down the spot at which I had disappeared, with much the air of a retriever puppy, when the squirrel he has chased for the first time takes refuge in a tree. His search being in vain, he retired, and I had just strength left to squatter into the water again, and soon regained my accustomed haunt beneath the stone.—*Autobiography of a Salmon.*

ACTINOPHRYS.

A SPECIES of *Actinophrys*, which is not described in the "Micrographic Dictionary," occurs abundantly in some of the pools in this neighbourhood. It differs from *A. sol* in being of a deep orange colour; but perhaps it may be only some peculiar condition of that creature. The body of this *Actinophrys* sometimes appears as a simply granulated mass, contained in a colourless envelope. At other times, the contents of the envelope are gathered into irregularly rounded masses of a darker colour, as at fig. 73, *a*. The tentacles are of various lengths, seldom exceeding the diameter of the body. Upon each tentacle there frequently occurs one or two very small globules of sarcode. These run rapidly from the body to the extremity of the tentacle, and after a little while return, but much more slowly. Possibly by this means the creature is enabled to capture its food, and to draw it into itself. I have, however, never noticed any foreign body in it. During the winter months, it becomes encysted, and attached to the filaments of *Spirogyra*, and other similar floating plants; and in this manner becomes exposed to the influences of the sun and air.

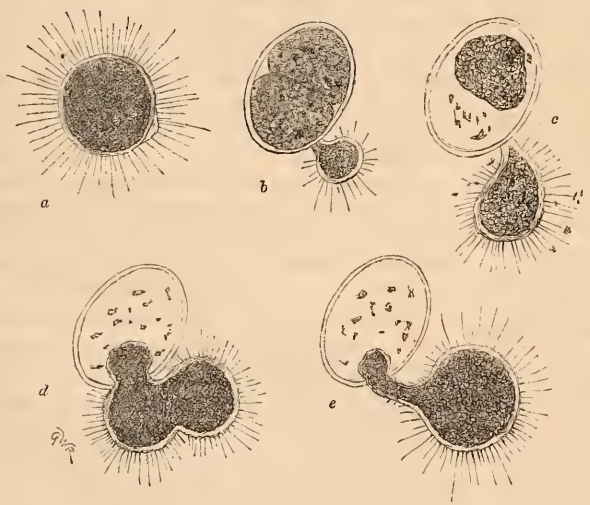


Fig. 73. *Actinophrys* × 300.

The cyst consists of a tough, colourless, oval case, in which at last the creature becomes divided into two (*b*), the escape of which from the cyst I had an opportunity of observing.

From the ruptured side, apparently from a round hole, first one passed out (*b*, *c*), leaving the other in the cyst, with certain chocolate-coloured particles, some of which escaped at the same time with the *Actinophrys*, and were cast off into the surrounding water. These particles seem to be merely dead matter, thrown off during the encysting process. When one of the creatures had escaped, it assumed the usual round form, and then slowly moved away to a little distance. After a short time, it returned towards the other, which was in a similar manner passing out of the cyst. In a few moments more, a fusion or conjugation of the two took place (*d*), and the whole finally left the cyst, as at *e*. I have not noticed any further developments, though it is quite possible that the rounded bodies represented at *a* may be germs.

This may possibly be a new species, as it does not agree with any of the species given in the "Micrographic Dictionary." If so, perhaps *Actinophrys aurea* would describe it sufficiently.

Markington, Ripley, Yorkshire. J. S. Tute.

SALAMANDRINE.

IT is well known that Aristotle and Pliny, as well as other writers of more recent times, relate extraordinary stories respecting certain Batrachians; and although a good deal of the more mysterious and extravagant of these statements has worn off in the course of time, the belief that toads, newts, and salamanders are highly poisonous animals was quite general down to our own times, when this notion was altogether discarded as unworthy of our enlightened age. Many a modern work on natural history draws particular attention to this subject, and declares the suspicion with which these animals are still regarded by the uneducated to be wholly without foundation, and indeed a mere superstition.

Nevertheless, in this matter naturalists have clearly gone from one extreme to another, and this is only another instance proving how reluctant and careful we ought to be in disregarding or denying altogether such statements of the ancient writers as may at first appear either untrustworthy or fabulous; for, though often distorted and exaggerated, they generally contain some foundation in fact.

During the last ten years several physiologists have paid attention to this subject, and have brought to light sufficient facts to re-establish the old belief in the poisonous nature of the toad, the newt, and the salamander; but the educated public seem to be still disinclined to recognize the results of their inquiries—relying no doubt on the fact that these harmless and inoffensive creatures have hardly ever an opportunity of bringing their venomous propensities into action.

In addition to the observations made by Gradiolet and Clocz (Compt. rend. xxxii. p. 592; et xxxv. p.

729), and those by Vulpian (Etude physiologique des Venins Crapauds, du Triton et de la Salamandre terrestre, *Mem. de la Soc. de Biologie*, 1856, p. 122), there has recently been published a paper on the poison of the "*Salamandra maculata*" by Dr. Zalesky, who has isolated and examined the poisonous principle of the secretion of this animal. This investigation has been carried out in the well-known laboratory of Professor Hoppe-Seyler, at Tübingen, and is especially interesting on account of its being the first accurate chemical examination of an animal poison.

The poison was obtained by scraping the head and back of the animal with a teaspoon, and collecting thereby the whitish secretion, which is of a viscid consistency, possessing a strong alkaline reaction, an acrid bitter taste, and a faint but not unpleasant odour. From this secretion, the poisonous principle was isolated by a somewhat lengthened chemical process, and found to be a true alkaloid, possessing all the characteristic properties of this class of substances. That this alkaloid (Samandrine) is in reality the poisonous principle of the secretion of the salamander has been proved by direct experiments, which show that it belongs to the most potent poisons. A fish, a duck, and a dog to whom it had been administered, died of its effect.

There are a few instances on record in which cases of poisoning are ascribed to the salamander; but they are perhaps on the whole not well enough authenticated to be accepted as facts; it would therefore be interesting if this subject should receive some attention from those of your readers who may have an opportunity of making observations or collecting trustworthy evidence.

H. M.

CLIP FOR ZOOPHYTE TROUGH.

IN the ordinary zoophyte trough used for examining under the microscope animal or vegetable objects in water in a free, unconfined condition, the position of the inclined glass plate is regulated by an ivory wedge in front, supported by a whalebone spring at the back inside the trough; but this construction has the objection that the spring is liable to be upset sideways by an accidental touch of the hand, or by catching the stage bracket of the microscope, causing the object in view at the time to be suddenly washed out of the field and perhaps lost altogether, to the disappointment of the observer.

For the purpose of removing this objection, I have devised, in conjunction with Mr. Pumphrey, a double clip that takes the place of the wedge and spring, and is found very satisfactory and convenient, and quite free from risk of disturbance accidentally. This clip is shown full size in the accompanying drawing, and is made of a piece of ebonite about one-eighth of an inch thick, having two long cuts upwards from the bottom end, inclined to one another so as to leave a wedge-shaped piece between them, corresponding to the ordinary wedge for regulating the position of the inclined glass plate; whilst the front and back portions act as spring clips, holding the front plate of the trough and the inclined plate, the two cuts in the clip being made narrower at the bottom end than the thickness of the glass plates, so as to hold them by a slight spring pressure, as shown in the detached view of the clip.

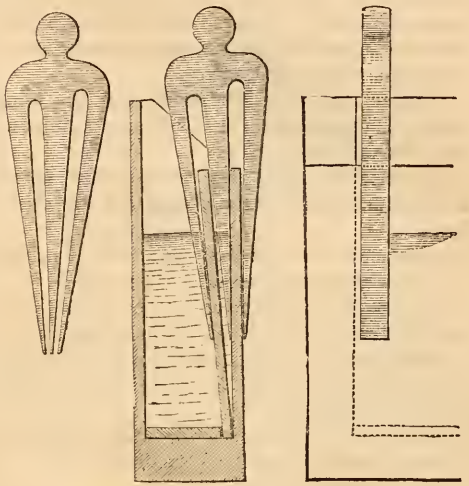


Fig. 74. Zoophyte Clip. Full size.

By sliding this clip up or down, the width of the space between the plates that contains the objects under examination, is regulated in the same manner as by the ordinary wedge; and the clip at the same time holds the inclined plate securely in each position, without any risk of being displaced or moved unintentionally, as the clip is entirely free from the back of the trough, and keeps clear of the stage bracket in all positions whilst the trough is being moved upon the microscope stage.

The narrowness of this clip is also an advantage, as the ordinary wide wedge occupies an inconvenient amount of the field of view.

The inclined glass plate, which is usually made as high as the back of the trough, is cut down in this case to the same height as the front of the trough, as this is found to be a sufficient height, and allows the clip to be shorter.

A specimen of these clips is enclosed herewith, and they are now made by Mr. Pumphrey, Paradise Street, Birmingham, from whom they can be obtained. In the drawing the larger of the two sizes of zoophyte trough in ordinary use is shown, but the same clips suit also the smaller size of trough, and in that case the original height of the inclined glass plate is not altered.

W. P. Marshall.

JUVENILE MUSEUMS.

THE paragraph in the March number of Science Gossip, extracted from "Town Talk" in *Fun*, suggested to me the importance of adopting means to encourage young persons in various localities to make collections of natural objects, and the result is that I propose to arrange for offering prizes to the young people of both sexes in Northumberland and Durham for the best collections in the following departments; the prizes to be awarded in the month of October. I intend that four prizes shall be given in *each of the following departments* of Natural History and Botany.

1st prize, any scientific instrument of the value of £1; 2nd prize, ditto, 10s.; 3rd prize, ditto, 6s.; 4th prize, ditto, 4s.

Department I.—The best collections of marine and freshwater algæ, prepared, mounted, and classified.

Department II.—The best collections of marine and freshwater shells, prepared and classified.

Department III.—The best collections of ferns and wild flowers, dried, mounted, and classified.

Department IV.—The best collections of fossils from limestone, the coal measures, and clay slate, named and classified.

Department V.—The best collections of butterflies and moths, mounted and classified.

The conditions to be—

I.—That each boy or girl competing shall not be more than 16 years of age.

II.—That they shall themselves gather the objects exhibited in competition.

III.—That all the objects exhibited be accompanied by a document, stating when, where, and by whom the objects were found.

IV.—Any competitor may compete in any one or in all departments.

V.—That all objects exhibited in competition be gathered during the present year.

VI.—Competent adjudicators to be appointed for each department.

VII.—All objects exhibited to be obtained within the area of Northumberland and Durham, or off their coasts.

VIII.—Each competitor to arrange his or her objects in cases, which will be provided for the purpose in the Museum of the Natural History Society, or other convenient room.

IX.—All intending competitors to enrol their names before the end of May.

As it is desirable to discourage as much as possible the tendency to injure small birds, no prizes will be given for collections of birds' eggs.

I throw out these general suggestions in order that gentlemen in other parts of the kingdom interested in the spread of a love for Natural History among young persons may adopt such measures for interesting them as may be adapted to their respective localities. It is intended to prepare and print a prospectus of this project for general circulation in this neighbourhood, and any reader of Science-Gossip who will forward me an addressed and stamped envelope shall receive a copy of the prospectus by return of post.

Newcastle-on-Tyne. T. P. Barkas.

THE CHIGNON FUNGUS.

NOTHING could more clearly have shown the amount of ignorance of the natural history of minute life abroad amongst the public, and the little trouble people will take to make the most trivial use of their common sense, when a novelty, embellished by plausible description, is presented to them, than the rampant nonsense which has been penned and believed in regard to the so-called gregarinæ infesting certain varieties of false hair. The "chignon controversy" has been one of the most widespread but at the same time transient sensations of the age: started abroad, it soon reached England, where it bewildered the fashion worshippers of the day. The immediate cause of this hubbub was the appearance in the Hamburg paper *Der Freischütz*, of the 7th of February, 1867, of an article based upon the account given in the "Archiv. der Gericht. Medicin und Hygienie," and in which we are informed that "Mr. Lindemann professes to have discovered and observed a new microscopical parasite, to which he has given the name of Gregarine. He reports, according to his observations, that the gregarine—a protozoic animalcule—is of the lowest order of development of the animal organism, and is found parasitically within the animal and human body, where it floats about with the blood, by which it is nourished. The most striking instance of the parasitism of the gregarine is said to be its existence on the human hair. The gregarinous hair, however, differs in no way from the sound hair. Only if one looks very closely, little dark brown knots, which are generally at the free end of the hair, may be distinguished even with the naked eye. Those are gregarines. Out of thirty samples of hair procured from a hairdresser in Nishni Novgorod, gregarines were found in seventy-five per cent. And it is well known that the hair used for the chignons of the better half of Russia is bought of the poor peasant women, who are proverbially of dirty habits. Pursuing his inquiry, Mr. Lindemann has discovered that almost every louse has in its interior an enormous number of gregarines, and he convinced himself by further experiments that the gregarines on the human hair are deposited there by lice. He observes that the most favourable conditions for the growth

of gregarinæ are light, increased temperature, and a moist atmosphere; and he declares that in the ballroom these are not without their influence on the parasites when they exist on false hair, for they at once revive, grow, and multiply, get disseminated in millions, and in consequence of the increased respiration produced by the exertion of dancing, are inhaled freely into the lungs, reach their specific gregarine nature, and after a while induce disease in the body.

In these quotations prevalent fashions were depicted as sources of danger, inducing discomfort and disease. A writer in one of the daily papers ("Investigator") asserted that he had witnessed from direct observation the development of gregarinæ into lice, an assumption that implies a liberty with Darwinism that its most zealous and radical devotees would at the present time hesitate to suggest. It is only just to say that the *Lancet*, which first noticed the matter, and confined itself to a mere mention of the facts, urged its readers to accept the statements put forth, with the gravest caution. Lindemann's assertions are very startling to scientific men, because they are wholly in antagonism with observed facts. Whilst scientific research has as yet afforded little insight of the habits of the lower forms of animal and vegetable life, the revelations of the microscope within the last few years are pregnant with significance as regards their ubiquity, and teach us that we are not to be astonished if we find living forms in unexpected sites, undergoing the most manifold variations in aspect when brought under the play of different influences. At the same time we have the amplest experience to caution us against the acceptance of new species without the keenest criticism. What, then, is the truth in this matter? In my devotion to the subject of diseases of the skin, it has lain in my way during the last ten years to investigate the whole subject of diseases of the hair connected with the development of vegetable parasites, and I think no one has made a larger number of microscopic observations. I have never seen a true gregarina in connection with the hair; but I have recently found a vegetable growth on false German hair answering in naked eye appearances to that described by Lindemann as little dark specks surrounding the hair towards its end. Gregarinæ, according to Lindemann, are made up of cells, which he states to be vegetable, and it is possible that that which I have found may be identical with his gregarinæ. I cannot help thinking that many bodies totally dissimilar in nature have been classed with gregarinæ, which my friend Ray Lankester, than whom no higher authority on the point exists, declares to be truly animal. The growth I have found I now proceed to describe.

If you take a hair on which the parasite exists, and hold it between yourself and the light, towards the outer half you will see one or more, perhaps half a dozen, little dark knots the size of pin-points, surrounding the shaft of the hair; they are readily felt on drawing the hair through the fingers; they are somewhat difficult to detach. If a hair be placed under the microscope with a quarter-inch objective, the mass will be seen to be made up of cellular bodies surrounding the hair, such as are seen in figs. 75 and 76, kindly drawn for me by Dr. Braxton Hicks, F.R.S.

Fig. 75.

It will be seen that the mass has the appearance of a fungus growth, of which two distinct forms are here present, viz., *mycelial* or *filamentous*, seen in the central part of fig. 75; and *sporular* or *cellular*, seen in fig. 76, which is the outer part of fig. 75 considerably enlarged.

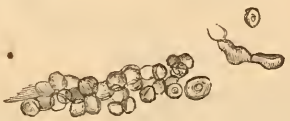


Fig. 76.

The hair is apparently healthy, and if the slide be pressed the mass will break away from the hair on either side, bringing away with it more or less of the cuticle, and leaving behind a healthy shaft. The cells are seen to be of various shapes and sizes.

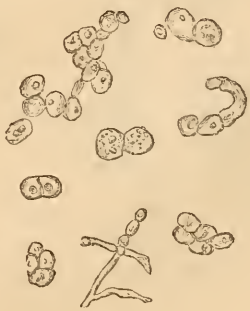


Fig. 77.

Fig. 77 gives a good representation of them; they are from $\frac{1}{4000}$ to $\frac{1}{3000}$ inch; many are like the

torula cells, developed from Penicillium. Others are larger, undergoing division very actively, as in

Fig. 78.

fig. 78, seen with a $\frac{1}{12}$ inch; they may be subdivided into two, three, or four parts, or much more freely. This indicates the assumption by the parasite of an algal condition.

In watching the mass on the hair carefully, it is evident that a number of small cells become detached from the outer or sporular form, and at once move actively about. These small cells indicate an active growth by subdivision, and a fruitful source of propagation; they subsequently become the cells seen in fig. 77. Certainly this variety of fungus so far described is the most active growth I have come across in my researches, and I have been enabled to germinate it most successfully, so as to set all questions as to its nature completely at rest. Placed under favourable circumstances in water, the spores (figs. 76 and 77) enlarge considerably, and the mycelial filaments increase also, as seen in

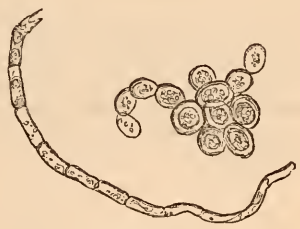


Fig. 79.

fig. 79, which represents the fungus after its growth two days in water; but there is at this time to be

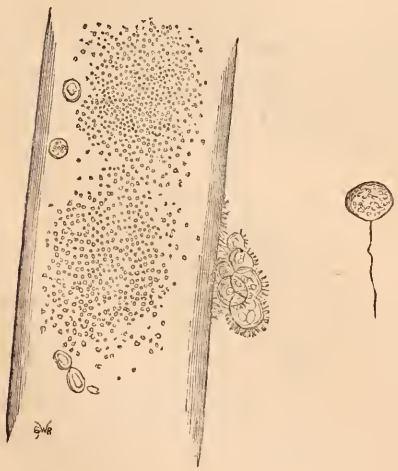


Fig. 80.

observed a very remarkable occurrence, though not in all cases. Some of the large cells in fig. 75 have become filled with smaller cells; and in others, in addition to these, processes have been put forth from the circumference of the walls in a radiating manner; in other cases the enlarged cells have two long cilia attached to them, by which they move about rapidly, whilst a part of the hair, previous to this free from the fungus, has become dotted all over by minute cells similar to those seen in the interior of the larger ones. All this is seen in fig. 80.

But more than this, I have observed most distinctly large cells filled with smaller cells, furnished with exceedingly delicate radiating processes and putting forth pseudopodia. One of these cells of large size is represented in fig. 81.

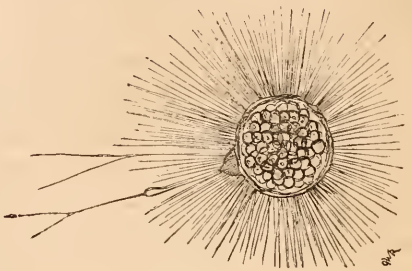


Fig. 81.

It will here be seen to have assumed the features of an amœboid body. Smaller ones are seen in fig. 82.

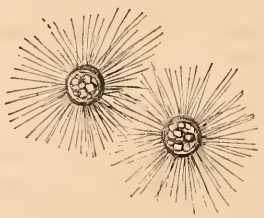


Fig. 82.

Nothing could have been more distinct to myself, and those who were observing with me, than this peculiar form; and it seems to me that we have here a pretty complete history of the life of this fungus—namely, the sporular subdividing and assuming an algal form, which in turn becomes amœbiform, and furnishes ciliated cells that supply the earliest condition of the fungus, as seen in fig. 80, scattered over the hair.

But not satisfied with these results, I set to work to grow the fungus in sugar and water, under constant observation. A rapid enlargement of the sporular cells took place, as in the former case, and in some of the larger cells the most distinct circulation of the granules around the inner circumference of the parent cell was witnessed by myself and my friends, and a beautiful object it was. Finally, I obtained a result similar to the former one.

Fig. 83 represents the appearance of the fungus at the end of fourteen days, seen with an ½-inch object-glass.

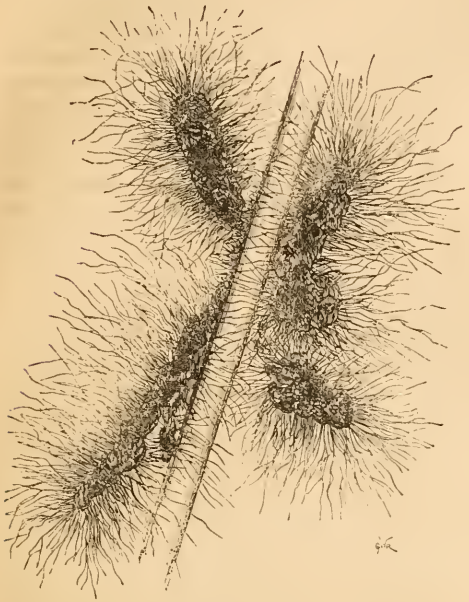


Fig. 83.

Fig. 84 is a portion of the mycelium, taken from the part over the hair, more highly magnified with a $\frac{1}{12}$ object-glass.

Fig. 84.

The ends of the filaments seen in fig. 85 are analogous, in fact identical with those forms which I have figured in my work on *parasitic diseases of the skin* as resulting from the growth of oidium. The globose head containing spores, is an early stage of that represented in fig. 86. The double cell figured on the left was of a green colour like many others.

Fig. 85.

Accompanying these appearances were, as in the former case, cells—filled with smaller cells and

Fig. 86.

granules in active motion—furnished with cilia, and bodies undergoing the "amœboid" transformation, as seen in figs. 87 and 88, with $\frac{1}{12}$-inch Powell and Lealand.

Fig. 87. Fig. 88.

Here, again, we have the growth taking on an algal phase in one direction, and fructifying into a perfect fungus on the other hand. The drawings I have given were made on the spot from the microscopic objects, and I must do the artist credit to say he has most faithfully and cleverly portrayed the actual appearances presented by the parasite. The observations now recorded are in complete harmony with those of Dr. Braxton Hicks on the Volvox, and De Bary in his work published in 1864, at Leipsic, "Die Mycetozoen, Ein Beitrag zur Kentnniss Der Neidersten Organismen," and are completely confirmatory of the opinion before advanced by myself, that the fungi found upon or within man belong to one genus, and undergo an infinity of variations under different circumstances. In the present case the fungus approaches to the

character of Torula rather than any other. There are many most interesting questions that cannot be discussed here. The only one I need refer to is the influence which this species of parasite has in the production of disease. In the immediate condition in which we find it on the hair it need cause but little anxiety; but the minute form as seen in fig. 80 transplanted to a suitable soil—and the scalp of delicate children best furnishes it—would produce disease of the scalp: of that I have no doubt. Luckily, the tissues of adults, viz., those who wear chignons, are not prone to the more severe forms of diseases produced by vegetable parasites; and as the mass of false hair used in England is free from the fungus described above, the total danger on the whole is slight.

Tilbury Fox, M.D.Lond.

THE UNITY OF MANKIND.

In a thousand different ways we are continually reminded of the common origin of the whole human race, irrespective of colour, language, or habitat. The coincidences observable betwixt the usages and traditions of nations, often very far removed from each other, are endless; and plainly point to a time when the minor differences which at present divide mankind were unknown. The writers of works upon Geography and Ethnology often perplex the student, instead of aiding him, by presenting him with some highly complex and utterly unworkable list of the divisions of mankind; whereas if they kept to the broad and simple lines of demarcation, which nature has herself laid down, they would be doing a great service to the cause of science.

The simplest mode of classifying the human race appears to me to be by colour; and, taking this as the basis of operations, there are three varieties of men—the white, brown, and black; but of these the brown is merely the first variety in a transition state.

The *white* nations are the Circassians, only one branch of whom differs in colour from the parent stem; the Mongols, including the Chinese, Tartars, (to whom belong all the tribes of Chinese, Independent Tartary, and of Siberia,) Turks, Japanese, and Coreans; the Arabs (and Moors), the Persians and Esquimaux (akin to whom are the Fins, Laps, Samoyedes, Biscayans, and Magyars).

The *brown* nations comprise the American Aborigines, the Asiatic-African races (Abyssinians, Egyptians, Kaffirs, and Gallas); the Hottentots; the Malays (also Malay Polynesians and Hovahs of Madagascar); Affghans; and Indo-Chinese races.

The *black* are few in number, *i.e.*, the Negroes of Africa and Polynesia; the Papuans (of whom the Negrittos are probably a variety); the Hindoos (who are Circassians), and other races which under exceptional circumstances have changed hue.

It is very important to prove that the brown nations are merely white nations becoming black; because, if we can do so, it will be a complete answer to the assertions of those individuals who dispute the identity of the white and black races, on the ground that we nowhere see the change between the two extremes of colour going on. If we can succeed in convincing them that this change goes on through the medium of the brown races, we shall have removed an important obstacle to the general acknowledgment of the unity of mankind. That white nations have become black, we know from history, and the testimony of our senses; for, at the present day, there are the black Jews of Bombay, the Hindoos, and the Shegya Arabs of Nubia, all perfectly black, whilst the great mass of their respective nations remain white; and that this change was produced solely by climatic influences, we are sure from the fact that in every one of these cases intermarriages with other tribes have been strictly forbidden. Of the Shegya Arabs, who live down the Nile above Dongola, Mr. Waddington says: "They are distinguished in every respect from the negroes, by the brightness of their colour, by their hair and the regularity of their features, by the mild and dewy lustre of their eyes, and by the softness of their touch, in which last respect they yield not to Europeans."

The first thing that we have to prove, then, is that a white skin under certain influences becomes brown, and secondly, that the brown under like circumstances deepens into black. About the truth of the first clause I suppose there cannot exist much difference of opinion; an inspection of the face and hands of a countryman, or of the complexion of an old Indian resident, will sufficiently prove the reddening and tanning influence of the sun. To my mind the fact that amongst the brown nations the children and high castes who are protected from the sun, are nearly as white as Europeans, conclusively proves this. The Parsees, the ancient Guebres or fire-worshippers of Persia, who fled before the Mahometan invasion under the Caliph Omar, in A.D. 651, to Bombay and Western India, must originally have been of the same fair, yellowish complexion as the modern Persians, but are now so altered by the Indian climate as to be of a dark blackish brown, although they have not intermarried with the natives. No nation exhibits this facility for changing hue, consequent upon geographical position, more clearly than the Arabs. Bruce observes that "some of the women are exceedingly fair," and on the mountains of Ruddua, near Yambo, on the coast of Yemen, he was told that the water freezes there in winter, and that some of the inhabitants have red hair and blue eyes, a thing scarcely ever to be seen but in the coldest

mountains in the East. The Arabs of Museat, on the eastern part of the peninsula, are described as resembling Mulattoes in colour, of a sickly yellow hue, with a deeper brownish tinge about the eyes, neck, and joints. Volney says that some of the Bedouins are black, and the Arabs of Nubia whom I have previously described, are assuredly so. Here are the three gradations—yellow, brown, and black. Singularly enough the same conditions which produce blackness seem also to produce the crisp and curly hair erroneously called "wool," for Bruce says that the tribes who inhabit the middle of the deserts have locks somewhat crisped, extremely fine, and approaching the woolly hair of the negro.

It has always been noticed that brown individuals were very numerous amongst black nations, such as the Negroes, Australians, and Hindoos, especially amongst those inhabiting the healthier districts of their respective countries; this otherwise inexplicable fact is satisfactorily solved by adopting the theory that it is the brown nations which under favourable circumstances become black. Fortunately we are not left only to conjecture upon this subject, for Winwood Reade tells us in his "Savage Africa," that the Camma tribes inhabiting the interior of the Gabun country have entirely changed their complexion since they came down to the coast for the purpose of trade with Europeans.

Within the memory of man it was rare to find a black individual amongst them, now they have all become black. There is collateral evidence on this point, for higher up the coast nearer the Senegal the red Foulahs (who are strongly suspected to have been once white) have been swallowed up so entirely in the black Foulahs, who have come to the French and English settlements to trade, as to be practically extinct. This has been hitherto attributed to intermarriage with the natives; but, as there is no proof of its having been carried on to an extent sufficient to account for such a transformation, it seems most reasonable to consider it a parallel case to that cited by Winwood Reade.

This gentleman, in order to account for the self-evident fact that the great majority of the Negro race are actually brown, and not black as we have been accustomed to consider them, broaches a theory well worthy of consideration; he asserts, and strongly supports the assertion, that the distinctive blackness of the West African Negro, as well as his other physical defects, are the result of disease. Dr. Livingstone tells us, in his recent work on "The Zambezi and its Tributaries," that the negroes there are light brown in colour, and that none of the peculiar malformations of the frame which we have come to regard as inseparable from the true negro are known, so that the question is seriously suggested, how is it that the negro of the Guinea coast differs so much from his congeners on the East coast? Winwood Reade believes that the solution to this question is to be found in the pestilential climate of the West coast which has become quite proverbial. I would go further, and would suggest that in the case of *every* black nation throughout the world, its blackness is the result of disease. It is a significant fact that the same conditions as those prevailing in West Africa, exist in *every* land where black races are found, and these conditions are a flat and swampy country, usually a sea-coast, intense heat, rank vegetation, and a more or less pestilential climate. Who can deny that the Andamans, the lowlands of the Indian Peninsula, and the shores of most of the East India Islands, exactly answer to this description? Wherever the land is higher and the climate more healthy, the race is found to be more muscular and lighter (browner) in colour, as is the case in Australia, Papua, Fiji, Yoruba, and the South Indian highlands.

That the blackness is caused by disease is proved by the fact that the more intense the colour the more degraded the mind, the more stunted and distorted the body, and the shorter the average duration of life become. In the Hindoo this is perhaps marked less distinctly than in the others, but he comes from a better stock, and who can deny that he is terribly deteriorated, especially in his physical strength and length of life, when compared with other Circassian races? It may be said, in objection to this theory, that if the blackness is caused by climate and surroundings, this ought to disappear when the Negro is placed in a different position, as he is in the West Indies and America. It must be remembered, however, that two influences militate against his restoration to the original type. Firstly, he is the descendant of a nation of criminals; for most of the negroes who were sold to the slavers were negro criminals, and therefore, according to the theory of natural selection, ought to be, as he is, the most deeply degraded variety of his race. And secondly, that after all, his external circumstances were not much changed by his transfer, for he was generally employed in districts which could not safely be cultivated by whites, and the delta of the Mississippi, the lowlands of the West India Islands, and the Sea Islands of South Carolina and Georgia, are very little more salubrious than his native Guinea. Here I must conclude my essay, which I intended to be both brief and comprehensive, but which has ended by being long and confined to one or two topics. Perhaps I may finish the subject on a future occasion, by giving some interesting facts which I have gathered from various sources, in conjunction with two or three examples of the identity of the customs and traditions of nations far removed from each other, which have come under my notice.

F. A. A.

MAY MUSHROOMS (*Agaricus prunulus*).

FEW who walk abroad in the fields in May, but must have noticed some rings of grass much taller and of a darker colour than that of the rest of the field: these are generally known as "Fairy Rings," and legendary lore tells us that they are formed by the circular dances of which the "good folk" were supposed to be so fond.

These rings, however caused, are known to the Botanist as the locale for the *Agaricus prunulus*, a most delicious mushroom, probably the identical species from which the French term *mousseron*, and hence our mushroom, has been derived.

As this species is abundant in the district around Cirencester, I introduced it to the notice of my numerous pupils as well as that of my brother Professor at the College, and I have known seventy persons to make a hearty supper of them at one meal, without a single case of inconvenience, and, in fact, we always looked forward to the month of May for gathering our usual treat.

Some years since I took a small basket of them to a May meet of the Cotteswold Club, which was appointed at Swindon Station; these were sent to the kitchen to be cooked for our breakfast, and when placed on the table, the perfume the dish exhaled, like that of Lamb's burnt pig, caused each member to forget his scruples, and, for the first time, to taste "toadstools." After breakfast the landlord made his appearance and asked for some information about the mushroom, as an Italian cook, immediately upon seeing it, struck an attitude, and commenced heroics on "Verdant Italy." The truth is, this is a favourite species in Italy, where it fetches a good price, and where, as stated by Dr. Badham, early examples are sent as "bribes to lawyers, and fees to medical men." The dried fungus is sold in England at the Italian warehouses under the name of "funghi." I never had them cooked so well as at Swindon, though I have always found them good fried with a little bacon, having been previously sprinkled with pepper and salt. A lady friend of ours once stewed them, but the result was a most unsavoury fluid, in which was roused something like bits of soaked buckskin.

Still, cooked well this is an agreeable, wholesome, nutritious plant, and is so abundant in some of the pastures in the first two or three weeks of May, that even tons of a good kind of food may be obtained from them; and here there can be no mistake, for in as far as I know, no other *fungus* grows in "Fairy Rings" in May, though I have seen the same rings occupied by the *A. orendes*, also a good species, and the *A. personatus*—the "blewit"—later in the season.* J. Buckman.

* For information on this useful tribe of plants, see "British Fungi," by M. C. Cooke, a book which no one living in the country should be without. It is published by R. Hardwicke.

ZOOLOGY.

Gracula religiosa.—Thinking that the ornithological readers of Science Gossip would be interested by a short description of two rather rare birds, located at the present time in our town, I will give the result of my interview with the "Talking Minos" (*Gracula religiosa*). They are in size between a blackbird and jackdaw; about 12 inches from beak to tip of tail; of a beautiful black colour, with yellow ears and eyelids, which, coupled with the peculiar heavy hops and jumps, gives them a very knowing and intelligent appearance. Both birds are very loquacious, and readily learn anything in the way of short sentences. The tone of voice is very deep, but clear and distinct, both birds keeping up a continual chatter, using such expressions as the following: "Half-past six—time to go to tea!" "Call the watch!" "Pretty boy! oh, you are a pretty boy!" "Call the dog—Toby! Toby! Toby!" (following which comes a long whistle); cough three or four times; and other things too numerous to mention. They appear in perfect health, very docile, not objecting to be handled, and have been some time in England.—*J. J. Owles.*

Cuckoo.—The cuckoo has appeared unusually early this year. I saw the bird on the 27th of March, and one of my family distinctly heard its note some hours previous to my seeing it. The cuckoo here almost invariably lays its egg in the nest of the wagtail; but about three years since, I noticed a young cuckoo being fed and cared for by the redstart.—*G.*

Slowworm Climbing.—Is the slowworm known to have any climbing propensities? I have in my possession a smallish specimen, being rather under twelve inches in length, and in the case which he inhabits is a diminutive dead tree, that grows nearly upright for about six inches, and then slants for eight inches more at an angle of 45° or less with the ground. Up this he frequently climbs as far as the branch extends, when he stretches about in various directions, showing great muscular power, until he usually overbalances, and descends quicker than he went up. Though I have had this reptile two or three months I have not seen him take food; he goes up to either worm or slug, as if to take it, but after examination turns away with an air of indifference.—*George Guyon.*

The Nightingale.—On the 12th of this month (March), I distinctly heard the notes of a nightingale in some woods between Claygate and Leatherhead. Two were heard near Monmouth on the 7th (vide the *Field*, March 13th). These dates are, I believe, very early, but one could scarcely mistake the beautiful notes of the nightingale. There are a great many about here.—*L. S., Surbiton, Surrey.*

The Baillie's Salmon-Roe.—I was lying listlessly one day in summer thirty feet beneath the surface, beyond the influence of the rapid stream above, in the fathomless pool called The Pot, some half-mile below Merton Bridge, a boat, kept in its place by two light oars, floating above me, when the fragments of a conversation reached my ears, which by degrees absorbed my attention. A river-keeper was detailing to his employer the circumstances connected with the capturing of a poacher. "Ay, sir," he said, "but that saumon-roe is a sair temptation; mony a guid mon has been beguiled by it. A' ken ane, a baillie; a' took him mysel'." "How came that? Tell us all about it," was the reply. "A' was watching, mebbe six months syne, up in the Pavilion Water; the fish were thranging sair upon the spawning-beds, and weel a' kent they were thrang on the bank abune the Whirlies. A' was hidden in the wee brae just abune the brig, and a' hadna' been there mebbe twa hour, when a' see a mon come daintily alang. Looking carefully this way an' that, an' seeing naebody, he just out wi' the gaff, an' screwing it on to the end of his walking-stick, stepped lightly into the water. It wouldna' be mickle abune his knee, an' the back fin o' mair than ae great fish was plain to be seen on the bank before him. 'Deed, but he wasted little time in selection, an' varra little ceremony he treated 'em with. In a second the gaff was in a puir half-spawned beastie, an' lugging her ashore, he started aff het foot towards Melrose. A' up an' after him, an' for a weighty mon he made mickle running. When he saw me he dropped the fish, but no' stopping to pick it up, a' just kept on under the railway brig, down the meadows, by Ailwand Foot, under Melrose Brig, an' there, as he was creeping up the steep bank, a' grippit hold of him ahint; a' grippit hard, an' he turned and said, 'Sandy, lad! dinna grip sae hard; ye'll rive ma breeks.' 'Ay, Baillie, said I, 'is that you? How cam' ye to do it?' And he said quite solemn-like, 'Sandy!' he said, 'it was neether the need nor the greed, but *joost the saumon-roe!*' 'Ech, Baillie,' a' said, 'a' wadna' have believed it of ye, but it will be dear saumon-roe to ye.' And sae it proved, for he was fined five pund, and ither harm cam' of it."—*Autobiography of a Salmon.*

Sea Fish in Fresh Water.—Last month a fish was captured in the river Blyth, near Halesworth, supposed to be a large specimen of the common trout, but on examination of the head and shoulders which were sent to me, I am confident it was a sea or bull trout (*Salmo eriox*). As I believe the occurrence of this fish to be uncommon on the Norfolk and Suffolk coasts, I thought the following description might interest some of your readers:—Length, 3 feet 4 inches, from the tip of his snout to the end of his tail; girth, 21 inches; weight, 15 lbs.; head, peculiar in shape and size, armed with large strong teeth. The extreme end of the lower jaw turned up more than an inch, with a blunt point, nearly at right angles, fitted with a corresponding hollow in the upper jaw. The colour, a pale orange, with spots, not very bright; flesh very inferior.—*E. A., Norwich.*

Yankee Receipt for Cockroaches.—Close in an envelope several of these insects, and drop it into the street unseen, and the remaining cockroaches will all go to the finder of the parcel. It is also said that if a looking-glass be held before cockroaches, they will be so frightened as to leave the premises.—*Cowan's Curious Facts.*

Wintry Fleas.—During the winter of 1762, at Norwich, after a chilling storm of snow and wind that had destroyed many lives, myriads of fleas were found skipping about on the snow.—*Gent. Mag.*, xxxii., 208.

Small Birds for the Antipodes.—The caterpillar, we (*New Zealand Herald*) hear, is making great havoc with the grain crops south of Auckland, about Otahuhu, Mangarei, Wairoa, and other places. Oats, wheat, and barley have had to be cut green for hay, and some farmers have lost hundreds of pounds by this pest. Again and again we have urged upon the local legislature the necessity of encouraging the importation of small birds, and the neglect of doing so is painfully manifest in the ravages which have taken place in the farmers' fields this year. It is neither the climate, nor the fact that New Zealand is in the southern hemisphere, as some imagine, that is the cause of the presence of these armies of caterpillars. The same thing would occur in England were there no small birds to destroy the insects and their larvæ. In districts at home where a ruthless destruction of small birds has been permitted, the same results have occurred as here. It would seem as if our local legislatures, puffed up with the idea that they are full blown statesmen, thought the matter of encouraging the importation of small birds beneath their notice. A few sparrows and finches may in themselves be very insignificant things, but the destruction of the grain on a whole country's side for the want of them, considerably alters the question.—*N. Z. Advertiser.*

A Hint.—Those that know the most, are most sensible how little they know in comparison of what is yet unknown, and therefore consider things with modesty and candour; but Ignorance cries out at once it "cannot be," inconsiderately measuring the powers of Nature by the scanty compass of its own experience, and more ready to reject the truth than take the pains to find it out.—*Baker, "On the Polype."*

BOTANY.

Distribution of Plants.—In connection with this subject, it is, I think, quite as interesting and important to notice what species are absent from a district, as it is to record those which occur in it. As an instance of this, I may name the Red Campion (*Lychnis diurna*), which is at present unknown within five miles of High Wycombe; it is, I believe, scarcely known throughout Cambridgeshire, in which county the Barren Strawberry (*Potentilla Fragariastrum*) is also said to be very uncommon. In our Wycombe district, well wooded as it is, the Yellow Cow-wheat (*Melampyrum pratense*) is found in but a very small portion; and this is also the case with the Wood Sage (*Teucrium Scorodonia*). But when we descend to smaller districts, and to even more common plants, we still find the same curious irregularity. In one part of Essex, the Wake-Robin (*Arum maculatum*) is almost unknown; while a few miles off, every hedge-bottom is filled with it. All who have really, attempted to investigate the botany of any one district in particular, will agree with me that the distribution of plants is in itself a subject of deep interest, and one which deserves far more attention than it has yet obtained.—*B.*

A Deodara (*Cedrus deodara*), in the garden of the Vicarage, Bredwardine, produced two fertile cones last year. On comparing them with cones taken at the same time from a Cedar of Lebanon in the same garden, the only differences I noticed were, that the cone of the Deodara was smaller and more obtusely pointed than the Cedar of Lebanon, and was of a looser structure. I have been told that it is by no means uncommon for Deodaras to produce cones in England, but that the trees which do so are generally stunted. This is by no means the case with this one. It is a remarkably well-grown and graceful tree. Its age, as nearly as I can discover, is from 35 to 40 years.—*R. B.*

Sensitive Plants. — Your correspondent "J. L. B." will find that the stamens of the Rock Rose (*Helianthemum vulgare*) are similarly sensitive to those of the Barberry. The only British species with which I am acquainted which really deserves the name of sensitive *plant* is the Wood-sorrel (*Oxalis acetosella*). If its leaves be roughly handled, they will gradually fold up—not in the same wonderfully instantaneous manner as those of the Mimosa, but quite perceptibly, though slowly; but, curiously enough, this property is more evident in some specimens than in others. I first noticed it in some plants of wood-sorrel which I had in cultivation. The remarkable manner in which the seed is dispersed was also then first brought under my observation. Many plants are *sensitive* of the approach of rain, but the *Oxalis* leaves are the only ones I know which close at the touch.—*B.*

Exogens.—When the axe is laid to the roots of the monarch of the woods, and other forest trees, a host of adventitious buds are thrown out from the more or less remaining stump, which progress, and in some cases bid fair to rival their progenitors. I believe the rule holds good in both deciduous and evergreen Exogens, with the exception of a few genera, from *Quercus* (the oak) down to the humblest shrub. The Coniferæ seem the only kinds, whether young or of more advanced growth, that lack the vegetative power in the stump. I have observed the denuded trunk of larch to send forth shoots when laid on the ground, but not one from the former, although I have watched closely for a series of years. Have any of your readers observed the same, and can they suggest a cause? I am aware that if a plant be severed at the junction of radicle, and plumule (termed the neck), it is certain death. Can this be said to apply to trees, such as the larch and pine?—*J. Maughan.*

The Mezereon (*Daphne Mezereon*). — This rare plant is, I am glad to say, not yet extinct in Bucks. I have found it this year in one of its old localities near High Wycombe; and it has been observed also in another wood not far hence.—*B.*

The Primrose (*Primula vulgaris*). — The form of this plant, which is generally known by the name of Oxlip—although the *true* oxlip (*P. elatior*, Jacq.) is a widely differing species—is one of the most beautiful and interesting of our spring flowers. A very fine specimen which was brought me the other day had on the same root the umbels elevated on a footstalk, which characterise the oxlip, and the apparently solitary flowers of the primrose. I am inclined to believe that this oxlip is not, as has been asserted, a hybrid between the cowslip and primrose, but rather a development of the latter species. I have found oxlips among primroses frequently, but never among cowslips; and although they seem to assume a middle position between the two, I fancy the primrose characteristics are always the more defined. Perhaps, after all, Linnæus was in the right when he united all these forms under one species, which he named *P. veris*. I have been much struck this spring with the curious metamorphoses which occur in the calyx of the garden polyanthus. In some, this is transformed into a second corolla, under the first; this I have observed in two or three instances, and in widely differing forms. A more curious variation still is that in which the calyx is replaced by leaves, which spread out and far exceed the corolla in size. In some cases these are green, in others green streaked with red, and in texture a curious compound of leaf and petal. This form is very common in our cottage gardens. Perhaps Mr. Holland, who is so well up in monstrosities, may be able to give some additional examples.—*B.*

MICROSCOPY.

Cuticle of Leaves.—At the last meeting of the Quekett Microscopical Club, an interesting discussion took place on the relative advantages of removing the cuticle from the leaves of plants by the slow process of maceration in pure water, or the quicker one of boiling in nitric acid. Since then I have made a first and successful attempt by the latter method, and hoping it may induce others to try experiments who hitherto have been deterred by fancied difficulties, I now give the result. A leaf of a rhododendron which had been dry for some months, and a freshly gathered leaf of an azalea, were put into a test tube, and covered with undiluted nitric acid of commerce—I believe about 1·320 specific gravity: the tube was held over a spirit lamp until the acid just boiled, and the contents were then thrown into a basin of cold water. The cuticle of the rhododendron leaf partially separated spontaneously; that of the azalea came off without the least difficulty. The whole operation did not occupy more than five minutes. Undoubtedly many leaves, according to their texture, will require different strengths of acid, and longer or shorter periods of boiling; therefore, if members of the club will try experiments, noting the specific gravity of acid used, and, if diluted, the proportion of water added, and communicate the results to each other, much useful information may be obtained.—*W. J. D. Arnold, Fulham.*

Diatoms in Shell Fish.—Dwellers in towns need not go far to obtain certain diatoms for their microscopes, as a large variety is at once procurable from the nearest fishmonger. This the following experiments may serve to prove. During the past month I purchased and brought home a quart of cockles. These I opened one by one, and placed what I supposed were the intestines (brown-looking little threads, plainly visible when the animal is split open with a penknife) by themselves in a wine-glass. After treating these with hot acids, and cleaning and washing as usual, I obtained slides containing specimens of the following genera: *Coscinodiscus, Hyalodiscus, Actinoptychus, Navicula, Surirella.* I then tried mussels, and got valves of *Cymatopleura, Dictyocha, Campylodiscus, Cocconeis, Triceratium;* and, lastly, by cleaning the washings of a few oyster-shells, obtained specimens of *Biddulphia, Amphitetras, Nitzschia, Pleurosigma, Stauroneis, Zygoceros,* &c. After a few trials, I found that the most satisfactory way of getting slides of the above genera was by patiently picking the valves out under an erector, mounting them as selected diatoms, and restricting the number to four or five on a slide. This will perhaps be found a tedious process, but I know of no royal road to the preparation of good slides. I was told that the cockles were brought from Holy Island, the mussels from Yarmouth, and the oysters from the west coast of Scotland.—*H. W.*

Rack of Binoculars.—Allow me to call the attention of the various makers to an error in the construction of, I believe, all binocular microscopes—but one that is as easily avoided as committed. The spindle of the pinions, which work the racks of the draw-tubes, is, in every instrument which I have seen, placed at a right-angle to the axis of the principal tube. The result is (the teeth being the same in both), that the left tube travels further for each revolution of the pinion than the right—and hence a *difference of focus* in the two eye-pieces. Some may consider this of small importance, but I maintain that a first-class instrument should be free from all avoidable defects, however minute. In my case, it is of considerable importance as I am unusually wide between the eyes; and I find that when the tubes of my microscope are sufficiently drawn to suit my eyes, the difference in the distance travelled by the two amounts nearly to $\frac{1}{16}$ of an inch. The obvious way of overcoming this, is to place the spindle at a right-angle to a line drawn from the edge of the prism to a point midway between the two eye-pieces. It would thus be at an equal angle to both racks, and their movement would be alike.—*James Vogan.*

Erector for Binoculars.—At the March meeting of the Quekett Club, a member exhibited an application of the erector to Richards' Universal Investigation tube, for the purpose of dissection, &c. By this means an erect and *binocular* view of the object is obtained, with little loss of light, and good definition. This combination, which seems to offer some advantages over the erector as usually constructed, is to be had of Mr. C. Baker, High Holborn, at a less cost (including the tube) than that usually charged for the erector alone.

Spermaceti.—My attention was drawn to this substance by observing the crystalline appearance it gave to pomade; and the idea suggested itself that it would make a good polarizing object. I took a small quantity, and proceeded with it in the same manner as for fusible crystals, only that when melted on the slide it should have a thin cover dropped on it, otherwise the substance is too dense to allow sufficient light to pass through. I think this is something entirely new; to watch the manner of concretion is worthy of remark.—*E. Histed.*

Turntable.—I recently felt the want of some shallow cells for mounting minute crystals in preservative solutions, and not having a turntable at hand I set to work to make one. I failed on my first attempt, but was easily able to remedy its faults in the second; as it is a very simple contrivance, and one requiring but a small amount of

mechanical skill, I thought some of your readers might perhaps prefer one of their own construction to investing from 5s. to 15s. on what would not answer the purpose one whit the better, and so I send you an account of my proceedings. The first I made of soft deal; it consisted of two wheels of three and four inches diameter grooved on the circumference, the smaller one to hold the slide was made to revolve by an endless band passing from it to the larger one, which was turned by the hand. It was not the thing, however; there was too much friction between the lower surface of the wheels and the board on which they were screwed, and as they worked rather loosely around the screws their centres were not constant; and thus, though I managed with it to point several cells, they did not come up to my idea of circles. I found that the two essentials of the machine are perfect centreing, and the reduction of friction to a minimum, and after turning it over in my mind for a short time, I hit upon an expedient for accomplishing this admirably. I took a piece of heavy Spanish mahogany, and cut a circle a little more than three inches in diameter and half an inch thick (*a*), and drilled a hole through the centre; I then got a small key, filed off the wards, cut it in half, and drove it into the

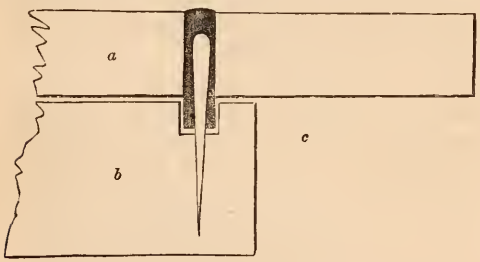


Fig. 89. Section of Turntable.

hole. For a pivot I took a brass-headed nail, knocked off its head, and filed it till it accurately fitted the key, finishing it off with a point (*b*); I then drove the other end into a bit of deal (*c*), and dropping a little oil into the barrel of the key, inverted it on the pivot; on giving it a sharp spin it revolved exactly half a minute. To hold the slide in place, fasten a slip of wood, the thickness of slide, half an inch from centre of circle, and upon this, and at right angles to it, about an inch and a half apart, screw two narrow strips of thin brass or sheet-tin, which may be readily cut with a strong pair of scissors. Before securing them in their places, they should be bent a little downwards, so as to act as a clip. I do not imagine this turntable is superior in principle to those of the instrument-makers, though I never had the opportunity of examining one; if there is any merit, it is in utilizing two articles within everybody's reach for the pivot and pivot socket; hoping, if anyone makes the experiment, he will succeed as well as I have done.—*Frederic H. Ward.*

GEOLOGY.

Plesiosaurus.—A new species of *Plesiosaurus* has been purchased by the British Museum. The specimen is from the Lower Lias, near Charmouth, and has been named, by Professor Owen *Plesiosaurus caticeps*. It measures nearly fourteen feet long, and with the exception of the displacement of a few caudal vertebræ, the vertebral column is in a complete and natural state.

Colliery Explosions and the Barometer.—Mr. J. Rofe writes to the *Geological Magazine*, and shows that colliery proprietors have only to watch the barometer, and provide in accordance with its indications for the supply of air to the mines. Alluding to the well-known "Blowing-well" of Preston, in Lancashire, he states that some time since, in a well recently constructed by him as a cesspool to some chemical works, he observed the phenomena characterising the "Blowing-well." When the atmospheric pressure diminished, the air came from the well loaded to a disagreeable extent with the offensive vapour from the cesspool. On continuing his observations with a barometer, he found similar results. He concludes from these facts that a coal mine must be regarded as a gigantic well from which, when the atmospheric pressure diminishes, the air expands, and rushes out with great violence. This circumstance is not of itself dangerous, but if there be an excess of gas in the mine, and at the same time, from accident or carelessness, a means of ignition, then, indeed, the consequences are very likely to be serious. Hence the barometer becomes the miner's safest guide.

Origin of Petroleum.—Although nearly all geologists are agreed as to the organic origin of petroleum, a great many are of opinion that the rock-oil is the result of a natural distillation of coal. Professor Hitchcock, however, no mean authority, comes to a different conclusion. Admitting with all who have carefully studied the matter that petroleum is of organic origin, he says that in his opinion it comes from plants, and that it is not, as some have suggested, a fish-oil, or a substance altered to adipocere. It does not appear to be the result of a natural distillation of coal, since its chemical composition is different from the oil manufactured artificially from the cannels, containing neither nitrobenzole nor aniline. Moreover, petroleum occupied fissures in the Silurian and Devonian strata long before the trees of the coal period were growing in their native forests. The nearly universal association of brine with petroleum, and the fact of the slight solubility of hydro-carbons in fresh, but insolubility in salt water, excite the inquiry whether the salt water of primæval lagoons may not have prevented the escape of the vegetable gases beneath, and condensed them into liquids.

NOTES AND QUERIES.

Water Boatman.—Should any one be tempted to follow the advice of Mr. John Bockett by introducing the Water Boatman into an aquarium, let him beware of putting him in company with fish. When less experienced than at present, I introduced several into my children's aqua-vivarium, and in about two or three days such was the mortality that we thought some terrible epidemic had seized our fish. While looking mournfully at our pets, with this idea, we saw a Water Boatman lodge on the head of a rather large gold fish, who shook it off and swam away, but in a few minutes staggered, struggled, turned on its side, and died. Carefully watching them, we witnessed several similar attacks with the same result; I need not say the murderers were summarily ejected. No doubt they are amusing creatures in a separate tank.—*L. H. F.*

Rural Natural History.—I know not how far Mr. Holland's ingenious speculation regarding "fistles" is correct, but he may be interested in knowing that "fistula" is in the district (W. Norfolk), generally pronounced by the poor "thistulo."

Cure for Ague?—A curious mode of treatment for ague is practised in Marshland. I give it as it was narrated to a clerical friend in that district. "Well, sir, you must catch a moll, and it must be a male moll." "What is a moll?" says his reverence. "A moll, sir! why one of those little creatures which they hang on trees" (meaning, O illiterate reader, a mole). "Well, sir, you must then skin it, and dry the body in the oven, and then powder it, and you must take as much of the powder as will lie on a shilling every day in gin. You must take it for nine days running, and then miss nine, and then take it nine days more, and then (note well the final part of the treatment!) *miss nine*. By this time you are cured." "Thank you," said my friend, departing. "But mind, sir," shouts the doctress, "it must be a *male* moll."—*L.*

Birds Breeding in Confinement.—The best and I believe only successful plan, is to put the pair of birds intended for breeding into the cage intended for that purpose, which should be hung against the wall of the room in which you intend having your birds at liberty, and (if they will) let them get as far as having young ones; at night open the doors of the cage (gently); in the morning and next day they will most likely fly in and out, and feed the young. The birds reared in this manner are stronger and healthier than when kept in a closed cage. Some of the birds mentioned by A. P. he will find it very difficult to get to breed in confinement, as Siskin and Snow Bunting, but all the others ought to do so freely. At first the Linnets are rather sulky, but when once they begin they get on very well. The hemp seed should be given very sparingly, as it makes them corpulent, and not inclined for breeding. Hard egg is most essential, and should be given (one between each pair) every week; it need not be chopped up, as was the old style, but cut in two and left in the half shells; in this way it will keep better. —*R. R.*

Early Wasp.—I caught a female wasp (*Vespa vulgaris*) on the 22nd February, this year, being nine days earlier than the one recorded by your correspondent Henry W. T. Ellis. It was captured on a tree in Kensington Gardens, and was extremely lively.—*H. H. O'Farrell.*

Spawning of the Frog.—Your correspondent for March (George Dansey), in alluding to the above subject, stated that "spawning takes place in the night." This may be occasionally, but not as a rule. At our last meeting (Lower Mosley Street Schools Natural History Society), one of the members made a communication to the effect that he and his friend had been in the fields, and had come across a number of frogs that were in the act of spawning, some of which he picked up, and received the spawn in his hand. This was about four o'clock in the afternoon. I myself saw some toads spawning last summer at midday, in the Manchester Museum. As this is an interesting subject, it would be advisable for those who have watched the habits of frogs to give their experience, in order that we may ascertain whether they (frogs) do or do not spawn during the night.—*H. Hyde.*

Skeleton Leaves.—I would feel greatly obliged if you or any of the subscribers to Science-Gossip could inform me how to dry skeleton leaves. After bleaching them, how do you prevent them from sticking to the paper on which you lift them out of the water? You can take them out of the water in the same manner as seaweeds, but then they stick fast to the paper.—*J. S. S.*

Dust on Aquaria.—The following is a simple method of removing this. Lay a piece of paper gently on the surface of the water, allowing the whole under-side to become wet; then, carefully raising one end of the paper, *peel it off*, and the dust, &c., will be entirely removed, adhering to the paper. By repeating the process two or three times wherever dust, &c., occurs, the water will be found perfectly clean.—*George Henslow.*

Faro apophyllite.—Can any of your correspondents give some information about this crystal? Quekett, in his work on the microscope, mentions it, on the authority of Sir David Brewster, as a splendid polariscopic object, "when the prisms are complete."—*A. S.*

How did they get there?—Some years ago while staying at Bicester, in Oxfordshire, I met with a circumstance which has often struck me as worthy of record. I was standing, on a hot summer's day on a bridge over a little stream, the parapet of which was formed of broad thin slices of stone, cemented one upon the other. The top stone appearing loose, I pushed it off, and its removal was followed by that of another, and another—to the detriment, I fear, of the bridge. When I had arrived at about the third layer, a toad hopped out, and as I progressed in my work of destruction, many more appeared—in all about a dozen. How did they get there? The cement appeared quite firm, save just at the top; and I could see no crevices through which they could have entered. The toads were very dry and dusty, and seemed to be quite at home in their nooks. The remarkable point was, that the lower I went, the more toads appeared; and how they got in is still to me an unexplained mystery.—*B.*

The First Swallow.—I was much surprised to see a martin (*Chelidon urbica*) on the 5th of this month. Mr. Jesse, in his "Gleanings," notes the 3rd of April as the earliest date for the appearance of the swallow; but here I never remember seeing them before the 15th or 16th. We are not giving our old friend a very genial welcome.—*Robert Holland.*

Birds Breeding in Confinement.—Though I cannot supply A. Pickard with the information he desires, yet the record of my experience may be of some assistance. Bechstein, I think, cites a few instances of cage birds breeding in confinement; but the occurrence is very rare.

A pair of greenfinches were brought up from the nest by a pair of canaries; the male bird acquired the song calls of his foster-father; but the female preserved the calls of the species. For several successive summers these greenfinches built nests, the hen laid eggs, but the male on every occasion prevented her from sitting. I have no doubt that if A. P. reared the birds from the nests, and thus to some extent domesticated them, they might be brought to breed in confinement, especially if they have the use of an aviary, containing growing shrubs and plants.—*R. Tate.*

Revolving Stereoscopes. — There are few instruments more attractive and interesting in the family circle than a good revolving stereoscope, but unfortunately they have, because of their great cost, been used to a very limited extent. The importance of obtaining revolving stereoscopes to contain fifty slides, at greatly reduced prices, led me to suggest to two of the principal wholesale dealers in optical instruments in London, the desirability of producing revolving stereoscopes at such prices as would enable working men in the receipt of weekly wages, to obtain them with comparative ease; and I am glad to inform your numerous readers that revolving stereoscopes of neat appearance, and of excellent optical capabilities, may now be had of any respectable dealer in optical instruments, at about one third the sum previously charged for such apparatus. So popular are the new revolving stereoscopes that one dealer in Newcastle-on-Tyne has within the last few days ordered upwards of one hundred, and a similar or even greater sale, might by a little enterprise be obtained in all the large towns in the kingdom.—*T. P. Barkas, Newcastle-on-Tyne.*

Honey Ant of Texas.—A Texas paper of a late date, speaking of the honey ant, says: "We have often heard of the 'honey ant' of Texas, but the account seeming so romantic, we have heretofore been hardly able to credit it, but as we now have a specimen before us, furnished by our friend Leo Smith, of this city, we can no longer have any doubts on the subject. These ants are a medium size between the large and small red ants, and are of a reddish and brown colour. Appended to the rear of each one is a transparent sac or globe filled with pure, clear honey, of a most delicious flavour. These sacs vary in size on different ants—ranging between the size of a buckshot and a navy pistol ball. On this sac, at short intervals, are attached thin layers about the length and width of half a grain of rice, and of a dark colour, evidently to strengthen it and keep it in shape. These interesting animals, when they crawl, draw their delicious load after them, and if the sac is empty, they set themselves to work to replenish it again. Whether they deposit this honey in their great general reservoir among the rocks, to draw from it as occasion may require, or hold and use it as individual property, we are not informed. Here is a curiosity that we believe has heretofore escaped the eyes and pens of our celebrated naturalists."

Are these ants unknown to entomologists, as the Editor of the American Paper believes, or if known, by what name are they distinguished?—*S. A. Stewart.*

Rural Natural History.—Will you allow me to correct a slight error into which my friend Mr. Holland has fallen, in your last number? He represents me as saying that the dock is "used *in Buckinghamshire* as an antidote to the sting of the nettle;" whereas I specified *Essex* as the county in which this use obtains (S. G., ii., 83). I would not have troubled you with this, save that I have not yet met with the practice in Bucks.—*B.*

Puffanas multiformis.*—This curious fish is imported every year into England at the end of March, or in the first days of April, coming especially from the United States, sometimes also from France. Great numbers of species, or rather varieties, are known: the *P. capensis* or *lunarius* reported to have been found by Dr. Herschel at the Cape of Good Hope. The *P. Martii* found fossil in America in an aërolite, &c., are most interesting specimens. I believe the whale that was cast upon the shore near Dunkirk, in April, 1863, during a *south-eastern* storm, and which is described in a recent French work, is the *P. bolænœformis*. A new species is *P. thermalis*, just found at the island of Santorin (when out of hot water the fish dies), is boiled and eatable. English and French journalists sometimes gratify their friends with a dish of Puffanas fish; the French call them generally "Poisson d'Avril." I beg to warn your readers against any too marvellous news they may meet with in the papers at this season, assuring them, probably, it will belong to the genus *Puffanas.*—*B. Melle.*

Dust on Aquaria.—To remove this, I cut a newspaper into strips about 16 inches by 2½ inches, my aquarium being 18 inches wide, and I frequently skim soup or broth. I find that two sweeps of the skim the surface of the water by running the edge of the strip of paper over it in the same manner as cooks strip of paper remove all the dust resting on the surface of the water, and leave it perfectly clean and brightly. Another advantage is that very little water is wasted, and the aquarium may be perfectly cleaned in twenty seconds.—*T. P. Barkas.*

Double Oranges.—I have in my possession a small orange that was found in the centre of a large one, and is quite perfect except that the rind is wanting. And it was only the other day that I read in the *Manchester Examiner and Times* of one having been found with the rind upon it, and strange to say it was of the same yellow colour as the larger orange. As I am quite ignorant of the cause of the development of these double oranges, I shall be glad if any of your correspondents will enlighten me.—*H. H.*

Aquarium Pest.—L. H. F. (p. 70), asks why do the eggs of the water-snails, which are adherent to the sides of his or her aquarium, never hatch? Why, give them time! In my little book on the British Snails, I have stated that the eggs of the fresh-water snails are hatched in about thirty days; and I dare say, 'ere this, L. H. F. will have verified this.—*R. Tate.*

Polarising a Rainbow.—When a portion of a rainbow is viewed through a Nichol's prism, and the prism turned till the long diagonal coincides with the chord of the arc viewed, the coloured rays disappear. Do they consist of light polarised in one direction?—*J. W.*

* Puff and anas = canard.

Spawning of Frogs.—Frogs began to spawn here during the warm weather which we had at the end of February. I did not note down the exact date, but on March 2nd I passed a quantity of spawn imbedded in ice. Would the vitality of this be destroyed? A strange notion prevails here that three-year-old frogs destroy all the four-year-old frogs. The females are generally larger than the males, and hence the idea that they are of different ages; whilst the fact that many of the females do die after spawning,—from exhaustion, or because from weakness they cannot escape from their enemies, the boys,—has given rise to the belief that the smaller ones kill the larger ones. Frogs are also looked upon as good weather-guides. If they are of a bright yellowish colour, it will be fine weather; if of a dull brown, it will rain. Frogs certainly vary greatly in colour, but whether they are capable of changing their hue, like a chameleon, I do not know.—*Robert Holland.*

Hyalodiscus.—Your correspondent "R. G." kindly sent me a slide of diatoms from under Menai Bridge, containing one specimen of what he considers to be *Hyalodiscus subtilis*, var. *lævis*. I find abundant specimens of the same form in slides of diatoms from Teignmouth and Isle of Arran. I believe it to be a Podosira, possibly *Podosira maculata* (S.), see Pritchard, p. 815, 4th edition, and S. B. D., vol. ii., p. 54, pl. 49, fig. 328. The disc is certainly convex, and not flat, convexity being the distinguishing characteristic of *Podosira* as opposed to *Hyalodiscus*. The markings, moreover, are not like an engine-turned back of a watch, but the disc appears obscurely divided into compartments, each with two sets of oblique, intersecting, distinct striæ.—*H. R.*

The Lackey Moth.—I recently found some eggs, greenish and of a conical shape. From a drawing I have seen, I believe them to be the eggs of the Lackey Moth. If so, a rather curious circumstance presents itself. In all books on insects that I have read, the eggs of the Lackey Moth are represented as being made in a ring round the branch of a tree. Now these eggs were laid on the *trunk* of a tree, and in a *patch* not—a ring. Is this a common occurrence? I have never seen it noted by any writer on entomology. Perhaps some of the readers of Science-Gossip may have met with a similar instance.—*H. H. O'Farrell.*

Brimstone Butterfly.—I saw here this year the first Brimstone Butterfly on the 15th of February. I believe this butterfly has no regular time for its apparitions, as several others; I have observed since nearly twenty years the periodical visits of birds, insects, &c., and have seen it sometimes very soon, when there was only a glimpse of fine weather. In 1852 it appeared on the 21st December; in 1862 on the 14th of January. The Brimstone Butterfly is called in French "*Citron*," the Brimstone Moth "*Soufré*."—*B. Melle.*

Mice and Cockroaches.—In the struggle for existence, is there any antagonism between mice and cockroaches? My house at one time, and for years, was swarmed with the latter, of which I have a special horror. At that period we had no mice. Within the last year or two mice have taken their abode with us, and are now not only numerous but supreme, the cockroach having disappeared before it, and this without any poison or other means having been resorted to. Have the mice eaten them or frightened them away?—*J. B. Keene.*

Sensitive Plants (*v. S. G.*, p. 94).—I have seen in some authors that the false Acacia (*Robinia pseudo Acacia*), when suddenly and violently shaken, seems also sensitive, but I never experienced that.—*B. Melle.*

Babeer (*v. S. G.* p. 90).—Might that cane not be the *Eriophorum Cannabinum*, called, I believe, in India "*Bhabhar*," and employed there with other grasses for making ropes?—*B. Melle.*

An Egg within an Egg (*v. S. G.* p. 94).—We have here, in the Museum, an egg enclosed in another, just as the one described by C. A. J. A communication was made last year to the Academie des Sciences of a similar occurrence. The case seems to happen occasionally.—*B. Melle.*

Santonine, &c.—E. M. will readily procure most beautiful crystals of santonine from its solution in chloroform. By varying the strength of the solution, and the quantity laid upon the slide, E. M. will procure a variety of combinations. Let the solution evaporate spontaneously. My specimens are mounted dry. Has your correspondent tried Naphthaline? If not, he should do so, thus. Place a flake or two at the bottom of a watch-glass, over which put a lidless salve or pill box, with the bottom uppermost, and with a hole punched in it; over the hole place your glass slip, and apply a spirit-glass to the under side of the watch-glass, when the vapour of the naphthaline will condense on the slide in most exquisite crystals (vide *Intell. Obs.* vol. vi., p. 441). I have not yet been very successful in mounting this highly volatile substance.—*J. E. Whalley.*

Double Pear.—A notice of a peculiar pear in Science-Gossip reminds me of one I saw some time ago. It differed from that described by your correspondent in being a double pear, the second growing out of the eye of the first—hanging and separated from it by a stalk. This pear grew on a tree against a wall.—*H. Smith.*

Stickleback out of Water.—The other day the boys were turning out the aquarium, and left the fish—which were three-spined sticklebacks (*Gasterosteus aculeatus*)—rather too long in a bottle. The consequences were that many of them died. The aquarium glass was refilled, and the boys put the live sticklebacks in, leaving the supposed dead ones—of which I rescued three—in a saucer, without any water. This was at 4 p.m. Just before I went to bed—it being then 10 p.m.—I saw that the boys had not taken away the supposed dead fish. I determined to give them a small lecture for the omission; and poured a little water into the saucer, and put it on one side. The next morning, when I told a boy to take it away, he said, "Why, sir, here is one of the fish alive!" And sure enough there was. We put it into the aquarium, and it has lived a week. Do sticklebacks generally live six hours without water?—*F. R. R.*

Santonine.—To prepare slides of rosette crystals, place about ten grains of santonine in a small test tube, and pour upon it one dram of chloroform, and dissolve by a gentle heat; then drop upon glass slips a small portion of the solution, which will rapidly evaporate, depositing fine rosette crystals of the salt. Canada balsam or Deane's gelatine medium will answer well for mounting them.—*F. R. Martin, Redland, Bristol.*

NOTICES TO CORRESPONDENTS.

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

A. C. K.—It is clearly impossible.

A. G. H.—1. *Helix hispida*; 2. *Limneu glaber*; 3. *Pisidium cinereum*; 4. *Helix concinna*; 5. No specimen; 6. *Limnæu pulustris*; 7. *Helicella excavata*.—*R. T.*

J. D. L.—Your specimen is the operculum of a recent species of *Turbo*.—*R. T.* Letters received after the 15th of the month cannot be replied to until the following month.

F. E. B.—Most probably a species of *Dytiscus*.

S. J. B.—Alcoholic solution of corrosive sublimate. Alcohol, 50 parts to 1 of the salt. Let your objects be perfectly dry.

Erratum.—Page 66, Vol. III., *for* J. W. Mencher, *read* J. W. Meacher.

J. H. A.—Your quill arrived unsealed. No insects, nor remains of them, to be found.

J. D.—The caterpillar is that of the Magpie Moth (*Abraxus grossulariuta*).

M.—"Our Common Insects," by Mrs. E. W. Cox, price 2s. 6d. London: R. Hardwicke.

W. V. A.—You have omitted to enclose your address.

H. H.—The fault of which you complain is certainly frequently committed, but we hardly see how you would propose to remedy it. A cheap work must necessarily be, to a certain extent, elementary also.

W. N.—Nothing new. It is constantly observed.

H. R.—Your packet for R. G. is to hand. We must, however, decline the responsibility of forwarding *glass* and *a letter* by "Pattern post." Both are forbidden by the rules of the Post Office.

R. H.—Thanks. You shall be advised in good time.

E. C.—We cannot recognise the insect from your description. Try tobacco smoke, or syringing with a strong decoction of tobacco.

T. O.—We have tried your experiment, but failed of success. It is not easy to understand *à priori* why the effects of which you speak should be produced.

H. C.—1. Impossible, without first identifying the species. 2. They rarely lay in this country; we do not know where eggs can be obtained. 3 and 4. See Vol. II., pp. 164, 186, 213, 237, and 256. 5. Consult "Brewster's Optics," or "Lardner on the Microscope."

J. B. L.—1. *Bryum alpinum*; 2. *Hypnum commutatum*; 3. *Hypnum* (*Eurhynchium*) *prælongum*.—*R. B.*

Th.—*Hypnum* (*Eurhynchium*) *piliferum*, with *prælongum* intermixed. *Pluntugo coronopus* is very variable—sometimes hirsute, sometimes nearly glabrous. The *Riccia* appears to be barren fronds of *Sphærocarpus Michelii*.—*R. B.* Can you forward a few specimens of this genus for a correspondent?

W. C.—It is very unsatisfactory attempting to name specimens from sketches or bare descriptions. Can you not send a frond?

W. H.—We know of many similar works, but none containing more detailed information. What branch of Entomology do you intend to study?

W. D. G.—You have omitted to give your name. "Lankester's Aquavivarium" is the best, but is now out of print.

H. R. C.—1. "Anatomical Manipulation," by Tulk and Henfrey (Van Voorst, 1844), which may be picked up, second-hand, for 3s. or 4s. 2. We know of no *single* book that would supply the deficiency.

J. M.—Solitary butterflies are often taken at unseasonable periods.

W. F.—*Poduræ* can be obtained at any time during the summer.

T. L.—Such abnormal forms are far from uncommon.

W. F. S.—You cannot do better than purchase "Davies on Mounting," London: R. Hardwicke, in which you will find all the particulars you seek.

C. J.—Your red sea-weed is *Ptilota plumosa*.

M. H.—Your suggestion is good, and shall have due consideration.

Double Eggs.—Having been overwhelmed with correspondence upon this subject, we are compelled to postpone many communications for want of space.

EXCHANGES.

Flint Flakes (arrow head?), several varieties from the gravels around Belfast, for similar flakes from other localities, or Geological specimens.—W. Gray, Mount Charles, Belfast.

Diatomaceous Earths from Antrim, &c., for other objects, mounted or unmounted.—W. Gray, Mount Charles, Belfast.

Fossil Diatomaceæ (mounted) for other mounted objects.—W. Fletcher, Grammar School, Bromsgrove.

British Seaweeds for British Birds' Eggs, or Preserved Foreign Reptiles.—F. Stanley, Harold-road, Margate.

Gorgonia spicules and *Tubellaria flocculosa* (mounted) for other good slides of Diatoms or Polariscope objects.—W. H., Stamp Office, Fordingbridge.

Pencil-tails for Infusorial Earths or Diatoms, unmounted.—H. H., 3, Edward-street, Moseley-road, Birmingham.

Fossil Wood in sections from Ashby de-la-Zouch.—Stamped envelope to J. Butterworth, 5, Bridgewater-street, Oldham.

Cotton Seed for Diatoms or Entomological slides.—E. M., 6, Holford-square, Pentonville, W.C.

Calytræa (20 species) for a good skeleton of the Squirrel.—G. A. Lebour, Fez Lodge, Addison-crescent, Kensington, W.

British Birds' Skins for Eggs of the same.—J. Aspdin, Richmond, Yorkshire.

BOOKS RECEIVED.

"The Birds of Norfolk," by Henry Stevenson, F.L.S. Vol. 1. London: Van Voorst.

"The Doctrine of the Correlation of Forces," by the Rev. J. Cranbrook. Edinburgh: Edmonston & Douglas.

"The Quarterly Journal of Microscopical Science." No. XXVI., April, 1867. London: Churchill & Sons.

"The Quarterly Magazine of the High Wycombe Natural History Society." No. IV. Wycombe: W. Butler.

"Theoretical Astronomy Examined and Exposed," by "Common Sense." London: Job Caudwell.

Communications Received:—J. R. C.—J. S. T.—A. L.—J. W. M.—W. S. M. D'U.—W. G.—W. F.—J. D. L.—D. E. G.—J. G.—R. H.—F. A. A.—J. E. W.—Dr. L.—S. J. B.—A. S.—E. K.—F. S.—L. H. F.—F. E. B.—C. D.—W. P. M.—B.—H. H. O'F., Jun.—J. F.—J. S. S.—J. D.—F. R. M.—J. G. (Sherborne).—C. J. W.—J. J. O.—F. R. S.—W. C.—S. C.—H. R.—H. H.—A. W. C.—J. B. K.—J. P.—J. M.—M.—E. H.—C. G. F.—W. G. (Belfast).—J. W.—B. (Melle).—G. B. C.—W. K.—J. D. L.—L. H. F.—W. V. A.—G. B.—E. C,—J. H. B.—T. O.—C. C. K.—G. G.—J. A.—G. A. L.—A. H,—H. C.—L. S.—G. H.—J. W. W.—H. U. C.

EXPOSITION UNIVERSELLE, 1867.

> For me, the genial day, the happy crowd,
> The sport half-science, fill me with a faith.
> This fine old world of ours is but a child
> Yet in the go-cart. Patience! Give it time
> To learn its limbs: there is a hand that guides.
>
> *The Princess.*

ANOTHER and final stroll through the Paris Exhibition enables me to add a few memoranda to the notes which appeared in the May number. It must be premised that everything approaches as much towards completion as it is likely to attain, and now it would furnish plenty of occupation for a week to see all that is to be seen in the Palace and Park. The fresh-water aquarium is in operation, but the marine was still unfinished, and consequently unfurnished, when I left. In one of the German courts (XXXVII.), in the outer circle, are two full-length life-size portraits of Napoleon and Frederic the Great, which at the distance of a few yards appear to be oil paintings, but on approaching closer they are seen to be composed entirely of dried "everlasting" flowers. These are exhibited by J. C. Schmidt, of Erfurt, and the only drawback connected with them is, that they are placed in such an out-of-the-way corner, that it would be difficult to find them, unless by devoting some time in hunting for them. Not far from hence (Sal XXXVI.), a number of small cases are exhibited, which contain a most complete series of "Bees and their enemies," which well deserve notice. In the Russian department, inner court, near the Fine Arts, is a small collection of considerable interest, though not occupying much more than a square foot of space; it consists of spiders and caterpillars, both very difficult objects to preserve well, and yet here they are as plump and nearly as brightly coloured as when alive. The caterpillars are crawling over artificial green leaves, and look as though they were "all alive," enjoying a meal. Ask me not how they are done, for I cannot tell; there was not the slightest intimation, not even of the name of the exhibitor, and not a soul present who could tell me. Not far from this spot, in the same court, are groups of dried flowers, especially pansies and pelargoniums, looking as fresh and natural as the caterpillars.

In the Austrian department I was attracted towards a picture about twenty-seven inches long, by a kind of presentiment that the subject was familiar, and so it was, though not scrupulously exact, but a very good representation of Westminster Abbey, done in straw mozaic, by F. Otto, of Linz, and priced at 1,500 francs. It required close observation to detect that it really was all straw. One is often led by association into a curious train of thought, as I was on this occasion. Passing into the Bavarian court, a quantity of wool recovered from old garments, under the well-known names of "mungo" and "shoddy" was exhibited, and beside it the catalogue, or trade list—not in German, nor in French, but in English. Of course one might imagine that the lists were printed in the language of the country in which the goods were in greatest demand. With the consolation that there was still plenty of "shoddy" in the world, I passed on, and found myself in the Rue d'Espagne, where a long row of cases against the wall, by different exhibitors, contained a very large collection of the remains found in the Swiss Lacustrine habitations. Here was a day's work to examine the hundreds of objects, well displayed, named, and with the extra advantage of a gentleman then on the spot, probably one of the exhibitors, ready and willing to afford

any information; but our watchword was "onward," and the day was one of the hottest of the three or four hot days which the Exhibition has yet experienced.

Before leaving the subject of this Exhibition, I must once more advert to microscopic matters connected therewith; not that I have any reason to alter the general opinion expressed in "A Voice from Paris," but to add one or two facts then unnoticed. First of all comes the discovery in the French department of a microscope with a moveable stage and a lever, and still more surprising a large microscope (not quite so large as No. 2 size of the London opticians), with two rack-work movements to the stage. I must add that the exhibitors of these phenomena are Mirand & Fils, Rue Galande, 52. It is but fair to add that the Parisian opticians are not at fault in shunning stage movements and other improvements, but, as a friend writes me from another corner of the Continent, there is a reason at the bottom. "I read with interest," he says, "your remarks on the microscopes. You are certainly quite right in reflecting on the small dimensions of the continental instruments, and on the very general non-adoption of machine stages and inclining joints, but you might have given (if you could have done so without offence) the true reason—*a desire for cheapness.* A German or Frenchman likes the luxury of a Ross, Smith and Beck, or Powell and Lealand, as much as any one, and when they affect to despise English appliances on principle, I never believe them."

I have also seen the working of high powers constructed on the "immersion" principle, at a comparatively cheap rate, and certainly with excellent results. I am disposed to think that we know too little of these objectives in England, and have hitherto regarded them with a trifle too much of prejudice. Fancy, for instance, looking at Pleurosigma angulatum, with an apparent diameter of about two inches, without artificial light, or condenser of any kind, and, more than all, mounted in the ordinary manner, with the common thin glass, *not* extra thin glass, and being able to take the slide off the stage without moving the objective out of focus. The magnifying power is said to be equal to about $\frac{1}{40}$th of an English inch, and the price 300 francs. Messrs. Hartnack exhibit objectives of a very superior character to those heretofore manufactured in France; and their new pattern objectives, without immersion, are spoken of by all who have tried them in terms of high praise. On this point, however, I am only echoing the opinions of others, although my own impression, from a casual peep or two through one of them, is much in their favour.

By the way, I am not aware that the spot lens, with the spot on the plane face of an inverted cone of glass, described by M. Nachet, in the *Microscopical Journal* some years ago, has been used in England. It appears to be approved both in France and Germany.

Before turning my back on the Exhibition, I must mention the splendid mass of crystals of purple Tourmaline exhibited by Colonel Guthrie, in a case directly opposite to Messrs. R. & J. Beck's case. These crystals, about six inches in height, are said to be the finest which have ever been seen. C.

"AT HOME IN THE WILDERNESS."

HOME is not shut within narrow limits, is not confined to scenes of pleasure, regal splendour, or the dwellings of the great. Wherever warm hearts are to be found together, with contentment and a hearty desire at all times to do the best that can be done under existing circumstances, health and strength, a will to work, and an unwavering trust in God, who cares even for the sparrows,—*there*, believe me, exists the primal elements, the magic of home. Thus writes Mr. J. K. Lord at the commencement of a book* which he has just issued with the above title, and which is intended to teach all wanderers how, if they have but the will, they may make themselves "at home in the wilderness." One of the most important requirements for such a task the author possesses, a long experience on the subject of which he writes. Still another scarcely less welcome recommendation will be found in the interesting, aye, fascinating manner in which he inveigles his reader into following him through what a less efficient hand would have left a dry detail of makeshifts about as interesting as a cookery book or a pharmacopœia. The object of the book is equally achieved, but in a different manner. We learn "where and when to camp; how to equip and manage a train of pack-mules; break, gear, and saddle wild horses; cross streams, build log shanties, trenail a raft, dig out a canoe, or build it with bark or hide; manage dog sleighs, and tramp on snow shoes; what to carry, and what to leave at home;" in fact, all that a wanderer would desire to know, freely interspersed with illustration and anecdote, joined with hearty and wholesome advice, and all so disguised that we fancy we are reading a new book of travels which we cannot leave until it is finished, and which has the merit *all* books of travel do not possess, of leaving the reader a wiser man.

Let us collect an incident or two from this little volume in illustration of our remarks. No one would think it a matter of much consequence in buying a horse whether the animal had a long tail or a short one. Oh, yes it is! says Mr. Lord. "In

* "At Home in the Wilderness: being full instructions how to get along, and to surmount all difficulties by the way." By "The Wanderer." 323 pp., post 8vo. London: Robert Hardwicke.

proof of the value of a horse's tail, in a country infested with blood-sucking flies, I may state that I once, when at Walla-Walla, a small steamer-landing and town situated at the head of navigation on the Columbia river, purchased a Siskyoo horse, which means a horse with its ears cropped short like a terrier's, and a tail cut off close up to the rump. This is, or once was, a common custom with the Siskyoo Indians, and all horses so trimmed are designated by the generic name of "Siskyoo." The object of this barbarous custom was to enable these Indians easily to recognise their own horses if stolen and subsequently discovered herding with other bands. Horse-stealing is the primary cause of nearly every Indian war and quarrel. The poor Siskyoo beast, although as perfect a cob as any man need have looked on, was nevertheless utterly valueless during the summer; unable to whip away his tormentors, they worried him with impunity, until want of rest and continuous irritation reduced him wellnigh to a skeleton. 'When found make a note of.' Always look out for long-tailed mules and horses in a fly country."

The author of this book was Naturalist to the British North American Boundary Commission, and when reading his account of one difficulty which he had to surmount to the west of the Cascade mountains, we could not help wondering what some of our "parlour naturalists" would have done in such a strait. The place is now called the Diamond Tree Pass. "It certainly was an awful place up which to make a trail that should be available for packed mules, and, to add to the difficulty, a good-sized stream of water tumbled rather than ran down the hill-side. The distance from the base to the summit, in a straight line, was not more than three-quarters of a mile, but it was rocky and densely timbered. The difficulty, too, was the more complicated, inasmuch as the prairie leading to the pass was intersected by several streams not fordable, and two swamps that must be crossed. I thought the matter carefully over, climbed up and down the hill, and recalling the words of Napoleon, '*Impossible, c'est le mot d'un fou*,' finally made up my mind to do it. By describing how this apparent impossibility was overcome, I shall give all the practical hints relating to trail-making, bridge-building, and fording swamps which a wanderer can require." But our space will by no means permit us to narrate how it was done, and we can only recommend all who desire to know, to procure the book and read it for themselves.

Fig. 90.

In compensation for omitting the details of the Diamond Tree Pass, we purpose to conclude with the picture of a "buffalo run":—

"The scene of my adventure is on the broad plains in the Red River settlement. The sun is just creeping from behind the eastern hills, tinting with the rosy hues of morning the splintered summits of many a far-off peak, and at the same time shedding a paler glow over the grassy slopes; the different intensities of the light give to the flat surface of the plains the appearance of being an ocean of mist. A band of Red Indians with whom I am hunting and living are mounted and ready for the hunt, and few have ever looked upon a more picturesque sight. Their only garment, a piece of skin tied round the waist, makes the muscular figures of the savages look more like exquisite carvings than real flesh and blood. Thus sitting their prancing half-tamed horses with matchless ease and grace, their black hair flowing in tangled locks down their backs, confined only by a narrow band of ermine-skin, with an eagle's feather sewn to it, they look as wild and fearless as the beasts they are about to chase. We are waiting for the mist to rise, which it will do when the sun comes fairly above the horizon. Ah! there it goes, the fog lifting like a veil. It does not evaporate, so to speak, and disperse, but rises *en masse* like a balloon, and at once becomes invisible. And now we can make out the buffalos scattered over the plain. Some are busily cropping their dewy breakfast, others are still lying down in little groups—but all are in happy ignorance of the dire enemies lurking behind the knoll watching their every movement. Craftily, and with extreme caution, we walk our horses to windward of the herd, and as we emerge from the cover of the ridge, the trumpet-like notes of the older bulls tell us that we are discovered. Concealment is now of no further use, the

beasts are crowding together like sheep when scared by a dog. The Indians give a piercing whoop, and we dash wildly after the now rapidly retreating herd, their tails upheaved and their horns rattling noisily against one another. The very plain seems to shake, clouds of blinding dust, raised by thousands of hoofs, nearly hides the hunters from each other, whilst a rumbling noise, like subdued thunder, seems to absorb and swallow up all other sounds. I soon overtake the rearmost animals, and singling out a young cow, drop her in her tracks; recharge my gun, and single out this time a fine old bull. He seems to roll rather than gallop along, his nose nearly touching the grass, and his shaggy brown mane tossing wildly in the breeze. My horse, though thoroughly up to his work, appears to know by past experiences that it is no mean foe he has to deal with; laying back his ears, and pushing out his nose, as if to make the most of every breath of air, the gallant mustang thunders on at such a pace that I find myself side by side with the shaggy bull before I have time to think of my position in reference to the other stragglers of the herd. Now or never I must fire, or lose my chance. Lowering my gun, I pull the trigger.

"It appeared to me that the cap had hardly exploded ere my mustang wheeled short about with such startling velocity, that it was with the utmost difficulty I contrived to retain my seat; but as if the fates were against me, two other buffalos were directly in the way, and for a few seconds prevented the horse from galloping away from the bull, which, turning nearly as rapidly as the horse, charged, and striking the horse on the point of the shoulder sent us both rolling on the plain. I was terribly frightened and shaken, but adopting Falstaff's maxim, 'that the better part of valour is discretion,' I lay still to await the issue of events. The mustang had by this time regained his legs, and was, with evident difficulty, limping away as fast as his damaged shoulder permitted. That the bull was badly wounded I could see by his rolling gait, heavy breathing, and the bloody froth besmearing his nostrils and lips. I do not think he saw me, for his glaring eyes were directed towards the horse, which he made a vigorous attempt to follow; but it proved a signal failure. The wounded beast seemed to be perfectly aware that if once he fell to the ground all hope for him was at an end, so bracing his muscles firmly, and planting his massive legs wide apart, the powerful animal seemed determined to stand up to the last. Hurt and frightened as I was, I felt sorry for him; the eyes lost all their fire, and a saddened expression took its place. He tried to get glimpses of his comrades, by this time nearly lost in the distance; and I know that dying buffalo was quite aware that he should never see them again. His great chest was heaving convulsively, and low plaintive sounds, more resembling sobs than anything else I know of, told in language plain as printed words how terrible were his sufferings. The head dropped, until the nose was nearly touching the grass, the ponderous body rocked like a storm-tossed ship from side to side, a gurgling sound replaced the stentorous breathing; then suddenly the muscles seemed to lose all further power, and with a heavy crash the king of the plain fell dead amidst the grass and wild flowers. The Indians soon recovered my lost steed, for his shoulder was so much injured that he could only contrive to limp slowly away."

Of course every wanderer in the future will read this book before he starts on his travels, and so should every one who stays at home, unless his home is a wilderness, and he desires to make it a desert.

SOCIABLE MITES.

UNDER the name of "Sociable Mites," I am desirous of interesting those who have opportunities for observing the small organisms which make their appearance during the summer months, on behalf of a little known group of Acari, which are associated by naturalists under the generic name of Tetranychus. Scattered notices occur of the appearance of some of these minute visitors in immense numbers in former years, and now, being forewarned, it is hoped that some of the readers of this journal will be prepared to add a little to our knowledge should they encounter any of the little creatures about to be alluded to, during their summer rambles.

There are probably about twenty different species of this genus described, and a few only of them have as yet been certainly known to inhabit the British Isles. Several have the singular habit of living in very large communities, and the history of one species, as described by Dr. Milner Barry in a letter read before the Entomological Society of London in 1855, will serve as an introduction to the rest.

"When strolling across Rusthall Common this afternoon, I noticed some red powder lying in thick cobwebs entangled in the furze. I took up some of the powder, and found it was living and moving, and consisted of myriads of vivacious red insects, resembling Acari." When the mass reached my hands, it was of the size and shape of a sparrow's egg, the Acari running over it in all directions, and each adding to the bulk by leaving behind him a continuous thread of the finest conceivable silk. I subsequently sent the mass to Mr. Meade, the Arachnologist, who has carefully examined it, and kindly sent me the following information:—"The minute animals inhabiting the curious cocoon you sent me are Acari, belonging to the genus Tetrany-

chus of Dufour, the type of which is the little red spider so injurious to plants in hothouses and rooms, the Acarus telarius of Linnæus; most of the species live in societies, on plants, and possess the power of forming webs." Koch says, when speaking of an allied species, Tetranychus socius, "It appears in certain years in such numbers that it covers the trunks and the branches of the lime-trees which it frequents, with such a thick web that they look as if clothed with glazed satin. I cannot find any description of the species sent by you, although it is closely allied to the common Tetranychus telarius, and I never before saw or found anything like the curious nest which it inhabits." Since the receipt of Mr. Meade's note, I have paid some little attention to the Tetranychus telarius, and find that the network of infinitely minute silken threads is admirably adapted to its singularly formed feet, and these are equally well adapted to the office of holding on while it perforates the cuticle of the leaf with its rostrum; its hold is so secure that no amount of washing by means of a garden engine seems to have the effect of removing it. As I have no doubt whatever that these little creatures are exclusively vegetable feeders, the web cannot serve, as in spiders, the purpose of securing prey, and it is, moreover, never accompanied by the glutinous particles which render the web of spiders so adhesive. As a matter of course, if the Acari can resist the action of a water-engine, they have little to fear from the effects of rain."

Fig. 91. *Tetranychus telarius.*

The "red spider," as it is called by gardeners, having been alluded to in the above communication, as forming the type of the present genus, it has been figured in this place, although too well known to all who are associated with greenhouses and conservatories (fig. 91) to need further description.

Ten years prior to the above communication by Dr. Milner Barry, the plane-trees in Regent's Park were observed by Mr. George Wilson to be infested by "sociable mites," of which occurrence the following account was transmitted to the society already named:—

At the beginning of September, Mr. Wilson's attention was directed to the trees, several of which had the trunks and branches entirely or partially covered with a very delicate web, upon which myriads of a small Arachnidous insect were running to and fro, extending their webs rapidly along the branches. The web was so fine as to appear like a thin compact layer of varnish upon the stems of the trees, and from the vast number of the insects, the grey web appeared dusted with a reddish powder, the insects being of a light orange colour, inclining to brown. From the web so completely enveloping the tree and obstructing the vital influence of the atmosphere, the leaves became withered and fell. This was especially the case with the plane-trees, the elms and horse-chestnuts being free from them. The weather for several days previously and subsequently was fine and sultry, but in the course of a few days a heavy fall of rain, accompanied by a thunderstorm, put a stop to the injury by destroying the insects. On placing a portion of the web with its inhabitants in a bottle, Mr. Wilson observed that in about an hour a beautiful transparent cylinder had been spun within the bottle, from the base to the top, impinging against the side of the bottle at about half its height; and it was remarkable that there was not a single thread stretched across the inside of the cylinder, nor was a single insect enclosed within it. Having completed their first cylinder, they threw a second around it, more slender than the former, leaving only a small interval between them.

Fig. 92. *Tetranychus tiliarius.*

Mr. White considered the species to be Trombidium tiliarum, or an allied species, and distinct from Acarus telarius, L., and Trombidium socium, the habits of which, as described by Hermann, were mentioned by Mr. White.

The species described and figured by Hermann and Koch under the name of Tetranychus tiliarius, or the "Lime-tree Mite," is engraved (fig. 92) for the benefit of my readers. It must be observed that bright colours characterize the majority of the members of this genus, although that feature is omitted in the woodcuts.

Careful readers of the past volumes of Science-

GOSSIP will remember that allusions have been made to a curious little red mite which deposits its white eggs on stones, and similar substances. This "Stone Mite" (fig. 93) is Tetranychus lapidus, and the extract from the *Entomologists' Monthly Magazine* alluding to it, which was quoted (SCIENCE-GOSSIP, 1865, p. 22), need not be repeated here. Gervais states that the eggs may be seen in autumn on the stones of the public promenades in Paris. These eggs (fig. 94) were observed and figured in one of the earliest numbers of Loudon's excellent *Magazine of Natural History*.

Fig. 93. *Tetranychus lapidus.*

Fig. 94. Eggs of the same.

M. Duges has described another and smaller species, with similar habits, under the name of Tetranychus glabrus, but which he says is so very minute that it is scarcely visible to the naked eye. A figure is given (fig. 102) belonging to the present species, and is copied from the one furnished by M. Duges.

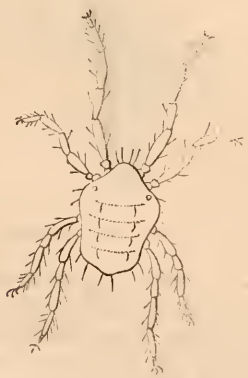


Fig. 95. *Tetranychus major.*

Another species, which may be called the Laurustinus mite, having a long appendage (Tetranychus caudatus), is found in colonies on the lower surface of the leaves of the Laurustinus, but has not yet been recorded in Britain.

Already allusion has been made to the "Social Mite" (Tetranychus socius), of which a figure is now given (fig. 96). It is of a pale colour, and also prefers to consort in colonies.

The "Plum-tree Mite" (Tetranychus prunicolor) is said by Gervais to be found in the months of

Fig. 96. *Tetranychus socius.*

July and August, on the leaves of the pear and plum trees in some parts of France, and when mature is of a violet-brown colour, but when young, greenish.

One species, affecting elm-trees, is called by Koch—Tetranychus ulmi, and is of a bricky red (fig. 97).

Fig. 97. *Tetranychus ulmi.*

Another attaches itself to willows, and has acquired from hence the name of Tetranychus salicis (fig. 98). In general colour it resembles the last.

Fig. 98. *Tetranychus salicis.*

Fig. 99. *Tetranychus Viburni.*

The guelder-rose also cherishes its sociable mite, which is called Tetranychus Viburni (fig. 99), and is orange-coloured when mature.

Upon the poplar a greenish mite has been discovered, belonging to the same genus, and which is named by Koch—Tetranychus populi (fig. 100).

The many foes of the common nettle are still further augmented by a rather elegant species of mite called Tetranychus Urticæ (fig. 101).

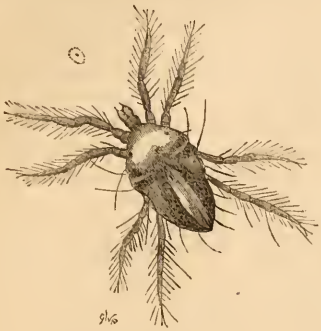


Fig. 100. *Tetranychus populi.*

To the above may be added Tetranychus major (fig. 95), and a red species which is not confined to any kind of tree in particular, but which spins a web resembling that of a spider, and dwells in societies. This is Tetranychus lintearius.

Fig. 101.
Tetranychus Urticæ.

Fig. 102.
Tetranychus glabrus.

The above enumeration comprises the best known of these singular creatures, but the most that is known of them is very meagre and unsatisfactory. It is hoped that readers of Science-Gossip will strive to make their better acquaintance, and communicate the result.

OPHIOCYTIUM.

In the Micrographic Dictionary it is said that no species of Ophiocytium have yet been observed in Britain. The plant, therefore, of which I send a drawing, and which seems to be undoubtedly a species of Ophiocytium, is interesting as an addition to our Microscopic Flora. It seems only to differ in size from O. majus, figured in plate 45 of the Micrographic Dictionary. I have found it abundantly in a small pond, entangled amongst the filaments, &c., of other Algæ; and I think that it is only from its minuteness that it has hitherto escaped the observation of microscopists. The plant consists of a single cell, filled with pale chlorophyll, in which occur denser granules irregularly dispersed. It has a short stipes by which it is sometimes attached to other bodies. Fig. 103 shows the

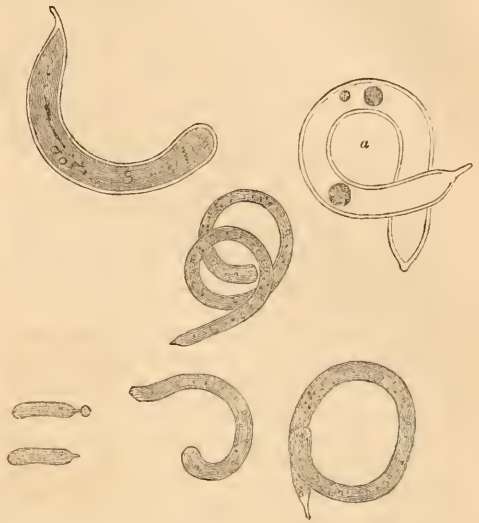


Fig. 103. The lower figures × 350.

different stages of its growth. Fig. *a* is a decaying frond containing a globule of oil, and two globules of brown matter. The pool of water is in a hollow of the glacial drift, which overlies the magnesian limestone in this neighbourhood.

Markington. J. S. Tute.

A CENTURY AGO.

Most of your readers will not need to be informed that Natural History a century ago was a very different science to what it is at the present day. In order to bring this the more vividly before them, perhaps you will allow me space to make a few extracts from an old work which I have met with. It is, I believe, a fair sample of the text-books which our grandfathers and grandmothers used in their youth.

It is entitled, "A description of Three hundred Animals, viz., Beasts, Birds, Fishes, Serpents and Insects. With a particular Account of the Manner of their catching of Whales in Greenland. Extracted from the best Authors, and Adapted to the Use of all Capacities. Illustrated with Copper-plates, whereon is curiously engraven every Beast, Bird, Fish, Serpent, and Insect, described in the whole book. The Ninth Edition, carefully corrected and amended. Printed for C. & R. Ware at the Bible and Sun, on Ludgate-hill, 1763." If, having in some measure recovered breath, after reading this lengthy title, we proceed to the preface,

we shall find, that "the Instruction of Children having been always thought, by wise Men, of great Use, both with regard to the present Age, and to Posterity; and most of the Books, which have been made use of to introduce Childreu into an Habit of Reading, being such as tend rather to cloy than entertain them." The anonymous author has extracted from "the most cousiderable Authors," a short account of all the Beasts, Birds, Insects, and Fishes. He somewhat magniloquently closes the preface by saying, "If this brief Essay shall any Ways contribute to the End proposed, let God have the Glory, and the Compiler the Good Wishes and Prayers of Parents." It will be observed that throughout my extracts I carefully followed the somewhat primitive punctuation and typography of the original. Every substantive is commenced with a capital letter, as in modern German.

There are three of the Animals described which have apparently become extinct in later years; unless, indeed, some of your readers, who are so widely scattered over the world, can personally testify to having encountered them. First, on page 19, we read that "the *Manticora* (or, according to the Persians, Mantiora), a Devourer, is bred among the Indians; having a triple Row of Teeth beneath and above, and in Bigness and Roughness like a Liou's; as are also his Feet; Face and Ears like a Man's; his Tail like a Scorpion's, armed with a Sting, and sharp-pointed Quills. His Voice is like a small Trumpet or Pipe. He is so wild 'tis very difficult to tame him; and as swift as an Hart. With his Tail he wounds the Hunters, whether they come before or behiud him. When the Indians take a Whelp of this Beast, they bruise its Buttocks and Tail, to prevent its bearing the sharp Quills; then it is tamed without Danger."

On the next page a still more marvellous creature is described, *i. e.*, "The *Lamia*, concerning which there are many fictitious Stories, is (according to the Opiuion of some Writers) the Creature meutioned in the 34th Chapter of Isaiah, called in Hebrew, Liliath; as also the same which is mentioned in the 4th of Lamentations. It is thought to be the swiftest of all four-footed Creatures, so that its Prey can seldom or never escape it; And by its Fraud it destroys Men, (or, when it sees a Man, it lays open its Breast, and entices him to draw near; and when it has him within Reach, it falls upon and devours him. It is said to be bred in Libya; and to have a Face and Breasts like a very beautiful Woman. It has no Voice but that of hissing like a Serpent. Its hiuder Parts are like a Goat's, its fore Legs like a Bear's; its Body is scaled all over. It is said, they sometimes devour their own young."

It is almost superfluous to add that there appears, in his turn, "The *Unicorn*, a Beast which, tho' doubted of by many Writers, yet it is by others thus described: He has but one Horn, and that an exceeding rich one, growing out of the Middle of his Forehead. His head resembles an Hart's, his Feet an Elephant's, his Tail a Boar's, and the rest of his Body an Horse's. The Horn is about a Foot and a half in Length. His Voice is like the Lowing of an Ox. His Mane and Hair are of a yellowish Colour. His Horn is as hard as Iron, and as rough as any File, twisted or curled like a flaming Sword; very straight, sharp and everywhere black, excepting the Point. Great Virtues are attributed to it, in expelling of Poison, and curing of several Diseases. He is not a Beast of Prey."

A picture of the *Whale-Fishery*, on p. 132, is very curious, the seamen being dressed in long coats resembling a soldier's tunic, and in triangular cocked-hats—rather a different style of dress from that indulged in by modern sailors. On arriving at the Serpents, after a very terrible description of divers Dragons, of which the author very wisely says, "it may be justly questioned whether they exist," we find the *Cockatrice* described as "Called the King of Serpents, not from his Bigness, for he is much inferior, in this Respect, to a great many Serpents; but because of his majestic Pace, for he does not creep upon the Ground, like other Serpents, but goes half-upright; for which Cause all other Serpents avoid him; and it seems, Nature designed him that Pre-eminence, by the Crown or Coronet upon his Head. Writers differ concerning the Production of this Animal. Some are of Opinion that it is brought forth of a Cock's Egg, and fed upon by a Snake, or Toad, and so becomes a Cockatrice, &c."

The last extract I have space for is a story on p. 200, concerning a combat between a spider and toad, which runs as follows:—"A certain Earl travelling near Woburn in Bedfordshire, some of his Company espied a Toad fighting with a Spider, under a Hedge by the High-way Side, whereat they stood still, till the Earl came also to behold the same; and there he saw how the Spider still kept her Standing, and the Toad divers times went back from the Spider, and did eat a Piece of an Herb like a Plantain; at last, the Earl having seen the Toad do it often, and still return to the Combat against the Spider, ordered one of his Men to go and cut off that Herb; which he performed, and brought it away. Presently after the Toad returned to seek it, and, not finding it, according to her Expectation, swelled and burst asunder; for, having received Poison from the Spider in the Combat, Nature taught her the Value of that Herb, to expel and drive it out; but wanting the Herb, the Poison did instantly work, and destroy her." Here is valuable evidence for the correspondents who wrote lately in Science-Gossip about the "Spider's Poison Vessels"! Of course, in the preceding extracts, I have merely quoted the descriptions

which would appear most extraordinary and amusing to our modern ideas; there is, it is only fair to add, a considerable amount of really useful information in the volume. But, without actually reading extracts from works of this nature, I believe few would credit the fact that such preposterous statements were prevalent even "a century ago."

F. Allen.

FORAMINIFERA.

It is not a little remarkable that whilst the shells of foraminifers are amongst the common objects most familiar to microscopists, and thousands of miles of the soft beds of our deepest oceans, and whole mountains and great tracks of land—the solidified mud of the oceans of geologic ages—are almost entirely composed of the carapaces and *débris* of these tiny beings in uncountable myriads, that hardly any one knows anything about them in their living state, and very few naturalists even can be said to be at all reliably acquainted with the proper history of the various species, still less with their actual habits.

What is a foraminifer? may indeed be easily answered. It is one of the very lowest forms of life. It belongs to the class of Rhizopods, merely gelatinous animals of which the Amœba is the simplest form. This curious spec of living jelly is devoid of any visible organization, has no perceptible muscles or nerves, no head, no mouth, neither arms nor legs—a mere minute mass of sarcode. And yet life is there—life in one of the most mysterious of its many forms and manifestations. That thin flesh, seemingly all on the run like limpid starch, quivers to the sensation of touch, contracts with the pain of injury, protrudes long filaments as arms to seek for food, perhaps more tender than even its own transparent substance, or uses these thread-like limbs—pseudopods, as the Greek-and-Latin-loving savans have termed them—as cables to pull itself along. Whether these Amœbæ even have the thinnest of skins is more than any one could swear to, though of course they ought to have; but if any kind of these animals possesses no other difference than that of the power of consolidating calcareous, siliceous, or horny matter around it, and turning its skin into a shelly house, it becomes at once a polycystin or a foraminifer.[1] In the main, if it has a siliceous shell, it is the former; if a calcareous shell, perforated with a lot of little holes for the protrusion of the pseudopods, the latter. There are, however, imperforate foraminifers and perforate polycystins, and these of course have mimetic resemblances to each other. Naturally, however, the imperforate foraminifers have more affinity with the polycystins than the perforate polycystins have with the foraminifera. We cannot here, however, enter into details of affinities or classification, for the main object of this article is to suggest work required to be done, rather than to teach what has been accomplished.

Two subjects require at the hands of naturalists and students full consideration and attention: a general review of the accepted classification into families, genera, and species; and a careful and actual investigation of the living forms and their actual stages of development. The one question involves the other; and we must start with an hypothesis. We must presume that the primitive typical form of a foraminifer is a simple single sphere, and that this primitive form is the first rudimentary stage of every species, however complex may be its ultimate mature condition.

Shut up in its stony cell, then, how will it propagate its kind? The mass of sarcode, constantly fed, increases, exudes; and the exuded mass ultimately forms another individual, which coats itself, and builds another house next door to its parent's, and the two have become a pair of semi-detached Amœban villas. Nutrition of the sarcode still goes on, and exudation again takes place; another house is added, and yet another and another, until in the order of generation a street of Amœban residences is built. All this is very simple, and one would hardly have preconceived the possibility of much variety in the results of a process so extremely rudimentary. And yet species and varieties more numerous than those of any other single order of animals abound, and the class of foraminifers is prolific in variety and beauty of forms. But all this variety and beauty are due entirely to the way in which each particular species builds its house, and the plan upon which it forms its street.

Let us explain ourselves by a selection of actual examples. Some foraminifers are perfectly round and solitary, as the membranous *Gromia*, and the calcareous shelled *Orbulina*. Other kinds will put

Fig. 104. *Orbulina universa.*

Fig. 105. *Lagena globosa.*

Fig. 106. *L. caudata.*

on shapes of every modification a viscous sphere is susceptible of. One sort, the *Oolina*, puts on a form

Fig. 107. *L. sulcata*, young.

Fig. 108. *L. sulcata*, adult.

Fig. 109. *L. mulo.*

something like an elongated globule of glass broken off from the stick of the blower, with a short bit of the tag attached. Another of this group, the *Lagena*,

puts on all the intermediate shapes between this elongated condition and a primary tear-drop form, some species being plain, others ribbed, cross-barred, chequered, and variously ornamented by the extraneous solidification of the shell-growth. This selection indicates, too, something of the wonderful variety of modifications put on by the species within the limits of every separate genus.

Fig. 110. *L. squamosa.*

Fig. 111. *L. semistriata.*

Fig. 112. *L. lævis.*

Another group follows in which all these spheres or elongated globules adhere together in lines or rows—single axes which may be straight, or may be bent or curved. Of those thus formed on a straight line, we may take a few examples from amongst the *Nodosariæ*, and in which we shall

Fig. 113. *Nodosaria hispida.*

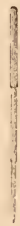


Fig. 114. *N. rugosa.*

Fig. 115. *N. longisulcata.*

Fig. 116. *N. spinicosta.*

again see further illustrations of that wonderful exuberance of modification which characterizes, as

Fig. 117. *Nodosaria striaticollis.*

Fig. 118. *Lingalina carinata.*

we have already noticed, every kind of developmental plan.

The *Lingulinæ* (fig. 118) also present another condition of this development of lobes—we prefer not to call them chambers—upon a single straight axis.

From the straight to the bent is but an easy step, and then all these exuberant modifications in the contiguity of lobes, and of their external ornamentation, can be run over again. The *Dentalina* is an example of the simply bent row (fig. 119); and in *Marginulina* (fig. 120) we have the rudiment of a tendency to spirality, and which has made still further progress in the examples given of *Vulvulina* (fig. 121), and

Fig. 119. *Dentalina semicostata.*

Fig. 120. *Marginulina Webbiana.*

Fig. 121. *Vulvulina oblonga.*

Rotalina (fig. 122), until an actual nautiloid spiral is perfected in *Robulina*.

And now again set in the currents of modifications of lobation and variations of ornamentation. The spiral may be on a flat plane or a direct vertical plane (fig. 123), or it may be of greater or less rising pitch,

Fig. 122. *Rotalina Canariensis.*

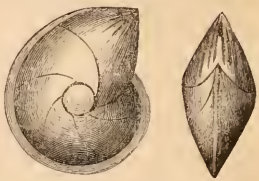


Fig. 123. *Robulina Canariensis.*

or screw-like, or it may be absolutely involute or coil-like, as in *Fusilina* (fig. 124). And the shells formed on each or all these plans may be plain,

Fig. 124. *Fusilina cylindrica.*

Fig. 125. *Robulina Arminensis.*

waved (fig. 125), keeled, spurred (fig. 126), ribbed, barred, indented; may be perforate or imperforate;

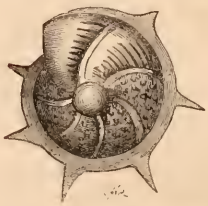


Fig. 126. *Robulina echinata.*

Fig. 127. *Globigerina bulloides.*

may have tubular asperities, or be hirsute; or the lobes, although spirally arranged, may be so far

individually distinct as to amount to little more than a mere congeries of globules.

Another branch of development of form goes off in the direction of a purely circular arrangement, as in the Cyclolinæ (fig. 129), and Nummulites;

Fig. 128. *G. hirsuta.*

Fig. 129. *Cyclolina cretacea.*

whilst the straight line and circular systems are compounded and compromised in such genera as *Frondicularia* (fig. 130), and *Cuneolina* (fig. 131).

Fig. 130.
Frondicularia annularis.

Fig. 131.
Cuneolina pavonia.

There is yet another division of developments as important as those we have been considering, and capable of permitting again all those modifications of lobation and ornamentation we have previously witnessed under novel and different circumstances. This division is that constituted by the compound forms—that is, those in which the development of the lobes takes place upon a plurality of lines. The lobes may be added upon two, three, or more axes, and these axes may be straight, bent, or spiral; and in each of these cases the lobation and ornamentation may repeat the wonderful variety characteristic of the simple classes. In *Biloculina* (fig. 132) we have one lobe

Fig. 132.
Biloculina simplex.

Fig. 133.
Triloculina Austriaca.

Fig. 134.
T. nitida.

merely adherent to the side of another; in *Triloculina*, a third lobe is patched on to the side (figs. 133, 134). In *Spiroloculina* (fig. 135) we have many lobes alternately added; and in *Quinqueloculina*, and others, we have other still more complex arrangements.

Amongst the most abundant genera and species of the compound division are those which make up their lobation on a sort of chrysalis-like plan, such as *Bulimina*, *Chrysalidina*, *Uvigerina* (figs. 136, 137, 138).

Fig. 135.
Spiroloculina canaliculata.

Fig. 136.
Bulimina pupoides.

Fig. 137.
Chrysalidina gradata.

There still remains another group to be noticed—those which, the lobations being more or less erratic, become confluent, as in *Planorbulina larvata*, and ultimately in some cases produce amorphous masses like those of aged specimens of *Planorbulina retinaculata*. Of this nature possibly is the recently discovered very remarkable fossil from the lowest of all known fossiliferous rocks—the *Eozoon Canadense*.

Fig. 138.
Uvigerina pygmæa.

Fig. 139.
Truntulina variabilis.

Amongst the simple single-axis forms, even crops up, as an example of erratic growth, *Truntulina variabilis* (fig. 139).

Such, then, is in the main the groundwork of the classification of the foraminifera—a classification based on the plans of arrangement of the lobes or segmentation of the shell. The animal inhabitants are treated as all alike, mere masses of jelly-like flesh. It is evident that a classification founded entirely on the disposition of the parts of the shell cannot be a perfect one, and that considerable modifications must at the least be engrafted on it as the knowledge of the living structure of the animals and of their modes of generation is acquired. Now it is just this knowledge which is needed, and it is the acquirement of this information that is an open and fame-giving field for microscopists. Almost all that has been done in the way of modifying the primary basis of a purely shell classification has been done by inductive reasoning upon general considerations or microscopic examinations of shell-structure. What is wanted is a regular systematic

investigation of the living forms. The foraminifers should be captured alive, and put into and bred in household vivaria. I see no difficulty in any one doing this who has leisure sufficient. The tanks, if constructed something on the plan of Mr. Ward's ingenious fern-cases, with the addition of a heating or refrigerating chamber for the regulation of the temperature of the water and air, might be made suitable for the condition of any species, tropical or arctic; and indeed as some particular forms are known to exist in great abundance in many of the estuaries of our own coast, it would seem that such species must be sufficiently hardy to withstand any of the ordinary conditions of indoor reservoirs, and certainly any one residing on the borders of such estuarine districts could have ample means for the observation of such foraminifers under their proper natural conditions. The most important points to be settled are: 1. Whether the shell of the foraminifer is formed piecemeal or lobe after lobe; or whether the whole mass of sarcode exists in an unprotected condition, and exhibits segmentation before the formation of the enveloping shell. 2. Whether spontaneous fission does or does not take place. 3. How generation is effected, and whether by one or more than one means. 4. What are the characters of the germs or ova, and what the differences in the young stages between the fry of various species?

The little that is known, added to what we have reason to believe, amounts to this conviction, that the sarcode exudes freely as it increases in mass by nourishment from every pore and orifice of the foraminifer's enveloping case, the whole shell being covered with a film of sarcodous flesh; at a suitable period the exuded sarcode gathers itself up into an additional fleshy lobe, and assumes a characteristic and definite shape. On the obtention of permanency of form, shell-secretion goes rapidly on, and the new animal is encased in a contiguous lobe to the previous shell. This view acquires confirmation from the fact that the older lobes have more layers of shell-matter than the more recent ones. For example, the primary lobe of a four-lobed shell will have four layers, the second three, the third two, and the last one layer of shell-matter shown in its transverse section. Moreover, as a general rule old shells are thicker than merely adult ones, and largeness of individual dimensions and conditions of ample food-supply, and their reverses, induce such modifications of the stoutness of the shell-structure as are in further harmony with this view.

That some foraminifera are viviparous we also know, because the larger chambers of some individuals have been seen full of the shelled young in considerable stages of advance. But how these young are liberated has never been witnessed, so far as I know, by human eyes. Most probably their growth increases until disrupture of the parent shell is effected; but it is on such points that actual observation is so much required. The young forms in a free state are also found commingled in the same samples of sand and mud with the adults of the same species, and we think it may be pretty safely asserted that the second youngest stage of all the compound forms is that of one lobe joined on to the primary animal, and which condition would not occur if the foraminifer were perfected in its mere sarcodous growth, and segmented before the formation of its shell.

Of the special habitats of the various species, much knowledge has been obtained, and although there are some seeming discrepancies in the conflicting statements of naturalists, the reconciliation of many of them is assured. For example, Dr. Wallich views certain forms as inhabiting the depths of the ocean, and says he has netted through seven hundred fathoms of sea-depth from the surface without the capture of a single individual; whilst Major Owen, coming over the same sea, bags in abundance by net-sweeping the surface. It appears, however, when the subject is closely looked into, that the same species abound in the same regions, and that the kinds found living at the top of the sea are also found living at the bottom. Moreover, the Doctor swept in the daytime, and the Major at night. This much is certain, that some forms of foraminifers are not free, but are firmly attached to foreign bodies, and such parasitic forms adherent to otolithes and stones having been dredged up from the greatest depths, are decisive proof of the residence and vitality of those organisms under those abyssmal bathymetrical conditions. As other forms have essentially creeping habits, being found travelling over the stems and leaves of seaweeds—along the tidal and laminarian zones, we may fairly infer that in accordance with their state of development, their attained size, the thickness or thinness of their shells, and the relative energy of their particular vitality, individuals of even the same species may be met with exemplifying all the intermediate conditions between absolute fixity, crawling, and free swimming.

Here we must leave this most interesting subject, with the hope that these few pages will have encouraged higher motives than a desire for the mere possession of so many slides of these exquisite pelagic life-grains, and that future pages of Science-Gossip may show the fruits of good work done. S. J. Mackie, F.G.S.

Suspended Judgment.—A truly wise man is so fully sensible how little he knows, and what things he once was ignorant of which he is now acquainted with, that he is far enough from supposing his own judgment a standard of the reality of things.—*Baker "On the Polype."*

MONMOUTH DEPOSIT.

THE Editor of this journal having received from the Rev. E. C. Bolles, President of the Portland Institute, a quantity of a rich diatomaceous deposit from Monmouth, Maine, U.S., for distribution under the conditions named in the exchange list, I have acceded to his request to furnish an account of the forms which this deposit contains.

It resembles the majority of the American fossil fresh-water deposits, namely, those of New York; Wellington, Connecticut; New Hampshire; Blue Hills, Maine; Cornwallis, Nova Scotia, &c., in being very rich in the genus Pinnularia. It also resembles the Bergmehl found in Lapland, in containing many species of Eunotia.

This deposit is perhaps the most purely diatomaceous of all that I have been fortunate enough to obtain. No action takes place on the addition of acids, showing the absence of any calcareous matter, thus indicating that the water in which the diatoms lived was free from lime. The diatoms are unusually perfect, and the striæ upon the more delicate species are as easily resolved as those upon recent forms.

Fig. 140.

Fig. 141.

The following are some of those which I have found in this material. Pinnularia gigas of Ehrenburgh, and Pinnularia major of Kutzing, the latter figured in Science-Gossip for 1866, and repeated here (fig. 140). These species, together with Pinnularia nobilis and Pinnularia mesogongyla, might with propriety be made one species, as their specific differences are not sufficient to warrant their separation. Ehrenberg gave a figure of Pinnularia gigas in the Mikrogeologie (plate 2, 3, fig. 1).

Pinnularia dactylus of Ehrenberg resembles the above-named in its conspicuous costæ, but differs in the apices being slightly narrower, and the centre not inflated.

Beside these, may be found Pinnularia stauroeniformis of Smith (figs. 141 and 142), Pinnularia divergens of Smith (fig. 143), and Pinnularia acrosphæria of Smith (fig. 144).

Fig. 142.

Fig. 143.

Fig. 144.

The genus Navicula is represented by Navicula Baeillum of Ehrenberg, Navicula dilatata of Ehrenberg, and Navicula amphigomphus of Ehrenberg. The two latter are scarcely sufficiently distinct to warrant their separation. Navicula microstoma and Navicula firma are probably only varieties; the appearance of longitudinal lines near the margin is caused by the curved margin of the valve, as I hope to explain by the aid of figures in a future paper on the forms in this deposit, which contains a very beautiful variety of this species.

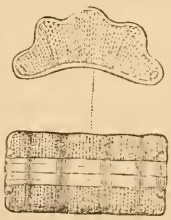


Fig. 145.

Fig. 146.

Navicula Trochus of Ehrenberg was first observed in a fossil deposit from Sweden, and has since been detected in several of the American deposits, and by G. Norman, Esq., of Hull, in a recent gathering from Norway, and by myself in the washings of some moss gathered in Heigham, Norfolk. This, although a small form (the largest specimen I have seen did not exceed ·1400 of an inch in length), is readily detected by its peculiar form. It has a strongly inflated centre, with rostrate and obtuse apices.

The next most conspicuous genus is that of Eunotia, including Eunotia triodon (fig. 145), tetraodon, diadema, octodon, and ennaodon. The crenate Eunotiæ with coarse markings might, as suggested by Mr. Ralfs, be advantageously united into one species, which he proposes to call Eunotia robusta.

Fig. 147.

Fig. 148.

To the foregoing may be added the names of the following, which also occur in the Monmouth deposit: Eunotia Camelus of Ehrenberg, Eunotia octonaria of Ehrenberg, Eunotia hemicyclus of Ehrenberg (fig. 146), Stauroneis Baileyi of Ehrenberg, Stauroneis phœnicenteron of Ehrenberg, which, although figured before in this journal, is repeated here (fig. 147), and Stauroneis gracilis of Ehrenberg (fig. 148).

In a future communication I hope to add a description of the rarer forms which I have detected. By that time, I doubt not, many of the readers of this journal will have become possessed of a portion of the deposit about to be distributed, and thus be enabled to follow with more interest any observations which I may make.

Norwich. F. KITTON.

COFFEE is said to have been first brought to England by Mr. Nathaniel Conopius, a Cretan, who made it his common beverage at Balliol College, at Oxford, in the year 1641; but it must evidently have been a few years prior to this date, as Evelyn says in his Diary, 1637, "There came in my tyme to the Coll. one Nathaniel Conopios out of Greece, from Cyrill the Patriarch of Constantinople, who, returning many years after, was made (as I understand) Bishop of Smyrna; he was the first I ever saw drink coffee, which custom came not into England till 30 years after."—*Phillips' Fruits of Great Britain.*

ZOOLOGY.

CURIOUS SEA ANEMONE.—In the winter of 1865, I found on the sands of Weymouth Bay several Anemones, Anthea Cereus (the lead and vivid green varieties), and Sagartia parasitica on Whelk Shells, cast up by the heavy sea. On taking them home, and putting them into sea water, I found one of the Sagartia parasitica to have *two perfect discs*. It was a very large specimen. The tentacula were white. When raw beef was offered to one set of tentaculæ, the other set showed no sign of closing, or sensation from the presence of meat. Having had much experience in keeping sea monsters of various kinds upwards of nine years, and yet never having met with such a curiosity before, I should esteem it a favour if any gentleman would intimate, through the pages of the Journal, of having met with a similar case in any variety.—*Alfred Hawes, Bath.*

AMPUTATED ANEMONE.—I have often noticed, in books on Aquaria, the assertion that a healthy *Actinia mesembryanthemum*, if cut vertically in two, will form two perfect Anemones; but the following fact will, I think, interest all aquarians. Last year I received a consignment of Anemones from Tenby. A *Sagartia nivea* having been roughly detached from the rock, was suffering from a rupture on one side; it was very bad, and was coated with mucus and white threads. In a day or two the side began to decay, and quite tainted the water of the temporary shallow pan in which I had placed it; during this, the other side of the Anemone was quite healthy, and the tentacles expanded. I thought it was a pity to lose this Anemone, and debated in my mind what amputation would effect; so determining to try the experiment, I took a sharp knife, and cut the anemone in two, cutting off all decayed matter, and put the remainder on a rock in the shady part of a well-established tank. In a day or so, the Anemone assumed the shape of a crescent, and the severed sides, in the course of ten days, joined, forming a circular Anemone, quite perfect, without the slightest trace of a seam. This curiosity fed, throve, lived in my tank for months after.—*Alfred Hawes, Bath.*

A FLEA ENCAMPMENT.—In moving a bed some time ago we came upon an encampment of the enemy. The flea wigwams were scattered over the white surface of a long piece of dimity placed between the bed and the partition of the room. I had often asked what became of fleas in cold weather; and here, in this hamlet of minute huts, the mystery was explained: we saw them in winter quarters; each habitation was a little over one-eighth of an inch long, and the exact shape of a cocoon, attached to the white field of the dimity, apparently after the manner of a chrysalis. While

curiously looking at them, the ensconced fleas proved they were on the alert, for first one and then another of these single tenements opened like a mussel-shell, and away went the startled occupants in quick succession, the whole making their escape in magical celerity. The piece of dimity looked as if it was nibbled. How do the fleas work up these snuggeries—the little abodes with only room for one, and a close fit too? And does each occupier know his own house? I once saw thousands of these insects, bound on some expedition, crossing a road closely adjacent to a beach, skipping, jumping, and scrambling, in such close order that the space of road, about a yard in diameter, was darkened by their migration, their direction being inland.—*W. B.*

A Canary's Antipathy.—It may interest some of your readers to note the extraordinary antipathy for certain colours of a pet canary-bird of ours. Any shade of violet or blue appears to drive him nearly mad. He not only flutters, but *beats* himself against the cage wires or the bottom of the cage, and I really believe would kill himself if the objectionable colour was not removed. The least bit of either of these colours is detected by him in a moment. One day, while my wife was feeding her pets, the cook came to speak to her, and had some ribbon of a violet shade to her cap. Poor little Dickey was off in a moment, violently beating and fluttering till the cap-strings disappeared. We have tried him with almost every other colour, and he takes no notice. I may add that he was brought up by hand, and is so tame that he is constantly hopping about us as we get up in the morning; any stranger can take him on their finger. In a moment, however, at sight of a dress or ribbon of the colours named he immediately commences trying to knock his brains out, or to do himself some other "grievous bodily harm." Can any one account for the strange fear of these particular colours?—*J. N. W.*

A "New River" Horse.—At the brickfields close to the Finchley-road, where the Midland Extension Railway crosses, are some very simple siphons for supplying the works with water. They are merely bent pipes, with a lever tap inserted below the bend. One of these is close to a field fence. My daughter, who pays considerable attention to animals, saw a common cart-horse walk up to the spot, put his head over the fence, and, with his teeth, turn the lever tap full on. He then craned his neck further over, so as to get his mouth below the stream, and caught the water as it fell. A gentleman standing near saw the ingenious creature refreshing himself, and to try whether it were accident or design, drove him away and turned off the tap. On his retreating, the horse renewed the experiment, and obtained a fresh supply. And it is worth note that to do this the animal had *to push the tap from him* a quarter of a circle, the mouth of the spout being turned away from the fence. We have all seen the elephant at the Zoological Gardens fill his pail at the driver's bidding, but I conceive this is rather a new branch of industry for horses. No doubt they make progress in the useful arts as well as their masters. But though my Welsh pony used to open gates for me, by lifting the wooden latch with his nose and then thrusting with his shoulder, I could never get him to turn round and close the gate for me. Nor in this experiment did the horse turn off the tap when he had drank enough. I believe his masters sometimes exhibit a like forgetfulness at the neighbouring tavern, so both horses and men have something to learn. As an instance of observation, reflection, and experiment, followed by deduction, I think the action of our four-footed philosopher worth notice.—*J. W. Salter.*

Lepidoptera wanted.—For many years I have paid a sort of desultory attention to subjects connected with those branches of natural history, the study of which it is the special business of your excellent little work to promote, and the attention has been only desultory because my every-day avocations have rendered a close study impossible. I should, however, much like to exchange specimens with any one who would like to open a correspondence with me for that purpose, premising that I am more likely to possess spare specimens of the Lepidoptera than those of other orders. If it be not too late, I should be obliged to any one who would send me a few eggs of any new silk moth, particularly those of the Ailanthus (Bombyx Cynthia). We have here, somewhat common, a moth which seems very closely allied to the above, judging from drawings I have seen of the Ailanthus, and which feeds on the apple and pear trees, but I should like to rear a few of the Ailanthus for the purpose of making a comparison. I hope the person favouring me with any eggs will accompany them with such instructions as may be necessary to the proper treatment of the caterpillar. Please make such use of this note as may most efficiently conduce to bringing about the object to be attained.—*W. V. Andrews, Post Office, Box 2905, New York City, U.S.*

Cheating a Spider.—Professor Rennie writes: "We have tried numerous experiments by moving and vibrating the lines of many species, so as to imitate as nearly as possible the entrapment of a fly; but in no case have we succeeded in bringing the spider to the spot, because, as we inferred, her eyes always detected our attempted deception." We once were so clever as to cheat a spider. Gently shaking a very small hook, called the midge-fly, in the lowest line of her web, our barometrical friend —whose pre-sensation gave warning of wet—was

fairly taken in: rushing on the hook, and grasping it, great was her astonishment. Finding that she should not believe her eyes, she precipitately fled; and no subsequent temptation, though renewed weeks afterwards, enabled us again to boast that we excelled Professor Rennie in angling for spiders. —*Contributions to Natural History by a Rural D.D.*

Catching a Diver.—On the 8th of April last, a Speckled Diver (I believe it to be a young *Colymbus septentrionalis*) was caught in Bridlington Bay, on a line shot for cod and haddock, at a depth of four or five fathoms. It had not swallowed the hook, but was caught by a bight (or a twist) of the snood. I forward this note to show at what distance these birds dive in search of food, in case it may interest any of your ornithological readers.—*H. H. Knocker.*

House-dogs.—Several articles on rural natural history having appeared lately, it may perhaps more amuse than instruct some of your juvenile readers to be informed that within a month or two a lady friend residing in Corfu asked a countryman to procure a small dog for the children. This he did, but the animal's ears were cropped close off, and on being asked why, he replied that it was to make it a *good* house-dog. The lady, astonished, wished to be informed in what manner such effect was produced, when the peasant said, "It is a *known* fact that if a puppy's ears are cut off, then cut up and mixed with oil, and made to eat it, that it makes them the best house-dogs." I leave your readers to judge of the merits of the case, and mention it simply to show superstition in the nineteenth century.—*H. H. Knocker.*

Striped Hawk Moth.—I see by "the books" that the Striped Hawk Moth (*Deilephila Livornica*) is so great a rarity that is has been a question whether it is really a native of these islands. On the 8th of May I was fortunate enough to capture an undoubtedly genuine and beautiful specimen of this moth in a garden in Ennis. It was resting on a piece of lily of the valley when I found it, in the middle of the day. Thinking it likely there might be more "where it came from," I have searched diligently all round, and burned decoy-lamps at night; but have failed to find any more.—*S. Leslie Brakey, Ennis.*

A Baseless Sea Anemone.—In cleaning out one of my tanks, I accidentally tore in two a fine specimen of *Sagartia sphyrodeta*, leaving the base on the slate of the tank; the Anemone was rather out of sorts, having no base, and his inside tumbling out. I put it in a spare tank, and in a few weeks the rupture healed, with a puckered appearance. The Anemone has no sticking base, and keeps its mooring by attaching the warts of its body to large pebbles.—*Alfred Hawes.*

BOTANY.

May Mushrooms.—Will Professor Buckman allow me to correct a slight inaccuracy in his article on "May Mushrooms," in last number of Science-Gossip? The agaric to which he refers is not *A. prunulus*, which is an autumn species, but *A. gambosus*, which belongs to the sub-genus "Tricholoma," and is one of the white-spored Agarics. *A. prunulus* is one of the "Hyporhodii," or those Agarics in which the spores are pale-rose, or salmon-coloured, and belongs to the sub-genus "Clitopilus." No doubt Professor Buckman's mistake arises from a perusal of Dr. Badham's "Esculent Fungi of Great Britain," in which *A. gambosus* is called *A. prunulus*, and the latter species is described under the name of *A. Orcella*. The true *A. Orcella* has not, as far as I am aware, been found in this country; but *A. prunulus* is not uncommon in grassy woods, in the months of August and September, and is also a very good fungus for the table. Its gills are at first quite white, but afterwards become decidedly rose-coloured.—*Archd. Jerdon.*

Than-hmo.—Your correspondent "W. T. H." (whom I regret to say I cannot bring to my recollection by the slender aid of initials), has referred to me (Science-Gossip, November, 1866) as a likely person to give you information on the subject of our native anthelmintic, the fungus called by the Burmese *Thau-gya-hmo* or *Wa-hmo, i.e.*, Worm-passing-fungus, or Bamboo-fungus. I am sorry to say I have nothing to add to what appears to be already known of this plant. In the *Gardeners' Chronicle* for August 11, 1866, it is described by the Rev. M. J. Berkeley, our highest authority in mycology, under the name of *Polyporus anthelminticus*, and some account of it is also given. Its virtue as a vermifuge appears to be thought great by the Burmese. But (as the article in the *Gardeners' Chronicle* says) since we possess so excellent a remedy in *Santonine* (which has found its way out here, and is eagerly sought after by the natives as soon as they become acquainted with it), there is no advantage in introducing what in all likelihood is, at least, an *inferior* remedy. I believe it is tolerably abundant in the rainy season, though, I am told, only on one kind of bamboo. The Burmese have a superstition that if one who has taken this medicine touch iron, its effect will be neutralized. — *C. S. P. Parish, Moulmein.*

The Primrose.—In answer to "B.'s" inquiry as to the varieties of Primula in which the calyx is so strangely altered, I do not remember to have seen any other than the three kinds mentioned by him, but I *think* I have seen the one in which the calyx is partly green and partly red, varying to green and white. This particular variety (with the red

and green calyx), is a great favourite in our cottage gardens, and goes by the name of "King Charles in the Oak." It is a very showy plant. With respect to the form of primula intermediate between the primrose and the cowslip, when first I began botanizing, I, of course, labelled it "Primula elatior," but I learned after awhile that it was not the true oxlip (which plant, however, I have never had the good fortune to see), and for a long time I have looked upon the cowslip (Primula veris), the primrose (P. vulgaris), and the spurious oxlip (P. intermedia, if I may so call it), as varieties of one species, but I feel quite convinced now that what I venture to name *intermedia* is a true hybrid between the other two species. My reasons for arriving at this conclusion are that I have found it in every imaginable stage of development between the cowslip and the primrose. Amongst cowslips, which, however, are not very common with us, I have sometimes found individual plants having the flowers cup-shaped like a cowslip, deep yellow, with an orange centre; cowslip-scented, sometimes drooping, but *sometimes erect*, and considerably larger than ordinary cowslip flowers. These, certainly, may be a development of the cowslip, and not hybrids at all; but then the development goes on, and I find oxlips with the flowers still deep-yellow in colour, but flat like a primrose (sometimes slightly cupped), and almost as large as a shilling. And, again, I find oxlips having the flowers quite like a primrose in colour, shape, and size; but a specimen of this kind now before me has the *unmistakable cowslip odour* very strongly, while a yellow one, also before me, has very little perfume at all, and what it has is more like primrose than cowslip. I have no particular notes on the subject, but I am under the impression that I have frequently seen oxlips amongst cowslips where the latter were plentiful, and I fancy that Professor Buckman will remember and corroborate the fact that we found oxlips amongst cowslips in a small wood at Ewen, near Cirencester, many years ago, and that there were sometimes on the *same root* oxlips and cowslips, sometimes oxlips and primroses, but not primroses and cowslips. I take it that the hybrid will most resemble the cowslip when a cowslip has produced the seed, and that such a plant will occasionally send up umbels of both oxlips and cowslips, but that the hybrid will be most like a primrose when the primrose has been the female parent, and that it will then have a tendency to send up umbels of oxlip and single-flowered scapes from the same root. What I have written does not *prove* anything, but the subject seems worthy of investigation, and I hope during the next few days to *begin* some experiments by impregnating cowslips with primrose pollen, and primroses with cowslip pollen, and saving the seed, and if others would do the same, when opportunity occurs (it will be too late this year when this is read), I fancy we should arrive at some valuable and certainly interesting results.—*Robert Holland.*

The Oxlip.—The view entertained by your correspondent "B." in reference to the consanguinity of this plant with the primrose, rather than with the cowslip, requires confirmation, and his observation of the facts on which that view is based assuredly does not agree with my own. In this district of East Sussex, where the soil is cloggy, the primrose flourishes most luxuriantly, but I have never once met with the oxlip here, nor even the cowslip; and I have heard aged labourers say they have never seen the oxlip growing here, but it is common enough on the calcareous soil of the South Downs. In Dorsetshire the cowslip is very abundant, and I have often found the oxlip growing with them. The primrose does not grow so luxuriantly there as it does in this soil. Some years ago I sowed some garden polyanthus seed which produced cowslips, oxlips, and polyanthuses, but no primroses.—*S.*

Rust and Smut in India.—At our request, Dr. Stewart, Officiating Conservator of Forests at Lahore, has just forwarded to us specimens of rust and smut on Indian Graminaceæ. These include the common smut (*Ustilago segetum*) upon *Cymbopogon Iwarancusa*, upon wheat, and upon a species of *Saccharum* and of *Eragrostis*, in the latter mixed with a kind of *Macrosporium*, with a singularly hard compact form on barley from the Jhelum district; also the glume rust, *Trichobasis glumarum*, on wheat. Together with these was a species of *Tulostoma* from Montgomery District. It is allied to *Tulostoma mammosum*, but appears to differ in the depression around the stipe at its junction with the globose head, at which point the head easily separates from the stem. Undoubtedly the common red rust and the corn mildew occur on grain in Northern India, but of this we have at present no evidence. We wish that some of our Indian correspondents would send us the ergot on rice which is said to occur in Bengal.

Winged Seeds.—In the seed of *Lophospermum erubescens*, in which the thin membranous wing surrounds the entire circumference of the seed, the cells, with their spiral fibres, are well shown. The most remarkable specimen of wing, however, and one in which this tissue is largely developed, occurs in a plant from the East Indies (*Calosanthes Indica*), the wing being more than an inch in length on each side of the seed.—*Quekett's "Lectures on Histology."*

Bitter-vetch Cluster Cups (*Æcidium Orobi*, D. C.).—A correspondent has sent us this rare parasite from Sheffield.

GEOLOGY.

Toome Bridge Earth and Flint Flakes.—Toome Bridge is a small village on a branch of the Northern Counties Railway, between Randalstown and Castle Dawson—about five miles from Randalstown, and three from Castle Dawson. It is situated in the county Antrim, but is close to the boundary of the county Londonderry. The bridge from which the locality takes its name was a curious old nine-arch structure that formerly crossed the river Bann, which at this spot divides the counties. The bridge was removed some time ago, and the County Road deviated; and now the County Road crosses the river by an iron bridge at a short distance from the site of the former old stone bridge. The river thus crossed is called the Lower Bann, to distinguish it from the Upper Bann, which, after rising in the Mourne Mountain of the county Down, falls into Lough Neagh at its south end, near the town of Lurgan. The Lower Bann leaves the Lough again at Toome Bridge, and falls into the sea a little to the north of Coleraine. Some fifteen years ago extensive works were carried on at Toome with the view of improving the navigation of the Lower Bann. During the progress of those works, a large number of stone and bronze implements were found, the majority of which are now in the Museum of the Royal Irish Academy, in Dublin. At this time also a bed of earth was cut into, which is now known as Toome Bridge earth, and mounted specimens of it are to be found in the cabinets of most microscopists, few of whom know anything of its whereabouts. The land at both sides of the river, particularly at the western side, is very low for hundreds of acres, and doubtless at one time was covered by the water of Lough Neagh; indeed, previous to the alteration of the bed of the river, the adjoining lands, and even the County Road, used to be frequently submerged during winter. From indications given in several directions, it is probable that the diatomaceous earth occurs over the whole of the extensive flat country, and when it has been cut through it shows a thickness of from three to five feet. All the hedgerows along the roads, and dividing the fields, are built of it; and even bricks have been manufactured from it, and it is so often turned up in the fields that the farmers returning from their work look as white all over as if they had been working in lime all day. An excellent section is exposed all along the river banks. This white earth is well marked, and it seems to rest upon a sunken peat moss. At low water during the summer the peat is exposed, and trunks of trees project from the peat up into the diatomaceous earth, so that the earth itself is newer than the peat. The latter forms in some places the bed of the river. A second iron bridge carries the railway across the river between the above County Road bridge and the Lough, and the peat forms the bed of the river between the railway bridge and the Lough. On this peat there occurs a bed of gravel, and in this gravel there are vast quantities of flint flakes similar to those found in the valley of the Somme, and the ossiferous caverns of England and the Continent. The boys in the locality wade out into the water in the summer, and collect the flakes, many of them very well formed, although *mere flakes*, there being no chippings upon them. With these flakes, however, there are some arrow-heads and stone celts found, and in some of the adjoining bogs inland flakes, arrow-heads, and celts have been found, similar in every respect to those found in the bed of the Bann.—*W. Gray.*

The Petrified Forest.—This celebrated forest, or rather plain of prostrate trees, is about an hour's ride from Cairo. The fragments are scattered about in all directions as far as the eye can reach; the hills all round and the valleys of the desert are strewed with them. There you see branches in one place, trunks in another, roots in another. Some of the pieces are split up, as if they had cracked from age or the heat of the sun. Many of the pieces are evidently of the palm tree. All the fragments are as hard as the hardest flint. Petrifactions of this kind are found in other parts of Egypt, but not to the same extent. Many speculations and suggestions have been offered as to the cause of these petrifactions, but it is beyond doubt that the trees were at one time under water. It cannot now be known whether they grew where they lie or whether they were brought there by a flood (or rather *the* flood) from a distance. The place, though now a howling wilderness, might have been in the earlier ages of the world a land of great and luxuriant vegetation. There is no doubt, however, that these trees date from the time of the deluge. They may indeed have been uprooted in some distant land, brought by the advancing flood, and deposited where they now lie. Many of these trees measure from 40 to 60 feet in length, and several are above 3 feet in diameter. The small fragments may be counted by millions, and thousands lie buried under the sand. They are capable of a high polish, and might be used as ornaments of various kinds.—*E. St. John Fairman.*

Rocks of the Aqueous Deposit behind the Citadel, Cairo.—Immediately behind the citadel at Cairo there is a small range of mountains called the Mokattam mountains, which is almost entirely composed of shells, roots of various vegetable substances, and small branches and roots of trees, all petrified and forming a solid rock. Besides these, sharks' teeth and crabs have been found in these mountains. There is no doubt that these rocks have been deposited by water, and, taking into consideration the evidence of other phenomena equally

strange to be met with in various parts of Lower Egypt—as, for instance, the existence of sea-water shells in different portions of the desert, and above all the petrified desert—it is evident that the whole of this part of the country was at one time covered by the sea. The Mokattam mountains are of a light yellow colour; the summits are quite free of any sort of vegetation, and various parts are covered with loose blocks of stones of the calcium species. There is in these mountains a very remarkable rock of a reddish colour, called by the Arabs *Ghebel Achmar*, which means literally *red mountain*. It is of a very soft nature, and closely resembles red ochre. In this range there are also immense caves, in each of which a regiment of soldiers might easily be quartered. The whole of Upper Egypt might be said to be a vast mass of granite, but Lower Egypt, at all events the Delta, having been probably formed by the clay and sand brought down by the Nile, shows no visible traces of this rock. The centre of the earth is a vast crucible in which materials of which we have no precise knowledge are fused or melted together, and then forced up to the surface, either by the intense heat or by a sort of centrifugal force. The composition called granite is formed and forced upwards in this manner, and as it cools and hardens bursts its way through the softer strata until it appears above the surface, assuming in many places the forms of stupendous mountains. Sometimes the force is only sufficient to raise the strata above to a certain height, while the granite itself remains concealed underneath. This may account for aqueous deposits being found in the shape of mountains, as in the instance of the Mokattam mountains in question. They once probably formed the bed of the ocean, and in the course of ages were raised to their present height by the upheaving of igneous rocks from below.—*E. St. John Fairman.*

Age of Niagara.—Many eminent geologists affirm that the eroding power of the swift rolling waters of the Columbia, Potomac, and Missouri could not, on an average, effect the stupendous erosions alluded to in less than 40,000 years; and Sir Charles Lyell asserts, after personal study, and close searching and accurate observation of the nature and properties of the Silurian rocks of the Niagara bed, and of the average annual rate of the erosion at present, that the strength of the eroding power, great though it be, could not possibly have effected the retreat of the cataract to its modern site in less than 35,000 years.—*The Twin Records of Creation.*

Fossil Dormouse.—At the meeting of the Zoological Society of London, 9th May, Dr. A. Leith Adams read a communication respecting a new fossil Dormouse from the quarternary formations of Malta, proposed to be called *Myoxus melitensis.*

MICROSCOPY.

Feathers for Mounting.—The feathers from the drake's head form a very interesting object under the microscope. Under a power of 80 diameters they appear to be divided into rectangular cells. Their colour, when viewed opaque, is beautiful. Can any one tell me if there is mention of them in any work on the microscope? The cells are best shown when mounted in balsam.—*A. W. Cooper.*

Centering Objects.—As hardly any hint in microscopic manipulation is too trifling to be of use, at least to beginners, I venture to send the following device, which I have used for some years, as from the *excentric* position which objects sometimes occupy on the slide it is evident that some mounters trust (vain confidence!) to the eye alone. Cut a piece of card the exact size of a slide, draw two lines diagonally from corner to corner, the point of intersection will show the centre, where a small hole should be punched or cut out. To use the contrivance, place it carefully on a slide, and with a pen put a dot of ink on the glass through the hole; the object is of course to be mounted on the other side of the slide, and the ink-spot is easily scraped off afterwards. The dot on the glass is preferable to any loose mark placed underneath while mounting, as it cannot possibly shift its position.—*George Guyon.*

Mounting Objects.—As I continually see in Science-Gossip discussions on the relative merits of various fluids for mounting microscopic objects, I would say a word on behalf of a very simple one, viz., distilled water. I have now lying before me on my table two specimens which were among my earliest attempts at mounting, and which were mounted at least eighteen years ago. Out of these eighteen years they have passed more than fourteen with me in the tropics, and yet they are as green and as fresh, and as perfect for microscopic examination as they were on the day they were mounted. The objects are *Nostoc vulgare* and *Jungermannia tomentella*. They are both mounted on slips of glass of the usual size, viz., 3 inches by 1. In one case the cell in which the object lies was built up of red sealing-wax dissolved in spirits of wine, and the thin glass cover cemented with the same. As the sealing-wax was laid on in a broad band (nearly three-tenths of an inch) no air at all has got in, and the specimen is in every respect as perfect as it was eighteen years ago. This is the more surprising as sticks of the very same sealing-wax brought out to this country, and laid in a drawer, in consequence of the heat, soon ran together, and flowed out into a flat circular cake. The effect of dissolving it in spirits of wine seems to have been to enable the wax

to preserve its hardness and brittleness, for that on the specimen in question is extremely hard, and as sharp at the edges as at first. In the other case the object was mounted in a cell ground out of the glass, and the thin glass cover cemented with black asphalte cement, which also has stood remarkably well, though, as it was laid on in a very narrow band, a large globule of air has got in, which spoils the *appearance* of the slide as a mounted specimen, but has not affected the object in the least degree. Distilled water, having thus stood the test of eighteen years, is, I think, shown to be a suitable fluid for, at least, vegetable tissues.

While on the subject of fluids and cements, I may take the opportunity of stating that marine glue (which answers so admirably for fastening glass rings to slides) when kept in the lump, loses its properties after two or three years in a hot country. When strips of it are laid on a slide and held over a spirit lamp, or if a piece of it be held in the flame, instead of melting, it burns and smoulders away into a dry ash, and is therefore useless. It is the same, also, with ordinary English sealing-wax, so that it is impossible to seal a letter with it.—*C. S. P. P., Moulmein.*

Fatty Acids.—E. Histed speaks of spermaceti as a good polariscopic object: I, to the same effect, recommend the fatty acids, either by E. H.'s process or otherwise in the ordinary way.—*S. D.*

Movements of Diatoms.—Science-Gossip is, I apprehend, a publication in which I may quietly buttonhole your own proper person, and relate what I have seen recently in our instrument of instruments, the microscope. Now, although I possess a few books relating more or less to all subjects which come under the said instrument's glass eyes, I am not aware of any which clear up the question of "How do the naviculæ force their way through the water?" Neither do I for one moment suppose that a humble individual like myself is going at once to solve it. I shall, however, relate (if you will kindly lend your ear) what I have lately seen. After a trip last Saturday, May 11th, to Swanscombe, which somehow or other is not now what Swanscombe was formerly (speaking from a microscopic point of view), I found that I had got *Surirella*, P. angulata, Nitzschia, R. elongata, P. fasciola, P. quadrata, Amphiplura, &c., &c., not to mention any quantity of ciliated and non-ciliated animalcules. With regard to the means of viewing them, I considered my Ross *compressorium* the best, and consequently transferred from my soup-plate (into which all the gatherings had been as usual turned) a drop from the surface. For the first time in my life I found a *quadratum* on edge—not having, as in ninety-nine cases out of a hundred, screwed down the top glass until all underneath *must* be flat—which gave it a curious appearance. In the ordinary mode of seeing these minute objects, there appears when alive, as every one has seen, a central spot, and a minute ring at either extremity. Our friend viewed sideways, gave me apparently the idea that the two rings might be the orifices of two tubes, and it struck me that the Ruthven propeller, in which water is sucked in at one end of the vessel and ejected at the other, might really be the principle upon which our Pleurosigma get along. If this is anything very old, let your humble servant down as lightly as possible. I mention it purely as gossip. I saw no motion, but I think my specimen was defunct. Does the central ring exercise any influence upon the two tubes in contracting and expelling the fluid, or otherwise? The powers used were a good $\frac{1}{4}$ and $\frac{1}{6}$. The $\frac{1}{8}$ would not go through the thickness of glass and water necessary to keep the object in position. I bring this forward simply because it is likely some of your readers may have seen the same sort of thing, and at the same time, with that feeling of diffidence that makes those who work long at the microscope not always to believe their own eyes.—*John Boeketl.*

Glenshira Sand.—In answer to J. W. W.'s inquiry respecting the method employed by the late Dr. Gregory with Glenshira sand, I have pleasure in informing him that, in a letter written by the Professor to an acquaintance of mine, he directed him to have four or six glasses, each about twelve inches high; into the first, nearly filled with water, to pour some of the sand, and to allow it one minute to settle, the fluid to be then carefully poured into the second glass, and two minutes to be allowed previous to the fluid being decanted from the deposit into the third glass, and here four or five minutes were to be allowed; the process to be thus repeated, doubling the time for the sediment to settle in each glass; the deposit will consist almost entirely of sand in the first glass, in the next of sand and the larger diatoms, the finest kinds being found in the last glasses.

If J. W. W. is desirous of exchanging Glenshira sand for other diatomaceous material, the writer will be glad to hear from him.—*Joseph B. Bodman, Castor, Peterborough.*

Mounting Diatoms.—How must I proceed in order to make diatoms stick on the slides after they are arranged? I have succeeded in arranging small groups, but all trials to make them stick have been in vain; the diatoms float away as soon as the balsam is put on them, and yet it is possible to fix them, as is proved by the beautiful preparations which are sold in England.—*E. W. Schoenebeck, Prussia.*

NOTES AND QUERIES.

Aquarium Pest.—I last year collected from my aquarium several pieces of the *Valisneria spiralis*, on which were deposited the ova of the *Planorbis corneus*, and put them in a small glass jar containing water, which I placed in a window with a south aspect, and let it remain there several weeks, when on examining its contents I found upwards of one hundred minute molluscs, some of which I now have in an aquarium; they vary in size from three-sixteenths to seven-sixteenths of an inch in diameter. If your correspondent L. H. F. will adopt the same course, and keep the jar where the sun can act upon it, I have no doubt he will be satisfied that the "nests" he names are the eggs of the snail, and that "something will come from them."—*H. M., Sheffield.*

Eggs of the Lackey Moth.—Mr. H. H. O'Farrell inquires if any of the readers of Science-Gossip have met with the eggs of the Lackey Moth laid in a patch, and not a ring. I believe it is a *very* common occurrence, as I myself have frequently found them so.—*E. F.*

Skeleton Leaves.—Your correspondent J. S. S. will have no difficulty with her skeleton leaves if she removes them from the water on *blotting* paper, and she may detach them from *it* with dry blotting paper and a careful use of her fingers. The same paper may be dried and used several times.—*A. S.*

Primroses.—In Science-Gossip for May 1st, your correspondent B. mentions having found Oxlips amongst Primroses, but never among Cowslips; it may therefore be interesting to state that here, on the Mendip Hills, in fields which are almost covered with Cowslips, we frequently find very fine specimens of the *Primula elatior* growing amongst them.—*J.*

[Is our correspondent certain of its being *Primula elatior?*—Ed.]

Impressions of Leaves.—Could you inform me what is the best method of obtaining *exact* natural-printed copies of the leaves and impressions of leaves found in the Lower Bagshot pipe-clays? I have a great many obtained from the Lower Bagshot beds about here—*R. C. C. L.*

Mice and Cockroaches (p. 119).—It is very likely that the common mouse will feed on cockroaches: that they do feed on insects, we had positive proof down here. In the roof of this house—*i. e.*, between the ceiling of the upper rooms and the slates—we have small apertures in the gable for ventilation, which are filled up with perforated zinc, and the larger flies all draw towards these apertures, especially on a sunshiny evening; but they cannot get out through the perforated zinc, and I was at first somewhat surprised to see mice running up the zinc and catching these flies in vast numbers. I find they eat all but the wings, which they manage to clip off as clean as if cut with a pair of scissors; but mice and rats are nearly omnivorous, according to circumstances.—*W. P.*

Leg Legends.—Is it a recognized fact amongst naturalists that thrushes acquire new legs, and cast the old ones when about ten years old? A great many persons in this neighbourhood give what appear well-authenticated instances of this: one of a thrush belonging to a clergyman at Stanwix, near Carlisle, which was visited and examined by many when the change was going on; another near Whitehaven, &c. The matter has been brought under my notice now on looking through the library of a deceased friend of mine who was a very close observer of nature. At the end of "Swainson's Birds" he has made the note, "A thrush kept in a cage at Lyneside (Kirklinton), said to be about ten years of age, has recently acquired a new pair of legs, the old ones drying up and dropping off. The first time I saw the bird, the new feet were protruding from the front of the knee joint, and looked soft and light-coloured. On my second visit they had lengthened considerably, but were not of any use to the bird. Afterwards I saw it when the new feet were used, and the old ones shrivelling up, soon after which the old feet dropped off." I have heard him speak of the circumstance, and express regret that he had not secured the cast-off legs as an evidence for unbelievers.—*Wm. Dodgson.*

[We suspect that the unbelievers are legion.—Ed.]

Aquaria.—All who are in contemplation of stocking fresh-water aquaria during the ensuing summer months, will do well if they introduce a greater number of plants of a floating nature than of those which require to be set in soil, as the fish will then have greater scope and room; whilst oxygen, which is essential to their preservation, will still be supplied in sufficient quantity. The thick foliage of many subaquatic plants is calculated to considerably retard the free movements of the fish, especially when the aquarium in which they are kept is small. Of course under-water vegetation should not be entirely discarded, for if sparingly introduced it affords a grateful shelter to newts and some species of fish which are fond of seclusion. As a rule, it is advisable to have plenty of space, in order that the living objects can be more easily observed. It is by no means advantageous, for the same reason, to have too great a display of rockwork, and in fact there ought to be hardly any, unless the aquarium is of large dimension.—*J. H. F., Harleston.*

Perforating Squirrels.—In the very interesting and able article on the flint-flakes of Devon, &c., by Mr. Tate, in the April number of the *Popular Science Review*, there is, I think, a slight error in regard to the habits of the Squirrel. At p. 173, it is stated that "*perforation in the nuts demonstrates that Squirrels skipped among the branches of the trees that grew there.*" Now, whilst I have no doubt that Squirrels *did* skip among the branches at the time referred to, I do not think that they made the *perforations* found in the nuts, but that these were the work of the common *Dormouse.* I have kept both Squirrels and Dormice, and so far as my observation goes the latter always nibble a nearly circular hole in the nut, whilst the former, having first rapidly cut an irregular opening, insert the lower incisors into it, and break off one side of the shell before beginning to eat the kernel. This may be thought a trifling matter, but in natural history, as in all other departments of science, we cannot be too exact in relation to the facts on which we base the reasonings by which we advance into new fields of knowledge. I have hence deemed it well to call the attention of your readers to this point; and possibly others, with wider opportunities than I possess, may show that *Squirrels* do leave *perforations* in nuts.—*Fras. Buckell, M.R.C.S.*

Dust on Aquaria.—Would it not be better to prevent the dust getting into an aquarium than adopting any of the ingenious (?) plans which some of your correspondents have suggested to get rid of it after it has got there? The way I do it is by keeping one, two, or more pieces of glass (according to the size of the vessel) on the top of the tank, which not only effectually keep out dust, but also prevent any loss of water by evaporation, and the escape of any of the live-stock.—*Geo. Abbott.*

Double Oranges.—Oranges such as are mentioned by your correspondent H. H. (p. 118) are not of unfrequent occurrence, and originate in all probability from the formation of a second row of carnels within and above the first. In those instances where the latter do not completely close over the supernumerary organs, but leave them more or less exposed, the nature of the case is obvious. H. H. will find references to similar fruits in "Trans. Linn. Soc.," vol. xxiii. p. 366, and specially in a paper of M. Clos in the fifth series of the "Annales des Sciences Naturelles," t. iii., p. 312.—*M. T. M.*

Book Wanted.—I should be very glad if any reader of Science-Gossip could inform me where I could meet with a copy of Witham's "On the Internal Structure of Fossil Vegetables of the Carboniferous and Oolitic Periods." I believe the work is out of print, but some of the readers of the Gossip may know of a second-hand copy.—*John Butterworth.*

Gnat Bites.—As there is the probability of a large supply of gnats this summer, can you or any of your readers furnish a remedy for their very troublesome, and to me very painful bites?—*D. G.*

Faro apophyllite.—Your correspondent A. S. (in Science-Gossip of May, 1867,) will perhaps find the following information sufficient. The mineral known as Apophyllite ichthyophthalmite albine belongs to the zoolitic series, but differs from other zoolites in its chemical constitution, the silicate of lime taking the place of the silicate of alumina. It consists chemically of a double silicate of potash, with eight equivalents of silicate of lime, and sixteen equivalents of water. Its specific gravity is 2·3 to 2·46; the degree of hardness, 4·5 to 5 (the diamond being 10). Acids easily decompose it, and it fuses readily with the blowpipe, colouring the flame a yellow-red, and gives off water. It crystallizes in right square prisms, generally with truncation of the angles, or quadrate pyramids, and more rarely in quadrate tables with truncate angles or foliated masses. In colour it varies from a vitreous transparency to rose-red and brown. Apophyllite is found at Andreasberg, in the Harz Mountains, of a rose colour; in the Faröe Isles colourless. The tabular form, or ichthyophthalmite (fishes'-eyes stone) is found in the Fassathal, South Tyrol. A variety of Apophyllite called tesselite or tesselated Apophyllite, when cut in thin plates transversely to the axis, appears when polarized to consist of nine crystals, contained within a number of parallel veins or plates. The central crystal has only one axis, and no double refraction, the other two. (See "Pereira on Polarized Light.")—*F. Kitton, Norwich.*

The Value of Scientific Knowledge.—The late Edward Forbes was in the habit of relating an excellent anecdote illustrating the practical advantages which the public sometimes derive from the delivery of public lectures on natural history. In one of his popular discourses on jelly-fishes, delivered in a small town in Scotland, he had been demonstrating to the audience how very few grains of solid matter a cartload of medusæ would contain, and how useless it would be to distribute these animals over the land as manure. At the close of the discourse, a canny farmer stepped up to the platform and tendered his thanks for the hint, for at considerable expense he had been in the constant habit of collecting and distributing myriads of these creatures, under the impression that his crops would be improved by their presence.—*Dr. Cobbold's "New Entozoic Malady."*

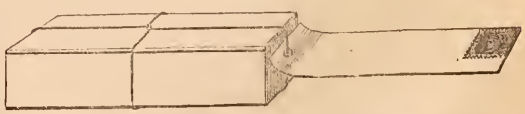
Exchange of Slides.—The Quekett Microscopical Club has just issued the following rules for the exchange of slides:—

I. That all slides be deposited with the Exchange Committee.
II. That the slides be classified by the Committee into sections, numbered according to quality. The first section to be a special class for rare specimens, the value of which will be determined by the Exchange Committee.
III. Members to select from the class in which their slides are placed, after the ordinary meetings of the club.
IV. Members may leave the selection to the Exchange Committee, if they prefer it.
V. Slides once exchanged cannot be exchanged again.
VI. A register shall be kept in which the slides deposited shall be entered and numbered, with the date of receipt, and in which exchanges shall also be noted.
VII. All expenses incurred in the transmission of slides, or in correspondence respecting them, to be borne by the member on whose account such charges may be incurred.

Parcels to be addressed—

Mr. W. M. Bywater,
192, Piccadilly,
London, W.
[Exchange.]

Note.—As much inconvenience frequently arises from the breakage of slides in transmission through the post, the following method is recommended:—Pack the slides in a small wooden box, which can be obtained of any optician, tie it securely with string, and attach a slip of parchment to one end, sufficiently large to receive the postage stamps, address, and local Post-office stamps during transmission. If paper be used as a wrapper to the box, the colour should be *black*. When twelve or more slides are sent, they should be packed in a racked box, and forwarded by railway carriage prepaid.



Black Surface.—What is the nature of the solution ordinarily in use by opticians to give a *dead* black surface? Lamp-black mixed with shellac dissolved in alcohol would give a *glossy* black.

The American Naturalist.—The Essex Institute (Salem, Mass., U.S.), the Microscopical section of which is one of the most vigorous and healthy in the United States, has just commenced the publication of a monthly journal called *The American Naturalist*, of fifty-six octavo pages, at a little less than eighteen-pence per single number. Such a medium was wanted by our transatlantic friends, and we wish it success.

Silkworm Gut.—The silk in the reservoirs (of the silkworm) is sometimes used in commerce, being sold under the name of "gut." The process of obtaining the gut is very simple; it consists in preparing worms ready to spin by putting them in strong vinegar for eighteen hours; a transverse opening is then carefully made on the under side and about the middle of the body, taking care not to injure the silk reservoirs, which are very distinct. The glands, or reservoirs, are then taken out and stretched parallel to each other on a board, and dried in the shade for several days.—*The American Naturalist.*

Great aquariums are numerically increasing in France. One was long since established by Mr. W. A. Lloyd in the Jardin d'Acclimatation, Bois de Boulogne, Paris. Another has been some time opened in the Boulevard Montmartre. A fresh-water aquarium is already opened in the Park of the Exposition of 1867, and a marine aquarium of equal size is in process of construction. There is, moreover, one at Boulogne, and another at Arcachon.

Mice and Cockroaches.—Although I by no means desire to propound any theory on the subject, I have twice observed a similar occurrence to that mentioned in a recent number of Science-Gossip. We had plenty of mice, but a cockroach was seldom to be seen. A cat was introduced into the establishment to reduce the numbers of the mice, which she did effectually, but now that there are no mice cockroaches appear in legions. The same thing has been observed by me in two separate houses in which I have resided during the past five years. There is no reason for affirming or denying that mice will eat cockroaches. We can only state facts—mine in corroboration of others, and look to future investigation and experience to develop the cause.—*A. C.*

Mice and Cockroaches.—In reply to the query of your correspondent, "Whether any antagonism exists between the domestic mouse (*Mus musculus*) and the cockroach (*Blatta molendinaria*, or *orientalis*)," my experience leads me to answer in the negative; and as one fact is worth more than a thousand theories, I will furnish him with what I consider a conclusive instance. A kitchen in my house has been much infested with cockroaches for years, in common with the crickets (*Acheta* or *Gryllus domesticus*), who are also tenants, and live in the utmost harmony with their more numerous neighbours. They are night insects, or lucifugæ. The floor at dark has been literally alive with them. During the same period the mice, although not in undisturbed possession, or allowed to "reign supreme," have had the range of the premises, and have certainly defied all attempts to extirpate them in kitchen and elsewhere. I am entirely unable to account for the alternate disappearance and reappearance of these pests, as recounted by your correspondent, but if it be a fact in natural history that the domestic mouse devours insects, I am quite unaware of it, although of course every one knows that his congener of the harvest-field (*Mus messorius*) is insectivorous as well as graminivorous. In this case, however, I have never heard that *his* ambition leads him to aspire to larger or higher game than the bluebottle fly (*Musca carnivora*). On one occasion, in order to clear the place of the cockroaches, two hedgehogs (*Erinaceus Europæus*) were introduced, but the animals were the reverse of abstemious, and in the height of their gluttony (in this respect apicius-like) gorged themselves so much that they absolutely died from indigestion, the effect of overloaded stomachs; otherwise I believe they would have effectually done the work allotted to them.—*Henry W. T. Ellis, Crowle.*

Which Bangor?—In L. Lane Clarke's "Objects for the Microscope," p. 48, under the head of "Diatoms of Guano," the infusorial earth of Bangor, U.S., is mentioned as very fine. Now, Bangor is in our State, but its diatoms are new to us here. I cannot imagine where it is, or what the deposit may be, unless it be intended to mean the fossil foraminifera which are to be obtained sparingly from the marine clays which occur on the banks of our rivers. Also where is Wreatham, U.S., given in the same list? There is a town named Wrentham in Massachusetts, which has a good many ponds, &c., where diatoms might be deposited, but I do not know of any celebrity obtained by this locality.—*E. C. B., Portland, Maine, U.S.*

[Can any one help our correspondent?—Ed.]

Baillon's Crake.—I have in my possession a very beautiful specimen of Baillon's Crake, a female bird, weighing only three-quarters of an ounce, which was caught by a cat near St. Leonards-on-Sea on the 12th of April. It does not appear to have been seen in this neighbourhood before.—*John Bissenden.*

Meerschaum.—It may appear surprising that so little is written on this extraordinary article, for its use is daily becoming more apparent. Doubtless many of your valuable correspondents indulge in a pipe—and a meerschaum. Lord Brougham, Tennyson, Thomas Miller, and a host of learned and distinguished men smoke; and it is stated that Tennyson may be seen with his large meerschaum, in his walks, frequently during the summer months, culling over some of his brilliant ebullitions. Dr. E. D. Clarke may be accepted as a reliable authority, and he states that before the capture of the Crimea this substance was a considerable article of commerce with Constantinople. It was sold to German merchants for the making of those beautiful pipes which after long smoking were sold for forty and fifty pounds of our money. In Natolia, at the present day, 1,000 hands are employed in its manufacturing process, and in Vienna, meerschaum pipes, from their artistic designs, realize 100 guineas. It appears all authorities agree as to its being classified as a *mineral*, but its exact nature is not precisely known; and as considerable ignorance prevails amongst the English of its nature, formation, and properties, I again repeat my question for answers by your valuable contributors—"What is meerschaum, and how is it identified when manufactured into smoking pipes?"—*C. M.*

NOTICES TO CORRESPONDENTS.

T. S. K.—It is not our province to name packets of objects; we really cannot afford the time to do for others what, with a little care, they could do for themselves. No. 1 is *Dædalea quercina*.

E. M. H.—No. 1. Yes! it *will* do so. 2. The only book for a beginner is Lindsay's "British Lichens," Routledge & Co. 3. It is impossible to say.

G. G.—The fungus is *Polyporus versicolor*.

A. (Dartmouth) could name his *Corallines* with the aid of Johnstone's "Zoophytes," published by Van Voorst. His No. 2 is *Corallina officinalis*.

H. H. (Fairy Villa).—It is not very easy to discover what you require. If we understand you correctly, it is that you desire to know just those problems which are continually puzzling men of science, and for the discussion of which our columns are unsuited.

J. G. desires some certain method of ridding his house of cockroaches. We have heard of many remedies, but never had any occasion for making the experiment. See SCIENCE-GOSSIP, 1865, pp. 42, 66.

L. A. G.—Is it the thread-worm (*Gordius aquaticus*)? See SCIENCE-GOSSIP, 1865, pp. 107, 197.

R. T. A.—The slide contained no organic form whatever.

F. S. F. (Plymouth).—We regret that we can give no information of the process beyond the extract quoted.

W. W.—R. W.—We never attempt to name objects from description only.

THE NIGHTINGALE.—SCIENCE-GOSSIP, bottom of page 112, for "March," in both instances read "April."—*L. S.*

J. L.—J. H. W.—Messrs. Hooper & Co., Covent Garden, or Mr. Sim, of Foot's Cray, Kent, or any other nurseryman growing ferns extensively, would furnish the prices of any of the ferns named in the article alluded to, upon application by letter enclosing stamp.

W. W. S.—Mix glycerine and spirit, says "Davis on Mounting," p. 17. We use gum-tragacanth, mixed with gum-arabic or calcined starch, sometimes called British gum.

W. D. R.—No book containing descriptions of the *species* of British Colcoptera has been published since "Stephens' Manual," and that, of course, is now very imperfect.

R. W.—There is no cheap work on Diatoms. We have given in SCIENCE-GOSSIP instructions for mounting crystals.

G. L.—You will find answers to all your queries in "Davis on Mounting," &c., price half-a-crown.

B. L. W.—We cannot inform you; probably the result of a wound.

J. G. T.—Patience and plenty of water works wonders.

D. S.—It is sometimes called the "great saw-fly."

J. B.—Many larger specimens. It might possibly have occupied the matrix of a femoral bone, but this is speculation.

LIZZIE should remember how much easier it is to ask questions than to answer them.

W. F.—We have already given full instructions for cleaning Fossil Diatomaceæ.

E. F. M.—Very like a "canard."

S. C. surely must have made a mistake. Was it the Barn owl, and *not* the Snowy owl?

E. C. J.—White's "Popular History of the Crustacea." London: Routledge. Price 7s. 6d. The malformation of the daisy is not uncommon.

BRITISH INSECTS.—The printed lists of British Insects, entitled "A Catalogue of British Insects in all the Orders," by the Rev. F. O. Morris, B.A., is at length published.

MRS. K.—T. H.—A. Dartmouth.—D. W.—W. R.—It is impossible for us to name all the specimens of mosses, lichens, zoophytes, &c., which are continually sent us, notwithstanding our repeated protests, in parcels of from six to twelve species from a single correspondent. Henceforth, therefore, whatever number may be sent, we shall only name one out of each packet.

W. D.—F. W.—We only insert in our exchange list objects of Natural History for which other like objects are required. Other exchanges may be inserted as advertisements, the charge for which may be learnt from the Publisher.

W. F. H.—Any water-mites are desired. The mollusc is a common species—*Cyclostoma elegans*.

W. R.—No. 1 is *Climacium dendroides*.

D. W. Skye.—No. 8, *Mercurialis perennis*.

H. M. (Birmingham).—It is *Julus terrestris*, not an inhabitant of the water, but having got into the spout of the pump came out with the water.

W. M.—Please to refer to page 96 of SCIENCE-GOSSIP. It is carelessness to ask a question which has only just been answered in two consecutive numbers.

J. S. K.—No English work contains coloured figures of all the British Lepidoptera. The nearest approach is Wood's Index Entomologicus. Nor is there a work in which British Lichens are all figured. For British Mosses, see Wilson's "Bryologia Britannica."

F. H.—We really know of no book "fuller" than that named. Its want can only be supplied by several books in different branches.

B. (Manchester).—Any large bottle warehouse, or dealer in druggists' sundries, in London. Surely also in Manchester or Liverpool such things can be obtained. If not, the dimensions must be sent to some friend in London, who may call upon us for advice.

J. B. S.—Davis on Mounting Microscopic Objects, page 80.

P. P., who inquired in March number for Bermuda Earth, will please to furnish name and address to the Editor.

QUARTERLY JOURNAL OF MICROSCOPICAL SCIENCE.—Vol. VII., for 1859, wanted. A good price will be given. Address, the Editor of SCIENCE-GOSSIP.

C. D. H.—Unfortunately your plant was too much shrivelled to determine with certainty.

B. T.—No. 1 is *Scatophaga stercoraria* (Order, *Diptera*). No. 2 is *Chrysopa perla* (Order, *Neuroptera*).—*F. W.*

DEODARA.—R. B. states that the age of the tree alluded to in our last is only thirty years.

EXCHANGES.

SCHISTOSTEGA in fine fruit, and *Trichostomum flavovirens*, for *Seligeriæ* or *Splachneæ*.—E. M. Holmes, 2, Arundel-crescent, Plymouth.

BRITISH BIRDS' SKINS and eggs for other British birds' eggs. Lists to John M. Hartley, 6, Cliff-terrace, Leeds.

C. ROLPHII, *C. laminata*, *B. montanus*, and other shells, for British or foreign species.—J. W. Taylor, 7, Freehold-street, Leeds.

PLANORBIS GLABER.—This rare fresh-water shell, for good microscopical material.—T. Sharp, Ackworth, near Pontefract.

PLEISTOCENE FOSSILS (20) from Maine, U.S., in exchange for British fossils or British marine shells.—E. C. B., care of Editor of SCIENCE-GOSSIP.

MARINE SHELLS (55) from Maine, U.S., in exchange for an equal collection of British marine shells or British fossils.—E. C. B., care of Editor of SCIENCE-GOSSIP.

DIATOMACEOUS EARTH (unmounted) from Monmouth, Maine, U.S., in exchange for good mounted diatoms or desmids.—E. C. B., care of Editor of SCIENCE-GOSSIP.

BRITISH FERNS.—Dried fronds for those of other species.—For lists, address H. R. F. C., Foley Cottage, Redlard, Bristol.

MERIDION CIRCULARE (unmounted) for mounted objects.—W. Swinburn, 5, Rosemary-lane, Whitehaven.

TRIPHOSA CERVINATA for other rare species.—C. R. Doward, 41, Copenhagen-street, Worcester.

ENGLISH AND FOREIGN SHELLS for British marine.—For lists, address, Beta, Post Office, South Shields.

SANGUINARIA CANADENSIS, sections of root, for stamped and directed envelope.—B. Taylor, 57, Lowther-street, Whitehaven.

ORCHIDS, or other Botanical specimens, wanted for American plants.—W. W. Denslow, Post Office Station, N., New York City, U.S.

MOSSES (unmounted), wanted for Toome-bridge Earth or mounted objects.—E. W., 48, Tollington-road, Holloway, N.

BOOKS RECEIVED.

"Contributions to Natural History," by a Rural D.D. Edinburgh and London: Blackwood & Sons, 1867.

"A Catalogue of British Insects in all the Orders," by the Rev. F. O. Morris, B.A., London, 1867.

"The Laboratory." No. 1 to 5. London: James Firth.

"Instructions for the Prompt Treatment of Accidents," in a sheet. Illustrated. London: W. H. Collingridge.

"Elementi per lo studio delle Desmidiaceæ Italiche di Guiseppe de Notaris." Genova, 1867.

"Cronaca della Briologia Italiana per G. de Notaris." Part II. Genova, 1867

"Neue Infusorien im Seeaquarium," von Dr. Ferdinand Cohn, in Breslau.

"At Home in the Wilderness," by The Wanderer. London: Robert Hardwicke, 1867.

COMMUNICATIONS RECEIVED.—J.—F. S. F.—E. F.—L. S.—F. S.—F. A. C.—H. W.—P. B. B.—R. H.—W. D.—J. L.—R. T. A.—J. S.—W. D. R.—E. M. H.—W. V. A.—H. M. G.—G. S.—C. D. H.—W. F. H.—C. S. P. P. (Moulmein).—J. M. H.—W. W.—E. C. B.—J. S. T.—W. W. S.—E. St. J. F.—E. K.—A. S.—T. P. B.—T. S. P.—A. W. (Walograve).—R. G.—E. G. K.—J. B.—D. G.—D. S.—E. J. S.—J. G. T.—J. W. S.—S. F. C.—H. R.—B. L. W.—J. H. F.—R. W.—J. W. T.—T. H. Jun.—F. A. A.—W. D. (Wigton).—J. G. B.—A. W.—T. S. K.—J. A.—G. L.—F. B.—R. B.—F. K.—H. R. W.—E. T. S.—E. C. J.—J. H. W.—C. R. D.—C. P.—A. J.—Dr. W.—W. F. H.—S. F. C.—S. D.—M. T. M.—F. W.—W. S.—J. B.—E. B.—F. T.—J. C. D.—J. B.—G. A.—T. W. W. S.—W. R.—G. N.—H. R. F. C.—R. M. C.—T. A.—G. B.—F. H.—B. (Manchester).—W. P.—H. H. K.—S. L. B.—C. M.—J. S. K.—J. B. S.—J. B. W.—W. M.—H. W. T. E.—B. T.—R. B.—W. W. S.—J. B.—C. D.—F. K.—R. B.—F. W.—R. H. J.—G. E.—R. C. C. L.—E. W.—W. P.—A. M. E.

THE FEAST OF ROSES.

Crop the gay rose's vermeil bloom
And waft its spoils, a sweet perfume
In incense to the skies.

Ogilvie.

OF all the flowers that have ever adorned the face of the earth none has furnished to the poet more delicate similes than the Rose. The poet in return has supplied the romance of its birth. Sir John Maundeville gives one legend of Christian origin; the Mahometans have another. Writing of Bethlehem, Sir John records that a fair maiden was blamed with wrong, and slandered, and was condemned to be burnt at that place, and as the fire began to burn about her, she made her prayers, that as truly as she was not guilty it might be made known to all men; and that thereafter she entered into the fire, and immediately the fire was extinguished, and the faggots that were burning became red rose-bushes, and those that were not kindled became white rose-bushes, full of roses. And these were the first rose-trees and roses, both white and red, that ever any man saw. On the other hand, it is reported that the Turk can by no means endure to see the leaves of roses fall to the ground, because that some of them have dreamed that the first or most ancient rose did spring of the blood of Venus; and others of the Mahometans say that it sprang of the sweat of Mahomet. If we are to believe the said poets, this flower is beloved of the gods as well as men, for Cupid was by them adorned with a wreath of roses.

The rose is the honor and beautie of flowers,
The rose is the care and the love of the spring,
The rose is the pleasure of th' 'eavenly powres,
The boy of faire Venus, Cythera's darling,
Doth wrap his head round with garlands of rose,
When to the daunces of the Graces he goes.

Anacreon.

Whether the roses of Abraham were believed by the Ghebers to be the first that had bloomed on earth, or not, the romance deserves remembrance in company with those we have already narrated. "The Ghebers believe," says Tavernier, "that when Abraham, their great prophet, was thrown into the fire, by order of Nimrod, the flame turned instantly into a bed of roses, where the child sweetly reposed." This legend is alluded to in "Lalla Rookh" by the lines,—

When pitying heaven to roses turned,
The death flames that beneath him burned.

Old Gerarde, in his "Herbal," apologizes for the company in which he placed such an august flower as the Rose, in his own quaint style. "The plant of roses, though it be a shrub full of prickles, yet it had beene more fit and convenient to have placed it with the most glorious flowers of the worlde, than to insert the same among base and thorny shrubs; for the Rose doth deserve the chiefest and most principal place among all flowers whatsoever, being not only esteemed for his beautie, vertues, and his fragrant and odoriferous smell, but also because it is the honor and ornament of our English scepter, as by the conjunction appeereth in the uniting of those two most royal houses of Lancaster and York."

The Oriental poets especially gave the preference to the Rose above all other flowers. The two greatest of the Persian poets, Hafiz and

Sadi, filled their writings with the odour of roses,—

> Hafiz loves, like Philomel,
> With the darling rose to dwell.

Sadi was the author of "Gulistan," which means "garden of roses;" for "gul" is, in more than one of the Oriental languages, the name of the Rose. The following is the motive which the author assigns for having written this poem:—"On the first day of the month of May I resolved with a friend to pass the night in my garden. The ground was enamelled with flowers, the sky was lighted with brilliant stars; the nightingale sang its sweetest melodies, perched on the highest branches; the dew-drops hung on the rose, like tears on the cheek of an angry beauty; the parterre was covered with hyacinths of a thousand hues, among which meandered a limpid stream. When morning came, my friend gathered roses, basilisks, and hyacinths, and placed them in the folds of his garments; but I said to him, 'Throw these away, for I am going to compose a Gulistan' (Garden of Roses) 'which will last for eternity, whilst your flowers will live but a day.'"

Roses were known to the ancient Greeks and Romans. Herodotus writes of roses in the garden of Midas, the son of Gordius, in Phrygia, that had sixty leaves, which grew of themselves, and had a more agreeable fragrance than all the rest. The Romans employed them at their feasts. Lucullus expended fabulous sums, in order to be able to have them at all seasons. In the time of the Republic people used not to be satisfied unless their cups of Falernian wine were swimming with roses.

"The Spartan soldiers, after the battle of Cirra, were so fastidious as to refuse to drink any wine that was not perfumed with roses. At the Regatta of Baiæ, the whole surface of the Luerine Sea used to be strewn with this flower. In some of his banquetings, Nero caused showers of the rose to be rained down upon his guests from an aperture in the ceiling. Heliogabalus carried this to such an insane length as to cause the suffocation of several of his guests, who could not extricate themselves from the heaps of flowers. The Sybarites used to sleep upon beds that were stuffed with rose-leaves. The tyrant Dionysius had couches stuffed with roses, on which he lounged at his revels. Verres would travel in a litter, reclining on a mattress stuffed with roses. He wore, moreover, a garland of roses on his head, and another round his neck. Over the litter a thin net was drawn, with rose-leaves intertwined, whose fragrance he thus leisurely inhaled. It was a favourite luxury of Antiochus to sleep, even in winter, in a tent of gold and silk, and upon a bed of roses. Cleopatra, in the entertainment she gave in honour of Antony, spent an immense sum in roses," with which she covered the floor of her banqueting-room to the depth of an ell.

When Nero honoured the house of a Roman noble with his presence at dinner, there was something more than flowers; the host was put to an enormous expense by having his fountains flinging up rose water. While the jets were pouring out the fragrant liquid, while rose-leaves were on the ground, in the cushions on which the guests lay, hanging in garlands on their brows, and in wreaths around their necks, the *couleur de rose* pervaded the dinner itself, and a rose pudding challenged the appetites of the guests. To encourage digestion there was rose wine, which Heliogabalus was not only simple enough to drink, but extravagant enough to bathe in. He went even further, by having the public swimming-baths filled with wine of roses and absinth. After breathing, wearing, eating, drinking, lying on, walking over, and sleeping upon roses, it is not wonderful that the unhappy ancient grew sick. His medical man gave him immediately a rose draught: whatever he ailed the rose was made in some fashion to enter into the remedy for his recovery. If the patient died, as he naturally would, then of him, more than of any other, it might be truly said he

> Died of a rose in aromatic pain.

In almost all Oriental poetry and romance the Bulbul, or nightingale, as it is erroneously called, is associated with the rose. "You may place a hundred handfuls of fragrant herbs and flowers before the nightingale, yet he wishes not in his constant heart for more than the sweet breath of his beloved rose;" or, as Moore has expressed the same sentiment—

> ——though rich the spot
> With every flower this earth has got,
> What is it to the nightingale
> If there his darling rose is not?

Advantage is taken of the same belief by Lord Byron in his "Bride of Abydos," wherein Zuleika plucks a rose and offers it to Selim, seated at his feet, pleading through the simile of the nightingale's love on behalf of her own—

> This rose to calm my brother's cares,
> A message from the Bulbul bears;
> It says to-night he will prolong
> For Selim's ear his sweetest song;
> And though his note is somewhat sad,
> He'll try for once a strain more glad,
> With some faint hope his altered lay
> May sing these gloomy thoughts away.

And also in "The Giaour" the opening description contains a no less happy allusion to the rose as the "sultana of the nightingale," and to the nightingale as "the Bulbul of a thousand tales,"—

> For there—the Rose o'er crag or vale,
> Sultana of the Nightingale,
> The maid for whom his melody,
> His thousand songs are heard on high,

Blooms blushing to her lover's tale;
His queen, the garden queen, his Rose,
Unbent by winds, unchilled by snows,
By every breeze and season blest,
Far from the winters of the west,
Returns the sweets by nature given
In softest incense back to heaven,
And grateful yields that smiling sky
Her fairest hue and fragrant sigh.

So intimate are the bonds of attachment between the rose and the bulbul, and so sensitive is the former to the song of the latter, that it is said to burst from the bud and open at the sound.

Oh, sooner shall the Rose of May
Mistake her own sweet nightingale,
And to some meaner minstrel's lay
Open her bosom's glowing veil,

than that we should longer continue to chant the praises of both, or lull our readers to sleep over the song of the one or the sweet odour of the other.

The very common expression, "under the rose," has been referred to two or three sources. Haydn, in his "Dictionary of Dates," says,—"The rose a symbol of silence, gave rise to the phrase 'under the rose,' from the circumstance of the Pope's presenting consecrated roses, which were placed over confessionals to denote secrecy." Whilst others contend that the old Greek custom of suspending a rose over the guest-table was employed as an emblem that the conversation should not be repeated elsewhere. Whichever was the true origin, whether Christian or Pagan, it is evident that both regarded the rose as an emblem of secresy, and in the same sense, but less studiously followed, we are supposed to regard the same flower, whenever we pick up a stray scrap of scandal, "under the rose."

This reminds us of the association of this flower with the names of persons, places, and things. It has been said that Syria derived its name from *Suri*, a beautiful and delicate species of rose, whence came "Suristan," the land of roses.

Now upon Syria's land of roses
Softly the light of eve reposes.

Beside a goodly number of such more evident compounds as Rosenthal, Rosenberg, Rosenau, &c., to say nothing of the beautiful visions of feminine humanity which have blessed the day-dreams of prosaic man, bearing for themselves the fragrant appellations, not merely of the Rose of Arragon or the Rose of Castile, but the less assuming Rose, Rosa, Rosina, or Rosalind. Ill-natured old bachelors and gouty sexagenarians may mutter incoherently about "thorns" and "briars" but we will not listen to them, we will not believe them—

We have a vision of our own,
And why should we undo it?

Cultivated Roses are supposed to have been first planted in this country in A.D. 1522. The damask rose (*Rosa damascena*) being introduced from the south of France some time prior to A.D. 1573. The Province rose (*Rosa provincialis*), from Italy, before A.D. 1596. The moss rose not much earlier than A.D. 1724, and the China rose perhaps about A.D. 1787. Besides these we *have*, and *had* long before these dates, wild roses, less beautiful and fragrant, but equally deserving of a remembrance at a "Feast of Roses."

How are we to enumerate the species of Rosa which are indigenous to Great Britain, since so much depends on the limitation of the word "species," upon which point botanists are not agreed. If we take the last edition of Sowerby's "Botany," we find that the first place is given to sixteen, which are by many authorities accepted as good species. These are again subdivided by others, for under the name of the Dog-rose twenty-one forms are named and characterized as species, so that there are to be found men of strong faith who can believe that in the British Islands we possess forty distinct species of native roses. On the other hand, Mr. Bentham limits the number to *five*. It matters but little to us for our present purpose whether there are forty species or only five. We believe in the Dog rose, the Burnet rose, and the sweetbriar; and if there were no others, we should still delight in the fragrance of the Eglantine, and have faith in the roses of England so long as a rose could be found to entwine with the thistle and shamrock, and never quarrel, whether it be known to science as *Rosa canina*, or *Rosa verticillacantha*, or *Rosa platyphylla*.

A wild rose-tree (*Rosa canina*) grows in the crypt of the cathedral of Hildesheim, which has the reputation of being one thousand years old. Baron Humboldt states that, from accurate information which he obtained, the age of the main stem did not exceed eight hundred years. This is, however, a respectable antiquity, and he adds that a legend connects this rose with a vow of the first founder of the cathedral, Louis the Pious, and a document of the eleventh century says, that when Bishop Hezilo rebuilt the cathedral, which had been burnt down, he inclosed the roots of the rose-tree within a vault still remaining, raised on the latter the walls of the crypt, which was re-consecrated in 1061, and spread the branches of the rose-tree over its sides. The stem, still living, is nearly twenty-seven feet in height, and only two inches thick, and spreads across a width of thirty-two feet over the outer wall of the eastern crypt. It is undoubtedly of very considerable antiquity, and well worthy of the renown it has so long enjoyed throughout Germany.

The Abbé Berleze gives an account of a rose-tree which he saw flourishing at Caserta, near Naples, in 1819, and which had been planted near a poplar sixty feet high, and had clambered up to the topmost branches of its companion tree.

The giant of all the roses is said to have flourished some few years since at Toulon, with a stem two feet eight inches in circumference at the surface of the soil, and when in full bloom bears the enormous quantity of from fifty to sixty thousand roses, and

The last rose of summer left blooming alone

does not fall to the ground till chilled by the cold of November.

And who has not heard of the Otto or Uttur* of Rose? This valuable and delicious perfume is admired both in the East and in the West. The "Utturs" of India and Persia are highly esteemed both in the broker's sale-room and the lady's boudoir. And *not* to possess a soul for Otto of Rose is equivalent to vulgarity, or worse. Let any rash mortal confess that he doesn't care for "strawberries and cream" or "otto of roses," the *summum bonum* of two of the senses, and he will at once be regarded as "out of his senses" altogether. And there is also that delicate luxury of the East called "Rose-water," so refreshing in sultry weather, that one cannot wonder that it is almost one of the necessaries of life with the Hindoo. Avicenna, an Arabian physician of the tenth century, is said to have invented the method of extracting and preserving the odour of flowers, and to him the merit of distilling the first rose-water is attributed by those matter-of-fact men who seek for causes in the regions of science rather than in the realms of mystery and romance.

Around one station in India, that of Ghazeepore, in Bengal, there are about 150 acres of ground laid out in small detached fields as rose-gardens. These gardens are let out for about three pounds sterling per thousand rose-trees for the season, and the cost of cultivation is about another sovereign. The value of the roses yielded should be nearly double this sum, or from six to eight pounds. The cultivators seldom distil their own flowers, but dispose of them to contractors. From the beginning of March to the end of April is the great rose harvest. Early in the morning men, women, and children swarm about the rose-trees like a colony of bees, plucking the flowers, and carrying them in bags to the contractors. The "still" is of the simplest and rudest construction; its boiler will hold from eight to twelve gallons; into this are cast from 12,000 to 16,000 roses, about fifteen to twenty quarts of water are added, and the result will be about one quart of rose-water from each thousand of roses. After distillation the rose-water is placed in a glass carboy and exposed to the sun for several days to ripen, or mix well the floating attar with the water. The value of one still of rose-water is about 24*s.* to 30*s.* on the spot. This is for the pure unadulterated rose-water. Adulteration is duly appreciated and resorted to in the East, and neither rose-water nor attar of roses are exceptions. It is difficult to obtain either of them pure. The great medium of adulteration is oil of sandal-wood, and the native does not appear to trouble much whether he gets the odour of the rose or the sandal. At the commencement of the rose season, people arrive from all parts at Ghazeepore to purchase their rose-water, and large quantities are prepared and sold. The value of the roses sold in this district for the manufacture of rose-water has been estimated at from 15,000 to 20,000 rupees a year, or 1,500*l.* to 2,000*l.*, and the value of the rose-water made therefrom is about double this sum.

We had almost forgotten the most valuable product, but the "attar" must share a little of our attention; and, at the risk of being regarded as tedious, a brief notice of how it is obtained.

The origin of this delicious perfume is thus chronicled in the romantic stories of the East:—Noorjehan Begum, the favourite wife of Jehan-Geer, was once walking in her garden, through which ran a canal of rose-water, when she remarked some oily particles floating on the surface. These were collected, and their aroma found to be so delicious, that means were devised to produce the precious essence in a regular way.*

The roses are distilled just in the same manner as for rose-water, and the product, which is indeed "rose-water," is transferred to a large metal basin, and tied over with wet muslin to keep out the insects. This vessel is let down into a hole in the ground about two feet deep, and allowed to stand quiet all night. The attar is always made early in the season when the nights are cool. In the morning a little film of attar has risen to the surface of the rose-water. This is skimmed off with a feather, and placed in a bottle. When obtained only three or four days it is of a pale greenish hue, but in a few weeks' time it subsides into a pale yellow colour. It requires the produce of 1,000 rose-trees to obtain a tolah, or 180 grains of attar. The attar obtained in the Indian bazaars is always adulterated, as not even the richest native will give the price for pure attar, which is only sold to Europeans. The price ranges between £5 and £10 per tolah, or, according to our English weights and measures, from £13 to £25 per ounce. So that a vial of the best Indian attar of roses the size of that which contains a "black draught," would be worth nearly £50.

Attar of roses made in Cashmere is considered superior to any other, a circumstance not surprising, as, according to Hugel, the flower is

* Written as Attur, Attar, Uttur, and Otto; the last, perhaps, least correct.

* Lieut.-Col. Palier in "Asiatic Researches."

here produced of surpassing fragrance, as well as beauty—

> Who has not heard of the vale of Cashmere,
> With its roses the brightest that earth ever gave?

A large quantity of rose-water, twice distilled, is placed over night in a running stream, and in the morning the oil is found floating on the surface, and is carefully skimmed off with a leaf of the sword-lily. When cool it is greenish, and nearly solid. Between 500 and 600 pounds of roses only produce one ounce of attar.

Extensive rose-farms exist also in Turkey, at Adrianople, Broussa, and Ushak. The cultivators are chiefly the Christian inhabitants of the low countries of the Balkan. In good seasons 75,000 ounces are said to be produced in this district, and it is estimated that 2,000 flowers are required to produce one drachm of attar.

In the Orient the "Atar-gul," or essential oil of roses is used as a perfume, and rose-water is sprinkled about from vessels constructed for the purpose over the guests and apartments, often to the astonishment of Europeans, when their first greeting chances to be, as it often is, a shower of rose-water "squirted" in their faces.

> She snatched the urn wherein was mixed
> The Persian Atargul's perfume,
> And sprinkled all its odours o'er
> The pictured roof and marble floor;
> The drops that through his glittering vest
> The playful girl's appeal addressed
> Unheeded o'er his bosom flew,
> As if that breast were marble too.

We are told that after the taking of Constantinople the church of St. Sophia (or Constantine) prior to its conversion into a mosque was washed throughout with rose-water; that Saladin would not enter the walls of the temple of Jerusalem in 1188 until it had been purified by similar ablutions of the same odoriferous fluid; that the Moslems employ it universally in the dedication of their temples, and that even young French nobles were formerly baptized in "Eau de Rose," or—

> Their earliest sniff
> Of this world was a whiff
> Of the genuine Otto of Roses!

During the whole season in which the roses are in bloom, the inhabitants of Cashmere are said to hold the "Feast of Roses." Why should we attempt to draw the veil which conceals the mysteries of this long festival, of the sad or happy hearts upon which the sun rises and sets in the vale of Cashmere; of the moonlight meetings in the alcoves of roses; and of the consummation attained by the "maid of Cashmere" when at the close of this glad season all doubts and fears shall have vanished like the morning dew from the petals of the rose.

> And happier now for all her sighs,
> As on his arm her head reposes,
> She whispers him, with laughing eyes,
> "Remember, love, the Feast of Roses!"

THE BIRDS OF NORFOLK.*

LOCAL Floras have always been, from some cause or other, more numerous than local Faunas. During the past year or two several good Floras of English counties have made their appearance, but, until now, not one county has had a recent record of its "birds, beasts, or fishes." Those who know anything of the ornithology of Norfolk will not be surprised that a county so rich in birds should be the first to set the example. That the plants of a county should change with the increase of cultivation may be reasonably expected, and pleaded as an excuse for the publication of new Floras. It may be urged, with equal truth, that this change in vegetation also necessitates a like change in the insects and birds, as well those birds which are insect-feeders as those which are entirely vegetarians. Hence a revision of the lists of birds which inhabit counties is as much a necessity as revised Floras. In the present instance it is not a list which has been given to us, but a "history" in two large octavo volumes, of which the first only is at present published.

In all departments of Natural History, when no monograph or other special work is published during a long series of years, much valuable and important information becomes scattered over the pages of our current scientific literature, and is almost buried and forgotten. To recover all that relates to the birds of Norfolk from this semi-oblivion, has been one of the objects of the present work. For many years the author has been one of the chief contributors of "stray facts" to the *Zoologist*, and similar publications, from this locality, and hence he is now to a large extent the collector and reviser of his own contributions. This forms but a portion of the work which, though professing to be only a local bird-Fauna, is a valuable addition to the ornithology of the British Islands.

In the "Introduction," the county is divided into six districts, which are called respectively the broad, cliff, meal, breck, fen, and inclosed districts. It was in the first of these that most of our ornithological experience was gained. It is only necessary, as Mr. Lubbock remarks, to draw an imaginary triangle on the map from Lowestoft to Norwich, and thence in a north-easterly direction to the sea at Happisburgh, to include the whole of that "great alluvial flat, once the bed of the *Gariensis ostium*," whose sluggish waters give rise to those shallow lakes, or lagoons, here locally termed "Broads." These lagoons are peculiarly rich in water fowl, and consequently the "Broad" district will contribute much to the second volume. The

* "The Birds of Norfolk, with Remarks on their Habits, Migration, and Local Distribution." By Henry Stevenson, F.L.S. In 2 vols. London: Van Voorst.

frontispiece view of Surlingham broad (not executed in Hanhart's best style) will give a general idea of one of these waters. This will be assisted by Mr. Stevenson's description. "Deep, sedgy 'ronds,' or dense masses of reeds and rushes, shut out, at times, the adjacent marshes. On the one hand, a wide expanse of swampy ground, relieved here and there with belts of alder and birch, or dwarf coverts, suggestive of pheasants and woodcocks in autumn, blends broad with broad; on the other, some slight recess in the waving reed-screen is covered in summer with a profusion of water-lilies, or an alder-carr, fringing the water's edge, casts a grateful shade in strange contrast to the surrounding glare. Everywhere the rich aquatic herbage teems with bird-life. Reed and sedge — warblers, with their constant companion, the black-headed Bunting, are heard on all sides; and occasionally, though yearly becoming more scarce, the beautiful little Bearded Titmice, may be seen uttering their sweetly musical notes as they flit amongst the reeds. Coots, Rails, and Water Hens, appear and disappear at every bend. Black-headed Gulls from their breeding-grounds at Hoveton, mingle their incessant cries with the warning notes of the Lapwing and Redshank; and the common Snipe, which here breeds regularly and in considerable numbers, adds its strange drumming noise, at intervals, to the 'armony of fowles.' Wild Ducks in large quantities, and many a 'coil' of Teal, are also reared on these waters, and afford good 'flapper' shooting in July and August; and of the rarer species that may still be named as summer residents on the larger broads, are the Shoveller, Garganey, and Great Crested Grebe; the Ruff, now confined entirely to Hickling, and the Marsh Harrier, if by chance escaping the doom of its race. The Spotted Crake, as well as the common Water-Rail, nest in the almost impenetrable swamps, which accounts for their eggs being so rarely obtained; and the accidental discovery, at Potter Heigham, during the past summer, of the nests and eggs of Baillon's Crake, never before known to breed in Norfolk, shows that even greater rarities may pass unobserved in such localities."

It is stated, on the authority of Professor Babington, that out of 1,767 species of flowering plants found in Britain, 1,067 are found in Norfolk. Out of somewhere about 350 species of British birds, our author observes that the actual number forming the bird-Fauna of Norfolk, amounts to no less than 291 at the present time.

The book before us could hardly have been written by any one except a resident, and no better resident for the purpose need be desired than Mr. Stevenson. All will read it (or should do so) who are interested in the Natural History of the Eastern Counties. To ornithologists it will be welcome as the production of a field naturalist, and a practised observer. And to the general reader it will commend itself by its popular style, the absence of pedantry, and the presence of an earnest purpose, and an ardent love for the feathered ornaments of God's creation.

GERMINATION OF THE TOAD-RUSH.

PASSING through a deserted brickfield, some few weeks since, my attention was drawn to a dense carpet of minute bright green threads, each tipped with an orange-brown knob, which, wet with recent rain, now glistened in the sun like a veritable little topaz. Not recognising at the moment to what this appearance was due, and having no time for investigation, I hastily snatched up a tuft of the mossy, jewel-bespangled pile and brought it home for more leisurely examination. When an opportunity occurred, I tried to make out what my carpet was composed of; but, at first, I could see nothing but the green threads, a little curved at the upper end, and there bearing the glistening knobs aforesaid. What could they be? It was little use speculating vaguely when a pocket-lens was at hand which might dissipate the conjecture in a moment. Better to use the lens first, and if that did not reveal the structure there would then be all the more room for

Fig. 149. Toad-rush Seedlings.

conjecture. The lens, however, solved the mystery at once, by showing that the little knob was a seed; but what was the thread supporting it? Not a root, from its green colour; besides, there was the root below it, fine, hair-like, and all but destitute of colour. Was it the stem? Hardly, for stems do not usually, at any rate, go downwards; besides, when one came to look at other specimens, there was a little thickening to be seen at this junction between the hair-like root and the green thread, while the lower part of the latter was clearly seen to be split on one side; and, in other cases, emerging from the chink so formed, another green thread was seen to protrude. So, then, the green thread resolved itself into a sheath; now, neither roots nor stems form sheaths of this character, so our green thread must be a leaf, and if so it must be the first leaf—the seed leaf, or cotyledon—one end of which remains within the seed, the other end being pushed downwards along with the root.

Clearly, then, the plant was monocotyledonous; and, putting two and two together, I arrived at the conclusion that the seedlings were probably those

of the Toad Rush (*Juncus bufonius*). A subsequent visit to the brickfields enabled me to confirm this impression, and to collect numerous specimens in all stages of germination. Many of the seeds sprout while still within the rotting capsule, and emerge from its cavity in brilliant little tufts, such as those which first caught my eye. The seeds are very small, oblong, somewhat three-cornered, and

Fig. 150. The Toad Rush.

on cutting them down lengthwise they may be seen to be filled in the interior with floury matter (*albumen*), at one end of which is a very minute embryo, which a lucky touch with the needle will serve to detach; and which, when examined under a lens, is seen to be a mere torso, a headless, limbless trunk,—in other words, a solid embryo in which no distinction of parts is visible. As germination proceeds, one end of this lengthens and protrudes to form the first root; afterwards comes the green thread, or cotyledon, the upper end of which never separates from the seed till both decay together, while its lower extremity forms the sheath before mentioned, encircling what must be considered as the extremely contracted stem, from which the other leaves proceed in due time. Ultimately, a tuft of leaves is formed around a little bulb-like mass, from whose lower surface proceed a number of young rootlets. While all this is going on, the original cotyledon and the primary root are gradually decaying; they have accomplished their parts, and give place to a new generation.

Not heeding the temptatious which the very simplicity of the embryo in this plant holds out to go into "transcendental" dissertations as to the intrinsic identity or diversity of leaf and stem, I venture merely to recommend those of my readers in search of an occupation to watch the processes of germination in our common wild plants. No great trouble and but little skill are requisite for these observations, which, nevertheless, are interesting, all the more so that it is comparatively new ground; in hardly a tenth part of our wild plants has the process been correctly observed and recorded. Nor is there the sameness that might be expected; on the contrary, there is much diversity, in some cases of a very singular character, *e.g.*, in some of the genera of Umbellifers, while systematic investigation could hardly fail to be productive of results of great value to botanical science. I have only to add that in all essential points the mode of germination here described in the Toad Rush finds its parallel in many other monocotyledons, *e.g.*, *Allium*, *Canna*, some palms, &c.

M. T. M.

OOTOLITES.

At the meeting of the Quekett Microscopical Club (April 26th), Mr. Higgins read a communication on "The Auditory Apparatus of Fishes," of which the following is a digest:—

All air-breathing animals live in a different medium from that inhabited by those living in water, and the adaptation of their organization to the conditions of their existence is nowhere more clearly marked than in their organs of hearing. In the Mammalia the complexity of structure in these organs is much greater than in lower orders, and probably enables them to distinguish in a greater degree the modulations of sound. In air-breathing animals the auditory organs may be said to consist mainly of the ossicula auditûs and the cochlea, with an external ear, the use of the latter being to receive and collect the vibrations of sound. In fish an auditory organ of this description would be a very great nuisance, because water conveys sound so much more readily than air that the effect of a small sound would produce the sensation of stunning. True fish are, therefore, deprived of the external ear, except in some members of the Ray family and the Sharks, where there is a small process which occupies the position of an ear. In almost all other fish the whole of the auditory organs are contained in the ootochrones, which are two holes, one on either side of the head. The internal surfaces of the bones of the heads of fish are covered with cartilage, and the semicircular canals, though not large, are not more than half the size of the holes through which they pass, and they are delicately suspended in the middle of them by means of a number of fine threads, the object of this probably being to lessen the shocks which loud sounds might otherwise produce. There are very

distinct differences observed in various families of fish. [Instances were given of various modifications in form, and diagrams illustrative of the anterior, external, and posterior portions were exhibited.] The sacculus consists of one large sac, and the superior ootolite occupies this position. This was its ordinary position; but in two specimens of the Wolf Fish the speaker had found that the superior ootolite occupied different positions, and from this circumstance he judged that they might have the power of moving about from side to side. Amongst the Cyprinidæ (or Carp family) the ootolites occupy a different position. Here they are all placed in contact inferiorly, forming a chain of bones. From the lower sac two tubes pass through the base of the skull, and open through the anterior portion of the saccula. These saccula are the only true representatives of the ossicula auditûs in the Mammalia, according to the opinion of most writers upon the subject; but his own belief was, that no fish at all have any true representatives of it, but that this is only an excessive development of the ootochrones. The ootolites themselves are found to consist of carbonate and sulphate of lime, with a very small quantity of animal matter; but whether to call it a kind of condensed sarcode, or to consider it the same in composition as the foraminifera, or as that of the oyster-shell, the meeting of the doctors on the subject has not been satisfactory in determining. By comparison and examination of these objects he had in many instances been able to identify species, and in many other instances he could identify genera; and he thought that this was more than could be said of the fins or any parts of a fish. He might mention that, out of about 4,000 specimens which he had examined, only one instance had been found in which the species could not be identified, and this one was a common form which had from some cause become abnormal in shape and cartilaginous in structure. Specimens are occasionally found in which they are wanting on one side of the fish. He had not examined the true structure of the granulus, but in their original forms they present the appearance of rhombic crystals.

Under the Rose.—The first rose ever seen was said to have been given by the god of Love to Harpocrates, the god of Silence, to engage him not to divulge the amours of his mother Venus; and from hence the ancients made it a symbol of silence, and it became a custom to place a rose above their heads in their banqueting-rooms, in order to banish restraint, as nothing there said would be repeated elsewhere; and from this practice originated the saying "Under the Rose," when anything was to be kept secret.—*Sylva Florifera.*

THE UNITY OF MANKIND.

In Science Gossip for May, a writer, under the signature of "F. A. A.," proposes to divide the human race according to colour; and I propose, with the Editor's permission, to make a few remarks upon his classification.

The gentleman in question tells us that the division according to colour is at once the simplest and the best. It gets rid of all the trouble entailed by the study of features, language, mental development, and religion. It relieves us from the dangers of embroiling our brains over the conflicting views of Prichard and Knox, Pickering and Lawrence. Such writers, to use "F. A. A.'s" own words, "perplex the student instead of aiding him."

The colours he divides into white, brown, and black; including under the white the Mongols, who I always thought belonged to the yellow races of men, the Moors and Arabs, some of whom, at any rate, are almost black, and the Laplanders, who are often almost as dark as the inhabitants of very hot climates. Among the brown races are comprised the Red Indians, and, I presume, as a natural sequence, the dirty-olive-coloured Californians, the olive-green hunters of San Francisco, the pale green Chanuas, and the dark sea-green people of the Mariau Islands; the chocolate-hued Sauks, and the Flatheads, whose tint can only be compared to that of a red brick, or Armenian bole. Finally, among the black races, we find the Hindoos, who are stated by Heber, Mill, and others, to present a great variety of tints, many being nearly copper-coloured, and a black being as rare among them as a white pariah; if, indeed, the term black can be justly applied to what is really a very dark brown, like strong coffee.

The next step to which "F. A. A." calls our attention, is that of proving that brown nations are merely white people turning black, and this he demonstrates to be simple and easy in the highest degree. "To see the first stage, or the conversion of white into brown, we have only to inspect the hands and face of a countryman, or the complexion of an old Indian resident." Mr. Winwood Reade's assertion that the Gamma tribes inhabiting the interior of the Gaboon country have turned black within the memory of man, conclusively proves the second stage.

That white people tan, and that even dark people may grow browner in a hot climate, or when exposed to the sun, no person in his senses would deny; but some very able observers, indeed, deny that this change is in any way lasting, or that it deepens with descent in any part of the world. They are even so unreasonable as to assert that climate has nothing to do with complexion, and that there is not a jot of evidence to show that a white race has ever been converted into a dark one. Sir W. Lawrence says,

"the theory which would refer the characteristic differences in colour in the varieties of the human species, and particularly to the degree of solar heat, is entirely improved;" and Mr. Crawford says, "The Creole Spaniards, who have for as long a time (three centuries) been settled in tropical America, are as fair as the people of Arragon and Andalusia, with the same variety of colour in the hair and eye as their progenitors. The pure Dutch Creole colonists of the Cape of Good Hope, after dwelling two centuries among black Caffres and yellow Hottentots, do not differ in colour from the people of Holland." The latter fact was long ago communicated to me by the late Robert Knox.

The readers conversant with the subject will notice here that Mr. Reade has solved a problem which had long bothered observers like Lubbock, Prichard, Millers, and a host of others. They were puzzled to know how it happened that on monuments in Egypt, which cannot be set down as later than 2,400 years before Christ, the negro appears as he is seen in our day. They might have spared themselves all the patient research they devoted to the subject; and it would be just as unnecessary to assume an error in the established chronology, or revise the calculations of Usher and Petarius. One generation being enough to turn brown men black, there can be no difficulty now in understanding that the rest follows as a matter of course.

The writer in question says, "that white nations have become black, we know from history and the testimony of our senses." Such being the case, I hope "F. A. A." will kindly give us the names of these historians, and say in what part of their works they state that races of men now known to be black were in their time white. I was under the impression that history, sacred or profane, is silent on the subject of colours, as it only too often is on the most interesting subjects; that it does not tell us whether the Jews of Cochin were or were not black, when, at the mandate of Nebuchadnezzar, they went forth from the land of the Euphrates to settle in Malabar, or whether, a thousand years ago, the Parsees were dark or fair; whether a Chinaman was always yellow, and a Hindoo of no certain tint.

"F. A. A." then recommends to our notice the theory put forward by Mr. Winwood Reade about the nature of the blackness. He asserts that *the* distinctive *blackness* of the West African negro, as well as his other physical defects, *are* the result of disease. Now this sentence proves two things; first, that Mr. Reade knows grammar better than Lindley Murray, Walker, and others, and secondly, that he has at one move pierced deeper into the shadows of physiology, especially the physiology of the skin, than such men as Wilson, Müller, Sugol, and others, going on in the old stupid way of noting down facts for years without venturing to draw a conclusion, would be likely to accomplish in a lifetime. Thanks to such teachers I had hitherto believed that the blackness of the negro was a normal product, and that, though it is very difficult to track even a single family, yet there was reason to conclude that a diseased race died out in about the fourth generation at the very latest. But I know better now.

"F. A. A." further tells us that the more intense the colour, the more degraded the mind, the more stunted and distorted the body, and the shorter the average duration of life *become*. Here, too, I was all wrong. I was of opinion that the negro race had produced specimens of mental development far superior to any ever seen in the red Indian or the Laplander; that Toussaint L'Ouverture, Freidig, the musician; Hannibal, the mathematician, who rose to be colonel in the Russian artillery; Lislet, the meteorologist, Capitein, who wrote the "Dissertatio de Servitude" which went through four editions, were men of a far higher stamp than any brave of the Rocky Indians or Hudson's Bay savage. In my innocence I believe that Lillywhite or Biasson would have thrashed any two Persians, and any half-dozen Hindoos. Indeed, I imagined that the negro was also long lived. *Mais nous avons changé tout cela.*

Supposing it granted that climate tends to transform white races into brown, and then brown into black, it becomes a puzzle to understand how it acts so differently, not only upon different races, but upon different members of the same race. On the west coasts of Africa are found the Cabendas, whose skins are of a moderately dark yellow. Just south of them are the jet black Congo people, while immediately to the north are the Loungos who are equally black. In Ireland, which does not extend over four degrees of latitude, we see the dark-haired, dusky-skinned, oval-faced Milesian, and the red, or brown haired, grey-eyed Celt; while in the north-west of Europe, from the southern border of Saxony, south of the lowest point of Ireland, to North Cape, a distance of more than twenty degrees, climate has produced a perfectly uniform fair race—at least we are told so in books which, by a stretch of language, are constituted authorities. Again, whatever be the origin of the gipsies of England, the Welsh and the English, their residence here extends beyond historic times. Yet climate has as little assimilated them in complexion as it has in temper. The variety of colour in the Hindoos has already been spoken of, and it is to be remembered that this difference does not in any way depend upon exposure to light, for it is seen in the fishermen who are all naked alike. Close to the black Jews of Cochin we find a colony of white Jews who are said to have emigrated thither when Titus destroyed the temple. If so, they must have resided there eighteen centuries, yet they have undergone no change, and don't seem likely to undergo any.

Nor is this the only difficulty. We find not only

decidedly fair races in very hot climates, but it is in these parts that we find the most colourless variety of the human family, the Albinos. On the other hand, the Kamtschatkans and Aleutians have skins as swarthy, and hair as dark, as the natives of hot climates. Dr. Prichard has figured in his "Natural History of Man," one of each of these tribes with complexions equal in tint to a Malayan; and La Perouse and Krusenstein both relate, that the inhabitants of the Bay of Crillon, living in what ought to be a temperate, if not a cold region of the north-east coast of Africa, are nearly black!

J. L. Milton.

A RAMBLE IN SOUTH AFRICA.

BY CAPT. G. E. BULGER, F.L.S.

A BROAD, steep, and rough path of two or three hundred yards in length, led us from the high ground where the regiment was encamped, down to the road which skirts the southern edge of the Buffalo River, and connects the ferry with the town of East London. This road runs close to the foot of the somewhat lofty cliffs that here form the right-hand boundary of the stream, and ends just above the ferry, where two large cables are stretched across from bank to bank for the purpose of warping the pont, or floating bridge, backwards and forwards. It is a good road so far as it goes, and a pleasant one, inasmuch as it affords two attractive views—one up and the other down the river. The first exhibits a charming reach of the broad and imposing stream, with its bold and picturesquely wooded banks; and the other the debouchement of its waters into the South Atlantic Ocean, where the huge rolling billows of that most stormy sea dash themselves on the dangerous bar with a crashing roar that is scarcely ever silent, even in the calmest weather.

East London—a straggling little town without a particle of beauty—is built upon the right bank of the river, and directly opposite is the more picturesque village of Panmure. The Buffalo, which flows between them, is here a noble stream, being at the ferry, between two and three hundred yards across. Its banks are a series of bold, roundish hills, which on the Panmure side are wooded more or less throughout, though in parts near the sea the trees are by no means plentiful, and the underbrush is thin and scarce enough. Above the ferry the forest is strikingly peculiar, being for some distance composed exclusively of the Giant Euphorbia (*Euphorbia grandidens*), which is here tall and large, and remarkably abundant. This most strange-looking tree, so common to many portions of the South African landscape, is singularly unattractive in its appearance, owing to the dull uniformity of its succulent and leafless stems, which, resembling gigantic candelabra in shape, are rigid and unnatural-looking in the extreme—much more suggestive of death than life! The woods which it forms are of a dark and mournfully uniform hue. The gaunt weird-like stems stand up all around one like skeletons. There is no grace of general figure, no beauty of detail. There are no leaves dancing in the sunlight—none of those lovely and perpetually changing effects of light and shade, caused by the incessant vibration of the foliage in ordinary forests. All is dull; all is moveless; all is silent as the grave! Apparently utterly deserted, motion seems to be lost amidst these gloomy groves, and one involuntarily shudders at the unnatural solitude which is their constant characteristic. Nevertheless, when viewed in the distance, they are very picturesque, and their sombre colour and dense solid-looking masses contrast well with the swaying branches and lighter green of the other trees around.

On the East London side the remains of "bush" are but scanty, particularly near the mouth of the river; but higher up the axe has not been so destructive, and there is still enough of woodland left to render the scene exceedingly wild and beautiful.

> The river nobly foams and flows,
> The charm of this enchanted ground,
> And all its thousand turns disclose
> Some fresher beauty varying round.

The ferry is about half a mile above the junction of the Buffalo with the sea, and the pont consists of a double boat, united under one strong deck, which is of sufficient size to receive two of the long waggons of the country, with spans of fourteen or sixteen oxen each, upon it.

Having crossed the river by means of the pont, we ascended a steepish slope to the village of Panmure, and then, turning to our right-hand, took what would be called in America a "bee-line," as nearly as possible in the direction of a rather prominent sand-hill, which forms a tolerably conspicuous landmark on the coast, a short distance beyond a rocky point where a noble barque, called the *Medusa*, was wrecked a few months ago. On our way we passed a small pond, or *vlei*, as it is called out here, prettily fringed with aquatic plants of various kinds, and adorned with a number of small islets of vegetation, amongst which we could discern some tiny water-fowl paddling about; but they were too quick in their motions, and too distant to enable us to glean much information concerning them. They probably belong to the species *Orty-gometra pusillus*.

Having reached the coast, we quitted the uneven summit of the bank and scrambled down to the beach, then presenting a noble expanse of hard, firm sand, uncovered by the ebb tide. It was so beautifully smooth and compact, that one experienced a positive pleasure in moving over its level

surface, and for more than a mile we followed every bend and indentation of the coast-line.

On our left rose a range of abrupt and occasionally lofty sand-hills, varying much in height and form, but nevertheless uniting in a sort of chain from the high land at Panmure to the extent of our vision along the shore, exeepting where a ravine, through which the "Blind River" flows slowly seaward, cuts deeply into the surfaee of the eountry. This river possesses a considerable stream of water; but its outlet, if it has one, is invisible—hence its name; and the dense, solid-looking beach offers a seemingly perpetual barrier between it and the wild, fierce sea without. Its banks are pretty, and picturesquely adorned with shrubs and other lesser plants, and the water is clear and bright-looking.

All the hills in this neighbourhood are apparently composed of white sea-sand, and covered with a peculiar succulent vegetation, amongst which the Hottentot fig (*Mesembryanthemum edule*) abounds, as well as another thick-leaved plant, at present crowded with bright red berries, whieh are strikingly handsome and eonspicuous. Trees of any magnitude are few and far between, but the lesser forest is dense and luxuriant—indeed in some places almost impenetrable. The rock of the eoast is of a most peculiar formation—sand and comminuted shells, which have been agglutinized by the action of the waves. It is exeeedingly rough and honey-combed, and presents the most varied and singular appearances,—here piled in long thin cones, like the smaller pinnacles of an ice-field; there offering a curious resemblance to the tall ruins of some castellated structure rising from the naked sand; and, again, displaying large rents and chasms, which may almost be called eaverns from their size and formation. The surface throughout is rough, and profusely armed with sharp edges, which are most unpleasant to walk over, to say nothing of the limpets and other shells that cover it below tide-mark in myriads. The greater portion of the rock—that is to say, all above high-water mark—is literally naked, not even a lichen being visible to break the uniformity of the brownish-grey hue, which pervades it throughout.

About a mile or so beyond the large sand-hill, we arrived at the object of our expedition, the Bats' Cave, which is, indeed, very curious and interesting. It is an enormous rent or opening in the rock, of between thirty and forty feet in length, by perhaps twenty in width, and rather less in height, with rough and jagged sides, and an irregularly arched roof, honey-combed and uneven in appearance, like all the rest of this peculiar coast formation. It does not run in its general direction, as we expected, at right angles to the shore-line, but rather parallel to it, and the entranee is on the landward side, very nearly faeing the town of East London. In its immediate vicinity there are some immense masses of rock scattered about, just as if some giant hand had thrown them there at random, and one of these stands nearly across the opening, at the distance of about twenty yards. It resembles in a slight degree a rough, irregular gateway, with the aperture corresponding so nearly in shape to the mouth of the cave as to give one the idea that it had at one time been the true entrance, and that some convulsion of nature had removed a large piece of the rock forming the roof and outward side, and thus disconneeted the two parts. The flooring, if I may so use the term, of the eavern consists of a series of little rocky basins, full of the most pellucid sea-water, green and brilliant as emerald, in which are growing most luxuriantly several kinds of beautiful seaweeds, as well as splendid *Actiniæ* and elegant *Sertulariæ* of various speeies. Round the edges of these little tidal pools, the projecting rock afforded comparatively dry but slippery footing to those who wished to explore the mysteries of the interior, and one of our party availed himself of the opportunity. Instead of disturbing multitudes of bats, as we expected, however, some dozen or so of red-winged Spreeuws (*Lamprotornis morio*) came flitting out of the darkness, apparently exceedingly astonished at our intrusion amongst their wild domains, and exclaiming loudly at our presence, an employment in which they were ably assisted by a number of Giant Kingfishers (*Alcedo gigantea*), and two or three of the smaller and commoner kind, the lovely *Halcyon capensis*, whose splendid plumage flashed in the sunlight like burnished metal. A few Sanderlings (*Calidris arenaria*) were running about and feeding close to the edges of the waves, and here and there, flitting from rock to rock, fearless and eonfiding as ever, were some of the little wagtails of the country (*Motacilla capensis*).

By the time we had finished our explorations, the tide was beginning to return, and the surf was breaking within a few yards of where we stood. The noise of the waves as they crashed upon the rocks and hard sandy beach, added to the wildness of a seene at all times striking from its peeuliar loneliness, and the screams of a couple of startled eurlew (*Numenius arquata*) seemed not unfitting accompaniments to the roar of the seething ocean.

Dog Life.—It is a eurious thing that dogs, which cannot only learn of man, but show such natural cunning, should yet never seem to teach one another. Probably they accept an accomplishment as an instinet. They don't know that they learn, do not notice their progress. Did you ever consider what an isolated life a dog leads? He is occupied mainly with the passing moment; he rarely meditates or looks forward; he seldom listens exeept when spoken to. No wonder, poor fellow, that he delights to bark and bite; his life would be otherwise dull enough.—*Jones's Holiday Papers.*

MONMOUTH DEPOSIT.

BEFORE proceeding with the description of the diatoms detected in this deposit, I would observe that no truly accurate description can be given of forms occurring in fossil deposits unless they have been previously studied in the living state. Dr. Lewis, in the proceedings of the Academy of Natural Sciences of Philadelphia, January, 1865, quotes some remarks of Professor H. L. Smith, who has long studied the habits of the living Diatomaceæ. He says,—"When I find Navicula amphirhynchus conjugating and producing Navicula firma, Stauroneis gracilis producing Stauroneis Phœnicenteron, Surirella splendida producing Surirella nobilis, quite different in form and striation, I cannot but doubt the propriety of making new species out of every different shape and marking."

In addition to the forms already indicated (pp. 133), I have met with the following:—Navicula firma (Kutzing), "valve large, turgid, oblong, lanceolate, with obtuse cuneate apices, thickened borders, large median nodule, striæ wanting or obscure." The median nodule of Kutzig is rather a large blank space, accompanied by a slight thickening of silex, than a nodule; the striæ are transverse, delicate, and about 40 in 100.

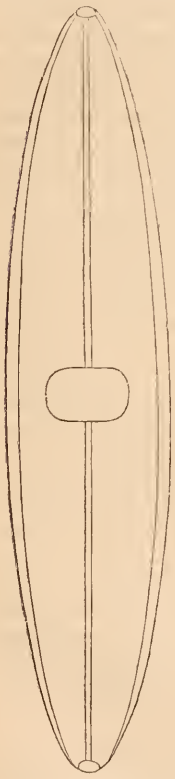


Fig. 151. Navicula firma, var. β (Navicula dilatata, Ehr.) × 400.

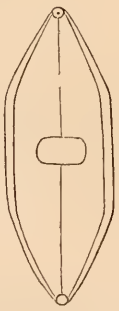


Fig. 152. Navicula firma, var. γ, × 400.

Variety α, linear oblong=Navicula Iridis, Ehr.

Variety β, pointed elliptic=Navicula dilatata, Ehr. (fig. 151, outline only).

Variety γ, cuneate = Navicula amphigomphus, Ehr. (fig. 152, outline only).

Variety δ, valves turgid elliptical-lanceolate, with several marginal longitudinal lines, large median blank space, striæ distinct. This is undoubtedly the finest of all the varieties of Navicula firma. Fig. 153, valve. Fig. 153 *a*, *b*, ideal sections of valve and frustule; *a* represents a central transverse section, showing thickening of the silex forming the blank median space; *b*, transverse section of frustule beyond the median space, and intended to illustrate the contour of the frustule: it will be seen that one portion of the valve inclines downwards towards the median line, and the other, or marginal part, forms a broad curve towards the connecting zone.

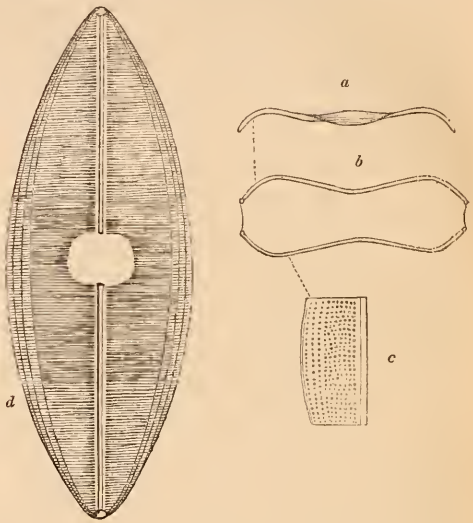


Fig. 153. Navicula firma, var. δ, *d* × 400, *c* × 1,000.

Fig. 153 *c* represents a small part of a valve magnified 1,000 diameters, showing that the appearance of longitudinal lines is produced by the greater distance of the striæ on that portion of the valve.

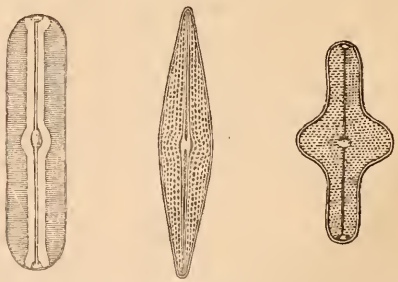


Fig. 154. Navicula bacillum × 400. Fig. 155. Navicula serians. Fig. 156. Navicula serians, var. β, × 800.

Navicula bacillum (Ehr.), Valves linear, with truncate rounded apices, terminal and central nodules distinct, striæ parallel, delicate, about 50 in 100, not reaching the median line (fig. 154). Navicula bacillaris of Dr. Gregory was supposed to be identical with this species; but a careful examination shows them to be distinct. It is rare in the lighter parts of this deposit.

Navicula serians (Kutzing), Valves acute with two sets of striæ, longitudinal, distiuct, about 30 in 100, under a low power apparently undulate, transverse striæ delicate, about 50 in 100 (fig. 155). Common in this material.

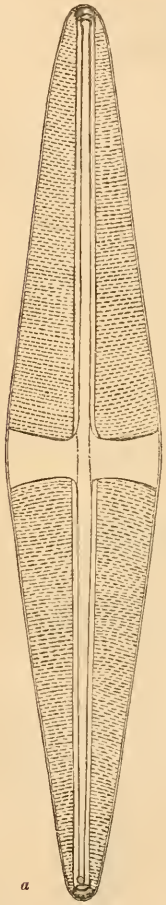
Variety *α* (apiculate), varyiug from lanceolate-elliptic to rhomboid, with apices more or less produced, and capitate (Lewis). This form I have not yet detected in the deposit; variety *β* (cruciform) = Navicula follis = Navicula trochus ? = Navicula inflata (Ehr.) ? Valves much inflated, compressed, sloping abruptly towards the produced apices (Lewis) (fig. 156). Navicula follis and Navicula trochus are no doubt identical; aud that this variety is identical with it is equally certain. Commou in this deposit.

Navicula rhomboides (Ehr.), Valves nearly quadrangular, striæ faint, parallel, 85 in 100 (Smith) (fig. 157). Variety *α* of Lewis does not occur in this deposit. Variety *β* = Navicula diaphana (Ehr.), Valves lanceolate, extremities slightly obtuse, median linc terminating iu an obtuse rounded nodular expansion, striæ transverse, about 55 to 60 in 100; longitudinal striæ coarser, slightly wavy, about 45 in 100, morc or less indistinct about the central nodulc (Lewis) (fig. 158). This and var. *α* are considered to be sporangial varieties of the typical Navicula rhomboides, uot uncommon in this deposit.

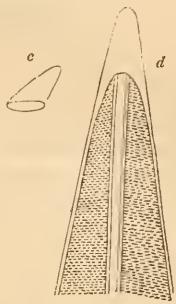
Fig. 157. Navicula rhomboides, Ehr.

Fig. 158. Navicula rhomboides, var. *β*.

Staurocis Baileyi = (Ehr.), valves large, broadly lanceolate, tapering gradually to the obtuse apices; surface with very firm longitudinal wavy lines, stauros linear reaching the margin (Kutzing). In the Microgeologie of Ehrenberg are many figures of this form, and Stauroneis Phœnicenteron; but, on careful examination, it is uot at all clear what Ehrenberg means. S. Phœnicenteron has fine transverse striæ, and a slightly dilated stauros, but not the wavy longitudinal lines. Ehrenberg, however, gives a figure of a form with a dilated stauros and distiuct wavy lines, which he calls Stauroneis Phœnicentcron (Bailcyi), (*sic*); thus mixing up the two species. Dr. Lewis at onc time supposed that this was a sporaugial variety of Stauroneis acuta; but from further observation he has comc to the conclusiou that Stauroneis Bailcyi and Stauroneis pteroidea arc interchangeable varicties of a common species, probably Stauroneis Phœnicenteron. (Fig. 159), fig. *b*, under surface, showing a siliceous plate at the apex of valvc; fig. *c*, ideal section of same at *d*, showing vacant space between valve and plate.



a



b. Under surface.

Fig. 159. Stauroneis Baileyi (upper surface), × 400).

Fig. 160. Stauroneis legumen, × 500.

Stauroneis legumen (Ehr.), this form (fig. 160) is considered by Dr. Lewis to be an aberrant variety of the above species—not uucommon iu this deposit.

Eunotia septena (Ehr.), fig. 161, is a variety of Eunotia robusta. Eunotia camelus (Ehr.), fig. 162; this species varies much in outline, and is probably only Himantidium bidens. Eunotia bactriana (Ehr)., fig. 163; all the above are common iu this deposit.

Eunotia incisa (Gregory).—Valves arcuate, slender, with obtuse or subacute apices, and subterminal notches or depressions on the ventral margin; striæ

Fig. 161.
Eunotia septena, × 500.

Fig. 162.
Eunotia camelus, × 500.

delicate. The preceding species of Eunotia are common in this deposit (fig. 164).

Fig. 163. Eunotia bactriana, × 500.

Himantidium undulatum (Smith).—Valves arcuate; constricted near the extremities, with a central inflation on the concave surface, and one or more dorsal elevations; striæ 22 in 1′.

Fig. 164. Eunotia incisa (Greg.).

Figures 165*a* and *b* are considered by Lewis to be sporangial varieties of the above; common.

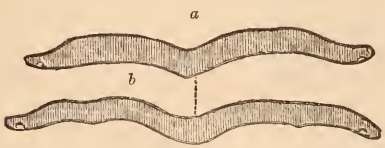


Fig. 165. Himantidium undulatum.

Actinella punctata (Lewis).—Frustules linear arcuate, commonly in radiating clusters of from six to twelve individuals. Valve arcuate, with a well-marked notched inflation at the free extremity;

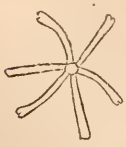


Fig. 166. Actinella punctata in situ, × 100.

Fig. 167. Actinella punctata, valve × 400.

smaller (attached) end rounded, sharp, with convergent striæ, and a row of marginal puncta. Fig. 167, valve magnified 400 diameters; fig. 166, frustules in situ; from Dr. Lewis's drawing magnified 100 diameters.

Fragments of this strange form are not uncommon in the deposit. Dr. Lewis considers it related to Eunotia, and representing a near approach to the Nitzschioid type. I am, however, not prepared to admit this; and judging from examples that have come under notice in this deposit, and in a recent gathering, I should feel inclined to place it close to Synedra. The remaining forms observed in this deposit will be described hereafter.

Norwich. F. KITTON.*

NEW BRITISH MOSS.

AMONG some mosses placed in my hands by Mr. M. C. Cooke, and collected in the Clova district by the late A. O. Black, are specimens of a fine Dicranum, which appear to be identical with a Norway species established by Professor

Fig. 168.
Dicranum arcticum.

Fig. 169.
Leaf and section magnified.

Schimper, in his recently published "Musci Europæi Novi," Fascic. 3, and characterized as follows:—

* The striæ as shown in the figures are not intended to represent the distance apart as described in the text, but the general appearance of the valve as seen by oblique light.

D. aretieum, Schpr. Monoieous, eæspitose, without tomentum, 2 to 5 inches high, simple or diehotomous (fig. 168), leaves ereeto-patent, rarely subseeund, nearly straight, the lowest minute, lanceolate, nerveless, upper from an oblong base, lanceolate-subulate, quite entire, very eoneave, the margin ineurved so as to form a channelled subula (fig. 162). Alar eells orange-brown, quadrate, nerve narrow, compressed (fig. 170). Capsule (fig. 171) eernuous,

Fig. 170. Base of leaf magnified.

Fig. 171. Capsule.

subareuate, strumose, not striate. Annulus simple. Lid rostrate. Teeth purple, eleft to middle. The localities on the tiekets are Cairn-Taggart, and Loeh-na-Neem, and the speeies will rank next to Dieranum Starkii.—*R. Braithwaite, M.D., F.L.S.*

NILE MUD.

THE mud brought down by the Nile in sueh immense quantities at the period of the inundation (for at other times the water is almost pure) is in part distributed over the level land, thereby enriehing the soil; a part is deposited in the beds of the river and eanals, and a large quantity is earried into the sea. When the Nile is on the rise, the water gradually beeomes turbid, and finally assumes a reddish hue. This is of eourse owing to the large quantity of sand and elay whieh it brings with it in its rapid eourse from the upper eountries. The mud whieh is deposited in the bed of the river, when exposed to the sun and dried, immediately turns into sand; even by watering oeeasionally it will not assume the nature of that whieh has been deposited on the land. The reason is simple. The Nile washes over granite roeks, and earries away partieles from them, sueh as miea, felspar, and hornblende; even quartz, although the heaviest, is borne along by the impetuous foree of the stream. The lighter substanees, miea and felspar, the latter of whieh is dissolved, together with elay, are earried over the fields, and form that rieh blaek soil of whieh the Delta for the most part is eomposed. The heavier particles are deposited in the bed of the river, and form a very fine sand. It has been proposed, as a matter of speculation, to utilize the sand (whieh is improperly ealled Nile *mud*) by sending shiploads of it to Europe for the purpose of manuring the land, as they do with guano. This would be a great mistake. It eontains very few manuring properties, being really nothing but sand. It would be a good thing for Egypt if it could be got rid of, because it ehokes up the river and the eanals. The Arab eultivators never make use of it as manure, although they make use of pigeons' dung and deeayed vegetable matter. On the eontrary, when the soil is too rieh, they mix this river sand with it. The houses, or rather huts, of the poor Arabs are eonstrueted of mud brieks dried in the sun, but they do not use the *mud of the river*, as bricks made of it would erumble to pieees immediately on being dried, even when mixed with straw. For this purpose they use the stiff soil of the fields. This applies also to burnt brieks. Should any European, therefore, be so foolish as to engage in sueh a wild speculation as that referred to above, he would find that he has had his pains for nothing, for his *mud* will turn into sand, and be good only perhaps for mixing with lime to make mortar. Even for this purpose the Arabs of the villages eonsider it worthless. There is little doubt, however, that a eargo of the rieh, blaek, alluvial soil whieh is to be found on the *sides* of the embankments along the Nile and the large eanals would be very valuable. This soil elose to the embankments is in many plaees from 20 to 30 feet deep. The large eanals are eleared out about every third year. From 20,000 to 30,000 Fellahs are impressed by the Government for this work on eaeh eanal. This operation of eourse takes plaee when the Nile is at its lowest. The embankments are also repaired or strengthened throughout about onee in every three years. This strengthening merely eonsists in making the embankments higher with earth. It has been said and with truth, that the beds of the Nile and the canals are rising higher every year. But the embankments are raised in proportion, and it is probable that the whole of the Delta is beeoming gradually more elevated. There is therefore no fear that the Nile will lose its bed and be direeted into some other ehannel. During a great part of the year the eountry suffers mueh from the want of water, and there is no doubt that if the irrigation of the lands was managed properly, the eountry would produee at least three times as mueh as it does. The waters subside very fast, and the poor Fellahs have not always the means of raising it up the steep embankments. Many Europeans have proposed to ereet steam pumps in the interior for the purpose of supplying the eultivators with water for their erops at a eheap rate. The Fellahs would be very glad to adopt the proposition, but the Vieeroy will not allow it, as he says it would inter-

fere with the irrigation of his own lands. It would be a fortunate circumstance for Egypt were the bed of the river and the canals really composed of stiff clay, or soil or mud properly so called, instead of sand, because then the inhabitants could repair their embankments with it. As it is, they are obliged to dig up the earth from the fields on both sides, thereby causing double labour, and destroying a large portion of arable land. The sand which they remove in cleaning out the canals is a great embarrassment. They do not know what to do with it. It is no use as manure, and it would never do to put it on the embankments, because in a few days it would be all blown away by the wind. Even if not blown away, still it would be a great inconvenience, for the embankments, being the highroads of the country, would be almost impassable with two or three feet of sand upon them. Besides, it would offer but a very feeble resistance to the impetuosity of the water in a high Nile. The consequence is that they remove it a little on each side of the canal, leaving the middle only clear. When the Nile rises, all this sand is of course carried back again to the centre of the canal. The Nile itself is never cleaned out or dredged. It is stated that in ancient times there were large caves, either natural or formed artificially for the purpose, in Upper Egypt, into which the superabundant waters of the Nile were diverted and preserved until wanted in the lower country. These immense cisterns are, it is believed, now for the most part choked up with sand. Perhaps it would not be too wild a scheme to propose that they should be restored to their original uses. This may be, however, impracticable, but a system of floodgates might be adopted in the canals, as in other countries, to prevent the water from going to waste—from going, in fact, into the sea. Were such a measure carried out, it is not too much to say that the canals would not be dry for so many months of the year as they are now. The pyramid at Dashoor is composed of mud bricks which have withstood the ravages of three thousand years. Had these bricks been made of the so-called Nile mud, they would have crumbled to dust ages ago; in fact, the pyramid could not have been built with them at all. The real Nile mud is that which is washed up on the sides of the embankments, and that which is carried over the fields when the river is high. This mud serves the Arabs in various ways besides fertilizing their lands. They make bricks with it, both burnt and unburnt. They use it mixed with chopped straw to plaster their houses inside and outside. They also use it as mortar without straw. They construct water jars and various kitchen utensils with it; and they seal their magazines or store-houses with it. This mud, when preserved in a cool place, becomes extremely hard, as may be seen in the Nilometer at Roda.—*E. St. John Fairman.*

ZOOLOGY.

A ROBIN'S PUNISHMENT.—About a month ago a robin, which was allowed to fly about my room, swallowed a butterfly ready set for the cabinet, and with it the needle, with which the body was transfixed. This took place in the presence of my son and of a young girl, who happened to be in the room at the time. For several days the bird was much less active than usual, remaining quite still, with its feathers disordered, and rarely attempting to fly; in short, poor robin was evidently anything but comfortable after his meal. By degrees these symptoms passed away; the little animal resumed its usual cheerful habits, and no one would have supposed that it had a long needle inside it! However, at the end of about ten days, the feathers of the neck began to raise themselves, and in a short time became decidedly upright. Next a bright spot made its appearance on the surface of the skin, which proved eventually to be the point of the needle projecting among the feathers. The bird was constantly scratching the place, and made numerous attempts to extract the cause of its trouble with its beak; at the same time it betrayed no symptoms of dulness, or of being out of health. Yesterday morning the needle was found lying on the floor, and since then the neck feathers have resumed their customary appearance. I have kept the needle, on which are still to be seen traces of dried matter, and fragments of feathers.—*From the "Leipziger Tageblatt," Nov.*, 1866.

BONNETS AT FAULT. — The note in SCIENCE GOSSIP on the dislike of a canary to certain colours, has recalled to my recollection an equally singular caprice in some eagles. About thirty years ago, being in Yorkshire, I received an invitation to join a pic-nic party at Whotley Park. After we had discussed the good things provided for the dinner, it was proposed to pay a visit to see the eagles, when our host informed the ladies that it was absolutely requisite to remove their bonnets before they approached the large cage where the birds were kept. This being done, we had a long and satisfactory view of three majestic eagles, who appeared to eye us with great disdain. When some of the party resumed their bonnets (not the *small things* worn now), the eagles, with loud screams, flew into an inner apartment out of sight. This, I was told, was their constant habit, and that the bonnet was the only thing to which they had any dislike.—*J. B. B.*

DESTRUCTION OF RARE BIRDS.—In his "Birds of Norfolk" Mr. Stevenson records the destruction of sixty-five specimens of that rare and beautiful bird, the Hoopoe, in that county alone between the years 1850 and 1865.

The Palmate Newt.—It may interest some of my fellow-subscribers to your interesting periodical if I inform them that I have met with the Palmate Newt (*Lophinus palmatus*) in this neighbourhood.—*Wm. Nettleton, Huddersfield.*

Slowworm (p. 112).—These are very interesting creatures, and are by no means difficult to keep in health, and in apparent comfort, even in Wardian cases; but, of course, the more space the better; let them only have a little fresh moss, and places to hide in,—a broken garden-pot, with some coarse dry sand or earth in it. We had one in London for years; it became tame, and would readily, when hungry, take a small slug (they refuse the large coarse black slugs) from the hand; but it might be well at the first to put in with him a good number of small ones,—the common small grey garden slug is his favourite. I do not remember to have ever seen him eat worms. Their movements are extremely graceful, and I have no doubt they will climb: they are very fond of basking in the sunshine.—*W. P.*

Crane at Sandhurst.—On the 1st of May I saw that *rara avis*, the Crane, in the marshes near Sandhurst. Have any of your readers ever seen this bird at a place as far inland?—*F. W. Gibson, M.D., Broadmoor, Berks.*

[Is our correspondent certain that he saw a veritable "crane"?—Ed.]

An Ocean of Fire.—As the ship sails with a strong breeze through a luminous sea on a dark night, the effect produced is then seen to the greatest advantage. The wake of the vessel is one broad sheet of phosphoric matter, so brilliant as to cast a dull pale light over the after-part of the ship; the foaming surges, as they gracefully curl on each side of the vessel's prow, are similar to rolling masses of liquid phosphorus; whilst in the distance, even to the horizon, it seems an ocean of fire, and the distant waves breaking, give out a light of an inconceivable beauty and brilliancy; in the combination the effect produces sensations of wonder and awe.—*Wanderings of a Naturalist.*

Preserved Fishes.—Recently we alluded to the excellently preserved fishes exhibited by Captain Mitchell at the Paris Exhibition. We have since had our opinion of their merits confirmed. Dr. Gunther, in a recent number of the "Annals of Natural History," unhesitatingly affirms that in his large experience these are the best-preserved fishes he remembers to have seen. Moreover, it is whispered that the International Jury has awarded for them a medal.

Malayan Birds and Insects.—Mr. A. R. Wallace's very interesting collection is being exhibited at 76½, Westbourne Grove.

Death Adder of New South Wales.—This hideous reptile is thick in proportion to its length; the eye is vivid yellow, with a black longitudinal pupil; the colour of the body is difficult to be described, being a complication of dull colours, with narrow blackish bands, shaded off into colours which compose the back; abdomen slightly tinged with red; head broad, thick, and flattened. The specimen I examined measured two feet two inches in length, and five inches in circumference. It is, I believe, an undescribed species. A dog that was bitten by one died in less than an hour. The specimen I examined was found coiled up near the banks of the Murrumbidgee river, and being of a torpid disposition, did not move when approached, but quietly reposed in the pathway, with its head turned beneath the belly.—*Bennett's Wanderings.*

Flying Fish.—The greatest length of time that I have seen these volatile fish on the *fin*, has been thirty seconds, by the watch; and their longest flight mentioned by Captain Hall, has been two hundred yards; but he thinks that subsequent observation has extended the space. The most usual height of flight, as seen above the surface of the water, is from two to three feet; but I have known them come on board at a height of fourteen feet and upwards; and they have been well ascertained to come into the channels of a line-of-battle ship, which is considered as high as twenty feet and upwards. But it must not be supposed they have the power of elevating themselves in the air, after having left their native element; for, on watching them, I have often seen them fall much below the elevation at which they first rose from the water, but never in any one instance could I observe them raise themselves from the height at which they first sprang, for I regard the elevation they take to depend on the power of the first spring or leap they make on leaving their native element.—*Wanderings in New South Wales.*

Portuguese Man-of-War.—This splendid physalia is often seen floating by the ship; the inflated, or bladder portion of this molluscous animal, glowing in delicate crimson tints, floats upon the waves, whilst the long tentaculæ, of a deep purple colour, extend beneath, as snares to capture its prey. It is oftentimes amusing to see persons eager to secure the gaudy prize; but they find, by painful experience, that, like many other beautiful objects of the creation, they possess hidden torments; for no sooner have they grasped the tinted and curious animal, than, encircling its long filiform appendages over the hands and fingers of its capturer, it inflicts such pungent pain, by means of an acrid fluid discharged from them, as to cause him to drop the prize, and attend to the smarting occasioned by it.—*Bennett's Wanderings.*

Cheating a Spider.—One day last autumn on going into one of the greenhouses, I noticed a fine spider web stretched between the lower part of a wire basket, and some long depending stems of the Ivy Snap Dragon hanging over its sides. A tray of silver sand standing near suggested to me the idea of testing for myself, the different adhesive powers of the concentric and radiating threads of the web. I took a small pinch and from a little distance gently threw it on to the web, which was immediately speckled all over almost as one sees them glistening with dew on an early morning. There was far less sand retained by the radiating threads, than by the concentric ones, but still there was some. Whether my friend the spider recognized the true state of affairs, or imagined the agitation was caused by some unhappy fly, whose intrusion he was prepared to resent, I cannot tell; but at all events, he was down "like a shot" into the centre of the web, and I imagined was somewhat non-plussed at its remaining perfectly motionless; with its anterior pair of legs it then seized two of the radii, and gave the web a good shake. As this elicited no response, it turned, and rapidly retracing its steps, took up its position at the bottom of the flower pot. In a few seconds I treated it to a little more sand, and again almost too quickly to be followed by the eye it was in the centre of the web, and once more made use of the same shaking process to ascertain what was the matter. Four times I threw in the sand, and four times it responded by putting in an appearance, but the fifth time it seemed to have gained wisdom by experience for it would not stir. I waited for a longer interval, and then tried it again, but the fact still seemed fresh upon its memory and it remained *in statu quo*. By this time the web contained about as much sand as it comfortably could, so as I resolved to try the experiment next day, I thought it would be as well that we should have a fresh web, and so swept away the old one. Next morning on paying my visit I found a first-class web in about the same position, but I could not detect the whereabouts of the spider; however, no sooner had I made advances by an offering of sand, than he took the field as before, prepared to wage an exterminating war with all or any trespassers on his domain. I was called away just then, and when I next visited the place there was no trace of either spider or web. I do not know the specific name of the creature, but it was a small black one of the geometrical kind. I was not aware till I read your last number, that there was any difficulty in cheating a spider, but I firmly believe this one was taken in. I am not in a position to speak positively, and should feel some diffidence in doing so in the face of Professor Rennie and the Rural D.D., but I am of opinion that as the Notonecta will seize the finger, or indeed almost anything if dipped gently in the water, it does so with the idea that it is going to have a meal; and as the death-watch (be it Anobium or Atropos) will tap several consecutive times at a good imitation of its call (as I have proved on several occasions), I imagine it believes itself answered by one of its own species, and so I believe that the light falling of some grains of sand upon a spider's web produces a vibration so similar to the contact of a fly, that the difference cannot always be recognized by the spider, cunning though he be.—*Frederic Henry Ward, Manor House, Poplar.*

Striped Hawk-Moth.—In the June number of Science Gossip, it is mentioned that a specimen of that rare moth the Striped Hawk (*Deilephila Livornica*), was found this spring in Ireland. I have also been so fortunate as to obtain a fine specimen of this moth, which was taken at Bredbury, near Stockport, on the 27th of April last, a remarkably early time of the year. It appeared to have just emerged from the chrysalis, and was caught in a garden on a window sill, by a friend who did not know at the time the rarity of the specimen.—*William P. Marshall.*

Hair-Worms.—The violent thunderstorm accompanied by a deluge of rain, which burst over the metropolis in the early morning of Monday, 3rd June, was followed in the course of a few hours by a curious phenomenon, but rarely observed. The rose-bushes and other shrubs in various gardens at Kennington, Brixton, and other southern suburbs, were seen to be swarming with small slender hair-worms (about 2 or 3 inches long, and not thicker than a lace-pin). These creatures are occasionally found in the earth, but they are parasitic in the bodies of different kinds of insects. A correspondent from the neighbourhood of Carlisle, in a letter also dated 3rd June, informs us that he had found a number of these creatures in his garden, stating that "they come out in quantities in our garden on *damp* evenings. They are long hairlike-looking worms, from 3 to 4 inches in length, rather pale in colour, and their habit is to wind half of their length round some leaf or stalk, and make a circular sort of motion in the air with the other half." Their history is very obscure, but we believe they are in no wise injurious to plants.—*J. O. W., in Gardener's Chronicle.*

[See also Science-Gossip, for 1865, pp. 107, 197, 288, and 1866, p. 255.]

Gannet and Diver.—A Gannet was caught alive at Coggeshall, Essex, a short time since, as was also a Black-throated Diver. Both of these birds are considered rare visitors in that neighbourhood. —*C. Denny.*

BOTANY.

An Ancient Rose-tree.—While very old oaks yews, and chestnuts have each found their "vates" to embalm their memories in the pages of history, there is an humbler member of the vegetable kingdom which has not, so far as I know, found a place in English botanical records. I allude to an exceedingly ancient rose-tree at Hildesheim, in Hanover, which is still flourishing (as a friend of mine, who has lately seen it, tells me), with all the vigour of youth. This remarkable tree (or rather climber, for it is supported against the wall of a church), was in existence when Christianity itself was little more than 1,000 years old; and, if we may believe tradition, had even then been blooming for well-nigh 300 summers! But I will give its history in the words of the well-known botanist, Herr Leunis, himself a resident at Hildesheim. "The oldest known rose-tree in the world is one at present growing against the wall of the cathedral of this town (Hildesheim), remarkable alike for its extreme age, and for the scanty nourishment with which it has supported itself for so many centuries. It varies but slightly from the common Dog-rose (*R. canina*): the leaves are rather more ovate, the pedicels and lower leaf-surfaces more hairy, the fruit smaller and more globular. The stem is 2 inches thick at its junction with the root, and the whole plant covers some 24 square feet of the wall. Bishop Hezilo, who flourished 1054—1079, took special interest in this rose as being *a remarkable monument of the past;* and when the cathedral was rebuilt, after being burnt down in 1061, he had it once more trained against the portion of wall which had been spared by the fire. Tradition states that, in the year of grace 814, the Emperor Ludwig the Pious, son of Charlemagne, was staying with his Court at Elze. Being desirous of hunting in the huge forest where now stands Hildesheim, mass was said by the Imperial Chaplain at the place of rendezvous. By some mishap, when the service was concluded and the party dispersed, the vessel containing the sacred elements was left behind. On returning to the spot the following day, great was the surprise of the chaplain to find the holy vessel overshadowed by the tender branchlets of a lovely rose, which had sprung up in the night, and now filled the air with the perfume of its flowers. The Emperor shortly after arrived and by his command a chapel was built, with the altar standing on the spot occupied by the roots of the rose,—that very rose which is now blooming as freshly as though a single decade, and not a thousand years, had passed over its head!" So far tradition. Certain it is that the roots of the existing rose-tree are buried under the altar of the cathedral, and, consequently, are *inside* the building, the stem being carried through the wall to the outer air by a perforation made expressly for it. My informant tells me that the plant is held in the highest veneration by the inhabitants, and that no one is permitted to gather the flowers or break the branches.—*W. W. S.*

Carex Buxbaumii.—Your readers interested in our native plants will be glad to hear that *Carex Buxbaumii* (*Wahl.*), *Carex canescans* (*Linn.*), still exists near Toome, co. Derry, This rare species is in Britain only found within the compass of a few square yards, and Dr. Dickie, in the "Flora of Ulster," issued a few years since, says, "it is perhaps now lost through the partial drainage of the lake." In the "Cybele Hibernica," published last summer, it is mentioned as gathered in 1855 by the late Mr. Woods. Further, I was informed by the caretaker of the grounds on which the plant is found that, four years since, a gentleman had been there and taken away a specimen of a *grass* which was not to be had anywhere else. If this meet the eye of the aforesaid botanist, he will learn that his visit is still remembered.

On the 1st of June of this year, the Belfast Naturalists' Field Club made an excursion to Toome; and, starting by a train in advance of my fellows, I had a few hours to search for the *carex*, which, to my great delight, proved to be still occupying the very limited area where Dr. Moore discovered it more than thirty years ago.

It is satisfactory to record that the visit of the Belfast Club to Toome did not involve any injury to the *Carex Buxbaumii*. It is, perhaps, the most elegant of our carices, and its extinction would be a grievous loss to the Irish Flora. The perennial roots were left untouched, and two flowering stems only taken away. One of these now adorns my own herbarium; the other is reserved for my friend, R. Tate, Esq., F.G.S., as a souvenir, reminding him of our joint attempt last summer to find this plant, which attempt only failed for lack of a very necessary element in these pursuits,—time.—*S. Alex. Stewart, Belfast.*

Oxlip.—Is there not some mistake about the true Primula elatior (Jacq.) growing on the Mendip Hills? Will it not rather be a caulescent form of the common primrose? I laboured for some time under the delusion that I had the true oxlip in my herbarium, which afterwards proved to be only Primula vulgaris β caulescens. If it is the true oxlip, it will be a very interesting locality.—*R.*

Natural History has been said by some to be a study of facts; by others, a science of observation. Each of these statements is, to a certain extent, true; it is only by observation that we can acquire a knowledge of the facts upon which all ulterior views must be based.—*Rev. Leonard Jenyns, M.A.*

MICROSCOPY.

Examining Soundings, etc.—As I was looking through a great many specimens of foraminiferous soundings from the Indian ocean, which I received through the kindness of Mr. Latimer Clark, I felt much inconvenienced by constantly stretching my neck towards the sky in order to examine the objects in a good light with my Coddington lens. Moreover, it took some time and trouble to fix some of the ooze between the two plates of glass. A glass prism happened to lie on the table, and I found that if the object is laid on one side of the same, and

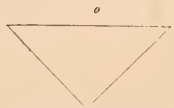


Fig. 172. Section of Prism.
o indicates the position of the object.

which is held horizontally, then the other side will reflect the sky light through the object into the eye in a manner exceedingly pleasant to the observer. In this manner a drop of water may be examined, which will not run off. A rectangular prism I found to be better suited then an equilateral one, and it may be mentioned that the quality of glass being of no consequence, the expense of one is very trifling indeed. I mentioned this application of the prism to several microscopic friends who did not know of it, and I think its publication in the Science-Gossip may be a welcome hint to microscopists.—*C. Becker.*

Movement of Diatoms.—Mr. Bockett's idea of the nature of the motive power of diatoms is very ingenious; but, as it differs from the opinion I have formed after a long course of observation, I venture to offer a few notes upon the subject. We may take it for granted that a diatom moves by means of organs, acting either upon the water surrounding it, or upon the solid matter over which it glides. That it moves with considerable force is evident from the ease with which it pushes its way through particles of sand, and masses of tangled conferva. To produce this force, any organs acting only upon the water would have to move with considerable velocity, and would cause a commotion in the immediate neighbourhood of the diatom, which would be rendered plainly visible by the agitation of the minute particles floating in the water; but no such disturbance is perceptible. Besides this, the diatom would have the power of moving when suspended in the water, but it appears quite helpless when so situated. We may therefore reasonably conclude that diatoms do not move by means of organs acting upon the water. Of the other known modes of propulsion, there are only two which seem worthy of consideration; the first of these, by means of the protrusion of sarcode or endochrome, so as to form pseudopoda, seems unlikely, from the consideration that if such organs existed, we might reasonably expect that they would be visible in our microscopes; the steady uniform gliding motion of the Naviculæ seems rather to point to the other form of motive power, the type of which we find in the Gasteropoda; that is to say, in wave-like motions of the so-called foot. It is generally admitted that diatoms have an external layer of soft homogeneous matter, which has to be removed with acids in the process of preparing the valves for mounting. It is possibly in this layer, and in the line of the keel, that the power of motion is situated. I have observed that the Naviculæ always move with their keel pressed against the substance over which they are passing; I have seen them leave the glass slide, and pass over a surface perpendicular to it, and in doing so they have turned over at right angles so as to keep their keel pressed against the new surface; even in this position I have seen nothing of the wave-like motion, but it is quite possible that it may never be seen, for even in a snail it is only visible under exceptional conditions, such as when it is seen crawling over a pane of glass. I have fancied that I have seen a motion of this nature in *Bacillariæ*, and it is difficult to account for the movements of those singular organisms in any other manner, as all who have watched their wonderful military-like manœuvres will admit. We see what we may call a company slowly stretch itself out into a long single file, then in an instant, as if anticipating a charge from some of the *lanceolata* about, fall back and form square "with inconceivable rapidity." Now if we suppose that each member of this company has the power of gliding along its neighbour, it is evident that acting simultaneously, no more time will be required for the whole line to draw back than for one of the diatoms to crawl its own length.—*F. W. M.*

What to do, and how to do it.—He who would learn the exquisite delights Nature has for those who ardently pursue her, and would acquire a deep sense of reverence and piety in presence of the great and unfathomable mysteries which encompass life, must give his mornings to laborious searchings on the rocks, his afternoons to patient labour with the microscope.—*Lewes' "Sea-side Studies."*

Medium Size.—The largest animal known is the Rorqual, which is about 100 feet in length. The smallest is the Twilight Monad, whose dimensions are 12,000th of an inch. It is evident that the middle term is $\frac{1}{3}$rd of an inch, about the length of the common house fly, which may therefore be considered as an animal of medium size in the creation. —*P. H. Gosse.*

NOTES AND QUERIES.

Struck by Lightning.—On Friday, the 7th of June, during a thunderstorm, which passed over Shiere, near Guildford, a man, who was ploughing at the time, and his two horses, were instantaneously killed by the lightning. The tobacco-box and knife which were in the pocket of the deceased ploughman, were rendered magnetic. No mark of any kind was visible on the bodies of man or beast.—*E. C.*

Gold Fish.—Would any of your correspondents have the kindness to inform me what is the best way of rearing gold fish out of doors? About a fortnight ago I put a few of them into a small pond in my garden, thinking they would there take care of themselves. Two of the number have already died, and a third looks as though he would soon follow. I may mention the pond is about 9 feet by 5 feet, and in depth slopes from 8 inches to 14 inches. The bottom was recently laid with Portland cement. There is a constant change of fresh water, as a jet rises from the centre of the pond, and trickles down from a series of basins. A few worms appear to have crawled in, and there is also a little vegetable *débris* in the form of leaves and scales, that have blown in lying at the bottom.—*G. A. W.*

Gnat-Bites.—Prevention is better than cure. Upon that principle I advise D. G. to garnish his hat this summer with a bunch of elder flowers. The scent of this blossom is much disliked by the insect in question. When the elder bloom is over, I think that washing the face with elder-flower water before going out, might answer the same purpose. At any rate, I know it is a very soothing application after a bite.—*Helen Watney.*

Gnat-Bites.—In reply to "D. G.," I can inform him, that if he rubs the place bitten with a piece of washing soda, or with hartshorn, it will stop the irritation. I used to have a bite trouble me for weeks sometimes, till I tried this. The poison seems to be of an acid nature. Flies, during the summer, are very troublesome, too; but this may be effectually prevented by bruising two or three elder-leaves, and rubbing them over the face and hat. The flies will not settle. In driving, it is a good plan to do the same with the head, &c., of the horse. It saves a deal of misery.—*E. T. Scott.*

Meerschaum.—"What is meerschaum, and how is it identified when manufactured into pipes?" asks C. M. in Science-Gossip. The word meerschaum is the German for sea foam, and it is so called from its lightness and white appearance; but it really is a mineral of soft texture, not unlike chalk. It is composed of *silica*, *magnesia*, and water. The Turks absolutely employ it as a substitute for soap in washing, for it is quite soft and soap-like when first dug from the earth, and it lathers in water, and will remove grease. When shown at the Exhibition of 1851, the jury came to the conclusion that there was no certain test for distinguishing the true meerschaum from the imitation, but the pipes made of the false are generally heavier and less perfect than those made from the true. There are many blemishes caused by the presence of foreign minerals in the genuine. I am told by smokers that the much-admired yellow colour, which is brought out after long smoking, is produced by the blocks having been kept for some time in a mixture of wax and fat.—*Helen Watney.*

What is Meerschaum?—In reply to your correspondent "C. M.'s" inquiry, "What is Meerschaum, and how is it recognized when manufactured into pipes?" perhaps the following may suffice:—1. It is a hydrated silicate of magnesium. 2. Its chemical composition is ($Mg_2\ Si_3 + \frac{a}{2}\ H$), and its percentage composition is,—

Silica	62·6
Magnesia	28·3
Water	9·1
	100·0 (*Nicol*).

Several varieties are known. 3. Generally associated with hornblendic rocks. 4. It breaks with a fine earthy fracture, that is, like fine-grained chalk. 5. Its hardness is about 2°, or, in other words, it may be scratched with the finger-nail. 6. Its specific gravity is 0·8, hence it will float in water, and it is from its being picked up at times floating on the sea that the Germans call it "foam of the sea," this being the meaning of the word meerschaum. 7. It has a greasy or soapy feel, in common with most magnesian minerals. 8. When a fractured surface is applied to the tongue it adheres strongly. It is brought principally from Asia Minor, Greece, near Madrid and Toledo, Moravia, and Wermeland. The best tests are those numbered 4, 5, 6, and 7. The above account is that given by Professor Smyth, M.A., in his course of lectures on "Mineralogy," to the students of the Royal School of Mines, Jermyn Street. I may, perhaps, add the pipes are made from the solid mineral, which is steeped in oil or wax, only the inferior articles being made from the compressed scrapings. The specific gravity of it is one of its most distinctive properties. Specimens may be obtained from most dealers in minerals.—*Archd. Liversedge.*

The Oxlip.—I have often found the oxlip growing with the cowslip, both in Wales and Hampshire, but I don't remember ever having seen it growing with the primrose. I have seen it stated that Professor Henslow found the primrose, cowslip, and oxlip, produced from the same root; but the general opinion, I know, is that the *Primula elatior* is a hybrid between the cowslip and the primrose. The oxlip is of much more vigorous growth than the cowslip, has scentless, pale yellow flowers, and the tube of the corolla is much longer than the calyx. A friend of mine brought in a very fine specimen this spring which he had found growing with cowslips in a field at the back of the lodge.—*Helen Watney.*

Squirrels Perforating Nuts.—Having had a squirrel in confinement for the last eight months, I can endorse what Mr. Buckle says with regard to their method of breaking open the nutshell before beginning to eat the kernel. My squirrel always bites a little irregular hole in the nut, and then breaks off a portion of the shell sufficiently large to enable him to get at the eatable morsel it contains, which he immediately sets about devouring with great apparent relish. What squirrels when at liberty may do to nuts growing upon trees I do not know.—*Helen Watney.*

Tail of Locust.—In the *Clerical Journal* for June, 1866, there is an account of a flight of locusts over Bethlehem; and, in describing one which had dropped, it is said to have had a tail like that of a scorpion. Is there a known variety with such an appendage?—*J. M. P.*

KILLING COCKROACHES.—In answer to J. G. in your last number, I beg to recommend phosphor paste spread on bread and butter (I dare say almost any eatable would do, but this is what I used), as a remedy for Cockroaches. Some years ago my house swarmed with them, but some ten days (more or less) after this treatment none were to be found. I am told these creatures are cannibals, and I believe it is so; and, if so, the riddance of their presence is easy to be accounted for. While speaking of these unpleasant intruders, I should like to ask if any of your readers have met with intestinal worms in them. I have been working at Cockroaches a little of late, and have found several with these worms in the intestinal canal—all sizes, $\frac{1}{10}$ to $\frac{1}{5}$ of an inch in length; but all the large ones have eggs in them, which generally are extended from the body of the animal as soon as it dies.—*W. Hanwell.*

NEST OF THE HYDROPHILUS.—Should any of your readers be curious on the subject of the nests of water insects, let me recommend them to procure a pair of the large harmless Water-beetle (*Hydrophilus Pireus*). Yesterday morning I saw Mrs. Hydrophilus cutting up a whole water-plant of a thin grassy kind, and, suspecting her purpose, I removed her with the plant, and a few stray leaves of another, from the aquarium to a separate jar. There, she first made a white silk bag out of materials provided by herself, laid a large number of eggs in it, tied it up, made a basket round it of the water plant, and closed it up with a *handle* made of another plant, which she painted of a brown colour with her ovi-positor: my children and I watched the whole process—she was far too much absorbed to notice us—the result is a thing looking like a miniature swan! the handle sticking up like the head. Can any of your readers inform us how long her eggs will take to hatch? I *have* succeeded in hatching the eggs of the water-snail, and can only suppose that on former occasions the contents had been devoured before we removed them.—*L. H. F.*

DEAD BLACK.—Mix lamp or vegetable black with common size, or, what is still better, turpentine. I should think a good instrument for the taking of skeleton-leaves off blotting-paper, and moving from place to place, would be a pair of forceps or tweezers, as used by gold-beaters in laying the gold-leaf on the books.—*Geo. Scovell.*

TO FASTEN DIATOMS.—In reply to E. W. Schoenebeck, respecting fastening the diatoms on the slides, Professor Williamson adds a few drops of gum-water to the last washing, which causes them to adhere to the glass sufficiently to prevent the balsam conveying them away. (See Davies on Mounting, p. 62).—*W. Fletcher.*

DAISY AND BUTTERCUP, BOTH WITH FASCIATED STEMS (G. B. and A. M. M.).—In these specimens it is clear that not only is there flattening, but also a fusion of several flower-stalks into one. Moquin Tandon, the great authority on these subjects, considered fasciation as the result simply of the flattening of a single stem.—*M. T. M.*

THE ZOOLOGICAL SOCIETY OF HAMBURG is desirous to obtain living marine animals for the aquarium. Liberal prizes will be given for desirable specimens delivered near London, and collectors are invited to apply in the first instance to Mr. W. A. Lloyd, Zoological Gardens, Hamburg, North Germany.

WEATHER-WISE.—In the country the weather predictions which are the most popular next to those of Moore's or Poor Richard's Almanacks depend upon the estimation of trees as thus:—

> If the Oak's before the Ash
> We may then expect a splash,
> With the Ash before the Oak
> We are sure to get a soak.

The simple meaning being, that if the leaves of the ash come out before those of the oak we are to expect but a splash or dash of wet for that season; but if the oak take precedence, much wet is to be expected. Now, as I happened to travel from Dorset to London on the 10th of May of the present year, I noticed that while the oak was almost sufficiently leafy to conceal a king, the ash was one uniform bundle of bare twigs; but, strange to say, that this state of things only continued as far as Swindon, as from a little beyond Swindon, and more certainly in the London district the ash was the most forward. Are we, then, from these facts, to predicate a different summer for the west from that of the east; and, if we are not, "Francis Moore, physician," and Old Richard ought to have left us eastern and western weather predictions? Some years there is good reason for gardening and farming according to the behaviour of the leaves of the elm-tree, as thus:—

> When the elmen leaf is as big as a farding,
> It's time to sow kidney beans in the garding;
> When the elmen leaf is as big as a penny,
> You must sow beans if you aim to have any.

But also for this year those who obeyed the first injunction have suffered woefully! Nay, more,—even the cautious ones who waited for the penny size have in the west suffered grievously from the frosts of the 22nd, 23rd, and 24th of May, and, indeed, we are all sowing afresh. It remains to be seen how far this kind of almanac will be right as regards barley sowing, the country legend being as follows:—

> When the Elmen leaf is as big as a mouse's ear,
> Then to sow barley never fear.
> When the Elmen leaf is as big as an ox's eye,
> Then says I, "hi boys, hi!

As a rule, barley may safely be sown as soon as the elm-buds burst; but if left until the leaf is nearly grown, it will be usually too late to insure a good crop; but this year some of the earlier sown barleys have suffered like most other things from an unusually severe spring. These remarks may, perhaps, serve to show that it is as difficult to make weather predictions come true by rhyming as it is by reasoning. —*J. B.*

DEAD-BLACK.—The dull-black used by opticians for "coating" the insides of microscope and telescope tubes, is a mixture of the best "lamp-black" and "lacquer." The former should be well pulverized, adding sufficient of the latter to give it the fluidity of ink. If too much lacquer be present, a "glossy" instead of a "dead" surface is the result. It may be laid on with a sable brush after shaking the bottle, and the tubes must be heated to insure quick evaporation.—*Thomas Curtis.*

STICKING DIATOMS.—In your last number Mr. E. W. Schoenbeck inquires how diatoms may be made to stick on the slides before being mounted in balsam. If he will place a thin film of a very weak solution of gum on the slide, and then deposit the diatoms in it, and allow it to dry, he will find them sufficiently fixed to prevent their being floated out by the balsam.—*T. W. G.*

Poisonous Flies.—The Austrian journals state that swarms of poisonous flies have made their appearance in Transylvania, and that more than a hundred head of cattle have perished. The farmers are compelled to keep their beasts shut up, and large fires are burning night and day around the sheds to keep off this unwelcome visitation. During one day, when rain fell copiously, they disappeared, but as soon as the weather became fine again they reappeared. The men in charge of the fires have the greatest difficulty in preserving themselves from their venomous attacks, and find tobacco the best preservative.—*Dorset County Express.*

Perforated Nuts.—I have frequently, in my searches for shells or mosses, found the perforated nuts referred to in your June number by Dr. Buckell. In woods and shady places I often come on little cozy retreats, nicely stuffed with soft moss, evidently the habitation of some tiny animal whose "Kjokkenmoddings" contain numbers of shells of hazel nuts, in each of which a little hole is made so as to allow access to the coveted kernel. I have often tried to find out who the little fellow was, but I have not been successful. It is not the squirrel, he graces not our sylvan shades. The holes drilled in the nutshell are often so small that it is a puzzle to think how the contents were at all accessible by such means.—*S. A. Stewart, Belfast.*

Double Cardamine pratensis (W. H. T. N., Ludlow).—Your flowers are doubled not only by the substitution of petals for stamens, but also by the increased number of the former organs. Some of them are the subjects of "median prolification," *i.e.*, they have a secondary flower springing from the centre of the primary one, occupying, therefore, the normal position of the seed-vessel. This is not an uncommon occurrence in this plant.—*M. T. M.*

Mounting Diatoms.—If E. W. Schoenebeck will try the following simple process, I think he will find no difficulty in fixing his diatoms for mounting in balsam. Let him take some mucilage of gum dragon (Tragacanth) and make with it the thinnest possible smear in the centre of his slide; this may be kept moist by breathing on it, and the diatom may be laid on and pushed into the required position with great facility. When dry they may be mounted in balsam without any danger of displacement, and the gum will not interfere in any way with the clearness of the slide.—*F. W. M.*

Guaco.—There is a plant in America called "Guaco," and it is said that if you drink the juice of this plant you can handle the most venomous snakes without fear; and if they should *accidentally* happen to bite a person, placing a small quantity of the juice on the wound is said to cure it instantaneously. Is this true; and if so, what is the real name of the plant, and where is it possible to procure a specimen? There is also a bird called "the snake bird" which, when bitten by snakes (on which it preys), flies towards the above-mentioned plant, eats a portion of it, and returns to the attack anew.—*Henry Cooke.*

[There are several plants which pass under the name of "Guaco," and which are said to be beneficial in cases of snake-bite. One of these is *Mikania Guaco*, others are probably species of *Aristolochia*. In the majority of instances the reputed power is fabulous, and the substance extolled is inert.—Ed.]

Bird's-eye Primrose (*Primula farinosa*).—Would any of the readers of Science-Gossip be kind enough to inform me if they know which is the most southern habitat for Primula farinosa? I have yet to learn if this plant is found in Wales, or in Derbyshire, Lincolnshire, or any other county further south than Yorkshire, where it is plentiful. It was found at Pendleton, near Clitheroe, Lancashire, a few years ago, by a Preston botanist, and in 1865 I unexpectedly came upon it in a boggy field, a mile south of Pendle Hill, nearly two miles further south than the Pendleton habitat. It is also said to have been found near Marsden Hall, and Worsthorn, near Burnley, in Lancashire; but I have not yet been able to find it at these last-named places.—*T. Simpson, Burnley.*

The Caddis-worm. — Can any readers of the Science-Gossip explain the following unusual incidents connected with the Caddis Worm? Having caught a fine specimen, I introduced it into a can containing some young dace, intended as contributions to my aquarium; whereupon, the former having grasped the latter with its feet, gradually drew it within its case, until the head of the fish was completely hidden. Being desirous to fully comprehend the intentions of the Caddis Worm, I watched the proceedings until the fish remained perfectly motionless: the worm then released its prisoner, who, floating underneath the surface of the water, lay to all appearances dead, but after the lapse of ten or twelve minutes perfectly recovered itself. On putting the same worm into my aquarium I saw it fix itself at once on a "miller's thumb" that was groping about at the bottom among the stones, and remain there until the unfortunate fish rolled slowly on its side, and became quite stiff. Thinking it dead, I removed the Caddis Worm, and found my surmise was correct; for though I left it for upwards of two hours, I found it gave not the slightest token of life. Having previously kept several of the above species in the same vessel without any hostility evinced from either the one or the other, I am at a loss to account for the pugnacity shown by this individual specimen, and shall be glad if any one can offer an explanation of it.—*J. G. T.*

Tadpoles in Aquaria.—A circular fresh-water tank, which I have in a north window, had, from some cause which I could not explain, become very turbid. The other day I quite inadvertently put in a few tadpoles, and in less than twenty-four hours it became much clearer, and in a couple of days was clear as crystal, and so remains "unto this day." I find by observing these tadpoles, that they are first-rate scavengers, and would recommend my fellow readers who are not satisfied with the appearance of their tanks to try a few, and report the result.—*W. M. Nettleton, Huddersfield.*

Skylark.—I have recently paid much attention to this bird, with the following results:—Those inhabiting upland pastures are of a much lighter colour than those found on marsh lands. In singing, the upland larks appear to fly almost perpendicularly upwards, and continue their song for several minutes; on the contrary, the marsh larks fly spirally upwards, and sing only a short time. I would certainly recommend any one, when purchasing a bird for a cage or the avairy, to choose only those that are light coloured: they will be found superior in many respects.—*R.*

NOTICES TO CORRESPONDENTS.

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

G. E. F.—Only by moisture can you relax your specimens. Have you tried keeping the leg joints enveloped in wet bandages for a week or more?

E. T. S.—The fresh water species of *Cocconeis* are mostly more or less striated. See Pritchard's *last* edition.

ZOOPHYTE CLIP.—The Clip for *Zoophyte trough* figured at pp. 105, is sold at one shilling by J. A. Pumphrey, Birmingham.

J. G. B.—If, from any cause, the teeth of a rodent (as a rabbit) cease to meet, and thus wear away at the ratio of their growth, they will in time attain the length indicated in your sketch. Many similar instances are on record.

ERRATA.—At p. 142, line 15 for "carnels," read "carpels," line 40, 41, for "zoolitic," read "zoolitic."

G. B.—It is impossible to say, without seeing the specimen, what your plant is, which, though only half an inch in height, has root, stem, and flower. It may be *Cicendia filiformis*, or it may be something else. We have a specimen of *Aster trifolium* in flower that does not exceed one inch in height.—*M. T. M.*

F. G. B.—It is *Alchemilla vulgaris*.

A. A.—We cannot tell. Apply to the publisher or author.

G. A. W.—The bees forwarded are *Andrena albicrus*.—*F. W.*

E. J.—See SCIENCE-GOSSIP for 1866, p. 260, "Wanted to kill."

W. F. P.—The water wagtail often selects an equally eccentric spot for its nest, such as woodstack, a pile of stones, or an old wall.

A. M. D.—The publishers of the Rev. F. O. Morris's Catalogue of British Insects are Messrs. Longmans, London.

W. M. C.—British moths and their transformations was published by Professor Westwood, uniform with his volume of "British Butterflies."

J. H. (Devizes).—*Epipactis grandiflora*.

C. H.—Nave's Handybook will be out in a few days.

J. S. S. will probably find all the information he requires in the "Handy-book to the Collection of Cryptogamia," which will shortly be published by Mr. Robert Hardwicke.

A. M. E.—We have seen many such albinos.

G. G.—The name "Horse mushroom" is usually applied to *Agaricus pratensis*, a large species, employed for ketchup. In our opinion it is equal to *the* "Mushroom" cooked any way, and therefore we always eat them when we can get them.

J. W. W.—See "Bechstein's Cage-Birds." The Blackcap has been kept in confinement.

T. L.—Clearly not a gall, but probably a species of *Coccus*.

G. B.—We should think your Alga is a very young state of *Desmarestia aculeata*, although unbranched.

B. D. J.—Yes, it is *Carex axillaris*.

T. S. K.—No. 11, *Hypnum cupressiforme*. No. 12, *Metzgeria furcata*.—*R. B.*

W. R.—No. 1, *Thamnium alopecurum*.—*R. B.*

T. HOWSE.—No. 2, *Mnium rostratum*.—*R. B.*

J. C. D.—No. 2, *Mnium undulatum*.—*R. B.*

W. D. R.—The beetle is *Anchometrus prasinus*.—*J. O. W.*

H. H.—We cannot see how we could follow your suggestion, neither do we think it would be generally approved if we could.

T. C.—Potamogeton pusillus.

W. G.—The bee is *Andrena Trimmerana*, a species common about London.—*F. W.*

WITHAM'S BOOKS.—Mr. John Butterworth may procure either of Witham's works of Mr. E. D. Suter, 32, Cheapside, London.

A. (Dartmouth).—No. 3, *Plumularia falcata*. No. 6, *Sertularia abietina*; both common.—*E. C.*

A. W.—A species of *Amelanchier*.— *W. C.*

C. D. H.—It is *Thlaspi alpestre*.—*W. C.*

J. R. W.—No. 3. *Luzula campestris*.—*W. C.*

EXCHANGES.

BRITISH AND FOREIGN DIATOMACEÆ.—Twelve first-rat slides for the same number of good Entomological or Anatomical slides.—B. Taylor, 57, Lowther-street, Whitehaven.

ASPARAGUS BEETLES wanted for good microscopic objects.—J. H. M., 78, Week-street, Maidstone.

BRYUM TURBINATUM in fine condition for other good mosses.—R. G., 42, William-street, Ashton-under-Lyne.

RARE BRITISH FERNS for others, or dried fronds of the same.—Send list to J. E. M. Woodfield, Stoney-lane, Birmingham.

GOLD FISH SCALES for other objects. For Pike scales, send stamped envelope to F. S., Post Office, Rugeley, Staffordshire.

ORTHOSIRA ARENARIA, and *Eupodiscus*, from Melbourne (mounted), for diatomaccous earth, or other material.—W. S. Kent, 56, Queen's-road, Notting Hill.

FATTY ACIDS mounted for good polariscopic objects, mounted or unmounted.—J. P., Abbotsbury, Dorchester.

BARBADOES EARTH, shells from (mounted), for other mounted objects.—E. Histed, 3, Great Bourne-street, Hastings.

RARE BRITISH BIRDS' EGGS for rare British *Lepidoptera*.—W. M. Cole, 93, St. Helen's-street, Ipswich.

MOUNTED OBJECTS in exchange for others.—Send lists to W. Fletcher, Grammar School, Bromsgrove.

PLANORBIS GLABER and *Clausilia laminata* var. *albida*, for foreign land shells, or British vertigos.—W. Nelson, Almaplace, Sparkbrook, Birmingham.

MONMOUTH DEPOSIT.—A good mounted slide of British Diatoms will still insure a portion of this deposit if sent to E. C. B., care of the Editor of SCIENCE-GOSSIP.

FOSSILS or minerals from the limestone, for fossils or minerals from any other formation.—W. Potter, Jun., Matlock Bath, Derbyshire.

CYPRIS GERMARII.—*C. imperialis*, *S. orbicularis* diatoms, &c. (mounted), for good objects.—Send list to T. Forshaw, Bowdon, Cheshire.

SPICULES of *Spongilla lacustris* (mounted) for good mounted Diatoms.—H. R., 150, Leadenhall-street, London, E.C.

PALMATE NEWTS for Edible frogs, lizards, or crayfish, as may be arranged.—J. B., Box 22, Post Office, Glasgow.

FOSSILS from Chalk or Limpet's tongues for other fossils or fronds of British Ferns.—J. Stanley, Harold-road, Newtown, Margate.

BOOKS RECEIVED.

"An Index to Mineralogy," by T. Allison Redwin, F.G.S., &c. London: E. & F. N. Spon. 1867.

"A Fern-book for Everybody," by M. C. Cooke. London: Frederick Warne & Co. 1867.

"The Technologist." No. XI. New Series, June, 1867. London: Kent & Co.

"The Fourth Annual Report of the Belfast Naturalists' Field Club. 1866-7.

"Naturalist's Note Book." Nos. I to VI. January to June. 1867.

COMMUNICATIONS RECEIVED.—H. W.—H. H.—E. W.—J. B.—G. E. F.—G. A. W.—T. W. W.—H. D. C.—A. L.—F. W.—J. P. G.—E. T. S.—E. T. K.—H. B.—W. S. K.—W. H. T. N.—W. F.—W. W.—H. W.—G. E. Q.—A. B.—A. M. M.—A. A.—T. P. B.—F. G. B.—W. H.—T. W. G.—L. H. F.—C. B.—F. A. A.—W. W. S.—J. J. O.—S. C.—G. S.—J. H. M.—S. A. S.—B. A.—E. W.—H. P.—W. D. R.—J. W. I.—R. G.—J. E. M.—A. M. D.—Capt. C.—W. S. K.—H. H. M. C. D.—M. T. M.—J. M. T.—J. F. R.—F. S.—H. R.—W. F. A.—J. B. B.—T. F.—J. B.—W. N.—T. G. P.—W. F. P.—W. S.—E. C. J.—M. T.—E. J.—R.—J. P.—E. H.—J. B. S.—W. M. C.—W. F.—A. B.—D. J.—J. M. P.—J. W. W.—G. G.—T. L.—J. W. G.—W. B.—W. N.—W. G.—S. D.—F. W. M.—C. H.—J. H.—G. B.—J. L. M.—J. G. T.—R. H. R. (no).—F. O. M.—S. A. S.—R. B.—F. H. W.—J. C. W.—W. P.—H. H.—H. C.—R. T.—E. W.—T. C.—W. P. M.—T. C. (Stow).—F. S.—E. A. C.—H. B. P.—C. C.—J. D. H.—F. W.—E. D.—J, B.—H. R.—T. S.—R. B.—C. R.—W. P. (Newark).—T. F.

LEAF-MINING LARVÆ.

By H. T. STAINTON, F.R.S., &c.

THE most unobservant can scarcely have failed to notice, some time or other, leaves of plants with pale blotches or slender tracks on them. These pale marks are formed by the minute larvæ of small insects, which, feeding between the skins of the leaf, devour more or less of the green fleshy-portion of the leaf, and so discolour it.

There are four orders of insects which furnish us with leaf-mining larvæ, &c.; but two of these are not numerously represented, and are comparatively seldom observed. I allude to the mining larvæ of saw-flies among the *Hymenoptera*, and the mining larvæ of some of the weevils among the *Coleoptera*. The two orders which furnish the great bulk of our leaf-mining larvæ are the *Lepidoptera* and *Diptera*. The *Diptera*, or two-winged flies, a group of insects, which, I am sorry to say, is very little studied in this country, afford an amazing number of leaf-mining larvæ, and we see these mines constantly on the leaves of the primrose, honey-suckle, buttercup, &c., &c. Those who search for the mining larvæ of *Lepidoptera* know only too well how very plentiful the mining larvæ of *Diptera* are; but as the mining larvæ of the *Lepidoptera* have been the most studied, I propose now to confine my remarks exclusively to them. Amongst the small moths of the group *Tineina*, a group which comprises the smallest known Lepidopterous insects, we have more than twenty genera of which the larvæ are leaf-miners, or at any rate some of the species in the genus adopt that mode of life; for in many genera we find a diversity of habit, and whilst some of the species are leaf-miners in the larva state, others are not so; in other genera every species without exception is a leaf-miner when in the larva state.

Sometimes the same leaf will be mined by two or three species, each of which imparts to the leaf a mark, recognizable by the initiated, indicating what species has fed on the leaf long after the larva has itself departed. A mined leaf is hence inscribed with hieroglyphic characters, and the key wherewith to decipher these is obtainable by patient and continued observation.

To take, now, some particular instances: bramble-leaves may frequently be found with two different kinds of mines; in one the leaf remains perfectly flat, and a long slender serpentine gallery winds its way across the leaf, and generally attains a length of from two to three inches; this mine, which is scarcely visible whilst the larva is still at work, the discolouration being then so slight, becomes very conspicuous after it has been long deserted, the dry loosened upper skin eventually becoming almost white, and contrasting strongly with the dark green colour of the leaf. The creature that makes this mine is a small, pale amber, semi-transparent larva, with no real legs, and when full-fed it crawls out of its mine and proceeds to some convenient corner in which it spins a small, flat, brownish-green, silken cocoon, from which at the end of two or three weeks there emerges a brilliant little moth about a quarter of an inch in the expanse of the wings, of which the fore wings are of a rich golden brown, tinged with purple beyond the middle, and with a nearly straight pale golden band beyond the middle: this we call *Nepticula aurella* (fig. 174).

Another kind of mine which we find in bramble-leaves is very different; the leaf does not

remain perfectly flat, but is a little puckered just where the mine is, and the mine, instead of being a long slender gallery, begins slender and gradually widens, the first portion of it reminding one of a ram's horn or cornucopæia: this is of a pale brown with the narrow end whiter: it then still further increases in size till it occupies nearly half the width of a bramble-leaf. The larva which forms the mine is very different from the soft-looking pale amber larva which forms the slender galleries; it is green, rather rigid-looking, with three pairs of short anterior legs, and with the head black, and two blackish marks on the back of the second segment. When full-fed it does not quit the mine, but changes within the bramble leaf to the pupa state, and in two or three weeks' time the pupa pushes its anterior end through the dry skin of the mined leaf, and the little moth makes its escape. When its wings are expanded it is rather more than a third of an inch, and the fore wings are of a bright yellow, with a brownish margin along the costa, and hind margin, and a round black spot above the anal angle: this we call *Tischeria marginea* (fig. 175).

In the month of June we may frequently find on young oak-bushes that many of the leaves have extensive mines, occupying nearly a third of the leaf, and the part mined is so completely cleaned out that nothing is left but the two skins of the leaf, and it hence has a very flimsy appearance: on holding one of these mined leaves up to the light, we should perceive within it a mass of short dark grey thread-like substances, being the excrement of the larva; possibly in some of the leaves we might succeed in finding the larva still there, a dull whitish creature with no legs, but with a well-defined head, his jaws being kept constantly at work devouring the green portion of the leaf, which imparts a greenish tinge to the dorsal vessel running along the centre of its body (fig. 173). This larva, when full fed, quits the leaf and descends to the ground which it enters, and there spins a subterranean cocoon, coated with particles of earth; within this cocoon it changes to the pupa state, and it is not till the following month of May that the imprisoned moth makes its escape and delights to fly round the oak twigs in the sunshine. It is a pretty glossy creature, about half an inch in the expanse of the wings; the fore wings are of a pale golden green, with a faint appearance of two paler spots, one on the inner margin beyond the middle, the other midway between this and the tip of the wing; and scattered over the surface of the wings are a few purple scales: the hind wings are rather transparent pale purplish. This we call *Micropteryx subpurpurella*. (There are many species of this same genus *Micropteryx*, which make similar mines in birch-leaves.) The miners in the leaves of oak are so numerous, that we frequently find several of the same genus happen to be oak-feeders, and it is by no means uncommon to find that a single oak leaf is mined simultaneously by half a dozen different species. In the month of July we may not unfrequently find oak-leaves which have nearly the entire upper surface discoloured by a large white blotch; these leaves are not transparent, for the under side remains green as before, and the white blotch is simply the upper skin of the leaf, which has been loosened over a considerable area by the operations of the mining larva within, and which, having slightly shrunk, has caused the under side of the leaf to curve a little upwards so that the leaf no longer remains flat. On examining one of the leaves closely, we shall see near the foot stalk several short, slender, pale tracks running into the

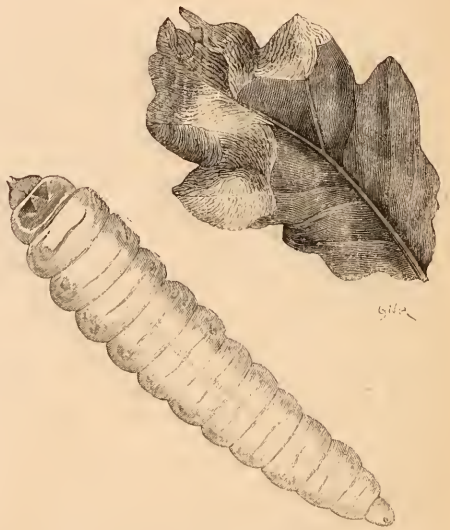


Fig. 173. Mined Oak Leaf, and Larva of Micropteryx subpurpurella, enlarged.

large blotch, just as if they were so many little streams running into a large lake; these are the tracks formed by the individual larvæ when young, each of them making a separate path towards the centre of the leaf, where they then proceed to mine a large blotch in common: these larvæ are pale whitish green, with a darker green line down the back, and with the head pale brown; when nearly full-fed they become suffused with reddish orange, and ultimately quit the leaf and spin small cocoons, in which to undergo their change to the pupa state. In a few weeks the elegant little moth makes its appearance; the expansion of the wings is rather more than a third of an inch; the fore wings are of a glossy brownish, with four oblique white streaks from the costa, edged towards the base with dark fuscous, and with two short whitish streaks on the inner margin: this is called *Coriscium Brongniardellum* (fig. 176).

Fig. 174. Mined Bramble Leaf, and Larva of Nepticula aurella, magnified.

Fig. 175. Mined Bramble Leaf, and Larva of Tischeria marginea, enlarged.

In July and September, if we examine the leaves of the oak, we are pretty sure to notice some which are mined in a peculiar way; a portion of the lower skin is loosened, and then drawn together, generally showing a distinct plait lengthwise. This gives a certain curve to the upper side of the leaves; and the small larva which feeds within, on the fleshy green portion of the leaf, removes here and there the green part which is in contact with the upper skin of the leaf, which hence assumes a prettily-mottled appearance. The larva which does this is whitish, with a greenish line along the back, and with the head, which is very pointed, pale brown; it changes to the pupa state within the mine; and in summer, after an interval of only two or three weeks, the pupa protrudes its anterior segments through the skin of the leaf, and the little moth makes its appearance. Those which assume

the pupa state in the autumn, remain unchanged till the following May; and many a fallen brown leaf, blown hither and thither by every gust of winter's wind, contains within it one of these living pupæ, destined to appear in the ensuing May, as one of

Fig. 176. Mined Oak Leaf, and Larva of Coriscium Brongniardellum, enlarged.

the most elegantly and delicately marked of our native small moths. There are several species which mine the leaves of the oak in the way described, but they all belong to the genus *Lithocolletis* (fig. 177).

When the month of October is well advanced and the leaves of the oak are fast turning brown, one very small mining larva will sometimes produce a very singular effect. It commences a very narrow slender gallery close to the midrib, and then, after proceeding a short distance in one direction, turns sharp round, so as to form the continuation of its mine in close proximity to the part already mined; by repeated turns, it thus eventually forms a small blotch close to the midrib, the larva as it proceeds getting gradually farther and farther away from the midrib. It thus completely separates the part of the leaf immediately beyond its mine from any connection with the midrib, and one singular effect

Fig. 177. Oak Leaf mined by Lithocolletis.

thereby produced is, that whilst the remainder of the leaf becomes brown, the part towards which the

Fig. 178. Mined Oak Leaf, and Larva of Nepticula subbimaculella, enlarged.

larva is mining continues green; and by these green blotches on the leaves we often readily detect the presence of the larva, which is of a very pale green, with a pale brown head. When full-fed, it quits the

leaf, and descends to the surface of the ground, and spins its small silken cocoon, in which it changes to the pupa state; and in the following month of June, the little moth emerges from the cocoon, and may be found sitting on the trunks of oak-trees. It is barely a quarter of an inch in the expanse of the wings; the fore wings are black, with two nearly opposite triangular whitish spots in the middle. This we call *Nepticula subbimaculella* (fig. 178).

In the months of May and June, we often find large brown blotches on the leaves of hawthorn; and, on holding one of these leaves up to the light, we see that the entire green portion of the leaf has been eaten away, nothing being left but the upper and lower cuticles of the leaf; where these brown

Fig. 179. Mined Hawthorn Leaf, and Larva of Coleophora nigricella, natural size, and magnified.

blotches are, moreover, we see in the lower cuticle a small round hole. On some leaves we may find attached a small brown cylindrical object, about half an inch long; this is the portable habitation, or case, formed by the larva which has mined the hawthorn leaf, and its mode of proceeding is as follows: it fastens its case to the underside of a leaf, and bites the round hole in the lower skin of the leaf, and then proceeds to devour the fleshy green portion of the leaf. By degrees it eats the green portion of the leaf away all round the spot where its case is fastened, but carefully leaves the skins of the leaf unbroken; and as it comes further and further out of its case as the mined space becomes larger, and as it has to reach to a great distance for some of the green substance of the leaf, it will frequently happen that it comes entirely out of its case into the leaf; but if in any way alarmed, it retreats quickly to its case, which in due time it transports to another leaf, and repeats a similar process. When full-fed, it generally fastens its case to the upper side of a leaf, and then assumes the pupa state. In two or three weeks the moth makes its appearance, and may be seen sitting on hawthorn leaves with its antennæ stretched straight out before it; the expansion of the wings is nearly half an inch, and the forewings are unicolorous—blackish. This we call *Coleophora nigricella* (fig. 179).

It will thus be seen that the leaf-mining larvæ do not all work after the same fashion, but that each sort of larvæ has its special work to do, which it does after its kind. We have in this country several hundred leaf-mining larvæ of the order Lepidoptera, and possibly, when all the orders are considered which furnish examples of leaf-mining larvæ, they may without exaggeration be numbered by *thousands*.

THE UNITY OF MANKIND.

IF Mr. Milton had taken the trouble to read my essay carefully before he attempted to criticise it, he would have done himself no harm and me less injustice. He asserts that in my essay I allude to Prichard and Knox, Pickering and Laurence, as likely to perplex the student instead of aiding him. I say nothing so ridiculous, but simply advise him to avoid those writers who abound in arbitrary and endless classifications. I, of course, do not in the least discourage the study of the religion, language, and customs of every race in order to discover from them its origin and affinities; but I maintain that while this process is going on, some such *memoria technica* as this arbitrary division according to colour would afford, is wanted to do what the Linnæan system has done for Botany, *i.e.*, to keep together the various elements of the science until its natural laws and divisions have been ascertained with some degree of accuracy. The division of mankind by colour is, after all, no novelty, but sanctioned by some of the highest authorities extant; and in proof of this I may refer to that very learned work on "The Geographical Distribution of Mammals," by Mr. Andrew Murray, which has recently appeared, and in which a system very similar to the one which I advised is adopted. Of course Mr. Milton will be able to adduce many exceptions to such a theory. There are doubtless races which cannot be strictly characterised as black, white, or brown; but those who have studied the subject will, I think, agree with me when I say that, according to our present knowledge, the classification I have adopted is the only one capable of any extended application.

I do not for a moment believe that heat alone produces a dark skin; but heat, an unhealthy climate, and prolonged isolation will, I think it is impossible to doubt, produce and perpetuate the most marked and extraordinary peculiarities. The vast desert of the Sahara was, geologists tell us, once the bed of an inland sea which completely severed Africa from the rest of the old world and

the Himalayas, performing the same office for Hindustan. We have, I believe, in this fact the secret of the marked idiosyncracy of the two races. Mr. Milton's argument, deducible from the different hues of the races inhabiting the African coast-line, does not appear to me to be worth much; for we know that the Kaffirs, Gallas, and other races of comparatively light colour, have permeated every part of South and Central Africa. The display of negrophilism contained in Mr. Milton's essay argues, I think, strongly against his theory; for if so imitative and numerous a race, which has been so petted and pampered for the last half-century, can produce nothing better than the few mediocrities cited, how greatly inferior must it be to the European and Asiatic nations, who have made every single discovery and invention which has been of the slightest benefit to man! The remarks upon the colour of the Esquimaux are incidentally answered below.

In an interesting paper recently read before the Ethnological Society by the chairman, Mr. Crawfurd, entitled, "The Skin, the Hair, and the Eyes, as tests of the Races of Men," the very views which I advanced are ably contested; but the essay is wholly destructive, and Mr. Crawfurd is forced to admit that dark-skinned races *do* usually inhabit hot countries. Now, if this is merely a coincidence, it is surely a very singular and suggestive one! One argument which he employs appears at first sight to carry some weight, and I will therefore briefly advert to it. He argues that the vulgar theory which attributes darkness of complexion to the influence of the sun cannot be correct, because the Esquimaux, who inhabit arctic countries, are brown, or at any rate dark, in colour, whilst the Scandinavian nations, who live in a far milder climate, are much lighter in hue. But it must be recollected that Sir John Richardson thought the Esquimaux white, also that they belong to the Mongolian race, which is almost invariably darker than the Circassian, to which the Scandinavians belong. Until Mr. Crawfurd can clearly prove that the Arctic climate darkens the complexion, we are quite at liberty to attribute the dark colour of the Esquimaux to their southern origin, all trace of which the climate of the Arctic regions has not yet eradicated. The fact that ethnologists now acknowledge the existence, in remote times, throughout the whole of Europe, Asia (perhaps even of North America), of a race akin to the Esquimaux, proves their southern origin, and their comparatively recent banishment to northern fastnesses by successive immigrations of Celts, Teutons, Sarmatians, Red Indians, and other warlike tribes.

Which is the primitive nation? What an interesting train of thoughts is opened up by this question! It is noteworthy that the red races of mankind—the Etruscans, Trojans, Egyptians, and Toltecs—were all diminutive in stature, peaceful in their habits, and of great intellectual capacity. The Phenicians and Babylonians were probably of a somewhat different hue, but their physical and mental characteristics are so similar to those of the red races that one cannot doubt their consanguinity. The Hindus also, who must once have been very light in colour, show in their ancient classics a minute acquaintance with the geography and ethnology of Eastern Africa; whilst their buildings and customs are almost identical with those of Ancient Egypt. All these nations were of Shemitic origin, and in all of them commercial and mechanical talent was developed to the highest degree, forming, in this respect, a remarkable contrast to the Greeks and other Japhetic races who ultimately superseded them in the empire of the world, who were characterized by an herculean physique, and a passionate love of liberty and of war.* It seems highly probable to my mind, that the Chinese justly claim to be descended from Noah (Fohi). The resemblances between the civilization of the Chinese and Hindus are too numerous to be accidental; indeed, we know that the religious system of Boodh prevailed in both countries. Anyone who will carefully compare the religious and social systems of the eight primitive races which I have mentioned, will, I think, be firmly persuaded of their identity, and will have gained a good idea of the characteristics of that earlier Shemitic civilization which preceded the dispersion, and subsequent conquests, of the Japhetic (Aryan?) races, and probably embodied the attainments of the Antediluvians. It will be recollected that *immediately* after the flood, a great architectural work was commenced. Whence could the skill requisite for the undertaking have been obtained but from the traditions of the antediluvian earth, handed down by the sons of Noah? That the Antediluvians had attained to a considerable degree of refinement appears highly probable from this consideration, and we must remember the advantages which they enjoyed of a vastly lengthened existence; a denser population (in new countries populations always spread fastest), and probably of a balmier atmosphere, favoured the spread of knowledge and the completion of great undertakings. It is difficult to see how the degree of wickedness which provoked their overthrow could have been reached in a savage or pastoral community. The complex sins and vices of civilization alone will explain the enigma.

The early civilization of the Shemitic race, which discovered letters, and attained such architectural and commercial successes, appears to have been extinguished, slowly but surely, by the same

* Although these Shemites generally lived under despotisms, the theocratic or republican form prevailed in Etruria and in Toltec America.

agency. The Greeks conquered Troy and Tyre; the Romans, Etruria, Carthage, and Egypt; the Persians, Babylon; the American Indians, the Tolteean Empire. The Chinese and Hindoos, being to the eastward of the great westerly emigration of the Japhetic races, escaped conquest, it is true, but were completely isolated, and their valuable secrets had to be re-discovered in the middle ages. This theory explains, I think satisfactorily, the co-existence of an effete and decaying eastern, and a vigorous and progressive western, civilization. In every case in which the primitive races were conquered, the victors became in time leavened with the civilization of the vanquished, and so far recognised its superiority, as to partially adopt the religious and social systems of their predecessors. Thus arose the Aztec and Peruvian empires on the ruins of that of the Toltecs; the Roman empire out of the Etruscan; the dynasty of the Ptolemies out of the Egyptian. In each of these cases this second civilization was obviously and confessedly inferior to the one from which it was copied; just as the Saxons were far surpassed in refinement by the Romanized Britons whom they displaced. These remarks cannot be carried further in the present essay, but will be suggestive, I doubt not, to those who take an interest in the early history of mankind.

The southern origin of the Gael of Scotland is curiously shown by the reverence which this people pay in all their rites and ceremonies to the south. They preserve, as was stated some time back in *Good Words*, the Druidic custom of carrying the dead round the churchyard the southern way, following the course of the sun; also of sending the bottle round the table in the same way. The Celts all seem to highly respect the south, for they call the right hand "Deus" (*i.e.*, the south hand), the same word signifying "being ready," "being expert," and "being handsome."

The existence of two distinct races of men in the archipelagos of Polynesia, the Negrittos (Papuans), and Malay-Polynesians, has often puzzled ethnologists. I think, however, there can be no doubt, if we investigate the legends and traditions of the natives, as to which is the aboriginal race. It will be found that whilst the Malay-Polynesians invariably recount their arrival by sea at their present homes, the Fijians (the most cultivated of the Papuans) claim to have been created upon the soil. This fact, taken in connexion with the argument deducible from the fact that the Papuans appear to inhabit the *interior* of the larger islands, and those groups of volcanic, and therefore older, formations, such as Papua, Fiji, &c., while the Malay-Polynesians inhabit the coral islands of more recent origin, such as Tongatabu, and the *shores* of the larger islands, argues strongly in favour of the hypothesis that the Papuans represent an old and widely extended race, which once inhabited a continent stretching from Australia or Malaya to South America; whilst the Malay-Polynesians are allied to the Hindus or Burmans, and have come to the South Seas by conquest only. The close resemblance observable between two races so widely severed as the Maories of New Zealand and the Hindus, is very remarkable; with some curious and interesting details of this likeness, I must close my remarks.

In Knight's work upon the "Hindoos," p. 370, the following occurs:—"The Hindoos, especially the Nairs of Travancore, a vigorous and athletic race, drink by pouring water, from vessels with spouts, in a stream into their mouths, it being considered indelicate to touch the lips with a vessel. Thus when the Portuguese, under Vasco-de-Gama, reached India, and were handsomely entertained by the Zamorin at Calicut, having been informed that this was etiquette, they strove to conform, and by choking themselves, and deluging their clothes or the table, threw the court into roars of laughter." Curiously enough in the same series, in the volume entitled "The New Zealanders," p. 133, a picture is copied from Rutherford's work on the natives, in which an aboriginal is represented, drinking from a calabash, held at some distance from his mouth, and this is stated to be a national custom!

The missionary, Taylor, also states that the native name of the New Zealanders, "Maori," is closely allied to our word "Moor," *i.e.*, a "dusky person." He states also that the figures in the renowned caves of Elephanta (Bombay) much resemble the Maories. The resemblance between the "caste" of the Hindus, and the "tabu" of the Malay-Polynesians is too obvious to need remark. F. A. A.

BITTEN BY A VIPER.

IT appears still to be a disputed question as to whether any one has been poisoned by a viper, and the poison has directly proved fatal. I say *directly*, for it no doubt may be, and has been, an *indirect* cause of death; as, for instance, where a person has been bitten in the neck, and the swelling has produced suffocation. But in such a case we should not say the man was fatally poisoned by the creature, although the poison caused his death indirectly: similar consequences have been known to result from the sting of a wasp:—A man was once drinking from a vessel into which a wasp had fallen, and the insect stung him on the tongue, which swelled to such an extent that he was suffocated. We are as yet without any well authenticated instance of the poison of *Pelias Berus* proving fatal from its own nature. Yet almost every country churchyard has its grave pointed out to children

and strangers as a caution against meddling with snakes and adders; I remember in particular a churchyard in one of the lonely villages of Norfolk, in which was a tombstone, ornamented with the sculpture of a snake with its tail in its mouth, forming a ring. Doubtless it was meant as an emblem of eternity, but there it was looked upon as proof positive of the mode of the man's death, and we children used to look at it with awe, while one of our elders related the story of the man gathering wood, when an adder stung him, &c. As there is, no doubt, some residuum of truth, even in the wildest legends, we may believe that death from the bite of a viper is not an utterly unknown circumstance. The physical constitution of the victim, the state of his health at the time, the heat of the weather, will no doubt affect the case. Very likely a person of feeble constitution, whose blood was in an impure state, and who chanced to get bitten in the sultry days of July and August, might succumb to the venomous bite; otherwise I should say not. Any instances brought forward on either side of the question must necessarily be interesting. From one or two accounts I have read, and from the following, for which I can vouch, it would appear that the venom does not always act in the same way. Mr. Wood mentions a case in which there was intense pain and fever; in the following instance there was little of either.

I was out entomologising a few days ago when I saw a very beautiful specimen of *Pelias Berus*, about half grown. Meeting a brother of the net a few minutes afterwards, I mentioned it to him. "Of course you killed it?" said he. "No, I did not; I very seldom do." "Perhaps you were never bitten by one? or else you always would." No, I had not. I had kept them in confinement, and I am always shy of killing any creature that I have watched and studied. Upon which he told me that he had, and the circumstances and consequences were as follow:—He was out butterfly hunting, and caught a viper in his net as it was gliding over the ground: not knowing then the difference between vipers and snakes, he was not at all afraid of it, but handled it repeatedly, and when he reached home, placed it on the table to watch its movements. He took it up several times, till at last it turned its head sharply round, and bit him on the forefinger of the right hand. Still he took no notice, and continued handling it as before; though he was careful now to lay hold of it closer to the head. Shortly, however, he felt a curious drowsy sensation stealing over him, and told his friends of it, but they attributed it to fancy. But it was not long before he became seriously ill, his mind wandered, they put him in bed, and sent for a medical man. No olive oil was applied, and the principal thing given him was neat brandy in occasional doses. The object of this was to cause a re-action from the great weakness which ensued; he felt utterly prostrated, and needed all that could be given him to restore his physical strength. He lay in bed a fortnight, no fever ensued, and more curiously no pain, nothing but excessive weakness, and, immediately after the bite, insensibility and delirium. The hand, arm, and side as low as the hip were immensely swollen, and almost black; the two former were frequently bathed in hot water.

Having gone through this little experience, he always made it a rule to kill a viper when he had the opportunity; not because there was any danger of its attacking anybody, he knew it was a very timid creature, but then "you *might* tread on one." I cannot agree with him, though I can make every allowance for his feelings: vipers, like all other created beings, have their allotted work to perform, and they are neither sufficiently numerous nor wantonly aggressive, to warrant our endeavours to exterminate them.

I mentioned olive oil to him, and also sucking out the poison, but, as he remarked, and with great plausibility too, one pulsation—the very first—carries the poison into the system, and unless it can be followed up there by some antidote, in the same way that some one has lately been advising nitrate of silver in the case of hydrophobia, I do not see how its ill effects can possibly be stopped. Probably death may be prevented, and pain or fever assuaged by applying remedies in this manner; but a certain amount of suffering, more or less severe, must ensue. Since writing the above I have had a conversation with a gentleman, in which he mentioned that sportsmen's dogs are occasionally killed by vipers; he had lost two very valuable ones himself. Young ones generally die, but occasionally recover; old ones seldom fall victims. One that he had had some years had been bitten twice when young, but as it grew older it became an adept in killing its foes: it used to spring upon them, all four feet coming down at once, and then with its head up in the air, trample them to death.

Henry Ullyett.

Nightingale Freak.—I found last week a whole nest of canaries disappear in about three days. I could not account for them, as they hung against a wall, being too young to get out of the nest. A few days after, another nest hatched, and next morning we found the hen canary and a nightingale in fierce combat, but the nightingale took the young bird, and then commenced a regular chase with the nightingales (of which there were three) to get the youngster, which of course they soon killed, and before I could get it away, the head was half gone. Do nightingales usually eat young birds?—*Charles Rudd.*

RURAL "FOLK-LORE."

THERE is scattered amongst the rural population a large amount of that sort of knowledge graphically called "Folk-Lore," from one branch of which, namely, that which your correspondents, B. and R. Holland, call "Rural Natural History," I propose to offer a few examples, taken almost at random from the "Folk-Lore" of the North and East Ridings of Yorkshire.

It is generally believed that the cuckoo sucks the eggs of birds, and that when that kind of food fails, the cuckoo loses his voice,—

> The cuckoo, he sings in the spring of the year,
> And he sucks little birds' eggs to make his voice clear!
> *Old Rhyme.*

It is also believed in some parts that the cuckoo, having no further occasion for the services of his foster-parents, repays them for their kindness by swallowing them. This was an article of "Folk-Lore" with the ancient Greeks and Romans. Aristotle believed it, and Shakespeare—the universal Shakespeare—alludes to this article of "Folk-Lore" twice: once in the tragedy of "King Lear." The old, doating king had stripped himself of his crown and kingdom, and given them to his two daughters. Goneril had begun to look coldly on the father, and to seek a cause of quarrel with him; and during a pause in her inditement, the fool says:

> For you know, nuncle, the hedge-sparrow fed the cuckoo so long that it had its head bit off by its young; so out went the candle, and we were left darkling.

And again, in the first part of "King Henry IV.," Worcester, reminding the king of his broken promises, says:

> And being fed by us, you used us so,
> As that ungentle gull the cuckow's bird
> Useth the sparrow; did oppress our nest,
> Grew by our feeding to so great a bulk,
> That even our love durst not come near your sight
> For fear of swallowing.—*Act* 5, *sc.* 1.

In the same play the king, speaking of Richard II., says:

> He was but as a cuckoo is in June.—*Act* 3, *sc.* 2.

That is, he was common, and he had lost the power to attract; his voice was like the voice of the stuttering cuckoo, no longer commanding attention, except to be unfavourably contrasted with its former perfection. Richard, when he began his reign, was the nation's idol: Pomfret tells the rest.

The old fallacy of the cuckoo wintering here is not yet exploded. It is also believed that if you have any money in your pocket, when you first hear the cuckoo, and turn it over, you will have good luck for the next twelve months. May not the expression "turning a penny" have arisen from this old relic of "Folk-Lore?" Some persons take out their money when they first hear the welcome cry, and spit upon it for good luck. Spitting for good luck on the first money taken during the day is very common; this money is popularly called "*hansel*." *Tettigonia spumaria*, the froth exuded from the body of which is found so common upon grass in the summer months is said by some to be cuckoo-spit, whilst others call it toad-spit. "Scabbed as a cuckoo" is a Yorkshire saying, alluding, I suppose, to the great quantity of scurf which comes off the young birds.

The lady-bird (*Coccinellæ*) is eagerly sought after by country boys, who believe, or profess to believe, that the price of corn for the next year will be as many shillings per bushel as there are dots on the wing-cases of this little insect. In our rambles we often see young Rusticus with one on his finger end, to which he sings the old rhyme,—

> Lady-bird! Lady-bird! fly away home!
> Your house is on fire, and all your banes gone!
> Lady-bird! Lady-bird!! fly away home.
> Fly away! fly away!! fly away home!!!

Woodlice (*Armadillo*) are an infallible remedy for fits. A friend of the writer's was in the constant habit of swallowing *Armadillo vulgaris* like pills. Docks (*Rumex* sp.) are a remedy against the sting of the nettle. You must take the leaf of the dock, and rub it well on the place nettled, saying nine times, "Docken in, nettle out." Rooks do not breed until two years old. Birds pair on St. Valentine's day, and do not build on Holy Thursday. Hedgehogs suck milk from cows. Eels are not in season when beans are in flower; and bean-swads rubbed well into a wart are a cure for it. The latter remedy I have frequently applied, and always with success. A roasted mouse is a cure for the whooping-cough.

The ass, before our Saviour's entry into Jerusalem, had not the mark of a cross on his back; but that distinguishing mark was a token of our Saviour's favour, given to the ass that bore him on Palm Sunday, and has been ever since borne by all asses.

If you take up a haddock, and examine both the gill-cases, you will observe on each what are not unlike the marks of the pressure of a thumb. These are said to be marks made by the finger and thumb of St. Peter, when he opened the mouth of the fish to take out the tribute-money. The fish in whose mouth it was found must of course have been a haddock, but I question whether that fish is an inhabitant of the Sea of Tiberias.

Pigeon-feathers are never used for beds or pillows, it being an article of "Folk-Lore" that a person cannot die on such a bed, but that his agonies are only prolonged. It is also believed that death most frequently takes place on the turn of the tide.

Such are a few of the articles of "Folk-Lore" in Yorkshire.

Linton-on-Ouse, York. JNO. RANSON.

PHYLLACTIDIUM.

SEVERAL correspondents having applied for information concerning the freshwater plant called Phyllactidium pulchellum; we have resolved upon communicating a few paragraphs of its history. During the spring of 1866, Mr. Aylward, of Manchester, sent us, for determination, some curious little green discs which had grown in a bottle of water collected in the previous autumn from a small pond near the new Assize Court, Manchester. When collected, this water contained Volvox globator in abundance, but no discs; during winter all traces of Volvox disappeared, and the little green discs supplied their place. At first, and for some time, Mr. Aylward suspected that they were a condition of Volvox, and sent us the discs to be named, these were submitted to Dr. Gray, F.R.S., whom we knew to have been for very many years deeply interested in Algæ (indeed, almost a walking polyglot of all forms of vegetable and animal life), and in July, 1866, a description of these discs, under the name of Phyllactidium pulchellum, appeared in Seemann's "Journal of Botany," contributed by Dr. Gray, in which the scientific affinities of the plant were discussed, and much useful information supplied.

This discoid water-weed received the above names, generic and specific, from Kützing, who appears to have been the first to observe it, and we gather from a private letter, from this author, that he first found it in his fresh-water aquarium which he had in 1838-40, in his study. He found about seven or eight specimens of various sizes attached to the glass, and took a drawing of several of them, afterwards describing the plant in his "Phycologia," under the name which it still bears, but he does not seem to have met with it again, or in any other situation. When Dr. Gray wrote the account above alluded to, he was under the impression that it had not been before observed in Great Britain; but, within a few days after its appearance, Professor Balfour stated at a meeting of the Botanical Society of Edinburgh, that it was found thirteen years ago in Scotland by Mr. George Lawson, in the water of a vase at the Royal Botanic Gardens, and specimens were exhibited under the microscope which were put up at that time by Mr. Lawson. In December, 1866, Dr. Gray communicated to the "Journal of Botany" an additional note on Phyllactidium, in which he announced the discovery of a still older authority for this plant in Britain, for that Mr. Ralfs had read a paper before the Botanical Society of Edinburgh in December, 1844, which was printed in the "Annals of Natural History" in 1845 (vol. xvi. p. 308), in which the same plant was described and figured under the name of Coleochœte scutata. He also says that he sent specimens to Professor Kützing, and that gentleman considered it to be the same as his Phyllactidium pulchellum. Hence it was known in Britain in 1844, and the merit of discovery is due to Mr. Ralfs, who adds to his account that he was indebted to Dr. Dickie for determining its name. It is also somewhat singular that Mr. Ralfs gives so many stations for this plant, as, Victoria Park and Windermere, on the authority of Mr. Sidebottom; Aberdeen, where it was found by Dr. Dickie; Henfield, and near Tunbridge Wells, as communicated by Mr. Jenner; near Fleetwood, on the authority of Mr. J. S. Ashworth; near Bristol, found by Mr. Thwaites; ponds at Singleton and Sketty, near Swansea, according to Mr. Moggridge; also abundant in Cromlyn Bogs, near the same town, and in several stations near Penzance and Dolgelly.

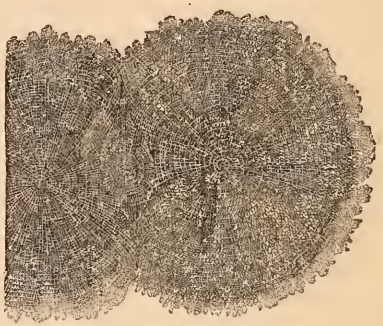


Fig. 180. Phyllactidium pulchellum magnified.

So much for the history of this interesting plant which we have figured from a specimen furnished to us by Mr. Aylward. We will not follow Dr. Gray in discussing whether it should be called Phyllactidium or Coleochœte, or Bulbochœte, but refer those interested in the more technical phases of the subject to Dr. Gray's two communications in the "Journal of Botany" for 1866. For the sake of those who may still be strangers to this organism we give Dr. Gray's excellent description. "The form is discoidal, circular, slightly concave on one side, formed of very many minute, nearly equal-sized; square cells, placed on forked lines regularly spreading from a central cell to the circumference; the frond is thin, membranaceous, and the upper and under surfaces are similar. The fructification consists of 12 to 16 square thickened patches, forming a circle (sometimes two) rather nearer the margin than the centre of the disc, the square patches being often placed in pairs. The fructification was first observed, and is well figured by Suringar, in his thesis entitled 'Observationes Physiologicæ,' delivered in Leyden on the 3rd of March, 1857, (p. 26, fig. 4, a)." The student may also consult Dr. Pringsheim's monograph of the genus Bulbochœte in his "Jahrbucher," vol. vii., for 1860.

We shall be happy to record additional localities, if authenticated by the name and address of the writer.

MY LITTLE GREEN MONKEY.

I HAVE the prettiest little monkey I ever saw, a wee green creature, with large red-brown eyes, and hands wonderfully like a human being's. *Pretty* may seem an inappropriate name to apply to a monkey, but this particular one is really deserving of it.

I have only had it a short time, and I wish to know how to treat it in the winter, in cold weather. It now lives in a hut on the lawn, fastened, by a chain, to a long pole which it can run up and down at will. It eats bread, milk, and ripe fruit. Milk and raw eggs are its especial weakness.

I fancy the poor little thing has been very badly treated in its earlier years by some organ-man or other, for one of these wandering gentlemen entered my garden the other day, and Jock evinced intense terror. He sprang on my shoulder and nearly strangled me with his long slender arms, clasped them tightly round my throat, and began to chatter in monkey language, telling me I have little doubt, could I but have understood him, some tale of sensational cruelty.

"That ere monkey will hurt you," cried the organist.

Poor Jock, I believe, understood him, for as if to reassure me, he let go his grasp, and nestled down on my arm with such an imploring look, that I at once unfastened his chain, and carried him off in-doors, flung him on the rug where his friend the cat lay curled up, and giving the man a few pence asked him to move on. When I came back, Jock was rolled up like a ball in the cat's arms. It is amusing to watch their friendship for each other; puss shares his saucer of milk, and then licks Jock's coat all over. He will gravely hold out his hands to the process or put up his face to be so washed, just like a man holds his face up under the hands of the barber. This cat I must tell you is an old acquaintance of his, belonged to his former mistress, a clergyman's wife, and I was presented with puss in order that the friends might not be parted; but Jock is not fond of kittens. I have a white one; she ventured one day rather too near his domain, and after he had thrown her about like a little snow ball for a few minutes, he coolly flung her into the pond to frighten the stickle-backs. My little boy was fortunately at hand, otherwise she would soon have been food for them. Chickens he invariably begins to feather alive; he holds them cook fashion, and plucks away finely, regardless of the old hen who from a coop close by abuses him loudly.

It is the custom in country villages for the different clubs, headed by a band of music, to call at most of the houses in the neighbourhood. I had a visit last week, and Jock, who hates music, was so frightened by the sound of the drum, that he broke his chain, sprang across the lawn, and mounted a tall beech tree. We tried in vain to coax him down, but early the next morning, he was on the top of the greenhouse, peeping in at me; a little fresh milk proved too much for his powers of resistance. He came down with a run, and having finished his breakfast very quietly, went to pay his respects to the cat, and was soon chained again.

H. E. Watney.

THE BLIND WORM.

THOUGH I can throw no light on the climbing propensities of the slow-worm, perhaps a few particulars concerning one which was in my possession for several months may not be unacceptable to Mr. Guyon, nor altogether uninteresting to some among your readers. My specimen was captured one warm day in May, on Clifton Down, was twelve inches long, with beautifully iridescent scales about the head, and a skin smooth and shining as satin. The "pretty fellow" soon became a favourite, and although his proper abode was a covered basket, furnished with some folded flannel, yet, as he was not an object of repugnance to any member of the family, a considerable portion of his time was spent in comparative liberty, thus affording every opportunity for observation. The only food he would ever take was the small delicate grey slug so destructive in our gardens and fields; of these four or five would generally satisfy his appetite, though he would sometimes eat as many or seven or eight at one time, renewing his repast every three or four days; but he could bear long fasting without any perceptible diminution of vigour or activity, and the summer being a very dry one, I had sometimes great difficulty in finding the requisite food, and was unwillingly obliged to put his powers of abstinence to severe tests. However hungry, he would take no notice of anything else I could offer him, neither would he eat the small *black* slug, yellow underneath, perhaps on account of the very viscid slime and tough skin of these little creatures. When about to take a slug, the slow-worm would open his mouth to its widest extent, generally turning the head on one side, and gliding slowly up to its victim, seize it exactly in the middle, with a grip like a vice. This appeared entirely to disable the creature, which was then slowly gorged, the operation, even on so small a scale, being decidedly unpleasant to witness. From this mode of capture he never varied, but if, as occasionally happened, from the very slippery nature of the prey, the first attempt failed, he never made another immediately, but would turn away with a most ludicrous air of unconcern, a very flimsy attempt to cover his evident mortification. He would drink freely of water, lapping it with his dark forked tongue, and every now and then lifting his head, precisely in the same

manner as a chicken drinking. He had a great love for warmth, particularly that derived from personal contact, and nothing delighted him more than being allowed to coil round my hand. He would interlace himself between the fingers in the most graceful and complicated folds, and it was on these occasions I was particularly struck with the muscular power referred to by Mr. Guyon. The manner in which my fingers were imprisoned in his coils made me realize, as I had never done before, the tremendous strength which the boa-constrictor must be able to exercise. Once established in his favourite position, he would retain it without moving for hours, if my occupation permitted. My singular pet was possessed of a very inquisitive disposition, and would investigate every object on the table with the utmost minuteness, particularly pleasing himself with getting into my work-box, and making almost as great a commotion among my cotton reels as a kitten. One day his researches led him into the salt-cellar, a result with which he appeared by no means satisfied. Of course, having so much liberty, he had many hair-breadth escapes, more especially in the way of falls, as he had no conception of danger when approaching the verge of anything, and if not observed when getting near the edge of the table, the next thing was sure to be a "flop" on the floor, but he never seemed the worse for these accidents. I hoped to have kept him through the winter, but on my return from an absence of some weeks in the autumn, I found my "pretty fellow" was dead. He lived in captivity from May till November. The terror and astonishment he inspired amongst servants was most amusing, and at a small watering-place to which he accompanied me in the summer, I believe I am still remembered as the lady with the snake!—*F. T.*

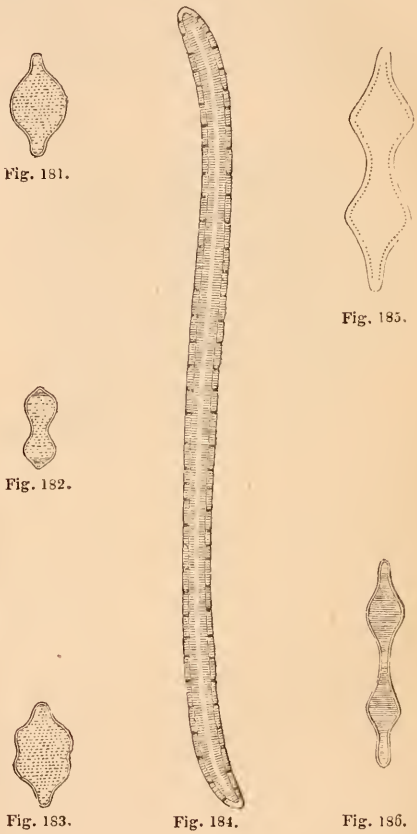
MONMOUTH DEPOSIT AGAIN.

TO the two papers already devoted to an enumeration of the diatoms found in the Monmouth deposit, from Maine, U.S. I have a few "last words" to append. In a letter recently received from the Rev. E. C. Bolles, he states that this deposit is derived from the old bed of a lake, as one would have suspected, and that it is authentically what it purports to be.

In addition to the forms already enumerated, I find—

Surirella linearis (Smith). The valve occasionally constricted, obtuse, or acuminate. The longitudinal central line distinct. Alæ conspicuous (fig. 187). I have hitherto only found the constricted variety, and that but rarely, in this material.

Surirella anceps (Lewis). Frustules free, linear. Valve sigmoid and elongated, with rounded subacute extremities. Alæ very small (sometimes nearly obsolete) or sub-marginal. Canaliculi very inconspicuous, often wanting. Striæ very sharp and clear, extending to the wide, and well-defined central space, which runs from end to end of the valve. Colour of the dry frustule a rich chestnut brown (fig. 184). This singular form of Surirella occurs but sparingly in the deposit, and very rarely perfect. It was detected by Dr. Lewis in a gathering from a pond near the Saco river, and sufficiently plentiful to allow of his giving the above characteristics.



Surirella intermedia (Lewis). Frustules free. Valve linear, strongly sigmoid, with attenuated rounded apices. Alæ usually distinct, twisted near the ends of the valves, giving rise to a spathulate appearance. Canaliculi numerous, inconspicuous, reaching the narrow central blank line. Striæ distinct. This form is very rare in the present deposit. Dr. Lewis found it mixed with the preceding species; it is probably identical with Nitzschia curvula of Smith.

Coccconema lanceolatum (Ehr.). Front view lanceolate, obtuse. Valve cymbiform, elongated, and concave. Margin with a central inflation and submedian line, central and terminal nodules. Striæ distinct and moniliform. Frustules stipitate.

Cymbella Ehrenbergii (Kützing). Valves cymbiform; the median line sub-central, with central and terminal nodules. Striæ distinct, costate (fig. 188).

Cymbella cuspidata (Kützing). Valves with the extremities produced and slightly acuminate. Striæ obscurely moniliform (fig. 190).

Fig. 187.

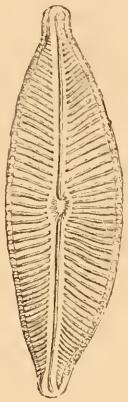


Fig. 188.

Gomphonema acuminatum (Ehr.). Frustule stipitate. Valve with central inflation, triangular and apiculate above, attennated below, with median line, and central and terminal nodules. Striæ conspicuous, moniliform. Variety β, much elongated (fig. 191).

Gomphonema capitatum (Ehr). Valve slightly constricted towards the upper extremity, which is somewhat rounded; much attenuated towards the lower, which is slightly acute. Striæ distinct, moniliform (fig. 192).

Cocconeis Thwaitesii (Smith). Valve slightly constricted towards the obtuse apices. Median line sigmoid. Striæ very faint. I refer the form in this deposit to this species with some hesitation as it differs in some degree from the form described in the "Synopsis of British Diatomaceæ."

Odontidium Tabellaria (Smith). The figures (183, 185, 186, 181) are considered by Dr. Lewis to be sporangial states of this species. They are common in the lighter part of the Monmouth deposit.

Fig. 182 represents the valve of a minute form considered by Dr. Lewis to be an abnormal state of Tetracyclus. The absence of the frustules from the deposit renders it impossible to decide as to the correctness of this view.

Fig. 189 represents a valve of Pinnularia gigas. This fine form has not, I believe, ever been figured in any English work on the Diatomaceæ.

Eunotia hemicyclus (figured at page 133, fig. 146) has been found by Dr. Lewis growing like Synedra lunaris, the frustules attached to a fixed point, and he has removed it to that genus. A curious abnormal variety may occasionally be detected in the deposit—it has an angular central inflation on the inner margin of the valve.

This enumeration of forms found in the Monmouth deposit, commenced at page 133, continued at page 156, and now terminated, must not be regarded as a complete catalogue of the Diatoms to be found in it. There are several species which I could not satisfactorily refer to any forms previously described, and I do not feel myself warranted in describing as new species forms occurring in a fossil deposit.

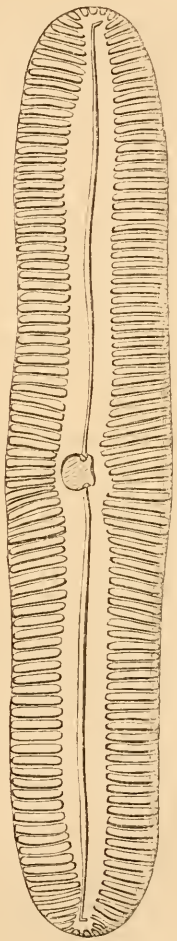


Fig. 189.

Fig. 190.

Fig. 191.

Fig. 192.

In conclusion, it is with pleasure that I publicly tender my thanks to the Rev. E. C. Bolles for his kindness in forwarding this deposit to the Editor for distribution amongst the students of Diatomaceæ in Great Britain, hoping that his example may be followed by others in respect of deposits of a similar character from other and little known localities.

Norwich. F. Kitton.

CORNISH COLLOQUIES.

OUR early home was in a Cornish valley on the banks of a tidal river. This valley, hemmed in by wooded heights, in some parts rocky, was periodically flooded. Its sheltered situation, with the combination of wood and water (salt and fresh), cliffs and meadow-land, gave us an opportunity of observing a larger variety of plants and animals than are often seen in one locality. Not only on the rocky-bank side, and under the woods before referred to, but further down the valley, toward the mouth of the stream, where the river sides were muddy or sandy, have we frequently seen the kingfisher darting about or perched on some low stretched-out bough, or other projection. These reaches abounded with tiny fish, crabs, and many kinds of little marine animals; and many were the sea-birds which frequented them*—cormorants (called "shags" by the Cornish), &c.

Apropos of "shags," I may remark that when staying near the Lizard, a favourite pleasure to my relatives and myself was to go out with the fishermen as far as the tide line and see what they call the "trammel nets" drawn, and I once saw a poor drowned "shag," its feet entangled in the meshes of the net, still holding in its beak the fish after which it had dived.

A pair of Cornish choughs frequented a cliff a long way down the river, and all kinds of gulls seen, with "sea-swallows," even *black* terns, were plovers, snipes, curlews, woodcocks, sand-pipers, oyster-catchers, and herons.

We often saw in little solitary glens (for as children we had a strange longing to push our way where as we could imagine, "human feet had never trod"), the curious little water-ouzel or dipper—"water-blackbird" we called him. I cannot but maintain, in spite of judgment to the contrary so vehemently pronounced by many of your correspondents, that I have again and again seen the dipper walking on the gravelly bottom of the clear streams before referred to—observed them not only diving and swimming, but, as one of your correspondents remarks, "disappearing under water at one place, and after several seconds had elapsed reappearing at another." My husband tells me he has observed the same habits in water-ouzels on the Teme, in Worcestershire, and in Monmouthshire. Their mossy, leafy nests, and dirty-white eggs were more than once found by us.

Four kinds of woodpeckers were seen in our woods—the three pied kinds, and the great green bird.

A fir plantation belonging to some friends of ours was visited year after year (with intervals for which there seemed no special reason) by large numbers of the beautiful crossbill.

Great was the excitement produced in three successive years by the report that a nightingale had been heard in a coppice not far from our house—nightingales being unknown in Cornwall and Devonshire. Some of us went again and again (I am sorry to say surreptitiously), remaining till long after midnight to listen to the exquisite song; but those who had heard nightingales sing, pronounced the notes quite unlike that. I do not remember hearing that the sweet songster was ever identified, but it was certainly not a blackcap.

Salmon abounded in the larger streams, and a most delicious fish called "salmon peel," which I am told, since I left Cornwall, must have been "grilse," "par," "sewen," (?) last spring's salmon, &c. &c. All I can say is, at times we bought *small* salmon, and they were as unlike *large* "salmon peel" of the same size, as *trout* are unlike both. Unfortunately, "mundic water" from the many mines has now spoilt the beauty and utility of most of the Cornish streams, and "salmon peel" are almost a thing of the past.

To Mr. Jonathan Couch, of Polperro, I was often promised an introduction by a much-regarded friend, and well-known local naturalist (Mr. Clement Jackson, of Looe, Cornwall), and I wish that my uninformed remarks on the salmon peel may elicit from him, or any other ichthyologist, some information on the subject.

Referring to Mr. Jackson, I deem it due to his memory to state (what Mr. Couch could probably corroborate) that as early as 1840, and for some years previously, he had made himself acquainted with the principle of the aquarium: how a judicious admixture of plants and animals will keep each other in health, the plants feeding on the carbonic acid gas, evolved by the animals; the health of the animals kept up by the oxygen given off by the plants. Mr. Jackson was a chemist in theory and practice, an experimentalist, and a close observer of nature.

Quite young when I was first privileged with his friendship, my interest and delight in the results of his close and accurate observations were indescribable. His little shop was an *omnium gatherum* and not the least interesting portion of its furniture were the odd-looking tubs, jars, and bottles in which were placed the plants and animals whose natural habits he desired, as far as possible, to observe. I well remember his assertion that the pretty coralline, found in every pool on the Looe rocks, was a vegetable, and not an animal, and giving proof of the fact. Very retiring, he never paraded his knowledge, and he died some years since, or he might have been induced to make some of his discoveries more public. An excellent taxidermist,

* I believe, since we left the neighbourhood, the whole valley to the river's mouth has been embanked, and part of it brought under cultivation.

his valuable collection of stuffed birds was, I believe, his legacy to the museum at Truro. Among his "curiosities" was a "white blackbird." I have also seen a white rook, and one partly white, with some white varieties of other birds, usually of coloured plumage. I observe two of your correspondents refer to the grey phalerope. This bird was observed by one of my cousins (himself a naturalist), one cold winter, on a small pool close to the town, where we were then living, many miles inland. I was taken by him to see it, and it seemed quite undisturbed by the presence of spectators.

Our early home afforded an excellent field for ornithological pursuits. Moths and butterflies in almost endless variety were seen. Of the latter, I may mention the rare Purple Emperor, Peacocks, Admirals, and Painted Ladies, and Fritillaries of many sorts—the Granville Fritillary, which is, I believe, very local, being abundant. We had also both the copper butterflies; the larger having now, I am told, almost forsaken England. We now find that some of the white varieties of butterfly we got there are very rare (my specimens were long since too dilapidated to be of any use), and white varieties of "clouded sulphur" and "clouded yellow" were not unknown to us. A privet hedge in our garden was frequented by the Privet Hawk moth, a sunny walk by the Humming-bird Sphinx, and more than one specimen of the Elephant and of the splendid "Death's-head" moth was captured. One of the latter, I remember, made a fearful noise while dying—a sort of shriek, which horrified my mother, who was its murderer, and very tender-hearted.

While on the subject of moths, I may mention that a moss house in one of the gardens of our after-home, situated near a valley, was the resort of the Goat-sucker or Night-jar, and we often found the floor strewed with the wings of the Puss moth, Oak-egger, &c. Walking once on Kinver Edge, in Staffordshire, I came upon what I thought was a piece of wood covered with some peculiar lichen; but, stooping towards it, noticed the sparkle of a bright, bead-like eye, in which *life* was evident, and, bending nearer, there was a Goat-sucker, cowering so closely to the heathery ground, I thought he must be wounded. But no—before I could grasp him, up he flew, and was out of sight and reach in a moment. I well remember how hard my mother fought, during our childhood, against our dairy-woman's prejudices as to this much-maligned bird. Some dishonest people had milked our cows in the field, and old "Becky" would have it that Goat-suckers, or else Hedgey-boars (the equally harmless English porcupine, or hedgehog), had sucked them. Cornish people hold the belief your correspondent mentions, *i. e.*, that if you try to kill a snake, "it will not die till sundown;" they also give full credit to the healing powers of that handsome St. John's-wort, "Tutsan."

In the woods before referred to, we often found colonies of the great wood ant, with high conical nests, in part made, as your correspondent observes, of fir leaves, but also, apparently, of grass stalks, and the thin stems of small plants. We often saw winged ants of this species near the nests, and though we watched the insects closely, I do not remember that either of us was stung by them at any time.

I am very unlearned as to spiders, for I must confess I have a silly but unconquerable antipathy to the whole race (unlike one of my brothers, who succeeded in so far taming some large spiders, as to get them to come to the edge of their webs, instead of hiding themselves at his appearance. The same brother was also a successful tamer of toads, of which he kept a large number). Despite my dislike to the race, I am bound to say I never saw such handsome spiders as were found in that neighbourhood—"Huge Zebras," more than one of which was not unlike a moderate-sized white strawberry, a large *green* spider, &c.

That spiders are capable of inflicting wounds on human beings I have had proof in my own person. I slept, one hot night, in what is called a turn-up bed; and, tossing restlessly about, my right hand got up into the corner of the bed's head: I felt a kind of prick in my forefinger, and a sharp pain shot up my arm, and next morning the finger was sore and slightly festered; and where it had struck the corner was a common black spider, crushed and dead. Some of your young readers may be amused at hearing, in connection with "Spider Gossip," that a cousin of mine, an engineer, who was superintending the erection of some saw-mills in South America, shot one of the large hairy spiders which there devour small birds; the English workmen being afraid to pass beneath its web lest it should drop on them, and the creature being out of ordinary reach.

The botany of the neighbourhood of our early home was also most interesting; but I need not say that many flowers and ferns seem almost peculiar to the slaty and granitic soil of north and west Cornwall. The delicate little Cornish money-wort, with its small whitish flowers, we greatly prized; and obtained from many a moist and shady place. Like Mrs. Howitt, we had a little garden exclusively for wild flowers, to which every pretty or interesting plant we could obtain was transplanted with as much of the original soil as we could convey; and much happy labour have I spent in securing shade for one and sunshine for another, &c. &c., at the same time. Only once since I left that neighbourhood have I seen that beautiful fungus the *Carmine Peziza*. It grew, year after year, on a time-worn elder tree in one of our fields, and the rich scarlet of its little cups was visible from some distance.

A. C. P.

ZOOLOGY.

Flying Fish.—At page 161, there is a quotation from that excellent naturalist, Mr. George Bennett, on the flying fish, in which he maintains the commonly received notion that its aërial movement is not a true flight, but merely a single leap, wholly dependent on the original impulse given in the water, and therefore incapable of augmentation in force, or change in direction, while in the air. In this opinion, though backed by so great an authority as Alexander Humboldt, I am persuaded he is in error. More than twenty years ago, in a voyage to Jamaica, I set myself to examine with great care this very point, as I had, in former voyages, seen what had appeared to me a distinct motion of the pectoral fins. The result fully confirmed my scepticism of the common statement, as will be seen by the following extracts from my journal.*

"*November* 20, 1844.—Many flying fishes appeared: a silvery species with clear wings, of middling size; the kind commonly seen in the Atlantic—probably *Exocœtus volitans*. I now feel certain that these fishes have power to change their direction when in the air; more than one which I saw to-day *turned aside at nearly a right angle*.

"*November* 22.—Flying fishes leap every few minutes. Several made courses *distinctly angular*; and some, I am quite sure, rose and sunk in undulations. To confirm my own observation, I requested a gentleman on board to notice this point; and he was quite certain of both these facts.

"*November* 24.—I observed a flying fish, after flying a very short distance, suddenly turn downward, abruptly and perpendicularly, as if alarmed, and enter the water. The action exactly resembled that of a bird.

"*November* 25.—Several times I have observed in the flight of these fishes, when near the ship, an occasional *fluttering of the pectorals*. In general, these wing-like fins appear motionless; but at the moment of rising to avoid the crest of a wave, there is a slight but rapid vibration of these organs distinctly perceptible.

"*November* 29.—I noticed a flying fish curve its course, so as to describe *more than half a circle*."

Surely these observations prove that the aërial course of the flying fish is a true flight, increased, directed, and terminated at will, by the action of the pectorals, exactly as is the flight of a bird by the action of its wings.—*P. H. Gosse, F.R.S., Torquay.*

I hope it is not hypercritical to add that a statement in the next quotation is somewhat incautiously expressed. The terrible irritation produced by touching the dependent appendages of the Portuguese Man-of-war, is caused by the emission from them, and the entrance into the human skin, of multitudes of those wonderful stinging weapons the barbed wires (*ecthoræa*) of nettling cells (*cnidæ*), which are found abundantly in our own sea anemones and jelly fishes. The injection of a poisonous fluid is rather a plausible inference than a matter of sensible observation. (For a detailed account of these remarkable organs, I may refer to my "British Sea-anemones, Introduction," pp. xxix. to xl.)—*P. H. G.*

* Nat. Sojourn in Jamaica, pp. 9-11.

"Hats off."—Having been greatly amused by the accounts given in Science-Gossip of the dislikes evinced by various animals to different colours and articles of dress, I think an account of poor "Brutus's" peculiar fancies may not be uninteresting. The Brutus I allude to was a dog—the Brutus mentioned by his fond master (the Hon. Grantley F. Berkeley) in many of his well-known works. I came down into the drawing-room one day at Winleton, dressed in my hat and cloth bernous; we were going to the river side to see Mr. Berkeley fish, when Brutus, who lay on the rug, got up and looked at me. He neither growled nor grumbled—simply looked: such a look! I can not describe it; but it frightened me, fond as I am of dogs—much as I liked Brutus; and I cried out in mortal fear, "Oh! what is the matter with Brutus?" His master looked up, and immediately spoke to the dog, who resumed his place. "He does not approve of your hat." He shows his taste, thought I; for an uglier felt never sat on woman's head; but it looked like rain, and I did not want to spoil my bonnet. "He is not partial to cloaks," added Mr. Berkeley; "a gentleman called here last week, and Brutus nearly tore his Inverness off his shoulders. He dislikes blue; my butcher is his abomination. The poor man has tried to conciliate him by bringing him pieces of meat, but in vain; his blue frock is odious in Brutus's eyes, and it is useless to try and deceive him by placing another over it; the fellow has done that. Brutus on one occasion tumbled butcher, tray, and all over in the road; and legs of mutton, &c., &c., flew about charmingly. I believe the butcher used the then empty tray as a shield." I was far from feeling at ease with Brutus during our walk, and I caught him stealing suspicious glances at my offending head-covering. His master's commands prevented his taking the matter into his own paws, but he looked "Hats off!" very plainly.—*Helen.*

An Original Mode of gathering Fruit.—I have in my garden a pear tree, the fruit of which though small, is of a remarkably sweet and delicate flavour. As the crop ripened last summer, I looked for the usual quantity of windfalls; but, strange

to say, in spite of an abundant produce and rather high winds, scarcely a single pear rewarded my daily search. I of course suspected that some thieving neighbour anticipated me, and I determined to bring my friend to account. With this object in view, I one morning hid myself behind the hedge which skirts the orchard. There was a west wind blowing, and I amused myself with watching the luscious little pears as they dropped from the boughs and fell with a "thud" on the soft earth below. An hour passed away, and I began to wonder whether the thief would make his appearance after all, when my attention was drawn to the movements of a hedgehog, which crawled out of the hedge on the opposite side of the orchard, and trotted towards the pear tree with its peculiar shuffling gait. I remained perfectly still, with my eye upon the little animal, more for the sake of amusement than with any idea of the important part it was about to play in the robbery of my pears. I thus became witness of the following curious scene. After snuffling among the fallen fruit for a short time, the hedgehog took one up in its mouth by the stalk, carried it a few yards, and laid it carefully down; it then returned, seized another, and laid it by the first one. This was repeated until no less than sixteen pears were lying close together, or rather heaped upon each other. Satisfied, I suppose, with the amount, and conscious that he had collected as many as he could conveniently carry at one trip, the animal spread out its prickles to their widest possible extent, deliberately threw itself on the heap of pears, and rolled from one side to the other, until the whole of the fruit was transfixed, and then calmly walked off with its ill-gotten booty to the place from whence it had issued, where I could plainly see some little ones awaiting her return, and no doubt anticipating a juicy breakfast. I made no attempt to disturb the clever little thief, grateful to it for giving me the opportunity of witnessing a fact which has long been treated as a fable—viz., the power and ability of the hedgehog to carry off food on its back.—*B. L.*

[From *Die Gartenlaube*, a weekly periodical published at Leipzig, 1865.]

Swallows hybernating. — Though residing some three thousand miles away from the dear old country, I have been a subscriber to your invaluable Science-Gossip since its commencement; and feeling much interest in your articles on the *hibernation* of swallows, would feel obliged by the insertion of the following in the columns of your ever-welcome monthly. An intelligent German, a native of Dantzig, employed in our office as an engraver, informs me that it is a matter of very common occurrence for the fishermen who ply their vocation during the winter season in the reedy and marshy pools and sluggish streams around the city of Dantzig, to dredge up in their nets from beneath the ice numerous swallows in a torpid condition. He tells me that in shape they somewhat resemble the handle of a shoemaker's awl; the head is turned downwards, and the beak pressed into the feathers of the breast so as to be scarcely discernible; the body is stiff and hard, as if frozen, and their weight much lighter than when in a normal state. He remembers an instance in particular of one being given to his mother in this condition by a fisherman; she placed it in tepid water, when it revived, but soon afterwards died. On one occasion he saw six taken up from the stream, clinging by their claws to a broken reed, from which it appears they had not detached themselves on immersion, as in most cases they do. In autumn they assemble in large flocks, and alight on the reeds overhanging the streams, when their weight accumulates to an amount sufficient to bear down the reeds into the water, the claws appear to relax their grasp, and as the birds disappear beneath the surface, the reeds again rise, and resume their perpendicular position. Professor Lieber, of Elbing, near Dantzig, has for a number of years paid great attention to the habits of these birds, and would, I have no doubt (if still living), feel great pleasure in communicating any facts relating to them. From the description of the bird, I should presume it to be the common house swallow (*Hirundo rustica*), but am not certain.—*G. W., Philadelphia, U.S.*

The Pearl Fisheries.—Perhaps my fellow-readers of Science-Gossip would like to hear a little concerning a work which is throwing light upon a branch of Natural History, whilst its immediate object is to fill the purse. I refer to the investigations now being carried on with regard to the Pearl-fishery of Ceylon. There is no necessity for me to give an account of the fishery. That has been done frequently already. But before giving some extracts from a private letter, kindly placed at my disposal, perhaps it will be as well if I give a short account of the circumstances which called for the inquiry. I need not say that the pearl-oyster is no oyster at all, but belongs to the genus *Avicula* of class *Conchifera* of the Mollusca. It rejoices in the name *Avicula margaritifera*, or *Meleagrina margar*, Lamarck, or *Mytilus margar*, Linnæus. It is well known of what importance and what a fertile source of revenue the Pearl-fishery is to Ceylon. For some years the fishery gradually lost its lucrativeness, until at length the oysters disappeared from the beds. In consequence of this Mr. E. W. H. Holdsworth was sent out as naturalist to see what could be done. The chief questions which required solution would seem to be—first, what were the causes which led to the disappearance of the oysters—secondly, what could be done to obtain

oysters on the beds again—thirdly, what rules must in future be observed in fishing so as to prevent a similar misfortune. It is evident that this last question will involve a thorough investigation of the habits of the pearl-oyster. It is, therefore, interesting to the lover of Natural History to know that there is a prospect of something being done in this direction. Mr. Holdsworth went out in October, 1865, and after more than a year of difficulties and disappointments, he is able to say in a letter, dated March, 1867, which I am allowed to quote,—"The pearl-oysters have again made their appearance on the Ceylon banks. Two patches of ground—one half a mile square, the other a mile square—are covered with young oysters, as thickly as they can well be placed. They are, however, very young, ranging from about two weeks to two months old, being much younger than any of the present fishery officials have seen; so that there is a prospect of ascertaining the rate of growth, if these young creatures remain on the banks. To know the age of an oyster when it is found, is one of the most important matters in connection with the fishery, since the oyster should be taken just when it arrives at maturity, and just before it dies, which it is said to do when six or seven years old."—*Robert Blight.*

Grasshopper Warbler (*Salicaria locustella*).—This is an exceedingly shy bird. On its arrival here in the spring, it generally takes up its abode in some thick stunted hedge, which affords it both food and concealment. Seldom moving from the spot so selected, in the evening its peculiar note may be heard, which has a fine ventriloquial effect; not often is it heard in the daytime, although I have seen it in the early morning perched on the topmost spray of the hedge, with quivering wings, warbling forth its notes. The nest is very artfully concealed a few inches above the ground, by the side of a ditch, and is composed of dried grass. The eggs are generally six or seven in number. Should the female be disturbed while sitting, she generally drops down among the grass, and shuffles along under it like a mouse for some distance. During the period of incubation the song of the male is very seldom heard; but as soon as the young is fledged, he is again harmonious, and continues so until their departure from our shores.—*Thos. H. Hedworth, Dunston.*

Voracity of the Trout.—Whilst fishing in one of the Hampshire trout-streams on the 28th of June, I caught several trout, one of which on being opened the following day was found to contain another, which it must have swallowed at least twenty-four hours previously. The length and weight of the fish are as follows:—The large one: extreme length 15 in., weight 1 lb.; the smaller trout: length 7 in., weight 3 oz.—*H. T.*

Pussy's Foster-Pup.—A small Scotch terrier had six pups; the three prettiest were left with the mother, the others were condemned to be drowned. One of the servants begged leave to bring up one of the ugly pups by hand, as a kitchen dog. Leave was granted, and the servant placed the pup in a basket belonging to a cat who had been deprived of her kittens a fortnight before. When the servant returned, she found that the cat was in the basket, and had taken possession of the pup, which she would not allow any one to touch. She took entire charge of the pup, and brought it up, with a very little assistance from the servant, who occasionally administered a little milk with a spoon. For some time the pup was very tiny. Puss used to wash it, carry it about, and in every way treat it as a child of her own. After he was six months old, the dog grew considerably; he is now about six years old, very ugly but very intelligent. In some ways he seems to have the nature of his foster-mother; he hates getting his feet wet or dirty, dislikes dogs, but is friendly to cats, and washes his face like a cat, by passing his paw behind his ear and over his face.—*Abigail.*

Snake and Mouse.—I was out lately on one of my expeditions in the neighbourhood of Sheffield, and captured a very fine specimen of the ring-snake; he was 35 inches long, very plump, and full of life and animation. I put the reptile into a wooden box with a glass front, so that myself and friends might the better watch his movements. We could get him to eat nothing. Toads and frogs, bread and milk, meat raw and boiled: but nothing would he touch. At length we put a live mouse into his box; but the mouse ate the snake—at any rate he ate four or five inches of his tail. Lest it should be said that I was mistaken, I took two or three friends with me to witness the novelty for themselves. The mouse was two days in the box before he commenced his repast. He first bit the tail off, I think; for when we observed his mouseship dining, he was munching the loose end with great gusto; so that instead of the snake eating the mouse, the mouse commenced devouring the snake.—*J. Potts.*

Died of a Shrew.—In one instance (during the severe winter of 1859-60) a kingfisher was seen to pitch down close to the bank of the river, and rising again fly off to a rail close by. The person watching this bird saw it attempt to swallow something, when it suddenly fell backwards, and was picked up dead. On being examined afterwards it was found to have bolted a little shrew mouse, which unusual morsel had evidently caused its untimely end, and showed how hard pressed these poor birds must have been for their natural food.—*Stevenson's Birds of Norfolk.*

BOTANY.

Walking Fern.—I send a specimen of the curious plant *Asplenium rhizophyllum* or Walking Fern, rare in our neighbourhood. I gathered it at Flat Rock, on the Schuylkill River, about eight miles above Philadelphia. It possesses the curious property of rooting from the end of the leaf, and would soon cover a large space with its matted foliage. Its favourite habitat is rocky woods, or lichen-covered rocks under shady trees. I should be pleased to collect and forward any species of plants growing around here to such of your readers as may think them worth the postage.—*G. W., Philadelphia, U.S.*

Lattice Stinkhorn (*Clathrus cancellatus*). — On the 14th of June, one of the above-named rare fungi, was brought to me by Mrs. Browne of Ashfield Tor. The species has, I believe, never been found in England, excepting in two localities, in Torquay, and one or two specimens in the Isle of Wight. The first that was found in Torquay was in the grounds of Mrs. Tracey, who gathered it in the egg, or nidus state, and as she carried it into the house, the beautiful lattice-like top suddenly broke through the white upper skin of the cap, and rose into its latticed form. The bars of the lattice work were so like coral, both in colour, and apparent substance, that you might believe them carved out of that substance. The pileus is of the purest snow-white, somewhat reticulated, white veinings. The hollow part at the bottom cap is full of a green slime of the most detestable odour. The late Mrs. Griffiths, the well-known algologist, figured the specimens found by Mrs. Tracey; Miss Griffiths also brought me several specimens in different stages. It was ten or twelve years ago that I had these specimens from Miss Griffiths, and about two years afterwards, some little girls brought me two or three fine ones from Ashfield, the only place, excepting those in Mrs. Tracey's grounds, where I have heard of their being found. Since that time I have not seen a Clathrus cancellatus, until this one was brought me this month. If any of the readers of Science-Gossip has seen or heard of this fungus at any other place in England than those I have named, I shall feel obliged by information on the subject. The smell of all that I have had has been so offensive that I could not bear them even on a passage table and under a bell glass, and was obliged to keep them out of doors.—*M. D. P.*

The Orobanche Picridis.—Picris Broom-rape occurs in Dorset in such quantity that, on my farm between Yeovil and Sherborne, I have estimated that in a field of clover are 11,073 plants to the acre; and as the parasite when compared with the clover, presents the same difference in size, as the cuckoo and the water wagtail, it may be guessed what mischief it does to the crop. I find this species here on several kinds of clovers and their allies, in the fields, *Picris heracioides* in the hedge-rows, and I found a specimen on a pelargonium in my greenhouse; and to-day I have taken up a parsley root with this species of broom-rape attached. It is the only species I have found here, and an examination of it inclines me to think that there is some confusion in the nomenclature of our broom-rapes, as I find specimens varying in size from two or three inches to twenty inches in height. Occasionally too, but very rarely, they are branched, but in all the examples I have examined the fold at the upper lip simulating a notch (*see* Syme's description, "English Flora," vol .vi.) is very significant. I confess to having doubts about the difference in species, from our present plant and *Orobanche minor*.—*J. B.*

Varieties of Ferns.—I have found wild in the woods here, *Lastræa filix-mas*, var. *cristata*, for which Moore, in "Nature-printed Ferns," only gives two places in Devonshire. Also, *Athyrium filix-fœmina*, var. *polydactylum*, and *Scolopendrium vulgare*, var. *multiforme*. — *W. D. R., Lonsdale, Westmoreland.*

A Stick without an End.—There may be seen in the churchyard at Shaftesbury, a somewhat remarkable freak of nature. In the language of the foreman at the gas-works, it is "a stick without an end." A branch of a goodly elm has grown into, and become part of another branch of the same tree, in such wise that it has become really "a stick without an end."—*H. Pocklington.*

The Oxlip.—It appears to me that a great deal of the uncertainty with regard to this plant, arises from its being so often confused with the variety *caulescens*, of *P. vulgaris*, which it somewhat closely resembles. This is very common in many parts of the country, and will be often found to have single primroses on the same plant, *P. veris*, *may* have claims to hybridity, but after examining great numbers of individuals, the specific distinctions always remain well-defined and clear. The only point upon which I feel misgivings, is that it occurs at wide intervals, and has a very limited distribution in those localities, whereas, it ought to be as abundant, *cæteris paribus*, as the primrose or cowslip. If your correspondents will consult Professor Babington's Manual of Botany, they will find the characters well given. The leaves abruptly contracted below; the lanceolate-toothed calyx, the points of which are reflected when the plant is in fruit; the concave corolla-limb; and open mouth; abundantly serve to distinguish *P. veris* from all others.—*L.*

MICROSCOPY.

Diatomaceæ.—It will be interesting to the readers of Science-Gossip to know that Herr Eulenstein of Wurtemberg is at present engaged on a complete synopsis of British and Foreign Diatomaceæ. It is to consist of five sections, and each section has to be accompanied by 100 slides of mounted diatoms, each slide being as far as practicable pure, that is free from intermixture of diatoms, other than those it is intended to illustrate. I believe Herr Eulenstein will be glad to receive communications from any English diatomists, of pure gatherings of either fresh-water or marine diatomaceæ, but specially of the latter.—*T. P. Barkas, Newcastle-on-Tyne.*

Mounting Desmids.—The great want which has marred all efforts (to mount desmids successfully) has been a fitting medium; a fluid of such a nature that the plant, when immersed in it shall not become distorted, or indeed receive any appreciable change for a long lapse of years, provided the cement inclosing it retains its air-tight properties. The want of success, it must be allowed, has not arisen from the positive evaporation of the liquids employed, but from the method of employing them. Following a natural law, the frustule, immediately upon being inclosed in its cell, begins to part with the water contained within itself. And what is the consequence? The surrounding medium cannot take the place of the water, the primordial utricle contracts, the contents of the cell collapse, and the plant is left as much changed and disfigured as though it had been originally dried. The botanical world is, therefore, greatly indebted to Herr Hantzsch, of Dresden, for his researches in this direction, which have resulted in discovering an arrangement which completely supersedes the various unsatisfactory plans hitherto adopted.

[This plan is fully detailed in "Nave's Handy-book to Collection, &c.," just published, from which the above remarks are quoted. The old process would occupy too much space to quote entire; we must therefore refer our readers to the book itself, in which they will find many other useful hints.—Ed.]

Microscopic Measurement.—At the meeting of the Dublin Microscopical Club (21st of March), Mr. Stoney submitted to the club reasons which appeared to him, in the present state of science, to require the general adoption by scientific men, of the subdivisions of the metre in estimating micrometrical magnitudes. He observed, too, that all confusion and inconvenience arising from the use of fractions may be avoided by a very simple extension of the nomenclature of the metrical system, which he thought himself justified in recommending to the club, from the assistance he had himself received from it.

Ciliary Muscle of the Eye.—At the Quekett Microscopical Club (May 24th), Ernest Hart, Esq., President, submitted his reasons for doubting the existence of sphinctral muscles, or circular fibres of ciliary muscle, which could influence the accommodative action of the eye, and in a very interesting and lucid communication expounded the theories which have been propounded, to account for the accommodation of the eye, with the result of his own investigations on the subject.

The Study of Mosses.—Dr. R. Braithwaite, F.L.S., at the Quekett Microscopical Club (June 26), read a paper on the structure and classification of mosses, during which he gave a succinct account of the structure, growth, and development of these plants, with hints for their collection, preservation, and examination, adding thereto some remarks on the principles adopted in their classification. A large number of mounted preparations, illustrative of the subject, were exhibited under a series of microscopes provided for the purpose. Later in the evening, it was proposed that classes for the study of mosses and microscopic fungi should be organized in the autumn, Dr. Braithwaite and Mr. M. C. Cooke offering to take charge of such classes respectively.

Otolites.—Mr. Higgins complains of the report of his communication on this subject, published at p. 151—that he did *not read* a paper, but communicated his observations *vivâ voce*, hence our report, taken from shorthand notes made for the committee, was not literally correct—that "Otolites" was spelt incorrectly throughout the report. And, finally, he sends us a corrected account, which we fear that we cannot avail ourselves of, in a manner so as to make the errata wholly intelligible to our readers, except by reprinting the entire communication. In line 23, read "*though* in some members of the Ray family and the Sharks, there is a *tubular prolongation of the lining membrane, reaching from the otocrane to the external surface of the skull.* In almost all other fish, the whole of the auditory organs are contained in the *otocrane*, which are two *deep depressions in the interior of the skull, situated on either side of the brain.*" And at p. 152, line 6, "The sacculus consists of one large sac, *containing the central otolite. The ordinary position of the superior otolite is at the junction of the anterior and posterior semicircular canals*, but in two specimens, &c." And at line 16, "From the lower sac, two tubes pass through the base of the skull, *communicating by a chain of ossicles with the tube of the anterior air-bladder.* These *ossicula* are the only true, &c."

NOTES AND QUERIES.

Locusts with Tails.—There is a species of locust, one of the genus *Acridium*, with a projecting spine between the fore legs. Is it possible that the writer to the *Clerical Journal*, not being a naturalist, made the mistake of imagining this spine to be a tail?—*N. G. W.*

Cheating a Spider.—Some time ago I amused myself by watching a very large spider at work in a fine large web. After observing him complete his task, and post himself on the look-out, I tried him with some flies, which he soon settled. One day I tempted him by touching the web, and evidently deceived him more than once. On one occasion I presented him with a small piece of raw beef about the $\frac{1}{16}$ of an inch long, which I held to him on the point of a pencil. The first time he seized it fiercely with his strong jaws, but almost immediately afterwards threw it away in disgust, nor would he again venture, though I tried him several times. Once, after much fine weather, it threatened rain, and I saw him carefully passing over his web along the spiral threads, detaching them as he passed each intersection with the radial lines, and forming the whole into a roll or ball beneath his abdomen, which, when he had reached the centre of the web he carefully let drop to the ground, and then retired to a snug corner on the gate, to which his principal ties were attached. There he remained during several days, until I no longer had the opportunity to continue my observations. All the radial lines of the web were left intact, as though he intended making future use of them.—*J. B. Keene.*

Nut Borers.—For the benefit of your subscribers in general, and of Mr. S. A. Stewart in particular, I beg to state that the author of the nut-boring, mentioned in your last number of Science-Gossip, is the *Myoxus avellanarius*, class *Sciuridæ*, so called from their principal food being hazel-nuts. It is gregarious, building principally in dense thickets near the ground, where it lays up a considerable winter stock of nuts, wild apples, corn, haws, &c. It has all the habits of the common squirrel, holding its food between its two fore paws, and sitting upon its haunches whilst feeding. Towards winter it becomes exceedingly corpulent, and when winter fairly sets in it retires to its nest, and remains dormant nearly the whole winter, clement weather only rousing it at times to feed. Towards spring it awakes, and follows its usual avocations, conjugal and paternal—the young being born blind, of which there are generally two litters. It is very easily tamed, and has no offensive smell. It is known all over Europe. In England, Kent and Essex most abound in the dormouse, where they are very commonly seen, and are easily caught with the hand. But, lastly, let me warn those of your readers who rejoice in the hope of catching, and expecting to catch one, in trying the experiment, not to hold them by the tail, as they very commonly leave the epidermis and fur between the fingers, and "skedaddle," and thus the expectant captor of the fair prize is thwarted.—*Cleland Lammiman.*

The Petrified Forest.—It may interest our readers to know that fine specimens of the silicified wood from the "petrified forest" near Cairo may be seen in the Technological Museum at the Crystal Palace. They were sent by His Excellency Hekekyan Bey, with the interesting collection illustrating the manners and customs of modern Egypt exhibited in the above-named museum.—*P.*

Larva of Hydrophilus.—Could any of your correspondents (especially the lady who signs "Helen Watney," and gave so interesting an account of an insect vivarium in the Science-Gossip for April, 1866,) inform me how these little creatures should be fed? The eggs in the Hydrophilus nest which I described in last month's number, were hatched on the eighth day. About sixty fine, healthy, lively larva came out. We supplied them plentifully with water plants, and finding they did not eat them, with small red worms—all in vain: they grew languid, and all died within a fortnight—I fear of *hunger*. Should we succeed in obtaining a nest another year, we should feel very grateful to any one who would advise us as to how to avoid a similar catastrophe.—*L. H. F.*

Guaco.—In answer to Henry Cooke, in the last number of Science-Gossip. I lived for some time in South America, and mixed a good deal with the natives, and I know for certain that they inoculate themselves with the juice of the "Guaco" in their feet, and always carry some of the leaves about them, to eat in case of a bite from a snake. I cannot say from experience that Guaco is a cure for a snake bite; but unless it is so, I cannot imagine why these Indians think so highly of it. That the snake-bird does as mentioned by your correspondent, I can confidently affirm.—*Rev. William Goss.*

New Legs.—In S. G. for June, Mr. William Dodson calls attention to a note on a thrush that had been kept in a cage acquiring a new pair of legs. Surely no person in this age believes in such a phenomenon. I will, however, give Mr. Dodson what I consider to be the real foundation for such an absurd supposition. Having had a number of such *deformities* brought under my notice, I can speak not only from what I have heard, but from what I have really seen. I have found that it is not an unusual occurrence to see thrushes, blackbirds, larks, and many others, after being confined some years in a cage, with their legs deformed in the manner I am about to describe. From some cause—want of the necessary food or exercise—the scales of the legs increase to a prodigious size, often being five or six times as large as the ordinary legs, and taking a downward growth, frequently overhang the feet, and in some instances prevent the bird from standing upon a level surface. These scales becoming extremely dry, they are by the slightest accident detached from the leg as far as the knee joint; the scales at that part being smaller, and the skins more flexible, allow the mass of scales, still retaining the shape of the original legs, to remain suspended. The legs after being divested of their old scales, appear extremely thin, and quite pale; and to any person that does not make such an examination as they should, but arrive at a hasty conclusion that the bird has four legs, and that the cast-off scales, which are so much the largest, must be the old legs, are very likely to be deceived themselves, and misguide others. I have seen several instances of hawks that have evidently been trapped, and made their escape with the loss of one foot, and several other birds—a lark amongst the rest, that had been deprived of both feet; and this bird had lived for some considerable time after, as the legs had quite healed, and

become covered with a hard, horny substance, which enabled it to get about in some way or other. Now, surely, if such as your correspondent states be correct, these poor cripples would be fit subjects for nature's handiwork. But even in such cases where birds are sometimes hatched with four legs, they only make use of two, and were they deprived of these, the remaining ones would prove useless.—*J. B. Waters.*

Snake Charming. — The remarks relative to snake charming in Science-Gossip for February, remind me of a commonism that I used to hear long years ago, at least half a century, in a country-place, bearing upon the same subject, it was this: "Get on your own side, speckle-back," and the origin of the saying was given as this—a little girl used to sit upon the doorstep to eat her bread and milk, a snake used to come every morning for his share, and if by chance he got on the wrong side, she would give him a rap on the head with her spoon, exclaiming, "Get on your own side, speckle-back." Eventually the snake was destroyed by the child's friends fearing it might injure her, but, unfortunately, she took her loss so to heart, that she pined away and died broken-hearted.—*G. B.*

Dog in Trouble.—An acquaintance of mine had a rather valuable breed of poodles: amongst the number was one that was the most active, lively, and the finest; suddenly he seemed to lose the power of leaping up, and when stroked on the back shrunk from the hand. It went on thus for about six months, growing gradually weaker as if from consumption, and then died. A *post mortem* showed a skewer partially embedded in the lungs, thus causing a painful, lingering death. I have no doubt that these (see p. 63) are by no means solitary cases, and it seems a great pity they cannot be generally known, as a means of inducing care to be taken to prevent like occurences.—*G. B.*

Cats at the Fire.—In country places you will hear this commonism—

> When the cat sleeps on her brain,
> 'Tis a sure sign of rain.

And I have repeatedly noticed that when the weather is heavy the cat lies with the back of her head on the ground. There is one thing relative to the cat that I cannot at all understand, I have hundreds of times produced electric sparks from the cat's back by rubbing the hair the wrong way; that was in the country some years ago; but here in London all my efforts to do so have proved abortive, although the weather has been cold enough for such purpose one would imagine, neither do I find any one but my wife who ever witnessed it. Can you tell me why?—*G. B.*

Gold Fish.—We have a pond of circular form, some eighteen or twenty feet in diameter, having water-lilies, two kinds of pondweed, water crow-foot, &c.; and had in the dry summer of 1865, not less than eighteen inches of water in it. Into this were placed, two years ago, when it was dug (early in 1865), a few gold fish, which, in consequence of the supply of food which the pond contains, through having so many plants in it, have increased to an enormous extent, and some of the young ones of 1865 are already assuming the beautiful metallic colours which make these fish such an ornament to a piece of water, and which does not generally take place, out of doors, in water of the same temperature as the atmosphere, until the third year. If "G. A. W." prepared a pond with a natural bottom and *without* a jet of water, he would most likely succeed better, as gold fish are said, in common with others of the carp family, not to breed in running water.—*T. D.*

Tail of Locust.—The female *Locusta viridissima* has a straight sword-shaped ovipositor, which may possibly be the tail, like that of a scorpion, "I. M. P." speaks of. This is not the species which does so much mischief in the East; that being scientifically known as *Acrydium migratorium*, or as it was named by Linnæus *Gryllus migratorius*, but possibly the one may have been mistaken for the other.—*T. D.*

Are Anemones Oviparous.—On the 14th of July, I observed what I had not before seen, during my eight years' experience as a keeper of marine aquaria. I have frequently seen anemones of various kinds multiply by fission, by budding, and viviparously, but until to-day, I had not seen anemones give off ova. I observed a mass of greyish-looking matter near the orifice of a very fine strawberry mesembryanthemum which I have had in my aquarium for four years, and on attempting to remove it by means of a brush, which I generally use for brushing the anemones, and for removing impurities, I discovered that the mass was feebly gelatinous, and that every attempt to remove it, only removed a portion, the mass being broken by the brush passing through it. While engaged in the removal, I observed another and a larger mass of similar substance, being ejected from the mouth of the anemone, and on this occasion, I removed it by means of a glass dipping-tube. On examining the contents of the tube, I discovered it consisted of a mass of ova about $\frac{1}{60}$th part of an inch in diameter, and entirely covered with radii or ciliary processes. When examined under a microscope, the globules did not present any appearance of motion, were very uniform in size, were very symmetrical, and perfectly spherical. The quantity of ovarian matter emitted on the two occasions above referred to would have filled a small thimble, and correctly to estimate the number of the ova, exceeds my powers of calculation: I roughly estimate them upwards of a million. Can any of the readers of Science-Gossip inform me if ova so voided ever become anemones, or are they merely unprolific germs?—*T. P. Barkas.*

Hair-worms.—A large quantity of these worms were found after the thunder-storm of June the 3rd, at Epsom and its vicinity, but all disappeared in the afternoon. They were at first supposed to be *Gordius aquaticus*, but turned out to be *Mermis nigrescens*. During the dahlia season they are here parasitic, in the bodies of the earwigs, in the proportion of five to ten per cent.—*W. T. Iliff, Epsom.*

Death's-head Moth.—In "British Moths," by Edward Newman, authority is brought forward to verify his statement that the chrysalis and caterpillar of the death's-head moth (*Acherontia atropos*) have power to emit sounds. I have kept a great many of the former, and have three now, but I have failed to hear the slightest noise made by them. I know that the moth can (when touched) make a noise similar to a mouse, but more plaintive.—*Frederick Stanley.*

Impressions of Leaves.—To obtain exact nature-printed copies of the leaves and impressions of leaves found in the Lower Bagshot Pipe-clays, let "R. C." mix well with cold drawn linseed oil, indigo and chrome yellow to a very smooth consistence with a palette-knife, till it assumes a good vegetable green; then, with a small camel's hair pencil let him paint the impression very carefully, and before it gets too dry, he may obtain on thin paper, by gentle pressure with a piece of clean flannel, a very good impression.—*Wokingham.*

Mirage.—One hot day in the summer of 1865, a mirage was seen off the coast of Hants: the image of a large war-ship appeared upside-down, just above the horizon.—*K.*

Nut-borers.—In vol. ii., "Insect Architecture," by James Rennie, pp. 102, Ravages of Insects, Mr. Murray will find a short article upon the nut weevil (*Balaninus nucum*, Germar). As the entire article might be too long for S.G., I send a condensed account for Mr. M.'s information, as he may not have the work at hand. This weevil drills the hole with its long horny beak (*rostrum*) while the nuts are in their young and soft state, about the beginning of August; the female lays one egg which is thrust into the nut: it is of a brown colour, and is hatched in about a fortnight, the grub feeding on the interior of the shell as well as the soft pulp. It is remarkable that during this period care is taken not to injure the kernel, which is permitted to ripen before it is attacked, for had this been prematurely done it would have been starved, as it had not the power of perforating another nut. It is said to be careful to preserve the original hole made by the mother by gnawing around its inner edges, in order to facilitate its exit, which it effects when the nut falls to the ground in September or October. Two eggs are never laid in the same nut. This insect in all probability caused the hole in the nut observed by Mr. M.—*W. P., Newark.*

Skunk odour.—It is lucky for the trade of perfumers, that their skill in essences has not as yet attained to the power of concocting a perfume equal in persistency to that secreted in the oil-glands of this most disagreeable animal; if such were the case, the sale of one small phial would supply an individual for a lifetime. A handkerchief odorized with scent so permanent would defy the combined powers of soap, soda, and washerwomen to remove the mephitic bouquet, as long as the fabric retained its entirety—

> Bury and wash, and rub as you will,
> The scent of the skunk will cling to them still.

Lord's British Columbia.

Magpie.—I have a magpie the feathers of which of late continually looked greasy, as though the bird perspired profusely; and now he has not only lost his tail, but the greater part of his feathers, and though once a fine bird has become a miserable object. Can any one enlighten me as to the cause, or its cure? As I imagine, it must be in some manner associated with his food, a hint or two towards a rectification of his dietary would oblige.—*R. H.*

What's the Bird doing.—People are apt to suppose that a bird is preening, or rectifying its feathers when they see it applying its bill to its plumage, and running it down a feather, from the root to the extremity; but a man well versed in the habits of birds knows, when he sees the bird do this (except after it has got wet), that it is trying to dislodge the vermin which cling with an astonishing pertinacity to the feathers. Now, while the bird is thus employed on that part of its body just above the tail, where there is a gland, some people imagine that the bird is procuring a liquor from the gland, by means of its beak, in order to apply it to its feathers. But, at best, this can be only mere conjecture on the part of the observer, because the feathers on the rump completely preclude the possibility of his having a distinct view of what the bird is doing.—*Waterton's Essays.*

Song of the Lark.—No doubt much of the pleasure derived from the song of the Lark depends upon association, and to him who finds delight in wandering over the green fields, along the daisied margin of the clear stream that winds in the bottom of the pastoral glen, or upon the ferny brae, where the "lang yellow broom" and "blossomed furze unprofitably gay," shoot up amidst the wild thyme, yarrow, and blue bell, it is pleasant to listen even to the "skirl" of the Corn Bunting, the seesaw song of the Tit, the creaking cry of the Partridge, or the singular crake of the Land-rail; but, independently of circumstances and associations, the song of the Lark imparts an elasticity to the mind, elevates the spirits, and suspends for a time the gnawing of corroding care.—*Macgillvray's British Birds.*

Cement wanted.—I shall feel obliged if I can be informed through the medium of your "Notes and Queries" what is the best cement for fastening india-rubber to britannia metal.—*William Date.*

Milton and Reade.—"T. A. H." writes us in defence of the grammatical construction of the passage quoted by "F. A. A." and condemned by Mr. Milton in our last number. We cannot sanction philological discussions in our columns, and regret that Mr. Milton's grounds of complaint against "F. A. A." should have required such adventitious aid.—Ed.

Fish Tanks.—In answer to your correspondent "G. A. W." concerning gold fish, I would observe, in the first place, that the recent covering of the bottoms with Portland cement would in all probability prove fatal to his fish. It has the same blinding and killing properties as *lime*, therefore all tanks, ponds, basins for fountains and aquariums in the construction of which lime or cement has been used should have the water drained off once a week for about a month previous to the introduction of the *fish*. I would also recommend about one inch of gravel sand or burnt earth spread over the bottom. Your correspondent states that the depth of his pond is from 8 inches to 14 inches. Now 14 inches of water is not enough to protect fish from the burning rays of a summer's *sun*, neither is it sufficient to preserve them from the winter's cold. Give them three feet in the middle, procure some roots of the water lily and *a couple* of deep propagating pans in which plant the lilies, well securing them in the pans by placing large stones or pebbles upon the top of roots. A pot or two of the *Calla* plant look very beautiful in a pond and does well; the foliage of the lilies will prove an agreeable shelter to the fish without which no fish can thrive. Pursuing this plan, I have had them in water under my care breed by thousands, so numerous that every summer we were obliged to thin them, and this in a gentleman's garden within 4 miles of the Marble Arch, London.—*Henry Morgan.*

NOTICES TO CORRESPONDENTS.

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

F. B.—Your brand is *Puccinia Lychnidearum*, which is quite different from the wheat mildew.

E. T. S.—In using "immersion" objectives, a drop of water is placed on the lens.

J. P.—The "tick" from weasel does not seem to be different from the Dog-tick (*Ixodes ricinus*).—*W. W. S.*

W. R. and G. T. S.—The remains of organisms received were not in a condition to determine with certainty. The red patches in the water as described by you and seen at the docks, with the fragments received, lead to the conclusion that they were a large species of Daphnia (Science-Gossip, 1866, pp. 156-7).

R. G. A.—We have been informed that a complete list of British Mosses is in preparation, and will shortly be published.

H. C.—Have you seen "Liebig's Letters on Chemistry," or "Johnston's Chemistry of Common Life"? A book on "Chemical Analysis" will be of very little use to one "unacquainted with the principles of chemistry."

C. P. S.—It is Seaside Barley (*Hordeum maritimum*).

W. D. R.—No. 1, the common Weevil (*Phyllobius uniformis*), a pretty object for the microscope; No. 2, the still commoner Bracken-clock (*Anomala horticola*).—*I. O. W.*

W. H.—All the instruments you require for dissecting flowers will be a pocket-lens (about 1s. 6d.) and a good penknife. You may have a useful little microscope for three guineas. No book of British moths, coloured, can be had at a low price.

W. P. W. S.—Only "Insect Transformations," published nearly forty years ago.

E. A. C.—The query has been answered in Science-Gossip. There is no patent method for finding Triccratum without trouble.

W. R.—No. 2, Atrichum undulatum; No. 3, Polytrichum piliferum.—*R. B.*

T. H., Jun.—No. 1, Hypnum rutabulum; No. 5, Neckera crispa.—*R. B.*

J. R. W.—No. 1, Antennaria dioica; No. 2, Salix repens.—*R. B.*

Jemima.—Hieracium pilosella, very common.

H. B. H.—Cooke's "Fungi Britannici," cent. iii., is just published, and can be obtained at 192, Piccadilly.

T. P. F.—The maple-leaf insect is the curious little Phyllophorus testudinatus of Thornton, the Chelymorpha phyllophora of Clark, and the Periphyllus testudo of Van der Hoeven.—*W.*

W. M. J.—To determine the genus and species of ferns, it is absolutely essential that the fronds sent to us should possess fructification.

C. J. T.—We know of no works on British Marine Algæ superior, if equal, to those by the late Professor Harvey.

Water-filters.—Referring to inquiries as to purifying water, we would recommend that application be made to the Silicated Carbon Filter Company (Battersea) for one of their Illustrated Lists, as these Filters have been spoken of in the highest terms by the *Lancet*, the *Popular Science Review*, and the *British Medical Journal*.

B. T.—It is really quite out of our power to name so many specimens at a time. We are willing to do all that we can for our subscribers, but this is one of the things that we cannot do. Could not some of our friends think of the Editor, as well as of themselves, when they pack up a dozen "odd things" for him to name for them?

M. B.—A second issue of Mrs. Bury's "Photographs of Polycystius" is in progress, and will soon be published.

A. A.—See Nave's Handybook, just published at 2s. 6d. by Mr. Hardwicke, 192, Piccadilly.

B. R.—We cannot say. Inquire of Mr. King, Portland-road.

R. S.—In the present number you will find a chapter on Leaf-miners. It is most likely a Dipterous larva which mines the honeysuckle leaves forwarded to us.

EXCHANGES.

Grasshopper-Warbler's Eggs for good specimens of Acherontia atropos, Endrominis versicolor, or other good Lepidoptera.—S. H. Hedworth, Dunston, Gateshead.

Gums, seeds, microscopic objects (mounted, &c.), for fossil teeth and recent or fossil echini.—W. Gray, 16, Crooked-lane, London Bridge, E.C.

Leaf Insect (*Chelymorpha phyllophora*) in a living state, or the leaf fungus (*Xenodochus carbonarius*), for other objects.—J. P. Fernie, Kimbolton.

British Grasses (25 varieties) for a similar number of British Mosses, Ferns, or Butterflies.—F. Stanley, Harold-road, Newtown, Margate.

Blowfly (head and tongue mounted), or Campylodiscus clypeus, for other mounted objects.—E. Histed, 3, Great Bourne-street, Hastings.

British Ferns and varieties, fronds or spores, for others.—J. Morley, Jun., Sherborne-road, Balsall Heath, Birmingham.

British Lepidoptera for others in good condition.—For lists, apply to Mr. Brunton, Glenarm Castle, Larne, N. Ireland.

British Ferns, Mesembryanthemum, Cactus, &c., established in pots, in exchange for shells or fossils.—J. W., 4, Meadow-view, Whitehaven.

Eggs of Landrail, Lapwing, &c., for exchange.—Lists on application to G. C. Davies, Coneygreen House, Oswestry, Salop.

Fish Scales (six kinds, mounted) for other objects.—F. S., Post-office, Rugeley.

Trochilium tipuliformе and other Lepidoptera for exchange.—A. B. Farn, 5, Ebenezer-terrace, Parson's Mead, Croydon, S.

Nyssia hispidaria and *M. tristata* for exchange.—H. Willits, 38, Mowbray-street, Sheffield.

BOOKS RECEIVED.

"Popular Science Review" for July, 1867. London: Robert Hardwicke.

"A Handybook to the Collection and Preparation of Freshwater and Marine Algæ, Diatoms, Desmids, Fungi, Lichens, Mosses," &c., by Johann Nave. Translated and edited by the Rev. W. W. Spicer, M.A. London: Robert Hardwicke. 1867.

"Summary Notes on Vegetable Anatomy and Physiology, and the Classification of British Plants," by Louis C. Miall. London: Simpkin & Co. 1867.

"A Summary of the Occurrences of the Grey Phalarope in Great Britain during the Autumn of 1866," by J. H. Gurney, Jun. London: Van Voorst.

"The Technologist" for July, 1867. London: Kent & Co.

"The Quarterly Magazine of the High Wycombe Natural History Society," No. 5, June, 1867. Wycombe: W. Butler.

"Remarks on Pyrula carica and Pyrula perversa," by T. Graham Ponton. Reprinted from "Annals and Magazine of Natural History."

Communications Received.—W. J. B.—R. H.—T. B.—J. B.—W. A. G.—G. T. S.—J. S. T.—B. T.—W. W. S.—J. R.—F. B.—L. H. F.—P. H. G.—A. L.—E. C.—W. G.—C. P. S.—S. S.—E. W.—E. T. H.—F. A. A.—C. L.—A. B.—J. B. K.—E. T. S.—J. B. W.—L.—H. E. W.—C. W.—T. P. B.—M. D. P.—H. U.—J. H. M.—J. P. F.—J. P.—A. C. E.—G. C. D.—W. T. I.—G. E. B.—E. H.—R. G. A.—F. S.—T. H. H.—K.—H. C.—A B. F.—W. D. R.—B. T.—J. B.—F. S.—J. B. L.—J. M.—G. C. D.—J. W.—Y. D.—W. H.—W. P. (Newark).—W. P. W. S.—H. T.—J. B.—J. W. M.—W. M. J.—W. A. L.—T. A. H.—W. D.

THE DISGUISES OF INSECTS.

By ALFRED R. WALLACE, F.R.G.S., F.L.S., M.E.S.

EVERY one has heard of the wonderful Leaf-insect of the tropics, which is scarcely less a puzzle to the scientific naturalist than it is to the natives of the countries it inhabits. I have been told over and over again by intelligent persons in the East of the curious plant whose leaves changed into insects! And I could never convince them that this was not the true explanation, for they would say, "It is no good your trying to persuade me, for I have *seen* the creature myself; and I assure you that it has *real leaves* growing out of it, exactly the same as the other leaves that grow upon the tree." And we really cannot wonder at this belief, for when the creature is alive it remains motionless among the foliage, and the colour, veining, form, and texture of its wing-covers and appendages, are so wonderfully like those of leaves that it is extremely difficult to distinguish it at all.

A few years since a specimen of the Phyllium scythe, the "Walking Leaf" of India, was kept alive at the Royal Botanic Garden at Edinburgh. Mr. Andrew Murray wrote a long account of it, and among other matters says: "It so exactly resembled the leaf on which it fed, that when visitors were shown it, they usually, after looking carefully over the plant for a minute, declared that they could see no insect. It had then to be more minutely pointed out to them; and although seeing is notoriously said to be believing, it looked so absolutely the same as the leaves among which it rested, that this test would rarely satisfy them; and nothing would convince them that there was a real live insect there but the test of touch—it had to be stirred up to make it move, or taken off the plant to crawl on the finger of the attendant."

But these remarkable insects do not stand alone. There are many others in every order which are "disguised" in a somewhat similar manner, some with equal perfection, others less accurately, but all serving the same purpose—that of protecting the insect from the enemies that would destroy it. I propose now to give a short account of some of the more interesting cases that occur both at home and in the more luxuriant regions of the tropics.

Almost every one must have noticed the very different way in which the bright colours are distributed in butterflies and moths. In the former, the whole upper surface of the wings is adorned with equally gay colours, while the under surface is always less brilliant, and is generally blotched or mottled with obscure or simple hues. In most moths, on the contrary, the bright colour is restricted to the upper surface of the lower wings, the upper wings being usually of variously mottled brown or ashy tints. This difference is at once seen to be connected with the habits of the insects, the conspicuous colours being so arranged as to be visible during flight, but hidden in repose. On the other hand, the beautiful mottlings and spots and delicate shadings that cause so many moths to resemble bark or lichens, or leaves or twigs, are never developed on those parts of the wings which are hidden during repose. Thus all the Bombycidæ and Noctuidæ, which conceal their hind wings when at rest, have them either quite plain or ornamented with rich orange or crimson hues; while almost all the Geometridæ, which rest with their wings spread open, and such of the Bombycidæ as have the same habit, are mottled and tinted alike on both front and hind wings.

These general facts as to the distribution of colour are the first stage in that process of "disguise" which becomes so wonderfully developed in a few conspicuous cases. The next stage is exhibited by the fact that there is a general agreement between the colour of a large number of moths and the prevailing tints of nature at the season when they appear. Out of fifty-two autumn-flying moths, it has been noticed that a large proportion are of various tints of yellow and brown, so as exactly to match with the "sere and yellow leaf;" while in winter they are of grey and silvery tints, like the washed-out leaves and grass, the fog and the hoar-frost, which give a tone to every landscape at this season.

We now come to a closer and more special disguise. Many of the moths that rest during the day on palings or on the trunks of trees are marked and coloured so as to match the tints of the bark and lichens, and thus to escape observation. As examples of this numerous class, we may mention two of our commonest species—the "Dagger" (Acronycta psi) and the pretty green Agriopis aprilina. The Lappet moth (Gastropacha quercifolia) when at rest resembles very closely a small bunch of dead leaves; and at a little distance could hardly be taken to be a moth, so curiously does it spread out its hind wings so as to project beyond the others. The accompanying cut (fig. 193) by Mr. T. W. Wood, is an accurate representation of this insect in its attitude of repose.

Fig. 193. Lappet Moth.

One of the most curious of these resemblances is that of the Buff-tip moth (Pygæra bucephala). This insect closes its wings so as almost to form a cylinder; and on the tip of each wing is an oval yellowish spot, edged with a dark brown double line. The wings are greyish and hoary; and the head, again, is much contracted beneath the large thorax, which is also of a buff colour, with a double brown marginal line. The result of this arrangement is that the insect looks at first sight like a piece of stick, one end being broken off nearly square, the other end more obliquely (fig. 194); and as it often rests on the ground, among grass or on leaves, it may easily be mistaken for a piece of a broken branch which has fallen to the ground. Many

Fig. 194. Buff-tip Moth.

more of these beautiful adaptations remain to be discovered in our native insects. That most elegant insect the Elephant Hawk moth is of a reddish-pink colour, mingled with dull yellowish-green, and with specks and streaks of white; but it has not been noticed how closely all these colours must assimilate it to the handsome red-flowered Willow-herb (Epilobium), on which the larva feeds, and on which the female insect, while depositing her eggs, no doubt often reposes. The petals of the common Epilobium angustifolium, for instance, are of the same pinky-red as the moth; its stems and seedpods are green, tinted with brown-purple or yellowish, while the white filaments of its stamens correspond to the white lines and streaks on the insect. It is evident, therefore, that while reposing amid a clump of these plants, the Elephant Hawk-moth, although so brilliantly coloured, must be exceedingly difficult to detect, since every part of its body is of exactly the same hue as some portion of the flowers.

We owe the discovery of one of the most beautiful examples of "disguise" in a native insect to the talented young artist and close observer of nature who has furnished the illustrations for this article. He tells us that one fine afternoon in May, being overtaken by a shower, he sought shelter under a hedge, where, among other flowers, the wild parsley (Anthriscus sylvestris) grew in the greatest profusion. While observing the light and elegant forms of these plants, he noticed what appeared to be a small bunch of flowers projecting beyond the rest; and a closer examination led him to the inter-

esting discovery that our beautiful little "Orange-tip," one of the gayest and brightest of our native butterflies, was reposing among these flowers in such a manner as to gain a complete protection by its resemblance to them. He was now able to see the use of almost every detail, both of the form and colouring of this insect. The bright orange patch, so beautiful when the insect is on the wing, was hidden beneath the hind wings; and there is thus a very good reason for the circumstance that the colour does not extend so far on the under as on the upper surface of the wing, and also for the tip of the upper wings being mottled with green beneath, like the whole surface of the hind wings; for

Fig. 195. Orange-tip Butterfly.

as they are a little longer than the hind wings, the whole form one uniformly coloured surface when the wings are closed (fig. 195). Various other species of Anthocharis, as well as the pretty Zegris of Eastern Europe and our rare Pieris daplidice, are coloured in a similar manner on the under side, though with varying degrees of brilliancy; and it is probable that they are accustomed to repose on the flowers of umbelliferous or cruciferous plants of suitable colours. One of the handsomest species of Indian Pieridæ, the Iphias glaucippe, whose upper wings are ornamented above with a large patch of vivid orange-red, is so tinted and mottled on the under side as to resemble a dry leaf; and a strong dark line running through the centre of the wings represents the midrib. This species often rests on the ground, on the banks of streams, or on beds of gravel, and depresses the upper wings so much between the lower ones as to form an outline very similar to that of a leaf; and this is no doubt a great protection to it; for although so large and showy an insect, it is very plentiful.

By far the most singular and most perfect disguise I have ever met with in a Lepidopterous insect is that of a common Indian butterfly, Kallima inachis, and its Malayan ally Kallima paralekta. I had the satisfaction of observing the habits of the latter in Sumatra, where it is rather plentiful at the end of the dry season. It is a large and showy insect when on the wing; the upper surface being glossed with blue and purple, and the fore wings crossed obliquely by a broad band of rich orange. The under surface of the wings is totally different, and is seen at a glance to resemble a dead leaf. The hind wings terminate in a little tail, which forms the stalk of the leaf, and from this to the apex is a slightly curved dark brown line representing the midrib. The transverse striæ which cross the discoidal cell in many butterflies are here continued so as to form lateral veins, and the usual submarginal striæ on the hind wings, slightly modified, represent others towards the base of the wing. But it is only when the habits of the insect are observed that the disguise becomes manifested in all its perfection (fig. 196). This butterfly, like many others, has the habit of resting only upon a nearly vertical twig or branch, with the wings closed together so as completely to conceal the upper surface. In this position, the little tail of the hind wings exactly touches the branch, and we now see why it is always curved inwards a little; for if it were quite straight, it would hang clear of the branch, and thus fail to represent an attached leaf. There is a little scallop or hollow on the margin of the fore wings at the base, which serves to conceal the head of the butterfly, which is very small for its size, and the long antennæ are carried back and hidden between the folded wings. When sitting on a twig in the manner described, the insect is to all appearance a perfect dry leaf,—yet it is evident that its chances of escape would be much increased if it were surrounded by real dry leaves instead of by green ones; for if, when pursued, it took shelter in a growing bush, it could hardly fail to be still a conspicuous object. Marvellous to relate, it does possess the habit of almost invariably entering a bush loaded with dead leaves, and is so instantly lost to sight, owing to its close resemblance to all the surrounding objects, that I doubt if the most vigilant fly-catcher could detect it. I have myself often been utterly puzzled. I have watched it settle,

Fig. 196. Indian Butterflies at rest.

apparently in a very conspicuous situation, a few yards off, but on crawling carefully up to the spot have been quite unable to detect any living thing. Sometimes, while gazing intently, a butterfly would start out from just before my eyes, and again enter another dead bush a few yards off, again to be lost in the same manner. Once or twice only was I able to detect it sitting, and admire the wonderful disguise which a most strange combination of colour, form, and habits enabled it instantaneously to assume. But there is yet another peculiarity which adds to the concealment of this species. Scarcely two of the specimens are alike in colour on the under side, but vary through all the shades of pale buff, yellow, brown, and deep rusty orange which dried leaves assume. Others are speckled over with little black dots like mildewed leaves, or have clusters of spots or irregular blotches, like the minute fungi that attack dead leaves; so that a dozen of these insects might settle on a perfectly bare spray, and clothe it at once with withered foliage not distinguishable from that of the surrounding branches!

The protection derived from a vegetable disguise is not confined to the perfect Lepidoptera, but is often equally remarkable in their larvæ. The caterpillar of a European moth that feeds on the privet (Hadena ligustri) is so exactly the colour of the under side of the leaf, on which it sits in the day-time, that you may have the leaf in your hand and yet not discover it. In the caterpillars of the Geometridæ, form, colour, and habit combine to disguise many of the species. Those of the Brimstone and Swallow-tail moths may be taken as examples. They have the habit of stretching themselves out obliquely when in repose, attached only by the clasping legs at the further extremity, and will remain stiff and motionless in this position for hours. The little protuberances on the body, their colour and attitude, give them so exactly the appearance of twigs of the living tree, that we may easily conceive the advantage this disguise must be to them; for it is certain that many will escape destruction when more conspicuous insects will be devoured.

Among the extensive group of the Coleoptera, the examples of a protective disguise are literally innumerable. In the tropics, every fallen tree swarms with beetles, and a large number of these so closely resemble the bark to which they cling, that it requires a close examination to detect them. The families of the Longicorns and Curculios furnish the greater part of these; and among the former, that

which wears perhaps the most perfect disguise is the Onychocerus scorpio. This beetle is common in South America, and was found abundantly by Mr. Bates on the banks of the Amazon, but always clinging to the rough bark of one kind of tree, called by the natives Tapiribà. This bark was so closely imitated by the beetle itself,—its elytra and thorax being tubercled and coloured so as exactly to match it, and the insect clinging so closely as to form, apparently, one surface with the tree, that Mr. Bates assures me it was often absolutely impossible to detect it by the closest inspection as long as it remained motionless!

Many of the Tiger beetles, although they are such conspicuous and beautiful objects in our cabinets, are well disguised when in their natural stations. Our commonest species, Cicindela campestris, is fond of grassy banks, where its green colour makes it difficult to see it. Cicindela maritima is almost exactly the same colour as the sandy shores it haunts. The large Cicindela heros frequents the mountainous forests of Celebes, where its brown colour exactly matches with the dead leaves that cover the ground. The magnificent velvety-green Cicindela gloriosa was captured only on wet moss-covered rocks in the bed of a mountain torrent in the island of Celebes, where it was very difficult to see it. The pale-coloured Cicindela Durvillei was found on coral sand of almost exactly its own colour; and I noticed generally that, whatever the colour of the sand or the soil, the common Tiger beetles of the locality were of the same hue. A most remarkable instance of this was a species which I found only on the glistening, slimy mud of salt marshes, the colour and shine of which it matched so exactly that at a few yards' distance I could only detect it by the shadow it cast when the sun shone!

Several Buprestidæ of the genus Corœbus resemble the dung of birds freshly dropped on leaves, and I have often been puzzled to determine whether what I saw was worth picking up or not. Mr. Bates tells us that Chlamys pilula cannot be distinguished from the dung of caterpillars. Our own Onthophilus sulcatus is very like the seed of an umbelliferous plant, and the common Pill beetle (Byrrhus pilula) would be taken for anything rather than an insect.

We must now turn to the Orthopterous insects, which contain some of the most surprising cases of disguise yet discovered. The true Walking Leaf has been already described at the commencement of this article, but there are other insects of a quite different structure which almost equally resemble leaves, as shown by the names given to them by the old writers; such as Locusta citrifolia, L. laurifolia, L. myrtifolia, &c. Acrydium gallinaceum, from the Malay Archipelago, has an immense erect leaf-like thorax; A. platypterum has wings like the most beautiful smooth green leaves; while A. gibbosum is like a little shapeless lump of mud or stick. The voracious Mantidæ are often concealed in a similar manner. Many have the thorax broadly dilated, and, with the wing-covers, coloured like a dead or a green leaf; and one has large brown legs and small wings, so that it looks more like a cluster of bits of stick and withered leaves than a living insect.

Fig. 197. Stick Insect.

The true Phasmidæ, or Stick-insects, are the most curious, perhaps, of all, and they are much more abundant in the eastern forests than the Leaf-insects. They vary from a few inches to a foot long, and are almost always of the colour and shape of pieces of stick, the legs forming the branches. One of the most curious facts connected with them is that they seem to know that if they rested in the symmetrical attitudes in which they are always drawn, with their legs spread out uniformly on each

side, they would soon be detected. They are accordingly found stretched out motionless in the most unsymmetrical manner possible—one leg out on one side, and two on the other, for example, the remaining legs fitting so closely to the body that they appear to form one piece with it. They lay generally across leaves and twigs, as if they had accidentally fallen there from some dry branch overhead; and so impossible is it to detect them by the eye that I used to make it a practice, when walking along in the forests, to touch every suspicious bit of dead stick I saw loose on the foliage, as the only means of finding out whether they were real sticks or Stick-insects. Sometimes they are exactly the colour of lichen-covered branches, and are covered with little foliaceous expansions. One that inhabits the swampy forests of Borneo has these of a beautiful olive-green colour, so as exactly to resemble a creeping moss or jungermannia; and the Dyak who brought it me assured me it was very curious, for he had never before seen an insect grown all over with moss while alive! I was quite as much astonished as he was, for I could hardly believe my eyes, and it was only after close and repeated examination that I could convince myself it was not a real plant that covered the animal. This insect loses all its beauty when dried, and it has been very poorly figured by the Dutch naturalists, and very inappropriately named Ceroxylus laceratus, from its torn and shaggy appearance in the preserved specimens.

In the deserts of Egypt are some curious Mantidæ which are so exactly the colour of the soil they live upon that the closest inspection can scarcely detect them. It is even stated that where the soil changes from brown to white or yellow in a few yards' distance, the insects change also, and always correspond in colour to their habitation. The caterpillar of a European moth, Bryophila algæ, is said to change in a similar manner, being yellow when found on the yellow Lichen juniperinus, but grey when on the grey Lichen saxatilis. In this case, however, the food may probably produce the change of colour, as it is known to do in some other larvæ. Some cases more to the point have been observed by our artist, Mr. T. W. Wood. He states that the chrysalis of the common Tortoise-shell butterfly is of a very different colour according to its position. When attached to a nettle, it is of a golden colour; when on a wall or fence, mottled grey; and when on a tarred paling, nearly black. Once he placed some larvæ of the Swallow-tailed butterfly in chip boxes, where they changed into chrysalids; but, strange to say, instead of being green or dusky, as they usually are, they were of exactly the same colour as the inside of the box, without any marking whatever. Some of them produced very fine butterflies, which shows that they were healthy.

These curious facts prove that we have yet much to learn as to the causes which determine the colours of animals, and it is to be wished that a few of our young naturalists would experiment on some of our commonest insects, rearing them from the egg exposed to the influence of differently coloured objects and carefully registering the result. In this article I have only been able to call attention to some curious facts in the colouring of insects, and more especially to the disguises which serve to protect them from their enemies, or enable them more easily to entrap their prey. Such of my readers as may wish to know more of this subject, and may desire to learn how these strange modifications of form and colour have probably arisen, are referred to an article in the *Westminster Review* for July last, on "Mimicry, and other Protective Resemblances among Animals," in which the most recent views of Mr. Darwin's disciples are fully explained.

PRIMEVAL BRITAIN.

IN the April number of Science-Gossip there appeared a very interesting extract from Campbell's "Frost and Fire," treating of a legend recorded in the Gaelic poems of Ossian, and in the folk-lore of the Irish, Welsh, and Highlanders. This story asserts that in Ancient Britain, in the days of Fionn, and in the "Feimne" (which may be taken to mean, I suppose, the dynasty which he founded or the domain over which he and his posterity ruled), there lived men and animals of gigantic stature. This curious tradition, like most others, is probably founded on a truth which, when discovered, might greatly increase our knowledge of the early history of our race and land.

While Mr. Campbell quite sees reason, from the remains of large fossil animals which have been discovered in this country, to believe the latter part of the legend, he finds the former part, viz., the supposition of a gigantic race of men, incredible. Now it has occurred to me that the very name of the monarch under whom this state of things prevailed is the key to the enigma. Surely this Fionn is no other than the personage to whom almost all the old Erse legends relate, viz., Farsaidh, Finiusa-Farsa, or Phenius the Sage—the personification, in fact, of the rule of the Tyrian (Phenician) traders, whose attainments must have appeared so wonderful and gigantic (to use a material comparison) to the native Irish. It is well known that uncivilized nations regard those who have attained more knowledge than themselves as giants in intellect; and it is perfectly comprehensible how this reverence for superior intellectual power should become changed in time into an actual belief in their superior stature. In the sense of "learned" or "gifted" man, the word "giant" is frequently used in Scripture. If

however, a literal interpretation of the word "giant" should be insisted on, it is not at all impossible to conceive that the gigantic races of Canaan—the Emim and Anakim—took service with the Phenicians as mercenaries, in the same way as Goliah and his family appear to have been employed by the Philistines.

The Greek geographers relate that Carthaginian artificers and husbandmen left the Punic colonies in Northern Spain to settle in Ireland; and this immigration into that country must have been carried on to a large extent, to affect, as it has done, the native language; for modern Erse is nearly pure Punic. The native legends attribute the first colonization of Ireland to three fishermen from Northern Spain; and it may be that this is true, since Rennell's Current, a branch of the Gulf Stream, runs directly from Biscay to Cape Clear. The Irish bards embodied in their songs a tradition that part of the country was once in the possession of settlers called "Phenies," who came from Spain; and it is thus owing to the dim recollection of the glories of the colonial empire of Carthage that the modern Irish rebels took the name of "Fenians." St. Jerome says that "Poenns," a Carthaginian, is clearly derived from the term "Phenician."

When we proceed to examine the attributes ascribed to this Phœnius by the Irish traditions, we discover that they strikingly coincide with the known characteristics of the Phenicians. For instance, he is said to have loved learning, invented the Hebrew, Greek, and Latin alphabets, and to have held commercial dealings with Syria and Africa. The Phenician race had its two capital cities in Syria and Africa, was the most commercial one on the face of the earth, the reputed inventor of letters, and probably, from its wide dealings, greatly skilled in philology. Even in dress and personal appearance, the likeness between the Irish and the inhabitants of Northern Spain is most marked at the present day. The red cloaks of the women and the variegated plaids of the men, which the Irish formerly wore and the Gael still wear, are the usual articles of dress in Northern Spain. Probably at the time when Ireland was thus occupied by the Phenician colonists, the gigantic elk, auroch, bear, and wolf were alive in the dense forests of the two islands; if not the hyena, mammoth, rhinoceros, and great cave tiger of Britain, whose bones have been found in the drift or gravel stratum at Brentford and elsewhere. This last animal was of the feline race, as large as the largest African lion or Bengal tiger—probably something between the two, like the puma, but with stronger-knit limbs. It is not necessary to suppose that the climate was much warmer when it lived here than it is now, since the tiger at the present day often follows herds of antelopes to the verge of perpetual snow in the Himalayas, and goes far into Siberia. The large animals of the bovine species, with which our ancestors, to judge from the legends which reach us at the present day ("Guy and the dun cow," &c.), had such terrible conflicts, are nearly extinct. The auroch is only known to exist in two or three imperial forests in Lithuania and Poland; the "ox with the high promontory" of Celtic legends, probably the bison, is now confined to North America, and is being rapidly extirpated there; the indigenous wild ox only survives at Chillingham Park, in Northumberland, and at Hamilton Palace, in Lanarkshire. The wolf is the only animal, of those previously mentioned, of whose extirpation in Britain there is any record in history. The last was killed in Scotland by Sir Ewen Cameron of Lochiel in 1680; in Ireland they survived till 1710.

The bones and antlers of the elk are found in the peat-bogs of Ireland and the Isle of Man, in excellent preservation; but we have no records of their existence in our land, even in the time of the Romans.

Nothing is more striking than the similarity between the animals and plants of Northern Europe and North America. This fact seems to point to the union of the two continents at some distant date. Mr. Murray, in his work on "The Distribution of Mammals," tells us that Shetland shows evident signs of having been once inland; and to make it so again a rise of only seventy fathoms is necessary, which would connect it with America by way of the Faroe Islands, Iceland, and Greenland. In North America we find the dwarfish Esquimaux, who are one and the same people with the Laplanders of Northern Europe; and in both continents we find the bison (fossil in Europe), elk, reindeer (called "cariboo" in America), beaver, polar bear, and several smaller mammals.

F. A. Allen.

BITTEN BY A VIPER.

That fatal results have followed the bite of the viper, the records of many a country surgeon's note-book, I am satisfied, would show: that death has been the immediate consequence of the bite, in all cases, I am not so certain. That constitutional and other predisposing causes, in certain cases, will render a fatal issue inevitable to some persons when so bitten, cannot be doubted; and so will these causes influence the course and termination of the effects resulting from the infliction of other injuries upon the human body; *e. g.*, punctures from rusty nails, thorns of some shrubs, the sting of the wasp or bee, and the bite of the common flea and bed-bug, or other insects. Cases have come under my notice where severe constitutional disturbance and much local suffering and inflammation have resulted from the sting of a bee, inflicted upon the

palm of a healthy young man; and I am no stranger to the feverish excitement and severe local irritation resulting from the bites inflicted by bed-bugs in discharge of their allotted task. I destroy all such pests when they intrude upon me, and I cannot imagine that many are of Mr. Ullyett's way of thinking respecting the viper, and care to protect so obnoxious a reptile,—for, independent of his interesting cases as to the comparative harmlessness of the reptile's bite, I fancy many instances could be produced where it would be seen that the viper's bite is a malignant and a deadly one. The recollection of the following case induces me to imagine that the venom of the viper, when fairly introduced, is capable of producing death, or a very close approximation to it, to the person so injured. Some sixteen years ago, while residing in Essex, a healthy, industrious, and temperate labouring man, came under my notice, he having, some twelve or fourteen hours previously, been bitten by an adder on the dorsum of his right hand, about an inch above the first joint of the middle finger. The man's age was about 36 years, and he had enjoyed very good health for several years, not during this period being necessitated to absent himself from his daily labour. He was, when bitten, in the enjoyment of his usual good health, and he was engaged in the fields cutting some fagots or dry stubble (I forget just now exactly which), but he came upon a group of adders; one of these sprang at him, and seized his right hand, as mentioned; he shook it from him, and killed it. He sucked the wound well, but not immediately after he had rid himself of the reptile, but after he had destroyed it, so that absorption of the virus was complete. Soon after this he began to experience a sense of burning and stabbing pain in the hand; the arm also became heavy and stiff. The wound gradually assumed an angry look, while the hand became much swollen.

When I saw him he was in bed; the bitten member had been placed in a warm poultice of herbs; the man was feverish, flushed, and excited—the pulse being small and rapid, the tongue and fauces parched; he was very thirsty. A sedative was given to him, and a free but guarded supply of ammonia, with brandy, given at rather frequent intervals. A faint and bright redness was extending up the forearm, nearly to the elbow, and some marked amount of swelling also was clearly present. A large linseed poultice was applied over the entire limb, from the fingers to the elbow-joint. He passed a restless night, and next day at noon the hand and forearm were greatly swollen, the hand being mottled with green and yellow on a dusky red ground; the wound on the dorsum was sloughy, and discharged a dirty-coloured sanies. The forearm was much swollen and discoloured, but less so than the hand. Inflammatory and morbid action was extending up the arm; it was dusky-red in colour, painful, and swollen.

At times, a low form of delirium existed, and the tongue was dry and brownish. Increased attention was given to the poor fellow, and on the extension of the morbid action over the entire limb—from fingers to shoulder—several long and free incisions were made through the distended and discoloured integuments, so as to prevent sloughing of the whole, and also to give vent to the dark-coloured and fœtid sanies which had accumulated from disorganization of the cellular tissue. Much relief followed these incisions, and charcoal and other poultices gradually corrected the fœtor of the discharge; while, at intervals, considerable portions of the cellular tissue sloughed away through the openings mentioned. All this anxious period the patient required the closest attention and care; the delirium, restlessness, and tendency to collapse were combated by the rather free use of opiates, ammonia, brandy, strong beef-tea, &c., until after the lapse of ten or twelve days, when the danger, once so great, was considered as past, and a decrease in our solicitude took place.

However, some six or eight weeks were consumed before he could resume some of his duties as a farm labourer, and then only with an enfeebled limb, and one marked with distinct scars, which will ever remind him of the danger he had experienced from the bite of a viper. Against the whole tribe the man vowed vengeance.

Now, although this case of being bitten by a viper had not a fatal termination, I fancy it will not acquire any increased toleration for the reptile from those who may read its details. Had the man been less robust, or been deprived of ordinary care and attention, I fancy a fatal result would have been recorded. Supposing the reptile had bitten a child instead of the man, death would then have been certain, *i. e.*, if we may judge from the symptoms reported.

Sir Charles Bell, I think, like to Mr. Ullyett, has expressed his belief in the non-fatal effects of the viper's bite; and while respecting Mr. Ullyett's humane motive—the protection of the creatures he studies—I must confess, from the recollection of the above case, that I should be induced to destroy the reptile whenever and wherever I might see it. It has a bad, a very bad character, and is, there is no gainsaying it, a dangerous reptile; and from some resemblance it has to the common and harmless snakes, it passes its own demerits upon its harmless and certainly useful congeners, who are accordingly sacrificed needlessly by all who believe all snakes to be, like the viper, poisonous.

Frederick Hall.

The writer of a very interesting article ("Bitten by a Viper") in your issue for last month, says that when he suggested that the viper's bite should be sucked or cauterized, his friend asserted the uselessness of these expedients, excepting, perhaps,

in partially alleviating the effects of the poison—"Since," he said (I quote from memory), "the very first pulsation, after the bite had been inflicted, would carry a portion of the poison into the circulation." Now as the matter referred to is of considerable importance, perhaps you will permit me to say that my own experience connected with snake-bites—extending over a service of sixteen years in the East Indies—does not coincide with the assertion of the above writer's friend.

I have myself treated four cases of cobra-bites among my native servants and the men of my regiment; and in all the cases I found that speedy cauterization with *liquor ammoniæ fortior*, combined with small doses of brandy at short intervals, and making the sufferer walk about for half an hour or more after treatment, always succeeded in checking bad consequences. A *tourniquet* was at the same time applied above the bite (in my cases all four men were bitten in the leg), and kept tightly screwed up till the caustic had done its work. It is possible that merely sucking the wound might not suffice to remove the poison (to say nothing of the risk caused through any abrasion, however slight, in the mouth of the operator); but I feel sure that the prompt use of a ligature above the wound, and the application of liquid caustic to the bite would, in almost every instance, suffice for a perfect cure—certainly in the case of a bite from a common viper, whose venom has not the activity of that of the *cobra di capello*.

On a person being bitten by a snake, the poison is not at once admitted into the circulation. Nature endeavours by every means to prevent its entrance into the blood. The effusion of blood, on the bite being inflicted, is an effort on her part to wash out the veins, as it were; and although in the case of acute poisons (such as that of some snakes) this effort rarely suffices to expel the whole of the offending matter, still time is thus afforded for the application of further means for its removal. It would therefore be a great mistake to refuse to aid Nature's efforts by the use of ligatures, cupping-glasses, or liquid caustic.

All animal poisons when introduced into the circulating fluid—whether the poison be that of snake-bite, rabies, syphilis, &c.—have a longer or shorter period of incubation before they commence their work of destruction, and it is during this period of inactivity that means should be employed for their elimination; and I feel confident that were a man who was bitten by a venomous snake to at once tie his handkerchief or neckcloth tightly *above the bite* (should such be practicable), and cauterize the wound either with fire, lunar caustic, liquor ammoniæ, or any strong acid (*the liquid applications being far preferable*), he would, in nine cases out of ten, escape with nothing worse than the inevitable temporary shock to the system. W. S. Y.

TOADFLAXES.

September woods, September skies, so soft and sunny all!
Unfaded and unfall'n your leaves, and yet so soon to fall.
Ah! what avails that dying smile which gilds your fading green,
While Winter peeps, like Death, behind, to shut the farewell scene!

THE wane of the year is again upon us: the fields, cleared for the most part of their "golden grain," present a forlorn appearance; and the shortening days, as well as the gorgeous hues of the fading leaves, tell us that Autumn has indeed arrived. There is always a certain amount of sadness associated with the ingathering of the corn; we feel that the full beauty of the year has departed, and in the stubble which remains we seem to find an intimation of the coming Winter. Not that a stubble-field is, in itself, dull or gloomy; for many a bright flower, hitherto concealed by the waving corn, now appears in great force; but still there is an air of desolation about it which we cannot overlook. We must therefore study the more carefully the remaining flowers, in which almost every day marks a diminution, and may appropriately select for consideration in the present paper the British members of the pretty genus Linaria.

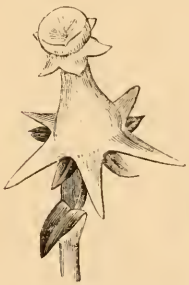


Fig. 198.
Toadflax, peloria form.

Fig. 199.
Toadflax, normal flower.

The common Snapdragon, or Bull's-mouth (Antirrhinum majus), with its curiously-shaped blossoms of various gay colours, is a plant with which almost every one is familiar. The mouth of the curious monopetalous corolla is closed by the palate attached to the lower lip; and it is only when we press the back of the flower that it opens and discloses the four white stamens, two long and two short, which tell us that the plant belongs to the Linnean class Didynamia. The Toadflaxes, or Linariæ, much resemble the Snapdragon; indeed the above-described corolla (technically termed personate) is among British plants confined to these two genera; but the two are distinguished by the presence, in the species of Linaria, of a spur at the back of the corolla, which spur is wanting in the species of Antirrhinum.

We find, then, that our Toadflaxes agree in

having each a personate, spurred corolla, with didynamous stamens, and are thus readily distinguishable; we may add that, as far as our species are concerned, the blossoms are all of some shade of blue, yellow, or white.

There are six British species of Toadflax sufficiently frequent to merit description; besides one (Linaria pelisseriana) which is confined to Jersey; another, a doubtful native (Linaria supina), which occurs in one or two places in Cornwall, Devon, and Dorset; and a third (Linaria purpurea), formerly much cultivated in gardens, which occasionally strays from them. None of these merit more than this passing notice in a paper which aims rather at instructing in common things than at encouraging the search for rare ones.

We shall find it convenient in this, as in previously considered genera, to divide our six species into groups, for the purpose of more readily considering each; and two very natural ones at once present themselves—the first containing three species, with upright stems and narrow leaves; the second, the remaining three, with trailing stems and broadish leaves.

I. The Common Toadflax (Linaria vulgaris) is the handsomest of our British species, and demands our first attention, as to it we are evidently indebted for both the English and Latin names of the genus. It is clear that the name Toadflax was originally bestowed upon this species *alone*, although it has since been extended to the entire genus. In our old herbals we find the name Toadflax applied especially to Linaria vulgaris, and *exclusively* to the species with long narrow leaves and upright stems. Mr. Holland thinks that the reason for this may be found in the supposition that the word *toad* is prefixed as meaning *spurious* or *false*—the name of an unpopular reptile being given to what, at first sight, appeared to be like flax (which Linaria vulgaris certainly does before flowering), but which proved not to be the right thing; just as *dog* is prefixed to the names of many plants to denote that they are not the genuine article—dog-rose, dog-violet, to wit. That the name Toadflax really means false or spurious flax, he considers is rendered more apparent by the fact that in Cheshire it is applied to the Corn Spurrey (Spergula arvensis), a plant which bears a very superficial resemblance, especially in flower, to the Mountain Flax (Linum catharticum), which is there in immense repute as a stomachic herb. Gerarde speaks of Linaria vulgaris as "Wild-flax, Tode-flax, or Flax-weed," which strengthens the above-expressed opinion; although he points to another derivation of the name when he says that the flowers have "a mouth like untoe a frog's mouth"—a somewhat fanciful resemblance, from which the Danish *torskmund*, or haddock-mouth, evidently originates. Linaria vulgaris is more like the Snapdragon than any of the other species, both in the size of its blossoms and in general growth; the flowers are very handsome—pale yellow, with a deep orange palate; the narrow grey-green leaves have been before alluded to. Withering says that cows, horses, and swine refuse to eat them, and that sheep and goats are not fond of them; while the smell of the flowers is obnoxious to flies. Besides the names above mentioned, this species is known as Butter-and-Eggs, Pattens-and-Clogs, Gall-weed, and Wild Snapdragon. It is by no means uncommon throughout England; and although preferring a gravelly soil, is not confined to it: in the north of Scotland it is of rare occurrence. Linaria vulgaris grows chiefly in hedges or the borders of fields. Mr. Holland says that "it is almost a sure indicator of an admixture of peat and sand in the soil." The first specimens we ever saw were brought, curiously enough, from the Toad Rock at Tunbridge Wells. It blossoms from June until late autumn.—Our second species, the Creeping, or Pale Blue Toadflax (Linaria repens), is the rarest of the six we are now attempting to describe. The term *creeping* applies only to the young shoots, as the flowering stems are erect, sometimes attaining, or even exceeding, the height of two feet. The leaves resemble those of Linaria vulgaris, but are shorter; the blossoms are white, tinged with blue or purple, the palate pale yellow, and the upper lip marked with purple lines; they are also slightly fragrant, and smaller than those of the common Toadflax. Ray, who calls this species the "Blue Toadflax, with short and narrow leaves," appears to have first directed attention to it as a British plant, "found by that learned and eminent physician Dr. Eales, in Hartfordshire." One of the best-known stations for the plant, also first noticed in Ray's "Synopsis," is Henley-on-Thames; here it was "found by Mr. Dandridge, on the side of a hill called Marvell Hill, by Henley townside, and by Mr. J. Sherard on the church walls at Henley, and in a field on the left hand the road from London, on a steep bank a little before you come to the town, plentifully." Mr. Stubbs, of Henley, to whom we are indebted for the specimens from which the above description was drawn up, writes that it still "grows profusely on the chalk hills about Henley—noticeably on White or Remenham Hill. I have also met with it on walls, and I believe the upper portion of the south face of the church tower is verdant with it, though the great height from the road will not enable me to speak with certainty. Ray's nomenclature," he continues, "is obsolete; at least, I have never heard of Marvell Hill." Linaria repens grows on a chalky soil, and is most frequent in the south of England, becoming gradually rarer towards the north, and is seldom, if ever, found in Scotland: it commences to blossom in July;—The Least Toadflax (Linaria minor) differs considerably from the two before described. Linaria vulgaris and Linaria repens are perennials; Linaria

minor is an annual; besides which, the flowers of the former are racemose, while in this species they are solitary, growing in the axils of the leaves. It is a small plant, with a weak but erect stem, much branched, and somewhat clammy, about six inches in height, but often much shorter; the flowers are small and inconspicuous, of a light purple colour, tinged with yellow or white; the leaves are narrow and dark green. The old writers evidently considered this a true Snapdragon; they called it the Least Calf's-snout, or Small Creeping Snapdragon, thus connecting it with Antirrhinum Orontium, which they call the Lesser Calf's-snout, or Snapdragon. It is by no means uncommon in cornfields, or as a weed in gardens; and we have noticed it in two places growing in great profusion between the lines on the railway, a habitat apparently congenial to it. In Macgillivray's arrangement of Withering's British Plants, this species is spoken of as "rare"; but this statement must be taken with reference to Scotland only, as in England it is very generally distributed, although less frequent towards the north. It blossoms from the end of May until late in the season.

II. We now come to our second group, which contains the three species with procumbent stems and broader leaves; the blossoms of each are also solitary. The first of these is the Ivy-leaved Toadflax (Linaria Cymbalaria), a plant which, originally introduced, has most completely established itself in the land of its adoption. Johnson, in his edition of Gerarde's Herbal (1633), says that it "growes wilde upon walls in Italie, but in gardens with us;" while Ray, in the "Synopsis" (1724), gives only two or three localities for it, mentioning especially the walls of Chelsea Garden, and neighbouring places. It is now, however, common on walls in many parts of England, especially in the neighbourhood of London; it prefers a damp situation, in which the leaves attain great luxuriance. These, as the name of the plant implies, resemble those of the ivy, although very much smaller; they are deep green above, frequently pink or purple beneath, and of a somewhat fleshy texture. The blossoms of this Toadflax, as of the two next species, are axillary, on long footstalks; they are small, pale-blue spotted with yellow and white, and very numerous. The whole plant is very graceful in appearance, especially when, growing on the top of a wall, the long trailing shoots hang down in dense masses on either side. Miss Pratt, in the "Flowering Plants of Great Britain," says that "the capsules, before ripening, turn round towards the wall on which the plant so often grows, and place themselves in a crevice or hole, so as to shed the seeds, when ripened, in a place where they may thrive, instead of scattering them on the ground, where they would be wasted." The fine fibrous roots insinuate themselves so tightly into these crevices, that it is almost impossible to remove them without breaking. Although an introduced plant, the Ivy-leaved Toadflax has obtained not only "a local habitation," but also "a name"—in fact, two or three; it is popularly called Mother of Thousands, and, less frequently, Pellitory-of-the-Wall, and Maiden-hair. The winter frosts are usually too severe for it, and the leaves then disappear, but it is by nature a perennial; the blossoms peep out about the end of April, and continue until the approach of winter.—Our other two species are known by the English name Fluellin, and have so much in common that they may be appropriately considered together. The Round-leaved Fluellin (Linaria spuria) is a trailing plant with many stems, and grey-green, dusty-looking leaves, mostly alternate, which are usually downy, and *round* or *egg-shaped*. The blossom, although small, is extremely beautiful, the lower lip being pale yellow, and the upper deep purple, almost black. The Halbert-leaved, or Sharp-pointed Fluellin (Linaria Elatine), has leaves of the same dusty hue, but they are narrower, longer, *halbert-shaped*, and *sharply pointed;* the flowers are also like those of Linaria spuria, but smaller, and the purple of the upper lip is of a somewhat lighter shade. Both are annuals, growing in cornfields, and, more rarely, on waste ground, in England and Ireland, preferring, although not confined to, a gravelly soil: Linaria Elatine is the more common. Their blossoms expand in July; but it is not until after harvest that they attract much notice, being previously overshadowed by the waving wheat. We shall often, however, find a stubble-field gay with these two species, in conjunction with the Least Toadflax, the blue and scarlet Pimpernels, the Spreading Bur Parsley, and the Basil Thyme, and many more equally pretty, and hitherto equally overlooked. Although not now used in medicine, the "vertues" of Linaria Elatine seem to be very noteworthy—as the following extract from Gerarde, which we cannot resist quoting, will show. It is "not onely of a singular astringent faculties, but of such singular efficacy to heale spreading and eating cankers, and corrosive ulcers, that its vertue in a manner passeth all credit in these fretting sores, upon sure proofe done unto sundry persons, and especially upon a man whom Pena reporteth to have his nose eaten most grievously with a canker or eating sore, who sent for the Physitions and Chirurgions that were famously knowne to be the best, and they with one consent concluded to cut the said nose off, to preserve the rest of his face: among these Surgeons and Physitions came a poore sorie Barbar, who had no more skill than he had learned by tradition, and yet undertook to cure the patient. This foresaid Barbar, standing in the companie and hearing their determination, desired that he might make triall of an herbe which he had seene his master use for the same purpose, which herbe (Elatine), though he were

ignorant of the name whereby it was called, yet he knew where to fetch it. To be short, this herbe he stamped, and gave the juice of it unto the patient to drinke, and outwardly applied the same plaisterwise, and in very short space perfectly cured the man, and staied the rest of his body from further corruption, which was ready to fall into a leprosie"! Perhaps a little judicious "puffing" would elevate our little Fluellin into a post of honour equally dignified with Parr's Life Pills and Holloway's Ointment; at any rate, here is a testimonial to its "vertues," equal, if not superior, to any produced in favour of the above-named compounds.

Before quitting our Toadflaxes, we would just direct attention to a very remarkable malformation which they occasionally present. This form is termed *peloria;* and in it the mouth of the blossom is closed up, while instead of one spur, there are from two to five: the stamens also are sometimes five in number, and the corolla becomes tubular. It appears to have been first noticed in Linaria vulgaris, in which species it is rare; but modifications of it have been observed in Linaria repens, Linaria minor, Linaria Elatine, and Linaria spuria. Mr. Holland writes that the two last are "very common on the oolitic clays of the Cotteswold Hills around Cirencester, and are both very prone there to have peloria flowers." It is said that the roots of this form, in Linaria vulgaris, if planted in rich soil, will produce blossoms in which the peloria appearance is retained; but in poor soil, they return to the normal appearance. Blossoms are occasionally found with two or three spurs, although otherwise of the usual form. B.

THE MAPLE APHIS.†

HAVING had communications on this subject, it will gratify some of our readers if we furnish the substance of MM. Balbiani and Signoret's remarks in the "Comptes Rendus" of June 17th, as translated and published in the "Annals of Natural History."

"In 1852 an English naturalist, Mr. J. Thornton, indicated, under the name of Phyllophorus testudinatus, an Hemipterous insect which he had found on the leaves of the common maple (Acer campestre), and which he regarded as the larva of an undetermined species of aphis. Subsequently, in 1858, Mr. Lane Clark also observed it, and placed it, under the name of Chelymorpha phyllophora, in a genus intermediate between the Aphididæ and the Coccidæ. Lastly, in 1862, M. Van der Hoeven, of Leyden, described it, also as a new genus, replacing the generic names Phyllophorus and Chelymorpha by that of Periphyllus, the other names being previously employed to designate other genera of insects; and our Hemipteron received from the illustrious Dutch naturalist the name of P. testudo. Like Mr. Thornton, M. Van der Hoeven regarded it as the larva of an aphis of which the adult form was still unknown.

"These brief historical indications form a summary of all that was known about this insect when we on our part undertook some investigations upon it, the results of which we now propose to communicate. We first ascertained that, far from constituting a new genus, or even a distinct species, the Periphyllus is really nothing but the larva of one of the known species of Aphides which live on the maple—namely, Aphis aceris, a brown species which is to be met with during a great part of the year upon the leaves and at the extremities of the young shoots of that tree. But, at the same time that we ascertained this fact, we were set on the track of a most unexpected discovery, constituting a new and very remarkable peculiarity in the development of the animals of this group, already presenting such curious phenomena in connexion with their reproduction.

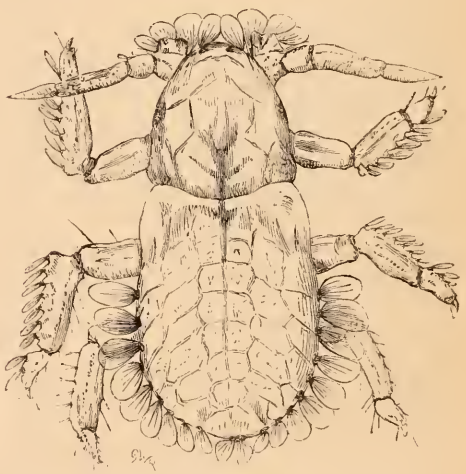


Fig. 200. Maple Aphis (Aphis aceris), young, magnified.

"This was the faculty, become transmissible to all the generations of a particular species, of engendering two kinds of individuals—one normal, the other abnormal—of which the former alone, after their birth, continue the course of their development, and become capable of reproducing the species; whilst the latter retain throughout their existence the form which they possessed on coming into the world, and appear to be incapable of propagating. Moreover these two categories of individuals present such marked characters that, without having watched their birth, and being thus convinced that they are really produced by identical females, and sometimes even by one and the same mother, one would inevitably consider them to belong to two species, nay even to two completely different genera. Now

one of these is nothing but the Periphyllus mentioned at the commencement of this note as having been described by the authors who had observed it as a separate genus in the family of the Aphides.

"Such is, in summary, the singular observation that we have made upon Aphis aceris. We may now give some fuller details upon each of the two kinds of individuals of which this species is composed.

"When we examine with the naked eye or with a lens the embryos of the brown Aphis of the maple at the moment of their being produced by the females, or after opening the bodies of the latter, we see at once that all of them have not the same coloration. In some they are of a tolerably bright green, whilst in others their colour is more or less brownish or greenish-brown. The brown embryos present no peculiarities, and only differ from their mothers by characters analogous to those which are remarked in all species of Aphides between the newly born young individuals and the adult females. As in these latter, their bodies and appendages are furnished with rather long simple hairs, and, like all young Aphides at the moment of their birth, they already contain rudiments of embryos in the interior of their generative apparatus. If, on the other hand, we examine the green embryos, we at once detect, besides their peculiar coloration, very marked differences between them and their brown congeners. The various parts of the body and limbs do not present the same conformation as in the latter, but one is especially struck by the extraordinary development and the unusual appearance of their tegumentary system. Thus their surface is no longer furnished only with simple hairs, but also and principally with scaly transparent lamellæ, more or less rounded or oblong, and traversed by divergent and ramified nervures. These lamellæ occupy especially the anterior margin of the head, the first joint of the antennæ (which is very stout and protuberant), the outer edge of the tibiæ of the two anterior pairs of legs, and the lateral and posterior margins of the abdomen. Moreover the whole dorsal surface of the latter and of the last thoracic segment is covered with a design having the aspect of a mosaic composed of hexagonal compartments, and which is not without analogy to the pattern formed by the scaly plates of the carapace of tortoises. These peculiarities give our insect a great elegance of appearance, which causes it to be much in request with the amateurs of the microscope in England, where it is commonly known under the name of the 'Leaf-insect.' The entire animal is strongly flattened, and resembles a small scale applied to the surface of the leaf upon which it reposes, and on which it requires a certain amount of care to detect it.

"Another remarkable character of these abnormal individuals of Aphis aceris is the rudimentary state of their generative apparatus. This is reduced to a few groups of small pale and scarcely visible cells, none of which arrives at maturity to become transformed into an embryo; and it retains this character as long as it is possible to observe the animal. The functions of nutrition, also, are performed in them in a very unenergetic manner; for from the moment of their birth until that at which we cease to observe them, they increase but little in size, attaining scarcely one millimetre. They undergo no change of skin, never acquire wings like the reproductive individuals, and their antennæ always retain the five joints which they present in all young Aphides before the first moult. Nevertheless they possess a well-developed rostrum and an intestinal canal, the peristaltic contractions of which we have distinctly observed. In short, although we have observed them for several months (that is to say, from May to November), no change in their condition was ascertained; and they disappeared with the leaves which bear them, without its being possible to ascertain what becomes of them subsequently.

"The question naturally arose, What was the signification of these abnormal individuals of the Aphis of the maple, and what part did they fulfil in the reproductive functions of the species to which they belong? They are evidently not males, since their generative apparatus retains the same rudimentary form at whatever epoch we examine them. Moreover in no known species of Aphis are the males produced at the same time as the viviparous individuals, which are not the true females of the species. There is therefore no other alternative but to regard them as a modification of the specific type constantly reproduced with the same characters by the successive normal generations. Our abnormal Aphides are indeed deprived of the faculty of reproduction, either by sexual generation or in any other manner; but after the observations of M. H. Landois upon the law of sexual development in insects, we know that in them the sexes depend simply upon the conditions of alimentation of the larva. Because, in the present state of things, these conditions have not yet occurred for one of the two sorts of larvæ of Aphis aceris, there is no reason for our concluding that they may not some day be realized; and by thus acquiring, with the attributes of the sexes, the faculty of propagating directly in an indefinite manner, these abnormal individuals will become in their turn the origin of a new species produced by deviation from an anterior specific type."

Contrary to Nature.—The truth is that folks' fancy that such and such things cannot be, simply because they have not seen them, is worth no more than a savage's fancy that there cannot be such a thing as a locomotive, because he never saw one running wild in the forest.—*Water Babies.*

"HAIRS OF DERMESTES."

NOTWITHSTANDING the strictures to which we were subjected for using the above title on a former occasion, we have adopted it again, because, though not absolutely correct, it is sufficiently so for such a purpose, and having used it before, it is advisable not to change it upon resuming the same subject. Mr. S. J. M'Intire, who has already contributed towards clearing the mystery which enshrouded the source of the so-called "hairs of Dermestes," during last month sent us the following communication:—

"I enclose two specimens of beetles bred from larvæ producing the hairs known as 'Hairs of Dermestes.' The larger is the insect referred to in my article in S.G., vol. i., page 230, and the smaller one, which is a very pretty microscopic object (being covered with scales like the Curculio family) is from larvæ found by Frank Blatch, Esq, in a wood-shed on his premises at Theale, Berks. The individuals he sent me, as well as the larvæ from under the elm-tree bark, fed while I kept them, upon the dried-up remains of a butterfly, until they completed their transformations. Perhaps you will kindly name both insects for the benefit of those interested in the subject which has occupied some space in the pages of SCIENCE-GOSSIP."

In consequence of this letter we wrote requesting to be informed more minutely on certain particulars regarding these insects, which were embodied in a second letter communicated to us by the same gentleman.

"1. The larvæ of the large beetle were found under the bark of an elm-tree at Ealing. One or two small specimens that I obtained at the same time have lived with me ever since and have grown considerably; they have also cast their skins, and the halbert-shaped hairs on the new skins are far more numerous than on the old ones. I have fed them on entomological specimens. They seldom feed while under microscopical observation, but that they devour the food I have given them when shut up in the dark is obvious.

"2. The first larva of the small beetle that my friend Mr. Batch sent me was found entangled in a spider's web. Others he has since found on the door, and various places besides in the same shed; and the perfect insects he obtains on the slabs. I think they fed while I kept them on the body of a hawk-moth; at all events they took refuge in its body, and effected their final change while inside it.

"3. I send the exuviæ of both insects mounted *temporarily* to admit of close examination, and I think you will find that there are hairs attached still to both skins.

"I notice that the elm-tree larvæ hairs are very much lighter in colour than those from the other insect, in which they are of a deep brown. This peculiarity is only noticeable in the living larvæ when the halbert-shaped hairs are very abundant."

All that now remains for us to do is to give a figure of the large beetle magnified (fig. 201), which certainly appears to be *Tiresias serra*, the larvæ and hairs of which do not differ from those figured from Mr. M'Intire's drawings in SCIENCE-GOSSIP for 1865, p. 230 (fig. 202).

Fig. 201.

Fig. 202.

Fig. 203.

The smaller beetle corresponds with *Anthrenus varius*, the hairs from the larvæ of which are now figured for comparison with those derived from the larvæ of the larger beetle (fig. 203). We have before affirmed our belief that hairs, scarcely distinguishable from each other, might be obtained from several of the Dermestidæ, and perhaps also from the allied family of Myectophagidæ, and we do not suppose by any means that *Tiresias serra*, *Anthrenus varius*, and *Anthrenus muscorum* are the only beetles the larvæ of which yield the beautiful hairs long known under the name of "Hairs of Dermestes." Mr. S. J. M'Intire deserves thanks for his patient pursuit of this inquiry to a successful termination.

THE CHOLERA FUNGUS.

IN the *Standard* of August 27th is an important communication on this subject, from which we are only able, at this late period, to give the following extract:—

"In the report of the medical officer of the Privy Council just issued, an account is given of some remarkable researches of Professor Hallier on this important subject. Hallier believes that he has discovered the active agent which causes cholera. In examining the contents of the bowels in cholera, this observer has noticed a very large amount of a vegetable fungus in the shape of cells (or seed) and filaments (or roots, as they may be termed). The cells attach themselves to the remnants of any food

or animal structures, such as the cells that cover over the mucous or lining membrane of the intestines, and seem to have the power of growing at the expense of the latter, which they therefore destroy. Hallier soon set to work to cultivate this growth, and in due time produced a microscopic plant which possessed characters that allied it in nature to a fungus, which constitutes the white masses seen in the 'thrush' of infants, and which belongs to a genus called Oidium. This oidium afterwards bore as fruit other forms of growth, which rank with 'mildews' and moulds. Varying his experiments, Hallier procured, under conditions similar to those which obtain in cholera, a phase in the development of the fungus which exactly resembled a form which grows on diseased cereals, and is called Uroeystis. It occurs in true cholera excreta. (It must be noticed here that microscopic fungi assume in the course of their growth, under the influence of different circumstances, a diversity of form, and that what are now known to be varieties were formerly regarded as distinct species.) Well, Hallier infers from his experiments, and especially his inability to produce the uroeystis form of fungus except in the contents of the intestines of cholera patients, that this form is not indigenous in Germany, but that it has travelled with cholera from India. He does not, moreover, believe that 'the original habitat of the fungus should be the human intestine, which is under much the same conditions in India as in Europe; but he sees in the high temperature of the intestine a condition capable of maintaining this fungus in activity. A similar high temperature, as provided by the mean climate of India, and by the extreme summer climate of Europe, also furnishes the condition requisite for the development of the fungus outside the body. Thus in summer, and in summer only in European latitudes, could the fungus find in earth and night-soil the necessary temperature for its increase.' The uroeystis form, then, that which is supposed to be peculiar to cholera, requires a high temperature for its life, and it is confidently asserted by Hallier that if it be the contagious agent or material of cholera, cholera 'cannot maintain itself permanently in our latitudes,' because of the cold which exists. Hallier then believes that this cholera fungus travels in the intestines of cholera patients from India; and he has pointed out the source from whence it may be possibly derived. Hallier 'recalls the fact that other forms of the fungus under consideration (for variation in form is characteristic of fungi) are peculiar to cereal plants, and that the uroeystis with its characteristic cysts, inhabits the delicate and highly nitrogenized tissues of grasses; and he asks whether the cholera cysts may not also, in their native soil, be parasites to some graminaceous plant in India, just as the form (tilletia) which can exist in an European climate is a parasite upon the imported cereal wheat, which acclimatizes itself in these latitudes.' We now come to the most interesting part of the matter. It seems that the fungus experimented upon by Hallier is identical with that which grows upon the rice-plant when in an unhealthy condition, and it is therefore important to consider whether diseased rice has any influence upon the development of cholera. When the cholera was first studied by English physicians, it was called in India the 'rice disease' (*morbus oryzeus*). In the year 1833, Dr. Tytler, in a paper which he had read before the Medical Society of London, stated 'that he was prepared to submit to the members a statement of facts of the utmost importance, in proof of an opinion which he entertained that the disease which had been described under the name of the Asiatic cholera, and which was said to have arisen in Jessore in 1817, was occasioned or kept up in India by the consumption of unsound rice as an article of food.' Dr. Tytler exhibited various samples of 'ergoted' rice in London, and found rice of a like character selling in the shops. Many travellers and others have at different times called attention to the fact of intestinal ailments having been produced by the use of diseased rice."

ZOOLOGY.

Incarcerated Frogs.—A near neighbour, upon whose veracity I can rely, recently opened a drain, when he made the following discovery. At the mouth of the drain were placed two large stones, in measurement nearly two feet square, and three inches thick; the one at the top rested closely upon the one beneath. Upon lifting it from the lower stone, the skeletons of five frogs were discovered; they were in a circle in the centre of the stones, quite flat. Upon taking one of them up, and holding it to the light, there was only a threadlike appearance of bones between the dry, flattened, and fleshless skins: these skins were clear, and beautifully marked. In this state they were seen by several persons, and by each of them the frogs were considered to be dead; but when the water commenced to flow over them, there was a slight gasping perceived in the throats of each, by degrees the bodies swelled, and life and motion returned! Then, to the surprise of the beholders, the frogs sprang up, and ran away into the drain. How did these frogs get beneath the stone that covered the lower one so closely? There was no space for them to enter or depart, and upon the surfaces there was not the slightest indention made by the frogs. It was supposed to be thirty years ago since the stones were placed over the drain.—*S. G., Benenden, Kent.*

Fly Acarus.—My friend Mr. S. having captured a fly for the purpose of microscopical amusement,

observed two small insects escape from the under surface of its body. We took the measurements of one of these insects, and found that in its greatest length it was exactly $\frac{1}{25}$ inch, and in its greatest breadth $\frac{1}{250}$ inch. The jaws were extremely sharp-pointed, and moved by lateral action. The two anterior members (A) were armed with grasping claws similar to those of a lobster. The next two (B) terminated in spongy-looking enlargements, from which proceeded numerous hair-like processes of considerable size. The third pair were longer and more distinctly jointed, and terminated in

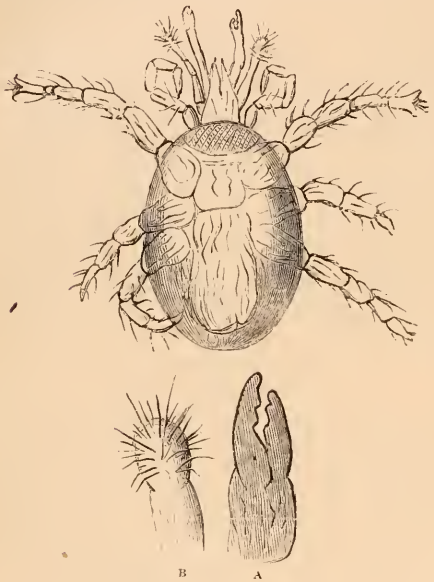


Fig. 204. Fly Acarus.

a tuft of hairs. Next came the six legs, the first pair of which possessed two hooklets at their extremity, whilst the rest terminated in fine points. I enclose a sketch of one of the insects traced by a "Beales' tinted camera," and an enlarged view of the more complex members. On further investigation, Mr. S. and myself have since discovered other parasites of somewhat different character upon the common house-fly, so that such things appear to be less rare than we at first imagined. Whether or not this be the case, we should much like to hear the opinion of more learned correspondents.—*A. M.*

Cat and Squirrels.—Some two years ago, when living at Kelvedon, in Essex, I found a squirrel's nest, and having taken two young ones, tried to rear them with a bottle. But under this treatment they did not thrive well; so, it being suggested that we should give them to a cat that had recently been deprived of her young ones (I must say with some misgivings as to their reception by "Tabby"), I gave them to her. To my great surprise, she nurtured them as kindly as if they had been her own. When full grown, they became quite domesticated, and would behave more after the fashion of a member of the tabby tribe than after their own wild sportive nature.—*George Jackson.*

Great Ribbon-fish.—It may interest the readers of Science-Gossip to know that, after a storm last year, a superb specimen of Banks Oar-fish, or Great Ribbon-fish, was cast up on the shore at Seaton Carew, in Durham. It is 15 feet long, and by far the finest example I know; it is stuffed with care, and placed in a large case. It is the property of Matthew Lamb, of Seaton Carew, who will answer any questions respecting this rare production of our seas.—*E. Wood, F.G.S., Richmond, Yorkshire.*

Death's-Head Moth Larvæ.—In July last I took six larvæ of Acherontia atropos, feeding on the tea-tree (Lycium barbarum); all were coloured and marked similarly to those usually described, viz., green with diagonal lilac stripes. Three of the larvæ, during their last change became insects of a totally different colour. The description of these last is as follows: length, $4\frac{1}{2}$ inches; general colour, olive-brown, the sides rather darker than the back—in some instances the oblique lateral stripes entirely wanting; the markings on the back form the letter X on each segment; the lower portion of this X is but one-third the size of the upper. The marking on the back, as a whole, present the following appearance

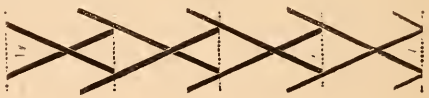


Fig. 205.

They are of an indigo-colour. The body is covered with whitish spots about the twentieth of an inch apart, each having a black point in the centre; the thoracic segments have the ground colour of a pinkish white with an irregular brown-black longitudinal division, and faint white lines dividing the same longitudinally and transversely; the colour from the under side of the body runs in an irregular form into the white segments; the front of the head, which in the usual form is green, is in this variety greyish-white pencilled with lines. Five out of the six larvæ have buried themselves. I have separated the varieties, and shall watch with interest the appearance of the perfect insect. I have not been able to detect any sound from the larvæ.—*John Berney, Croydon.*

[The most interesting feature in the above account is the fact that the variation took place at a period subsequent to the early stages of the larvæ, which were at first all so exactly alike that no trace of variability could be distinguished.—Ed.]

BOTANY.

Fertilization by Insects.—The mode of fertilization in the American Laurel (Kalmia) has already been well described, but I fancy I may be excused for adding my testimony concerning this beautiful and interesting plant. When the anthers are liberated from the pockets in the corolla, the stamens suddenly straighten and throw jets of pollen often for a foot or more, "acting," as Professor Gray used to say, "like a boy's pea-shooter." Many times when the dew was on, I have seen the common honey-bee and other *Hymenoptera* about these flowers. When the bee alights on a flower, the style comes up between the legs where they join the body, or sometimes further back against the abdomen. In this position they turn around, as though they were balanced on a pivot, generally inserting the tongue outside of the filament, and, while doing this, pull the stamens with their legs towards the centre of the flower, releasing them and frequently receiving the shots of pollen on their own body. A single visit from an insect is sufficient to release all the anthers. By noon it was a difficult matter to find a flower which had not been visited in this way. Insects seem to be absolutely necessary for the perfect fertilization of *Kalmia angustifolia* and *K. latifolia*, for I tied small nets over some flower-clusters (*corymbs*), and found that when the bees were kept away, the flowers withered and fell off, most of the anthers still remaining in the pockets, and the filaments so decayed that their elasticity was entirely gone. The very few anthers liberated were probably brought out by the shaking of the bushes by the wind. Considerable pollen was found stuck on the corollas by the nectar, which was uncommonly abundant, as no insects of much size were allowed to remove it. The wind might have carried some of this pollen to other flowers, or it might have dripped from those above to flowers below in drops of water (there were two showers during these experiments); but I infer this was not the case in the examples mentioned, because the flowers, especially the stigmas, remained fresh much longer than those which were left exposed to the visits of insects.—*W. J. Beal, in American Naturalist.*

Blue Pimpernel.—Yellow and Red Pimpernel are common enough, but I never met with the *blue* variety before this morning. Surely it must be very rare—rare as it is lovely. I came upon it quite by accident, having nearly lost my way in a wood, and doubtful of finding anything like a beaten path, and unwilling to retrace my steps, if indeed that would have been possible; I made my way, at last, through a partial opening in a hedge, and emerged at once into a turnip field. It was here, while gazing with delight upon the expanded wings of a splendid "Admiral butterfly," and soon after being charmed with the sight of a large fritillary, that I found a large bunch of the lovely blue pimpernel, of which I send one of the two sprigs I plucked. By leaving the rest, I am in hopes the flower will seed, and so produce more; and thus, at some future season, give delight to the botanist, who, like me, may be fortunate in finding it. If any of the readers of Science-Gossip have found or may find, the Blue Pimpernel, it would be very interesting to have the locality recorded.—*G., Ilfracombe.*

Double Bittercress.—I found lately, near Dublin, a curious double variety of Bittercress (Cardamine pratensis). When first it blossoms, there is nothing peculiar about it, only the pistil is a little larger than usual; but after the petals fall off, the ovary, instead of containing seeds, becomes changed into a bud, which opens out into a very double flower, without stamens or pistil. The flower continues for a considerable time, new petals coming out in the centre as those outside die away. My attention was called to it by seeing upon the same plant both single and double flowers.—*C. B. Ball, Dublin.*

Hampshire Lycopod.—The following letter, with the editorial remarks appended, appeared in the *Gardener's Chronicle* for August 3rd:—"I gathered the enclosed specimens of Lycopodium alpinum at Lower Wagner's Wells, in the parish of Bramshot, Hants; the soil a sandy peat, the elevation not more than 600 or 700 feet, the situation sheltered, and growing near to the roots of Heath, about 18 inches high, by which it appears to be almost smothered. Has Lycopodium alpinum ever been properly described? All authors describe it with a repent stem above ground; our plant has one an inch below the surface, but it agrees in every other particular with L. alpinum, its four-garious habit distinguishes it from L. complanatum. May it (L. alpinum) not have sometimes a running stem above ground, and sometimes under? Lastrea Thelypteris, in its native bogs, runs above the soil, but under cultivation it grows with a subterraneous rhizome."—*John Lloyd.*

"There are some doubts as to the true name of this Lycopodium, arising from the fact that the specimens sent are the barren stems only. Professor Babington 'inclines to place it under L. chamœcyparissus, R. Br.—a plant of the Rhine valley.' It may be L. alpinum, but the subterranean rhizome is unlike that species."—*Ed. Gard. Chron.*

Pear-tree in bloom.—There is a pear-tree in Sir Allan Bellingham's garden at Castle Billingham in full bloom, and, at the same time, having pear on it each as large as two walnuts.—*T. A. H.*

[Similar occurrences were common last year.—Ed.]

Sticks without end.—The note in last number, signed "H. Pocklington," relating to a "stick without an end," reminds me of some remarkable phenomena of this kind which came lately under my observation. In the demesne of Lord Hill of Hankstone, in Salop, and near the windmill end of the pool, there is a large beech tree in which I counted twenty-three cases of "sticks without end." Mr. P. calls the phenomenon a freak of nature. I regard it as a striking contrivance of Nature to strengthen and maintain the symmetry of the tree fabric. In the case I refer to, this design is most palpable: the general rule appearing thus—a branch from above dips down and grows into one of the immense lower limbs of the structure, thus connecting it with the trunk and affording support more effective than bands of iron could do. —*Wm. Hindshaw, Salford.*

Sonchus palustris, L. (*Marsh Sow-thistle*).—Those amongst your readers who are botanists, and they are doubtless many, will probably be interested in knowing that one of the rarest and most magnificent plants which are indigenous to these islands, still flourishes luxuriantly in a habitat seemingly secure from all but the most determined and systematic depredators. It does not appear that this plant has ever occupied a prominent position in the British Flora; our experience justifies us in assuming that, wherever seen, its peculiar appearance and imposing habit has attracted an attention at once fatal to its existence; we know, too, that marsh and fen, the only condition of soil in which this plant can flourish, are, and have long been, gradually disappearing in many parts of the country: it is not surprising then that, marked for destruction whenever observed, and finding the conditions necessary for its being withdrawn from around it, it should have been compelled to seek immunity from violence, as well as a congenial atmosphere, in the most secluded spots that remained for it, at length becoming almost extinct. It was, however, my good fortune a few days since to penetrate an extensive retreat of this rarity, though I believe I have not materially injured its prospects thereby. Being on an excursion in a large tract of barren and desolate country accompanied by two other botanists, we came to a large morass overrun with reeds of the tallest growth, and walking along a high bank adjacent, we noticed some gigantic plants overtopping the reeds at various points whose flowering-heads were remarkably conspicuous; availing ourselves of a boat which was luckily at hand, to cross a deep stream intervening between us and the reeds, we were constrained to get out and wade through the tangled mass, which, though standing in nearly two feet of water, entirely forbade ingress to the boat. Forcing our way in through about twenty yards, we came upon a fine cluster of the plants, and noble ones they were, towering above our heads; the reeds were nearly seven feet high, but the Sonchus was considerably taller, the largest specimen being quite eight feet from the crown of the root to the summit of the inflorescence. There were many other clusters visible at intervals in the swamp; but having succeeded in securing a fair specimen (as well as in getting uncomfortably wet), we retired, thinking ourselves amply repaid for our exertions. Those who have seen the recent plant in the full height of its luxuriant beauty, can say with me that it is indeed "a plant which once seen is never to be forgotten."—*Jas. W. White.*

[We much regret that our correspondents who make communications like the above do not permit us to insert their full addresses as well as their names; it would add so much more weight to their testimony.—Ed.]

Phyllactidium pulchellum.—In the spring of last year, while watching the manœuvres of a water-spider in a jar of *Anacharis* and *Lemnæ*, obtained from the "Heigham osier carr" adjoining the river, almost within the city, I detected adhering to the glass on the side furthest from the light some minute green discs which turn out to be this plant. I put up two slides in glycerine and camphor water—and what is most remarkable, they have continued to grow and fructify. There were no sporcells at first visible, but these have become developed, and are most abundant; some showing the green spores within, while others have discharged their contents, and whole colonies of young ones of from one to two or three cells are now making their appearance.—*W. Kencely Bridyman, Norwich.*

MICROSCOPY.

American Diatomaceous Deposits.—The Monmouth deposit is an example of a class of sediments which are very common in this country, especially in the Eastern States. I have over fifty similar. They are the result of the accumulation of the dead lorica of recent Diatomaceæ, and generally form at the bottom of ponds; sometimes they accumulate to a considerable depth. I examined one that had been traced down over ten feet. They are not truly fossil, which I take to mean containing for the most part extinct species, but perhaps might be called post-tertiary, as some one has dubbed them. However, I consider them as but recent deposits of existing forms. I know of no deposit of fresh-water Diatoms of an age as old even as the Tertiary, and I have examined scores of them, and have several now under examination for the State Geological Survey of California.—*A. M. Edwards, New York, U.S.*

The Stone Mite.—If any person living in the country wishes for an interesting opaque object for

his microscope, let him search diligently for the ova of the above-named Acarus (Tetranychus lapidum). They are of pearly whiteness, cup-shaped, with a cover slightly larger than the cup itself, and marked with a number of raised lines radiating from near the centre to the circumference. This cover is, I believe, pushed aside, when the larva makes its entrance into the world. The ova are to be found on the upper surface of stones, on open downs, and in similar situations; the masses standing boldly out, so as to be plainly conspicuous to the naked eye. When placed under the microscope, they bear considerable resemblance to some forms of minute fungi. A friend of mine has found them in this neighbourhood (Clifton), on a singular nidus, viz., the paper envelope of used-up cartridges, which had been fired off by Volunteers while practising. The acari have taken advantage of the tiny folds and sinuosities in the paper, and have filled them with irregular rows of ova. The fact of the ova being found on paper shows that the acari do not confine themselves (as their specific name would imply) to stones. A notice of this curious acarus may be found at page 22 of Science-Gossip for 1865, and again at page 126 of the volume for the present year, where there are also figures of the animal and its ova. The central portion of the ovum in this figure is not quite accurate. It should be "umbonate," not plane, much less depressed at the centre.—*W. W. Spicer.*

Slough of Amobium.—A friend, a few years since, gave me the exuvia of the larva of some beetle which he had found in an old book in his office, asking me if I could inform him to which of the coleoptera it belonged. This I was unable to do, and until lately had no opportunity of learning anything respecting it. One day, looking into a closet in my study, the receptacle of many odds and ends, I found an old tray, divided into compartments, and which had been made for some round game of cards: this was so perforated by the larva of Amobium that

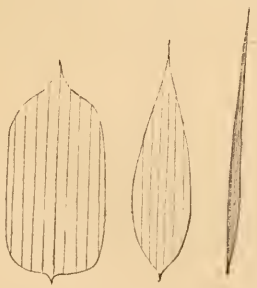


Fig. 206. Scales from Larva of Amobium.

it broke on laying hands on it. In one of the compartments, in the midst of a quantity of the dust from these borings, lay some of the beetles and three or four of the larva-sloughs which I instantly recognised as the same I have alluded to. The body is divided into twelve segments, covered with scales of two kinds; one, comparatively broad and marked with fine striæ, the others long, narrow, and hair-like; attached to the last segment is a bunch of very long hairs. The jaws are strong and of a brown colour; antennæ short, and appearing to consist of only three or four joints; the legs terminated with simple claws. The scales and details of the head are well seen with a $\frac{1}{4}$-inch objective. I may observe that the ticking sound, familiarly known as the death-watch, proceeded at all hours *during the spring*, from the above-mentioned closet, leading me to think that the amobium produced it.—*J. B. B.*

Centring Objects.—Mr. G. Guyon describes his very ingenious manner of centring objects upon slides; but I think I have a better. For a long time I have been in the habit of picking out single specimens of Diatoms and mounting but one on a slide. Thus I can keep my cabinet in order, and in time have representatives of every species. I used for some time a white card having a space three inches by one set out on it, and with a small black spot at the centre. On this I place my slide, and the spot serves as a guide to place the object. Small Diatoms are readily seen against the black background. I have now a card with a raised edge, made of thick cardboard, around three sides of it, and three ink spots, so that I can at once drop the slide into its place, and mount on it one or three objects, each under its own cover. I cannot understand why so many persons find difficulty in making Diatoms stick to the slide; my experience has been that, if they are not quite clean the dirt holds them well enough, and if they are clean, that they often hold so tight when dry that it is even difficult to brush them off.—*A. M. Edwards, New York, U.S.*

Diatoms of British Columbia.—Mr. J. K. Lord, in the appendix to his "Naturalist in Vancouver Island and British Columbia," enumerates 119 species of diatomaceæ found in gatherings made by him in British Columbia, and on the shores of Vancouver Island.

Parasite of Harvest-men (*Trombidium phalangii*).—Among the thyme I noticed one of those long-legged cousins of the spiders that are familiarly called Harvest-men; it was the common Phalanguim cornutum. I was first induced to look at it by the under parts appearing of a bright red hue, which, however, was derived from the Scarlet Mite (Trombidium phalangii), which so commonly infests the insects of this genus. I counted no fewer than forty-eight of the little pests, all sucking the poor wretch's juices from his belly and legs.—*Gosse's "Tenby."*

NOTES AND QUERIES.

Great Grey Shrike.—Observing something unusual about a bird the other day flying across the garden, curiosity prompted me to watch its movements. It pounced down upon a young bird and carried it away to a plum-tree; I approached cautiously, and perceived at once that the strange bird was the larger Shrike; it was mangling and tearing the bird it had caught like a carnivorous animal. Is this the bird's habit, as I never saw the like before?—*H. Morgan.*

Mr. Thomas Fenton, preserver of animals in Edinburgh, informs me that eight years ago, being out with a young man, Francis Dick, about half a mile to the north of Dundee, he was surprised to see a grey Butcher-bird fly out of a hedge with a bird dangling in its talons. His companion shot at but missed it, on which it flew to some distance, and alighted in a field, when they succeeded in shooting it.—*Macgillivray's Birds.*

Cockroaches.—In answer to "J. G.," cockroaches may be much thinned, if not exterminated, by pouring a small quantity of common creosote (a gallon may be had at a gasworks for 6*d.*) into the crevices and about the places in which they usually appear. I think if a number of neighbours used it, the effect would be to clear the neighbourhood, and the only disadvantage is a healthy smell of coal tar. —*Thomas Dunn.*

The Rattlesnake.—I never once saw the rattlesnake attempt to spring at, or attack either man, dog, or horse. I have, again and again, teased a large rattlesnake with a twig, but never succeeded in provoking it to attack me. It is very sluggish in all its movements, and remarkably fond of creeping in the dust.—*Lord's Naturalist in Vancouver.*

The papers have recently recorded an instance of a rattlesnake which had escaped from confinement in a menageric at Tunbridge Wells, attacking and killing a horse and a buffalo. The circumstances have been so fully detailed and widely circulated, that we need not repeat them. What reason can be assigned for this difference in the behaviour of rattlesnakes at home and abroad?—*C. M.*

To drill Glass.—Dr. Lunge gives the following method. It is simply the employment of dilute sulphuric acid; and he found it, on trial, to answer much better than the method referred to. Not only, it appears, is the efficacy of the cutting tool more increased by sulphuric acid than by oil of turpentine, but also, strange as it seems, the tools (files, drills, &c.) are far less rapidly destroyed by being used with the acid than with the oil. He also found it stated that, in the engineering establishment of Mr. Pintus, at Berlin, glass castings for pump barrels, &c., were drilled, planed, and bored, just like iron ones, and in the same lathes and machines, by the aid of sulphuric acid. As to drilling, Dr. Lunge can fully testify to the efficacy of that method. Whenever he wants, say, a hole in the side of a bottle, he sends it, along with some dilute (1 : 5) sulphuric acid, to the blacksmith, who drills in it, with a hand-brace, a hole of ¼-inch diameter. This hole is then widened to the required size by means of a triangular or round file, again wetted with the acid. He also finds a great help in the latter when making graduations on litre-flasks, &c. There is hardly any smell perceptible during the work, which proves how little the acid acts upon the tools, undoubtedly owing to their being tempered; but each time after use, he takes the precaution to wash and dry the files at once, and he has so far observed no sensible deterioration in them.

Timber-Borers.—The timber-boring insect, *Tomicus monographus*, has recently been introduced into Australia, where it seems to have been previously unknown. It is a most destructive creature, which seems to prey on casks and barrels with a voracity almost unequalled in the class to which it belongs. The *T. typographus*, a species more familiar to entomologists, is said to have destroyed no less than a million and a half of pines in the Hartz forest in the year 1783. An Australian paper gives the following description of this species, and of its ravages among the casks in some of the local breweries. The proboscis forms an excellent gimlet, with which the little insect penetrates the hardest wood in an incredibly short time, while the hinder portion is shaped like a shovel, and is employed in getting rid of the sawdust. They make clean holes through the staves; and some of the full barrels are leaking in fifty places. In a wine-cellar, thousands burrow into the wine and spirit casks. As soon as they get nearly through the wood, the liquor begins to ooze out, and the animal, of course, gets killed. Every description of box or barrel is full of them, also the doors and timber in the building. Almost every store in the township is infested with these mischievous insects. The head is red, with a proboscis somewhat resembling a parrot's bill; and the body is like a small black glass bugle broken off at the end; the whole length, a quarter of an inch.—*Pop. Sci. Review.*

Leaf-Miners.—Writing the words "Rural Natural History" reminds me of an amusing circumstance connected with the Bramble Leaf-miner, described in Mr. Stainton's most charming article on Leaf-mining Larva in Science-Gossip for July. I fancy the larva of this moth must have been unusually abundant the particular year I allude to; for all the bramble leaves for miles round were what the country people called "*snake-marked*," and you will scarcely credit the alarm excited by these "signs." It is a fact, I assure you, numberless poor persons, and some educated people who ought to have been better informed, deemed these marks on the bramble leaves to be a "sign" that the end of the world was at hand. Some years have elapsed, but to this day they think in the part of Wales I am alluding to, that if the bramble leaves are marked there will be much sickness.—*Helen E. Watney.*

Cats' Hair and Electric Sparks.—A black cat is the best to experiment upon, and do it in the dark, or at any rate in the dusk. It was a favourite diversion of mine when a girl. I wonder now that my old pet cat's hair did not stand on end, so continually did I brush it the wrong way.—*Helen E. Watney.*

Baby Hydrophilus.—"L. H. F." must give the larvæ *small* slugs and snails. They will not, I think, touch water-plants. They require molluscs; and, strange to relate, will break their shells adroitly. They make a sort of rest or table of their own backs, and bend their heads over in the most extraordinary way.—*Helen E. Watney.*

Woodlice.—I have discovered that these pests are fond of oatmeal. Therefore, in order to trap them, I got some glass bottles, and, after breaking the necks off them, I let them down into my cucumber-bed, pressed the soil firmly round them, and then sprinkled a little meal round the edge of the necks of the bottles, which must be made level with the surface of the bed. I also put a little in the bottom of the bottles, the result of which has been that next morning I had trapped some hundreds, and I continue to do so every night.—*J. B. S. S., in Gard. Chron.*

Hedgehog Eccentricities, &c.—In the August number of Science-Gossip you mention the fact of a hedgehog transfixing pears on its spines and carrying them off. A friend of mine, and upon whose veracity I can rely, told me some few years since, that he had witnessed, when a boy, a hedgehog rolling itself amongst the apples fallen from a crab-tree, and when its coat was well covered by the fruit, quietly retreating to eat them at its leisure. You have also an article upon the bite of the adder (Pelias Berus). I may mention that a relative of mine had a very valuable pointer which had been bitten by an adder, and after being some time ill it recovered its health, but with the loss of nearly the whole of its hair,—looking as if it was a victim of chronic mange. There can be very little doubt but that the bite has proved fatal to the human being. I think it is Taylor, in his Medical Jurisprudence, who relates more than one fatal case. I have several times had both larva and pupa of Acherontia atropos, but have never heard them emit the noise mentioned by Mr. Newman, although there can be but one opinion as to the moth having the power to do so.—*A. B. F.*

Great American Spider (*Aranea avicularis*, Linn.).—This spider is indigenous to almost all South America, where it is called Abamdui, or Nbamdu-guazu,—that is, "the great spider." These spiders are two inches and one-fifth in length, and the thorax is an inch in diameter. They have eight hairy legs, terminating in fleshy pads. I do not know whether this spider belongs to the hunting or to the working spiders, that is, whether or not it makes its web in order to take insects, since I always observed it wandering over the ground or upon the trunks of trees, or concealed in the earth. If it does not find insects enough for its food, it boldly attacks humming-birds, small birds a little larger than itself, while they are upon the eggs or upon the young birds in the nests, and if it cannot have the parent birds, it feeds upon the young and upon the eggs. This great spider produces cocoons proportioned to its size, containing thousands of eggs, and places them in the fissures on the trunks of trees. The cocoon is three inches long and one inch and a quarter of a line broad. This extraordinary size of the cocoon has made the inhabitants, who do not observe carefully, imagine that this spider would take the cocoon of the bombice moth del Guyavo (*Janus*, Linn.), and having destroyed or eaten the chrysalis, would place her own eggs there, and then artificially close the hole by which she had penetrated it.—*Termeyer, in Proc. Essex Institute, U.S.*

The Frog Season.—The frog season is now at its height. The thousands of frogs born early in the spring now swarm the marshy ground. The quantity disposed of in Buffalo is surprisingly large. The principal dealers sell easily 1,200 per day, and the consumption of four hotels which have the delicacy in their bills of fare will probably add 500 to that amount. As there are several smaller grocery stores which sell daily from 25 to 50 pairs, it will be safe to say that not less than 2,000 are being eaten in Buffalo every day. Already over 100,000 have been sold, and the remaining two months of the season will increase that amount to nearly 300,000, which is but a moderate quantity, considering the already large and yearly increasing numbers which inhabit the river islands and all along the shore of Canada. The article retails at from 1 dol. to 1 dol. 50c. per 100.—*Buffalo Express.*

Grasshoppers in America.—The ravages of these little pests seem to have begun in earnest. The hemp crop of the county has been almost entirely destroyed. A few crops may escape them. One day suffices for them to clean off a hemp-field as bare as before the sowing. The blue grass is in many places destroyed, and has suffered much wherever they have gone. Timothy and clover have also been very greatly damaged. The oat crop, it is thought, will be utterly ruined, as they prefer that to wheat, which they have so far only slightly damaged. The corn is not exempt, but has been injured less than any other crop except wheat. The gardens have suffered terribly; nearly all early vegetables have been eaten by them. They swept a garden bare in a few hours. A lady informs us that in the morning she had as fine a garden as she ever saw, and in the evening scarcely a vestige of it was left. It is consoling to know that the weeds also suffered.—*Minnesota Paper.*

Bangor and Wrentham.—In reference to queries in Science-Gossip concerning these localities, I always supposed that the Bangor mentioned by dealers was Bangor, Maine, although I do not know of any earth from near there; but as such deposits (sub-peat deposits I have been in the habit of calling them) are common all over our country this side of the Alleghanies, no doubt one was once found there. Such deposits being but small, as a general rule, soon get obliterated. The "Wreatham, U.S." is Wrentham, Mass., a locality from which Ehrenberg had specimens.—*A. M. Edwards, New York.*

Rearing Gold Fish.—Your correspondent informs us (p. 165) that his small pond or fountain basin is 9 feet by 5 feet, and lined with Portland cement. Presuming from that information, the pond contains nothing more than water, beside the débris he mentions. Now, one thing is certain (I write from some years' experience): your correspondent, G. A. W., will not succeed in keeping his fish (much less rearing them) unless he adopts some method of keeping up vegetable growth in the water, whereby there may be kept up a constant interchange of gases between the two kingdoms; and that may be attained by the following simple method:—Cover the bottom of the pond with gravel (washed, if he prefers, but I think not so good) two or three inches thick, in which insert a quantity of plants of common fresh-water weeds, and when they become established, and make a little growth, then G. A. W. may hope to keep his gold fish alive and healthy. The losing of two or three fish may arise from one of two causes: first, they may have been purchased of a dealer who had had them some time on hand; secondly, they may have been what are commonly called "Warm-water Fish."—*B. H.*

Wanted a Medium.—I have again tried my hand on Deane's Gelatine and Lawrence's Jelly, and have again failed. I can't get them as clear as I want them. I used Cox's Gelatine (English) the best I could get here. In the Glycerine Jelly, though made with extreme exactness and care, confervoid growths appeared in less than a week in my bottle, though I put it up, sealing as closely as I could. But I made one or two experiments—the most successful of which I will state. When the jelly was as clear as I could get it, I prepared a solution of carbolic acid by shaking up a few drops of the acid with distilled water, and added of this what I thought would flavour the jelly to the distaste of animalculæ or confervæ. This vial has till now been entirely free from any growth or cloudiness other than the original impurities, which I have not succeeded in getting out.—*E. C. B., Portland, U. S.*

Cat-Fleas.—In Mr. M'Intire's article under this title (Science-Gossip i., 278) a figure is given showing the spinous fringe on the under side of the head and on the pro-thorax, which agrees with my own observations of this species. In the "Micrographic Dictionary," article "Pulex," the dog-flea is described as the possessor of these appendages, and the head of the cat-flea is referred to as "naked." The figures on Plate 28 correspond to the letterpress. I shall be glad if some gossiper can enlighten me on this discrepancy. My own specimens were "taken from the life," and I keep no dog.—*E. Marks.*

Death's-Head Moth (*Acherontia atropos*).—Your correspondent in the August number appears to have some doubt about the pupæ of this insect uttering the shrill sound peculiar to the moth, and I also question very much if, during the chrysalis state, it has any power at all of producing sound. I have had from time to time many pupæ, but never heard the slightest noise from any of them, nor do I remember to have ever heard or read of an instance of pupæ producing sound, but, on the other hand, I have several times heard from the moth itself this singular shrill note, and I believe it to be a peculiarity only exhibited by the perfect insect.—*T. G. D., Leeds.*

Insect-Sounds.—In books on British moths the Death's Head is said to produce a squeaking noise, and no other instance is given of either moths or butterflies producing a similar sound. I cannot but think this to be an error. In several butterflies I have noticed that when caught they have emitted a sound like that of a blowfly. Having caught a specimen of the small tortoiseshell (*Vanessa urticæ*), on proceeding to nip it near the thorax I was struck by the sound it made, only differing in intensity from that caused by a fly under similar circumstances.—*H. H. O. Farrell.*

Larvæ in Mushrooms.—Can any of your readers inform me in what manner the larva enters the mushroom? I have frequently noticed immense quantities of these—many half an inch in length, white, with nearly a black head,—and have been much puzzled concerning them, knowing that the food is so short a time coming to perfection. How old can the grub or larva be when it makes its appearance; and if it has not been feeding in the ground previous to the mushroom showing itself, it must grow with amazing rapidity.—*J. B. Waters.*

To Grow Chara.—Dr. S. would be glad of information on the proper method of treating Chara and Nitella when grown in aquaria, in order to prevent the growth of Conferva upon them. A large quantity of this is constantly springing up, which he finds is not prevented by keeping a number of water-snails in the glass jars. He has always lost these plants from the same cause.

Bottom of Aquarium.—As very many marine animals burrow, and as the observation of their proceedings is very interesting, they should be provided with the means of gratifying their inclinations. For this purpose a layer of sand should be put on the bottom of the tank, which may vary in depth from one to three inches. If sand from a sea-beach can be readily obtained, it is the most suitable; but the next best is coarse river sand, such as the Thames sand, commonly sold at the stone-wharves of London for building purposes. It should be well washed until the water runs away clean; fresh water will do very well for this, but it must be drained off before the sand is put in. What is called silver sand, and the common yellow earthy sand sold in the shops for scouring, are not at all suitable, as they will tinge the water after any amount of washing, the former with lime the latter with ochre. Small pebbles or fine gravel, likewise well washed, may be used to vary the bottom with the sand. Masses of rock, of dimensions suitable to the aquarium, should be put in, to afford shelter and concealment to such animals as like the gloom. To afford this in the highest degree, a flat piece may be set, like a table or cromlech, upon two or three upright blocks; or two tall pieces may lean against each other, forming a rude arch, care being taken, whatever arrangement be chosen, that the masses stand with stability. It is of little consequence what sort of rock is selected—limestone, sandstone, granite, conglomerate—but the rougher and the more full of cavities and angles the blocks are, the better will be the effect.—*Gosse's Aquarium.*

Hybernation of Birds.—In Jesse's "Gleanings from Natural History" are included some of Gilbert White's, of Selborne, unpublished papers, in one of which is the passage, "Repeated accounts of Swallows, in large numbers, being seen, spring and fall, perched on branches of trees overhanging the water, induce me greatly to suspect that House Swallows have some strong attachment to water independent of the matter of food; and that if they do not retire into that element, they conceal themselves in the banks of pools and rivers during the uncomfortable months of winter." The hybernation of Swallows, either by submersion or concealment in holes and crevices, was a favourite theory of Mr. White's, and a subject that he tried to elucidate, but without success. Had the worthy old naturalist known such a fact as that stated by your correspondent "G. W.," his theory would have been much strengthened. I have myself seen Swallows taken out of the thatched roofs of old cottages, and out of chimneys, in appearance very like those described as taken out of the water near Dantzic; but in every case they were dead. From their appearance, they seemed to have crept into the holes, and become torpid, and then, probably from cold, perished. Is it possible that birds of any kind, even in a torpid state, can exist for a lengthened period under water? The fact related by your correspondent would seem to prove that they can.—*R. O. O.*

Beeches.—For several years past there has been considerable mortality among beech-trees in some plantations of thirty or forty years' growth having been quite emptied of those trees. The first symptom of disease which I have noticed is that portions of the bark are covered with a substance resembling mould, but which seems to consist of the eggs of some kind of insect. The following year, these having disappeared, the bark begins to separate from the tree and to decay, and in about two years the tree dies. Can you tell me whether the insect is the real cause of this? I have enclosed a little of the substance containing the eggs.—*R. O. O.*

Birds Preening.—I think the paragraph from "Waterton's Essays," in Science-Gossip for August, "What's the bird doing?" is not altogether correct in the remark about the preening to clear themselves of insects. Now, I don't think it fair to accuse "our feathered friends," when at their toilet, of being infested with vermin. Birds that become so infested do not preen their feathers, but sit moping; and when they do move, it is by sharp, hurried movements and frequent lifting of the feet, evidently being annoyed, as though something was pricking their feet. Canaries, when so infested, often stand quite still, looking suspiciously at their feet or shoulders. Birds which often bathe and preen their feathers are free from, or seldom have, any insects about the body or feathers. On the other hand, birds that are more careless of themselves, and do not preen much, are very much infested. For instance, the Woodlarks will sing and be in good condition, but do not preen themselves, and are mostly infested. I have a young Blackbird in my aviary. So assidnous is he, that he bathes once or twice a day, and much of his time is spent in preening his feathers; and I think I could safely say he has not any insects about him. Indeed, I have seen young birds, without feather or stubble, and scarcely any down on them, go through the routine of cleaning their feathers. And the gland over the tail certainly does contain an oily matter, which is used by birds to put a gloss on their feathers, also to make them, to a certain extent, resist wet. If a bird is closely watched while cleaning himself, one may observe him take the gland in his bill, squeeze the oil to the top of the gland, pass the side of his head over the gland, and touch himself lightly about the body. This simple fact may be seen by taking notice of water-fowl when preening themselves.—*Chas. Rudd.*

Volcanoes in the Cameroons Mountain.—It may interest you to hear that the Cameroons Mountain, whose volcanic fires have long lain dormant, is again in a state of active eruption. On the night of the 15th inst., the lava seemed to rush with tremendous force out of the east side, a few hundred feet from the top, then pour over in a grand cataract of fire, and flow off E.S.E. in a crooked fiery stream down the mountain-side. The molten lava poured out, from sunset, when it was first seen, till after midnight, increasing in volume. Clouds obscured the mountain next morning, but it has been seen burning thrice since. It is apparently quiet now. There was no thunder for several days preceding, but we had a gale of wind from the E.N.E.—an unusual direction—coming an hour before sunset on the 14th inst.: a tornado, in fact, without thunder or rain, except a few drops.—*Extract of a Letter from C. Livingstone, Esq., H.B.M. Consul, Fernando Po, to Dr. Hooker, F.R.S.*

Canary Antipathies.—A friend of mine reading in the Science-Gossip a paragraph on canaries disliking blue, told me of a canary of hers that had the same antipathy to black, and if, when dressed in that colour, she approached the bird, it would nearly kill itself, by violently beating its head against the bars of the cage. All other colours had not the same effect.—*B. L. W.*

Foraminifera.—I should feel obliged if any of your correspondents would inform me whether the Foraminifera portrayed in No. 26 of your journal are obtained from one washing, or from how much chalk. I have washed a considerable quantity, and though I find beautiful pieces of quartz and shapeless masses of transparent and opaque material, yet I find no fossil deposit whatever, unless the pencils I see are such. Do I wash too much, and throw away the shells, &c.?—*J. H. Gramshaw, M.D.*

An Invading Army of Snails.—On the 11th of May of the present year, I was witness, with seven other members of my family, to an extraordinary concourse of snails. I took notes of the occurrence at the time, and send them at the risk of their being a little out of date, having omitted to do so at the time. A light accidentally held down to some hencoops in a yard adjoining the house, about ten o'clock on Saturday, the 11th of May, revealed a most extraordinary and disgusting sight. Snails, with and without shells—chiefly the long black snail—were climbing up the bars of the coops, filling the food-pans and blackening the ground. The whole family was called out to witness it, and it was soon found that an army of these slimy creatures was advancing from the kitchen garden, the entrance to which was about ten yards distant from the coops. A further search showed that some other hen-coops at the top of the flower-garden were similarly but not quite so abundantly infested. The day had been showery, and it followed one of frequent thunderstorms and great rain and hail. These storms followed, as your readers may remember, on some excessively hot weather quite unusual at that time of year. I cannot well give an idea of the number of slugs and snails; some of those who saw them said there must have been thousands. Salt was profusely applied, and the dead bodies were shovelled up next morning. Were these creatures attracted by the barley-meal? What sense led them to the coops? Why did they leave the gardens? Had electricity anything to do with their appearance?—*L.*

The Maelström.—What is the nature and cansation of what is called the Maelström on the coast of Norway? What are its phenomena? Does such a thing really exist? as many tell me it is all a myth. Is it in any way connected with our volcanic phenomena? or what gave rise to it?—*C. T. Richardson.*

Volvox Query.—I have recently taken Volvox Globator in considerable quantities (the first I have ever found), but I cannot succeed in keeping these more than a day or two. Are they all devoured by the other inhabitants of the water? I have no microscopic friend to enlighten me, or I would not trouble you.—*F. G. Paine.*

The Harvest Moon.—What constitutes the difference of what is called *the Harvest Moon?* There are not any two volumes giving similiar ideas upon the subject, and all are scanty and unsatisfactory in their information.—*C. T. Richardson.*

NOTICES TO CORRESPONDENTS.

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

W. E. M.—We regret our inability to inform you where you can obtain the deposit you require.

B. L. W.—The "lumps" on willow-leaves are galls produced by an insect. If you will rear the insect from the galls and send it, we will endeavour to name it for you.

J. S.—We are informed that a complete catalogue of British Mosses is in course of preparation.

F. A. W.—In the winter, when living food for your frogs cannot be found, they will not require it. Have you really forgotten that reptiles hybernate?

C. E. D. will only find what she requires by searching through numerous volumes, such as Gould's "Birds of Asia," &c. &c.

J. B. L.—No. 1, Orthotrichum pulchellum; 2, Bryum pseudo-triquetrum; 3, Climacium dendroides.—*R. B.*

G. C. B. (Darjeeling).—The plants are Isopyrum thalictroides, L., and Hymenophyllum ciliatum, Sw., the latter new to India, although well known in tropical America and Asia, and has lately turned up in New Zealand. Will our correspondent forward herbarium specimen for one of our national collections.—*J. G. B.*

I. R. B.—You will find all particulars respecting mounting seaweed in "Davies on Mounting, &c." (price 2s. 6d.).

T. P.—More extraordinary instances of tame fish than that you describe are on record. Did you never hear of the trained gold fish of the Chinese?

G. B. C.—Communications acknowledged but not inserted should be considered as declined.

SILKWORMS.—We fear that Miss B. will be much disappointed in rearing silk and selling it. Dr. Wallace, of Colchester, *did* supply eggs of the *Ailanthus* silkworm.

J. R. W.—No. 4, Carex panicea; 5, Eriophorum angustifolium.

W. R.—No. 4 is Luzula campestris.—*R. B.*

J. C. D.—Sphagnum acutifolium?

T. H., Jun.—No. 3, Bartramia fontana; 4, Homalothecium sericeum.—*R. B.*

T. P. F.—The white substance on beech-trees formerly classed as a fungus, under the name of Psilonia nivea, is an insect production.

A. G. W.—We are desired to inform you of your mistake, the fungus being the common Stinkhorn (Phallus impudicus).

W. D. R.—No book published with coloured figures of all the British Neuroptera. Coloured figures of British moths are contained in Wood's Index Entomologicus, which may be had for about £4.

W. M. J.—No. 1, Pellæa hastata; 2, Pteris longifolia; 3, Aspidium (Cyrtomium) falcatum.—*J. G. B.*

J. H. R.—Galeopsis Ladanum and Carex ovalis.—*J. G. B.*

G. E. B. (Darjeeling).—Polygonum molle (Don), and Symplocos ramosissima (Wall.).—*J. G. B.*

W. G.—The form and position of the basal ray-plates in your little star show it to be Ophiocoma neglecta of Forbes (Br. Star Fishes, p. 30), Ophiura elegans of Leach (Zool. Misc., ii. 57), Ophiolepis elegans of Gray (Cat. of Radiata B. M., p. 24).—*P. H. G.*

CLARE.—The Beetle is a female of Saperda carcharias, not at all common in Britain.—*W. H. B.*

W. H.—We are not aware of any means of obtaining the scientific journals for perusal, except by purchasing them, or as member of some scientific society.

A. L.—The fern is Pteris tremula, Br.—*J. G. B.*

D. W. R.—The caterpillar of Acronyeta Psi.

EXCHANGES.

BEETLES.—Carded specimens of British Beetles in exchange for other species.—James Walkden, 89, Grosvenor-street, Manchester.

ZEOLITE or Needlestone (Crystals) from the Giant's Causeway, affording beautiful slides for the polariscope, in exchange for other objects.—William Gray, Mount Charles, Belfast.

EGGS of Ringed Plover, Snipe, Teal, &c., offered for those of the Cuckoo, Kingfisher, &c.—Mrs. C. Battersby, Cromlyn, Rathowen, Westmeath.

ALPINE PLANTS in exchange for others in good condition.—T. Howse, Jun., Garrybank, West Hill, Upper Sydenham.

BRITISH MOSSES.—Specimens of fifty species for British Grasses, Sedges, or Willows. Lists exchanged.—R. A., Leegomery-road, Wellington, Salop.

ECHINUS SPINES.—Acrocladia trigonaria from Feejee Islands, unmounted sections for other objects.—Lists to E. Marks, 6, Holford-square, Pentonville, W.C.

MELICERTA RINGENS may be obtained on application to A. Nicholson, Fareham. A small bottle or sealed quill should accompany the request.

FOSSIL WOOD, Fossils from the Chalk, &c., for other Fossils.—Address, F. Stanley, Harold-road, Newtown, Margate.

HIPPARCHIA SEMELE, &c., for other Lepidoptera in good condition.—D. Baxendale, Akroydon, Halifax.

RASPBERRY BRAND.—Aregma gracile.—Send stamped and directed envelope to T. W. W., 53, Buckingham-place, Brighton.

VICIA SYLVATICA for Gonepteryx Rhamni, or Arge Galathea.—W. D. Robinson, 2, Shandwick-place, E.

POLARISCOPE OBJECTS (Crystals, &c., mounted) for exchange.—A. L., 61, Buckingham-road, N.

ACNANTHES LONGIPES, Diatoma vulgare, or Synedra radians (mounted), for other mounted Diatoms.—E. Capron, Shere, near Guildford.

BRITISH Land and Freshwater Shells offered for common Echinodermata.—W. H. G., Vernon Cottage, Thornhill-road, N.

BRITISH BIRDS' EGGS in exchange for others.—James W. Lloyd, Kington.

BOOKS RECEIVED.

"The London Catalogue of British Plants." Sixth edition. London: Robert Hardwicke. 1867.

"The American Naturalist," July, 1867. No. 5. Salem: Essex Institute.

"Proceedings of the Essex Institute." Vol. V., No. 3. Salem: Published by the Essex Institute, June, 1867.

"A Trip to the Land's End," by the Rev. M. C. T. Sturman, B.A.—London: E. Billing & Son, 152, Bermondsey-street.

"The Naturalist's Circular for July and August, 1867." London.

"Second Report of the Quekett Microscopical Club, July, 1867."

"Symons's Monthly Meteorological Magazine," No. XIX., August, 1867. London: E. Stanford.

"Country Life," Nos. I. and II. London: 10, Bolt-court, Fleet-street.

COMMUNICATIONS RECEIVED.—A. M. E.—T. H., Jun.—F. H.—B.—H. H. O'F.—R. B.—H. E. W.—P. F. & Co.—E. A. B. (Cleveley).—C. B. B.—A. M.—W. E. M.—J. B. B.—B. L. W.—J. B. A.—F. I. B.—G.—A. G. W.—J. H.—C. E. D.—J. F. R.—D. C. B.—W. G.—S. C.—F. A. W.—B.—E. W.—J. W. W.—J. S.—J. S. (Perth).—W. E. B.—A. S.—T. G. D.—R. A.—T. P.—I. R. B.—G. J.—W. H.—R. O. O.—E. M.—J. H. R.—A. L.—D. B.—M. A. G.—B. H.—F. S.—G. B. C.—R. R. S.—B. D.—James.—R. A. S.—P. P.—W.—J. N. E.—A. N.—W. W. J.—L. L. S.—A. M. E.—W. D. R.—A. B. F.—C. R.—T. W. W.—J. B.—E. L. L.—J. H. G.—J. B. W.—S. D. L. A.—G. D.—J. H. R.—E. C. B.—A. L.—W. K. B.—J. B.—W. H.—C. T. R.—C. H. G.—J. G. T.—F. G. P.—D. W. R.—J. W. L.—G. T. K.—J. A. T.

LEFT BY THE TIDE.

Here, too, were living flowers,
Which, like a bud compacted,
Their purple cups contracted;
And now in open blossom spread,
Stretched, like green anthers, many a seeking head.

SOUTHEY.

IF any one will take the trouble to visit which he pleases of the fashionable watering-places on the coast during the present season of the year, unless convinced by the demands made upon his purse at every turn, a stroll on the beach will afford conclusive evidence that humanity has its migrations as well as feathered bipeds. Some mature specimens will indulge in ablutions, others in inglorious sprawlings upon the beach, and juveniles will rush deep into the mysteries of sand-pies, shovels and pails, when and where sand is to be found. One and all seem to be blissfully ignorant or indifferent to everything but drawing in as much fresh air as will be equivalent to their railway fare—plus their lodgings, and a few items in the way of "extras." Yet children will be inquisitive—they will demand of parents and guardians replies to all kinds of unconnected queries, for which the said parents and guardians are not at all times prepared. The subject of many such queries are the strange-looking objects which lie scattered up and down upon the beach, "left by the tide." We cannot suppose that the intelligent parents whose eyes habitually scan our pages are unable to satisfy the demands made upon them relative to objects so common as those we are about to allude to, but it may afford them some gratification to be able to refer the querist to the present number for an answer, whilst they, reclining in dreamy wakefulness, can survey in peace the flight of a solitary seagull, or watch the waves dashing and splashing over the sunken rocks, rehearsing to themselves, meanwhile, the lay of "The Ancient Mariner," or the ballad of "The Inchcape Bell."

Localization has its advantages, even when the commonest objects are to be described, and we may as well confess at once that the objects to illustrate this chapter were picked up on the beach at Hastings—a place no naturalist need be ashamed of visiting, for it has other charms beside sea-air, mermaids, and fishy odours. Romance may cling to the Lover's Seat, and take no note of the stray wanderer below, cracking the old thistle stems, and looking for a rare beetle which he might seek in vain elsewhere. It's of no use that he offers half-a-crown apiece for specimens of another coveted rarity, which he hopes will parade the streets of St. Leonards. It's low water, and everybody is off to the beach, regardless of beetles or butterflies, and thither we follow.

Here, there, and everywhere lies the Sea Wrack, which we have figured and described in a former volume (SCIENCE-GOSSIP, 1866, page 204). Most common is the Serrated Wrack, and scarcely less so the Black Tang, or Bladder Wrack. Of other seaweeds, the long furbelows of Laminaria saccharina are extremely common, and at every few steps a fragment or two of Carrageen (Chondrus crispus), or Irish Moss (fig. 207), as it is sometimes called. It is one of the most useful of seaweeds, and when carefully washed to remove the salt-water, may by boiling be made into a very palatable article of food. Seaweeds are much used as food by the Chinese and Japanese, especially the Agar-agar of the Malays, a species not found on our coasts.

The rocks left uncovered at low water are green with two species, either of which is suitable for a marine aquarium. The narrow kind is Entero-

Fig. 207. Carrageen (Chondrus crispus).

morpha compressa, and the broad, like green frills, is Ulva latissima; in company with them is the purplish Iridæa edulis, the common Rhodymenia

Fig. 208. Rhodymenia palmata.

palmata (fig. 208), and the delicate wavy purple fronds of the laver Porphyra laciniata, which are so thin that they cling to the fingers like a film when any attempt is made to lift them from the water. The little pools on the rocks are often fringed with the interesting Corallina officinalis, long believed to belong to the animal kingdom, from the quantity of lime which it secretes (fig. 209). Bleached specimens cast upon the beach are of a chalky whiteness, but when living it is of a purplish tint.

Fig. 209. Corallina officinalis (mag.)

But the shore has other spoils of the ocean which have been left by the tide beside seaweeds, and much more likely to attract attention. There are the pixy-purses, or egg-cases, of the Spotted Dog-fish, and the common Skate, described and figured in this work (for 1865, page 182); and there are also those common but puzzling objects the tufts of egg-cases of the common Whelk (fig. 210), which roll and blow

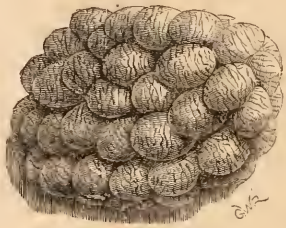


Fig. 210. Egg-cases of Whelk.

about upon the beach, and are certain to elicit a query from juveniles. The membrane, mounted in balsam, is a good microscopic object (Science-Gossip, 1867, p. 91). Less common are the clusters,

Fig. 211. Eggs of Cuttle-fish.

like bunches of black grapes (fig. 211), of the eggs of the cuttle-fish, of the same kindred as the Octopus, so graphically described by Mr. J. K. Lord in a former number (1865, page 50), and the original of the "Devil-fish" of Victor Hugo's "Toilers of the Sea." Apropos of the cuttle-fish, the white oblong plates commonly called "cuttle-fish bone,"

which constitute the solid framework of the Cuttle (Sepia officinalis), and the transparent plates of the Calamary (Loligo vulgaris), sometimes called "Sea-pen," will occasionally be seen on the beach near the fisherman's quarter. The dead cuttle-fish may themselves be seen there, but often more offensive to the nose than pleasing to the eye.

The common Star-fish, or "Five Fingers" (Uraster rubens), is too well known on the beach to need description, and our woodcut will be a sufficient introduction to those who stay at home (fig. 212). A very pretty little star, not exceeding an

Fig. 212. "Five Fingers."

inch in diameter, may be collected by hundreds at low water at one spot at Hastings, and we failed to find them anywhere else. This little animal is the

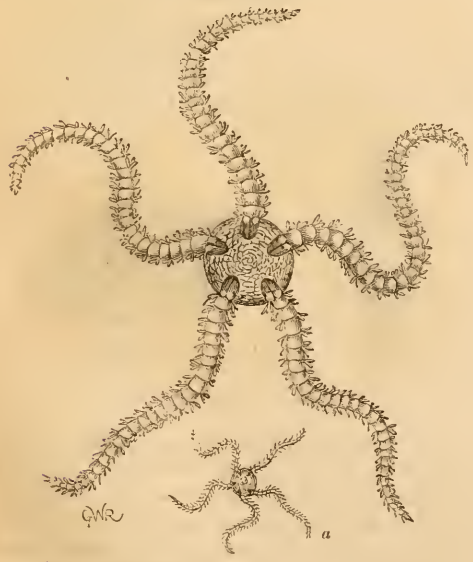


Fig. 213. Ophiocoma neglecta. (*a*. natural size.)

Ophoicoma neglecta of Forbes (fig. 213). Just by the outlet of the drainage excavations at the base of East Cliff, a cluster of rocks is left bare at low water. The surface of these rocks contains numerous hollows or pools, some no larger than a hand-basin, fringed or lined with mussels, which latter are covered with green seaweeds. If a handful of these mussels are torn from their moorings, and separated from each other, scores of this little star-fish will be found amongst the threads (byssus), by

Fig. 214. Alcyonidium.

means of which the mussel attaches itself to the rock. To preserve these little animals in a dried state, they should be plunged into fresh water, which kills them at once with the arms expanded. They may then be dried by exposure to the air, and are beautiful little objects. Specimens of the Common Sun-star (Solaster papposa), with twelve or more rays, are sometimes cast upon the beach at Hastings, and less commonly the Egg-urchin

(Echinus sphæra). Though both of them are designated "common," they are certainly neither of them common, according to our experience, in the locality alluded to.

Of Zoophytes and Polyzoa, dead specimens are plentiful enough. There is the Oaten Pipe Coralline (Tubularia indivisa), and the Branched Pipe Coralline (see SCIENCE-GOSSIP, 1865, page 177); still more commonly the Sickle Coralline (Plumularia falcata), and the Sea Fir (Sertularia abietina), both of which are figured in a former number (August, 1865). One of the most frequent of Polyzoa is the Sea Mat (Flustra foliacea), and, nearly as common, the Paper Sea Mat (Flustra chartacea), to say nothing of the parasitic species on sea mat, coralline, or seaweed.

Of all the strange objects which a high tide leaves stranded, there is one not at all attractive by any beauty which it possesses, but which is sure to raise a host of inquiries (fig. 214). It has a most variable form and size, ranging between two or three inches and a foot in length, of a colour resembling sponge, the substance tough, fleshy, and somewhat firm; and the odour nothing in particular when fresh, but particularly undesirable as it becomes stale. This is the "Dead Man's Fingers" (Alcyonidium gelatinosum, fig. 212), a republic of "low life." Under the microscope, the whole surface will be found covered with teat-like projections; and should the specimen be really alive, an animal resident within each of these projections will protude its tentacles. It is most probable that the specimens picked up on the beach will be past all exhibition of vitality.

We must not forget the sea-anemones, which the receding tide will leave exposed to the stroller's gaze like little lumps of jelly adhering to the rocks. No great variety will be found here; but, especially on the rocks near the old town, marked by the remains of old piles, their tops worn to cones and covered with green seaweed, hundreds of smooth anemone, of all shades and sizes, may be collected. This species is figured under the name of "Beadlet" (Actinia mesembryanthemum) in our volume for 1865 (page 157, fig. 10). Its chief beauty resides in the turquoise beads which surround the disc; otherwise the colours are usually some shade between brown and green.

Towards the other end of the town, a little to the east of the Infirmary, when the water is very low, as at new and full moon, a few Daisy Anemones (Sagartia bellis) may be seen, with an occasional—very occasional—"crass," or Dahlia Wartlet (Tealia crassicornis). To see them is one thing, but to get them, if required for an aquarium, is another. This applies particularly to the Daisy Anemone, which of all others is the most desirable for a small aquarium. Our hostess had never seen such creatures until we established a temporary tank in a hand-basin for their reception; and her brother, although seventeen years resident, had neither seen nor heard of such things before. Well, we have all of us a world of our own, and theirs had certainly not the same orbit.

Of Molluscs, thousands of mussels are attached to the rocks, and the Dog-whelk (Purpura lapillus) crawls amongst the seaweed. The conical shells of the Limpet (Patella vulgata) are almost as numerous (fig. 215), and the little Yellow Perriwinkle (Littorina littoralis) is quite at home amongst the sea-

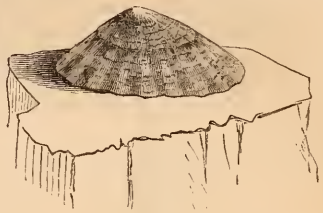


Fig. 215. Limpet.

wrack. The common shells of the beach are confined to a few species, such as the Scallop (Pecten

Fig. 216. Scallop.

varius, fig. 216), and the pretty little elongated shells of the Donax politus (fig. 217). The larger and

Fig 217. Donax politus.

more rounded shells of the Trough-shell (Mactra stultorum, fig. 218) are also numerous. The shells of the mussel, limpet, rocks, stones, iron drain-pipes, &c., are profusely covered with the Acorn Barnacle (Balanus balanoides), and the rocks are perforated in all directions by Pholas dactylus, one of the most wonderful of Nature's excavators.

There are other objects besides those which we have enumerated thus briefly, each of which has a history, and possesses an interest; but had we at-

tempted more than this barren enumeration, the present number of Science-Gossip would have contained but a single chapter—"a consummation *not*

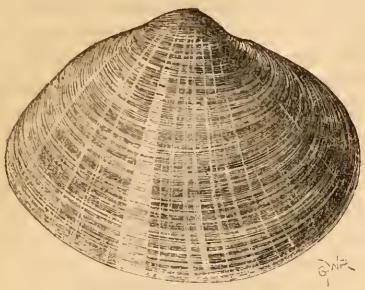


Fig. 218. Mactra stultorum.

devoutly to be wished." The Nudibranche Molluses, found on the rocks at low tide, have been almost

Fig. 219. Æolis coronata.

forgotten, and of these the pretty little Æolis coronata (fig. 219) is very attractive. Annelids, or sea-worms, must also be passed by, with an allusion to the tubes of a species of Terebella, found either attached to or drifted amongst the seaweed. These tubes are about the thickness of a tobacco-pipe (fig. 220), nd composed of sand, little stones, and minute shells, or fragments of shells, agglutinated together into a flexible tube, somewhat after the manner of the cases of the caddis. The mouth of the tube is fringed with a number of smaller hair-like tubes of a similar construction. Lively crustaceans "left by the tide" consist of crabs of all sizes, hermit crabs —shrimps, and sand-hoppers. It is expedient to furnish the juveniles with small hand-nets, and send them off to the shallow pools on the sands to catch shrimps, so that

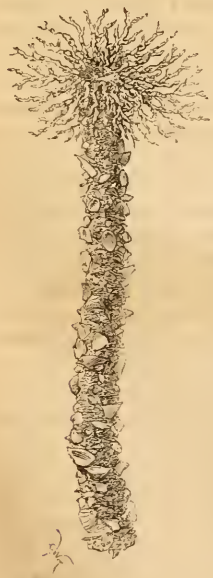


Fig. 220. Tube of Terebella.

we may come to a termination. As for their elders (like "the three clerks" in the ballad)—

> Sauntering down the shady hollow,
> Strolling o'er the sunny sands,
> Letting fancy idly follow
> Steamers bound for distant lands;
> Watching, through the distance hazy,
> Vessels standing out to sea,

we will leave them to try an aquarium in a hand-basin, as we have done. If a recipe is desired, let the following suffice. Take a basin, bowl, or pan of coarse earthenware capable of holding a gallon of water; spread on the bottom thereof a quart of small beach pebbles well washed from sand. Lay thereon two or three stones, or fragments of rock, on which green seaweeds are vigorously growing. Over all pour a half gallon of clear sea-water, and allow it to stand a day or two. Finally, collect and transfer to the bowl half a dozen sea-anemones, a dog-whelk or two,—and anything else will probably be too much, for shrimps and sandhoppers will soon die, hermit-crabs won't like it, æolis will attack the anemones when they become hungry: hence it is advisable to "leave well alone," and be content with strolling up and down to ascertain what has been "left by the tide."

MERMIS NIGRESCENS.

By R. T. Lewis.*

THE subject of the following remarks—Mermis nigrescens—is a creature concerning which there has of late been much discussion, both of a scientific and of a speculative character. The facts of its recent appearance have gone the round of the newspapers and serials, and it has been a topic of conversation at several meetings of learned societies. It will no doubt be remembered that the first two days of last June were unusually hot, with light wind from the S.W.; and that during the night of the 2nd a remarkably heavy rain-fall took place, accompanied by lightning and thunder. On the following morning much surprise was created in the districts over which the storm had passed by the appearance of great numbers of hair-worms on the leaves of plants, bushes, and, in some instances, of trees. They were chiefly observed to be hanging by one extremity, and waving their slender bodies to and fro in the air, seeming at first sight to be so many threads of silk; but on being taken into the hand, they immediately coiled up in that peculiarly intricate manner which originally suggested a name for the family to which they belong. Mention was made of them at the meeting of the Entomological Society on the evening of June 3rd, but they were then thought to be Gordius aquaticus; and at the meeting of the Linnæan Society on June 22nd,

* Read at the Quekett Microscopical Club, Aug. 23rd.

living specimens were exhibited to the Fellows; whilst from information received then and since, it seems that their appearance was general and simultaneous at a large number of places in the counties of Sussex, Kent, Surrey, and Middlesex. Naturally the first question that arose was, where did the creatures come from? And in reply to this there were not wanting persons who, connecting their appearance with the storm and the rain, boldly claimed for them a celestial origin, and well-authenticated instances of the descent of small fish and frogs from the clouds were adduced in support of the notion; whilst other persons gravely inquired whether they might not have been produced by electricity—an idea which, though at first sight absurd, certainly does not, upon reflection, seem to be surrounded by any greater difficulties than those of the more fashionable but less novel theories of spontaneous generation. Whilst endeavouring to investigate the subject, I thought it worth while to make inquiries whether anything special or peculiar in the condition of the atmosphere had been noted by meteorological observers; but with the exception of the unusual depth of the rainfall—registered at Kew as ·727 inches, but at Steyning as no less than 2·44 inches,—I cannot ascertain that anything remarkable was anywhere recorded. But it is worthy of mention that sudden appearances of immense numbers of these worms took place in the years 1781, 1832, and 1845—on each occasion in the month of June, and immediately after thunderstorms with heavy rainfall; the prevailing opinions then being that they came from the clouds. Their appearance on June 15th, 1845, has been described at great length by the Rev. L. Jenkyns, in his "Observations on Natural History."* They were then found upon flagstones as well as on the earth, and were equally abundant upon shrubs and trees as high as examined—certainly 7 or 8 feet from the soil. It is not, however, my present purpose to occupy any more time either in following up these inquiries, or in entering into any speculations to account for the apparently anomalous circumstance of Entozoa being found in large quantities upon apple-trees and gooseberry-bushes; but it will, perhaps, be worth while, before going into any detailed description of what the microscope reveals of their structure, to state in as few words as possible what Natural History teaches us concerning them. They were first recognized as a distinct genus by Dujardin, who, in a memoir published in 1842,† minutely described them, and gave an account of what he considered to be their origin and habits. He was of opinion that they were chiefly parasites of the larvæ of the cockchafer, which, he says, are many years coming to their full growth, and that they leave the bodies of their hosts only when arrived at maturity, and merely to lay their eggs, after which they speedily die. He accounts for their appearance after heavy rain by supposing that at such times the moisture stimulates the already sick larvæ to expel their parasites by contraction. But although this theory might in part explain their being found upon the ground, it does not so well account for their abundant presence on the tree-tops. These worms belong to the family Gordiacea, in the order Sterelmintha, of the class Entozoa. Formerly they were placed amongst the Nematoidea, in the order Cœlelmintha; but from the fact that they do not possess the distinctive characteristics of the last-named order, and do agree with those of the first-named, it is rather surprising that they should have been so long allowed to occupy a false position. In the family Gordiacea, the two British genera, Gordius aquaticus and Mermis nigrescens, bear so close a resemblance to each other that it is hardly to be wondered at that mistakes should often be made in identification; and it may be noted in passing that, with the exception of the descriptions already quoted from, the amount of written information concerning them is very meagre, owing, no doubt, to their very retired habits, and to the fact that they have not been discovered to be injurious, either directly or indirectly, to man or to his property. According to the various descriptions, the chief differences between the two may be stated as follows:—Gordius attains the length of 7 to 10 inches, Mermis from 4 to 6 inches. Gordius inhabits water or mud; Mermis is found in damp earth. In Gordius the oviduct is situated nearer to the posterior than to the anterior end of the body; in Mermis it is nearer to the anterior than to the posterior. In Gordius the head is much more abruptly rounded than is the case with Mermis; and, by error, in Science-Gossip, vol. i., p. 197, the tail of the *female* Gordius is stated to be bifid, whereas *male* is intended, as I am since informed, whilst that of the female Mermis is certainly simple, terminating in a rounded angle, as shown in the diagram. What sort of caudal appendage may be possessed by the male Mermis I am unable to state, since the whole of the fifty or sixty specimens in my possession belong to the female sex. Gordius is also of a much darker colour than Mermis; but both are developed in the intestines of insects, who find the ova and swallow them—doubtless afterwards wishing they had not. On the evening of June 3rd I received by post a small box full of these worms from a friend at Bognor, the letter which accompanied them stating that they had been found in great numbers that morning in the garden after the thunderstorm, chiefly depending in the manner already alluded to, from the leaves of the apple-trees. Specimens were also found upon asparagus, and on bushes and shrubs. On turning them out of the box, I found them to be quite dry

* Pp. 303, et seq. † Annales des Sciences Naturelles, 1842.

and shrivelled, and entwined together into one mass so intricately that it appeared at first sight impossible to separate them by any other means than that adopted by Alexander with the knot of the Phrygian's famous harness; but although they resisted all attempts to flatten or uncoil them, they proved to be sufficiently elastic to bear the amount

Fig. 221. Tail, × 80.

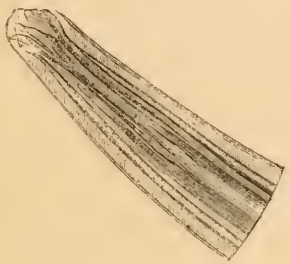


Fig. 222. Head.

of force required to tear them from each other's folds. In colour some were a pale yellow; but the majority were more or less longitudinally streaked with brown, in some cases approaching to black. On placing one of them in water, it speedily began to untwist itself, and to writhe about in a manner strongly suggestive of returning animation; but although it is said that Gordius aquaticus will come to life again and swim away, after having been dried up for weeks, I am quite sure that these movements on the part of the many specimens of Mermis examined were merely the result of the relaxation of their stiffened bodies, consequent upon the absorption of the fluid in which they were immersed, the motion entirely ceasing as soon as the last trace of shrivelling had disappeared. The absorption of the water appeared to take place almost entirely through the substance of the skin; and it is stated that in their natural condition they obtain their nutriment in a similar manner. When thoroughly moistened, their bodies became naturally distended, cylindrical, transparent, and pliable in a remarkable degree, and so elastic that they bore stretching to much beyond their natural length without breaking asunder. On placing them under the microscope, upon moistened slides, I found that the dark colour of most of the specimens was due to the presence of large numbers of clear brown ova, which, in many instances, filled the body from within $\frac{1}{2}$ inch of the head to $\frac{1}{4}$ inch from the tail, no fewer than 7,200 of them having been counted in the first one taken under examination. In length the worms varied from $3\frac{1}{2}$ to $5\frac{1}{2}$ inches, and in breadth or diameter from $\frac{1}{30}$ to $\frac{1}{20}$ inch, excepting at the extremities. The tail ended in a somewhat curved and rounded point, and there was no posterior aperture to the intestinal canal. From a distance of about $\frac{1}{2}$ inch from the head the body gradually tapers down, until it terminates in a slight rounded enlargement, just behind which there is a small, ill-defined, red spot; the diameter of the head in most cases does not exceed $\frac{1}{140}$ inch. Whether this worm has any mouth or not appears to have been hitherto a matter of some uncertainty, for in works where its characteristics are given I find it frequently stated, "Mouth none, or very indistinct;" and from the examination of nine out of ten mounted specimens, it was impossible to decide the question with any certainty; but in the tenth I was delighted to find that the structure of the mouth was shown in a remarkably clear and beautiful manner; for although this slide, as a specimen of mounting, is anything but what it ought to be, the head is more perfectly shown than in any former instance. From the examination of this, I think it may be determined that the creature is furnished with at least two very minute circular mouths or suckers, one on each side of the head, about 90° apart, or 45° on either side of the terminal extremity, from each of which a cone-shaped tube extends towards, and at its base joins, the alimentary canal. There is also some reason for suspecting the existence of one or more additional mouths. The body is filiform and cylindrical, its integument being perfectly transparent, homogeneous, very elastic and tough, and seemingly of a gelatinous nature. It absorbs water with great facility, undergoes no perceptible change from the action of sulphuric acid, but is instantly dyed brown by a solution of iodine. Its effect upon polarized light is very slight, unless in a state of tension, when it becomes brilliant, and exhibits beautiful graduating colours with selenite. The most noteworthy appearance connected with it is that it is delicately marked with an immense number of striæ, which run spirally round it from end to end, preserving their parallelism throughout, their distance apart scarcely exceeding $\frac{1}{2000}$ inch. These markings are best seen when the worm is freely floating in fluid, and has not been subjected to pressure. (The specimen exhibited under the microscope in the room was placed in a glass cell containing water only, and in which it had been for more than two months without undergoing any perceptible change.) Whatever may be the nature of these markings, they seem to indicate the secret of the creature's climbing powers, and to confirm the opinion that it ascends the stems of shrubs by a winding spiral motion.

Next within the integument, and between it and the alimentary canal and ovary, are what appear to be two tubes or cords, which may possibly constitute the nervous system. These are well seen in polarized light. Whether there are two ovaries, or only one extending nearly the length of the body, I have not been able clearly to determine; but from the examination of the parts immediately adjacent to the oviduct, and from the fact that an incision made through the integument on one side of the vulva only caused ova to float out from that half of the body, I am inclined to believe that there are two distinct ovaries, as in the case of the common Ascaris. The ovaries appear to consist of fibrous tissue, very different in appearance and structure from that of the outer integument—a difference which becomes strikingly visible by the action of re-agents. Schultze's test, which produces no effect whatever upon the integument, changes this tissue immediately from its natural pale yellow colour to a deep crimson. When a worm has been immersed in water sufficiently long for its body to have become naturally distended and pliant, it should be cut in two with the scissors, and on pressure being applied to the extremity, and steadily continued along towards the cut end, the whole of the contents of the body will be forced out from the integument without any apparent injury to either. Treatment with acetic acid will render it easy to separate the fibres, or a drop of syrup and a drop of sulphuric acid added to it will change them to the deep red colour already referred to. But perhaps the greatest amount of interest may be said to attach to the ova themselves, which, from their great number and conspicuous colour, must immediately attract the attention of the most casual observer. The number in the different worms which I have had under the microscope I found to range from a few score to upwards of 10,000; in colour they are a clear transparent brown, and in shape slightly oval, having a major diameter of $\frac{1}{300}$ inch, and a minor of $\frac{1}{600}$ inch. They may readily be obtained for examination, either by pressing out the contents of the body in the manner above described, or by placing the body of the worm in water, bending it nearly double, and then cutting it half-way through with a sharp-pointed dissecting knife; the ova will then be found slowly but freely to float out through the incision. A small quantity of acetic acid added to the water will be found to hasten the process, and will also be of further service in clearing the ova from certain granules of matter by which they are frequently surrounded. On carefully examining them for the first time, I found that each one was enclosed in a delicate, colourless, membraneous sac, the opposite ends of which were slightly elongated, and furnished with two fine filamentous appendages, fringed or ciliated at their free ends. It is however rather remarkable that nearly all the ova of the various worms which I have examined since the first appear to possess only one filament at each end instead of two; but as to the fact there can be no doubt, since, as the observation was new to me, I made a drawing of what I saw at the time, and called in another person to verify its correctness.

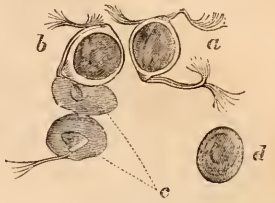


Fig. 223.
a, *b*, perfect ova. *c*, ruptured sac. *d*, ovum escaped, × 280.

The sacs containing the ova were filled up with a fluid, the nature of which I have been unable to determine. What may be the purpose of the filaments appears to be a question of some interest; and it has been suggested that, inasmuch as the ova are found and devoured by various insects, within whose bodies they undergo development, possibly the filaments may have a use as a means of attachment, by which the ova are prevented from passing out of their hosts before coming to maturity. But be this as it may, I have observed that by a comparatively slight amount of pressure, the sac is ruptured and the ovum escapes. It is also further to be noted that in every instance of this kind the sac has broken asunder in the same direction and manner, namely, in the circumference of its minor diameter, thus separating it into two equal parts, each of which in shape bears a curious resemblance to a round-topped smoking-cap with its tassel. The rupture of the sacs was in all probability due to the compression of the contained fluid, so that it would be unfair to infer from this only that an insect would swallow the ovum alone without its envelope; yet I cannot but regret that my endeavours to clear up this point have not been attended with better success. With this end in view, I have for some days past kept an earwig in a closed glass trough in which I had placed some of the perfect ova; but up to the time I left home this evening they remained untouched, although the insect has had nothing to eat for nearly a week; and having been caught in a London scullery, it is scarcely probable that its aversion arises from any previous experiences of the effects of swallowing the ova of Mermis nigrescens.* Surrounding the ovaries, apparently in contact with the ova, and occupying the spaces between them, is what appears—when seen through the integument by transmitted light—to be a quantity of milk-white flocculent material,

* To save it from death by starvation, the earwig was set at liberty a few days after, the ova remaining untouched.

which I take to be alimentary matter; it freely floats out with the ova when an incision is made, or it may be obtained directly from a cut portion by

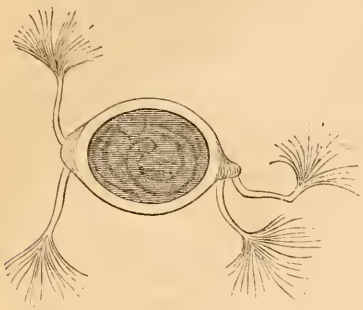


Fig. 224. Bi-caudate Ovum, × 575.

pressure. Examined under a 1-inch objective, it is seen to consist of semi-transparent granules or corpuscles; and it appeared of some importance to endeavour to ascertain what they consisted of—not merely from curiosity as to the worm's diet, but as tending to show whether or not they might be regarded as injurious to the vegetable produce of those gardens where they exist in such numbers. The result of sundry experiments seems, however, clearly to show that this granulated matter is neither of animal nor vegetable composition, inasmuch as it remained unchanged by the action of Schultze's test and of iodine. By adding sulphuric acid to a portion already treated with iodine, very minute isolated patches only gave a purple reaction, seeming to indicate the presence of cellulose; but strong sulphuric acid acted powerfully upon it, disengaging small bubbles of gas. Finding this to be the case, I allowed it to stand aside for a couple of days; and at the end of that time I found floating in the liquid numerous bundles of the well-known acicular crystals of sulphate of lime. For preservation as microscopic objects, entire specimens of Mermis may be readily mounted, freely floating in cells filled with water or glycerine. When intended to be viewed as transparent objects, they should be thoroughly saturated with water, then placed in the required position between two glass slides, and allowed to dry under pressure, after which they can be mounted in the usual manner in glycerine jelly or pure glycerine, under a glass cover only. With the ova alone greater care is necessary; and to avoid the results of pressure they should be protected by a very shallow cell, in which glycerine is undoubtedly the best medium for their preservation. All my attempts with balsam have turned out badly; for though free from bubbles, the sacs have in every case been broken, and the escape of the contained fluid has caused a blurred appearance round all those of the ova which were not completely isolated.

THE DRAGON-FLY.

By A. S. Packard, Jr., M.D.

WERE we to select from among the insects a type of all that is savage, relentless, and bloodthirsty, the Dragon-fly would be our choice. From the moment of its birth until its death, usually a twelvemonth, it riots in bloodshed and carnage. Living beneath the waters perhaps eleven months of its life, in the larva and pupa states, it is literally a walking pitfall for luckless aquatic insects; but when transformed into a fly, ever on the wing in pursuit of its prey, it throws off all concealment, and reveals the more unblushingly its rapacious character.

Not only does its horrid visage and ferocious bearing frighten children, who call it the "Devil's Darning-needle," but it even distresses older persons, so that its name has become a byword. Could we understand the language of insects, what tales of horror would be revealed! What traditions, sagas, fables, and myths must adorn the annals of animal life regarding this Dragon among insects!

To man, however, aside from its bad name and its repulsive aspect, which its gay trappings do not conceal, its whole life is beneficent. It is a scavenger, being like that class ugly and repulsive, and holding literally, among insects, the lowest rank in society. In the water, it preys upon young mosquitoes and the larvæ of other noxious insects. It thus aids in maintaining the balance of life, and cleanses the swamps of miasmata, thus purifying the air we breathe. During its existence of three or four weeks above the waters, its whole life is a continued good to man. It hawks over pools and fields and through gardens, decimating swarms of mosquitoes, flies, gnats, and other baneful insects. It is a true Malthus' delight, and, following that sanguinary philosopher, we may believe that our Dragon-fly is an entomological Tamerlane or Napoleon sent into the world by a kind Providence to prevent too close a jostling among the myriads of insect life.

We will, then, conquer our repugnance to its ugly looks and savage mien, and contemplate the hideous monstrosity,—as it is useless to deny that it combines the graces of the Hunchback of Notre Dame and Dickens's Quilp with certain features of its own,—for the good it does in Nature.

Even among insects, a class replete with forms the very incarnation of ugliness and the perfection of all that is hideous in nature, our Dragon-fly is most conspicuous. Look at its enormous head, with its beetling brows, retreating face, and heavy under jaws,—all eyes and teeth,—and hung so loosely on its short, weak neck, sunk beneath its enormous hunchback,—for it is wofully round-shouldered,—while its long thin legs, shrunken as if from disease,

are drawn up beneath its breast, since our fiend of the air is a poor pedestrian.

Its gleaming wings are, however, beautiful objects. They form a broad expanse of delicate parchment-like membrane drawn over an intricate network of veins. Though the body is bulky, it is yet light, and easily sustained by the wings. The long tail undoubtedly acts as a rudder to steady its flight.

These insects are almost universally dressed in the gayest colours. The body is variously banded with rich shades of blue, green, and yellow, and the wings give off the most beautiful iridescent and metallic reflections.

During August, the various species of Libellula and its allies most abound. The eggs are attached loosely in bunches to the stems of rushes and other water-plants. In laying them, the Dragon-fly, according to Mr. P. R. Uhler's observations, "alights upon water-plants, and, pushing the end of her body below the surface of the water, glues a bunch of eggs to the submerged stem or leaf. Libellula auripennis I have often seen laying eggs, and I think I was not deceived in my observation that she dropped a bunch of eggs into the open ditch while balancing herself just a little way above the surface of the water. I have, also, seen her settled upon the reeds in brackish water with her abdomen submerged in part, and there attaching a cluster of eggs. I feel pretty sure that Libellula auripennis does not always deposit the whole of her eggs at one time, as I have seen her attach a cluster of not more than a dozen small yellow eggs. There must be more than one hundred eggs in one of the large bunches. The eggs of some of the Agrions are bright apple-green, but I cannot be sure that I have ever seen them in the very act of oviposition. They have curious habits of settling upon leaves and grass growing in the water, and often allow their abdomens to fall below the surface of the water; sometimes they fly against the surface, but I never saw what I could assert to be the projecting of the eggs from the body upon plants or into the water. The English entomologists assert that the female Agrion goes below the surface to a depth of several inches to deposit eggs upon the submerged stems of plants." The Agrions, however, according to Lucaze Duthiers, a French anatomist, make, with the ovipositor, a little notch in the plant upon which they lay their eggs.

These eggs soon hatch, probably during the heat of summer. The larva is very active in its habits, being provided with six legs, attached to the thorax, on the back of which are the little wing-pads, or rudimentary wings. The large head is provided with enormous eyes, while a pair of simple, minute eyelets (*ocelli*) are placed near the origin of the small bristle-like feelers, or antennæ. Seen from beneath, instead of the formidable array of jaws and accessory organs commonly observed in most carnivorous larvæ, we see nothing but a broad, smooth mask covering the lower part of the face, as if from sheer modesty our young Dragon-fly was endeavouring to conceal a gape. But wait a moment. Some unwary insect comes within striking distance. The battery of jaws is unmasked, and opens upon the victim. This mask is peculiar to the young, or larva and pupa of the Dragon-fly. It is the labium, or under lip greatly enlarged, and armed at the broad spoon-shaped extremity with two sharp hooks, adapted for seizing and retaining its prey. At rest, the terminal half is so bent up as to conceal the face, and thus the creature crawls about, to all appearance, the most innocent and lamb-like of insects.

Not only does the immature Dragon-fly walk over the bottom of the pool or stream it inhabits, but it can also leap for a considerable distance, and by a most curious contrivance. By a syringe-like apparatus lodged in the end of the body, it discharges a stream of water for a distance of two or three inches behind it, thus propelling the insect forwards. This apparatus combines the functions of locomotion and respiration. There are, as usual, two breathing pores (*stigmata*) on each side of the thorax. But the process of breathing seems to be mostly carried on in the tail. The tracheæ are here collected in a large mass, sending their branches into folds of membrane lining the end of the alimentary canal, and which act like a piston to force out the water. The entrance to the canal is protected by three or five triangular horny valves, which open and shut at will. When open, the water flows in, bathing the internal gill-like organs, which extract the air from the water. This is then suddenly expelled by a strong muscular effort.

In the smaller genera, Agrion, Lestes, and Calopteryx, the respiratory leaves, called the tracheary, or false-gills, are not inclosed within the body, but form three broad leaves, permeated by tracheæ, or air-vessels. They are not true gills, however, as the blood is not aërated in them. They only absorb air to supply the tracheæ, which aërate the blood only within the general cavity of the body. These false-gills also act as a rudder to aid the insect in swimming.

It is easy to watch the Dragon-flies through their transformations, as they can easily be kept in aquaria. Little, almost nothing, is known regarding their habits, and any one who can spend the necessary time and patience in rearing them, so as to trace up the different stages from the larva to the adult fly, and describe and figure them accurately, will do good service to science.

Mr. Uhler states that at present we know but little of the young stages of our species, but "the larva and pupa of the Libellulidæ may be always known from the Æschnidæ by the shorter, deeper, and more robust form, and generally by their thick clothing of hair."

The pupa scarcely differs from the larva, except

in having larger wing-pads. It is still active, and as much of a gourmand as ever. When the insect is about to assume the pupa state, it moults its skin. The body having outgrown the larva skin, by a strong muscular effort a rent opens along the back of the thorax, and the insect, having fastened its claws into some object at the bottom of the pool, the pupa gradually works its way out of the larva-skin. It is now considerably larger than before. Immediately after this tedious operation, its body is soft, but the crust soon hardens. This change, with most species, probably occurs early in summer.

When about to change into the adult fly, the pupa climbs up some plant near the surface of the water. Again its back yawns wide open, and from the rent our Dragon-fly slowly emerges. For an hour or more, it remains torpid and listless, with its flabby, soft wings remaining motionless. The fluids leave the surface, the crust hardens and dries, rich and varied tints appear, and our Dragon-fly rises into its new world of light and sunshine a gorgeous but repulsive being. Tennyson thus describes these changes in "The Two Voices":—

> To-day I saw the Dragon-fly
> Come from the wells where he did lie.
> An inner impulse rent the veil
> Of his old husk: from head to tail
> Came out clear plates of sapphire mail.
> He dried his wings; like gauze they grew;
> Through crofts and pastures wet with dew
> A living flash of light he flew.

The largest of our Dragon-flies are the "Devil's Darning-needles," Æschna heros and grandis, seen hawking about our gardens till dusk. They frequently enter houses, carrying dismay and terror among the children. The hind-body is long and cylindrical, and gaily coloured with bright green and bluish bands and spots.

One of our most common Dragon-flies is Diplax rubicundula, the ruby Dragon-fly, which is yellowish red. It is seen everywhere flying over pools, and also frequents dry sunny woods and glades. Another common form is Diplax berenice of Drury. It is black, the head blue in front, spotted with yellow, while the thorax and abdomen is striped with yellow. There are fewer stripes on the body of the male, which has only four large yellow spots on each side of the abdomen. Still another pretty species is Diplax elisa of Dr. Hagen. It is black, with the head yellowish and with greenish yellow spots on the sides of the thorax and base of the abdomen. There are three dusky spots on the front edge of each wing and a large cloud at the base of the hind pair towards the hind angles of the wing.

Rather a rare form, and of much smaller stature is the Nannophya bella of Uhler. It was first detected in Baltimore, and we afterwards found it not unfrequently by a pond in Maine. Its abdomen is unusually short, and the reticulations of the wings are large and simple. The female is black, while the male is frosted over with a whitish powder. Many more species of this family are found in this country, and for descriptions of them we would refer the reader to Dr. Hagen's Synopsis of the Neuroptera of North America.

The Libellulidæ, or family of Dragon-flies, and the Ephemeridæ, or May-flies, are the most characteristic of the Neuroptera, or veiny-winged insects. This group is a most interesting one to the systematist, as it is composed of so many heterogeneous forms which it is almost impossible to classify in our rigid and at present necessarily artificial systems. We divide them into families and sub-families, genera and sub-genera, species and varieties, but there is an endless shifting of characters in these groups. The different groups would seem well limited after studying certain forms, when to the systematist's sorrow here comes a creature, perhaps mimicking an ant, or aphis, or other sort of bug, or even a butterfly, and for which they would be readily mistaken by the uninitiated. Bibliographers have gone mad over books that could not be classified. Imagine the despair of an insect-hunter and entomophile, as he sits down to his box of dried neuroptera. He seeks for a true neuropter in the white ant before him, but its very form and habits summons up a swarm of true ants; and then the little wingless book-louse (Atropos), scampering irreverently over the musty pages of his *Systema Naturæ*, reminds him of that closest friend of man —Pediculus vestimenti. Again, his studies lead him to that gorgeous inhabitant of the Mediterranean shores, the butterfly-like Ascalaphus, with its gorgeous wings and slender knobbed antennæ, so much like those of butterflies, and visions of these beautiful insects fill his mind's eye; or sundry dun-coloured caddis flies, modest, delicate neuroptera, with finely fringed wings and slender feelers, create doubts as to whether they are not really allies of the clothes moth, so close is the resemblance.

Thus the student is constantly led astray by the wanton freaks Nature plays, and becomes sceptical as regards the truth of a natural system, though there is one to be discovered; and at last disgusted with the stiff and arbitrary systems of our books,—a disgust we confess most wholesome, if it only lead him into a closer communion with nature. The sooner one leaves those maternal apron-strings,—books,—and learns to identify himself with nature, and thus goes out of himself to affiliate with the spirit of the scene or object before him,—or, in other words, cultivates habits of the closest observation and most patient reflection,—be he painter or poet, philosopher or an insect-hunter of low degree, he will gain an intellectual strength and power of interpreting nature, that is the gift of true genius.

[Although originally written for the *American Naturalist*, there is much in this chapter which is of interest also to the British student.]

SPONGE WASHINGS.

HE who possesses a microscope, and knows how to use it, need not go far in search of objects. Even within the four walls of his own house it is exceedingly probable that one who is in earnest will find enough to astonish his less enthusiastic friends. It is not always necessary to visit the sea-coast to obtain good marine Diatomaceæ. From a very simple and common source the student may often secure a plentiful store to employ his leisure and his microscope. Such home resources and simple expedients are amongst the charms of domestic microscopy; and the excuses sometimes urged of want of leisure, claims of business, town location, and inability to travel, are overturned when the Diatoms travel to one's own door. It is a reversion of the old saying, that if the mountain will not come to Mahomet, Mahomet must go to the mountain.

Some twelve years ago, being in want of a sponge for use in the stable, I purchased one from a hawker of such commodities for the small sum of half-a-crown. It was one of the coarsest and commonest kind, full of large holes, and with little of external favour to recommend it. This was a home lesson, read by a sponge, on the folly of rash conclusions from mere appearances. After repeated washings in water, this sponge yielded me a large quantity of sand from its interior. After allowing the larger particles to subside, I boiled the lighter portion in strong nitric acid; and having carefully washed it several times in water, obtained some very interesting slides for my cabinet. Lists are never very readable or acceptable communications, and a dry list of Latin names is least of all attractive to the general reader; but the following enumeration will give some idea of the hidden treasures of a sponge:—

The genus Campylodiscus is represented in my "washings" by no less than three species. One of these is the Campylodiscus notatus of Greville, which is distinguished by the central markings,

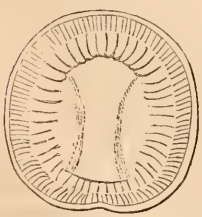


Fig. 226, × 500.

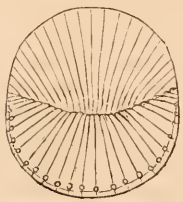


Fig. 227, × 250.

which Mr. Norman has aptly compared to the figure of a dumb-bell. My specimen measures ·0020 of an inch (fig. 226).

The second representative of this genus resembles Campylodiscus ralfsii, but it is larger, measuring ·0035 of an inch (fig. 227).

The third species is undoubtedly Campylodiscus parvulus of Smith, though larger than is usual in British specimens; it measured ·0022 of an inch (fig. 228). By some this species is regarded as a variety of Campylodiscus fastuosa (Ehr.).

Fig. 228, × 500.

The form called Auliscus sculptus by Smith, or, as it is sometimes named, Eupodiscus sculptus, is abundant in my washings, and varies greatly in size. The specimen figured (fig. 229) measured ·0017 of an inch.

Fig. 229, × 500.

Fig. 230, × 250.

There is also a fine Triceratium, which appears to be the Triceratium Thwaitesianum of Greville, described by him in the second volume of the "Transactions of the Microscopical Society of London" (new series). Dr. Greville's specimens were from the Cape of Good Hope. The size of the specimen figured is ·0040 of an inch (fig. 230).

Another species of Triceratium of a singular form is the Triceratium pentacrinus of Wallich, which was also found in my "washings." This form is

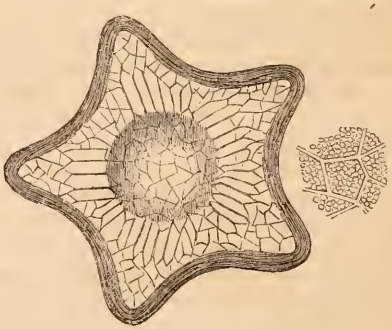


Fig. 231, × 500.

regarded by some authorities as a five-sided variety of the Amphitetras ornata of Shadbolt (fig. 231). My specimen measured ·0033 of an inch.

Amongst the better known species found on my slides are the Surirella fastuosa of Ehrenberg, a common marine form, diffused almost all over the world, since it has been recorded in Europe, Asia, Africa, and America. The specimen figured (fig.

232) measured ·0027 of an inch, Navicula palpebralis of Brébisson, which is found on our own coasts and those of France. My measurement is ·0020 of an inch (fig. 233).

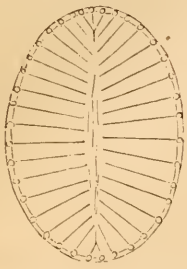


Fig. 232, × 500.

Fig. 233, × 500.

Two species of Grammatophora are also to be found in my washings. One of these is Grammatophora marina of Lyngbye, which is also common everywhere, and has been honoured with a variety of names. The measurement of the specimen figured (fig. 234) is ·0024. The other species is Grammatophora serpentina of Ehrenberg (fig. 235),

Fig. 234, × 500.

Fig. 235, × 500.

which is not uncommon in sheltered bays. Length ·0015 of an inch.

The finest form in my series is undoubtedly the Biddulphia pulchella (fig. 236) of Gray, which may

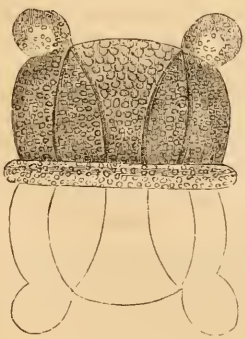


Fig. 236, × 500.

be regarded as the "king of the sponge." Albeit it is a British species, and not one of the most rare. My specimen measured ·0034 of an inch.

Less attractive, but interesting, is the variety β of Navicula Lyra (Ehr.), a species very much given to variation (fig. 237). The length of my specimen is ·0053 of an inch. The same genus is also represented by the Navicula nitida of Gregory (fig. 238),

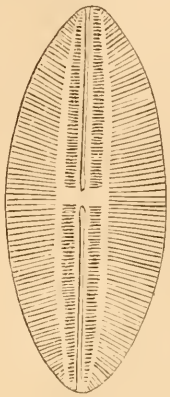


Fig. 237, × 375.

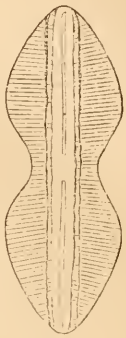


Fig. 238, × 500.

a form which was found by him in the Glenshira sand. (See his communication in *Trans. Micr. Soc.*, vol. iv.)

Of the genus Cocconeis, the only representative which I have recognized is the Cocconeis major of Gregory (fig. 239). Length ·0024 in.

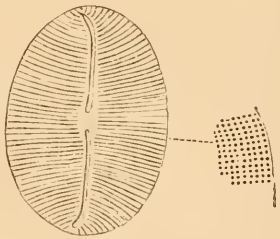


Fig. 239, × 500.

Uncertain forms also occur in my slides, of which one is the species of Navicula (fig. 240), which

Fig. 240, × 230.

Fig. 241, × 500.

measured ·0020 of an inch, and what appears to be the side view of Denticula nana (fig. 241) which measured ·0012 in.

Hence it will be observed that I have detected sixteen forms of marine diatoms in the washings of

a single sponge; and probably if others were to follow my example, they would be rewarded by richer treasures and rarer forms, though scarcely in greater variety. In addition to these, however,

Fig. 242.

Fig. 243.

Fig. 244.

Fig. 245.

there were present various forms of sponge spicules, of which I have given figures, but which hitherto I have had no opportunity to identify (figs. 242 to 248).

Fig. 246.

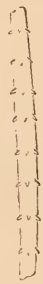


Fig. 247.

Fig. 248.

Spicules of *Halichondria*.

Strange localities are sometimes quite prolific in Diatomaceæ. The stomachs of molluscs contain them in abundance, and I once obtained a fine series of slides by boiling in acid, the legs of a spider-crab (Stenorhynchus phalangium) which was dredged in Southampton Water. The long, straggling, though useful members of this crustacean, were a perfect forest of vegetation. There was Biddulphia pulchella, figured above, and Amphitetras antediluviana (figured in Science-Gossip, for 1866, p. 182, figs. 170, 171), both of which in profusion; and more sparingly, two other forms of Biddulphia, and at least nine other good species belonging to eight other genera, which altogether amply rewarded me for my trouble.

I have also a specimen of Collctonema subcohærens, which I obtained from the top of a stone wall amongst moss.

Let no one hereafter deplore that their lot is cast among men who dwell in cities, where no objects for their leisure occupation are to be found, since I have shown that more interesting diatoms may be purchased in a common sponge in the next street, than they will collect by spending a week at Hastings or Brighton, with probably far less of mortification and inconvenience.

Shere. E. Capron, M.D.

BUXBAUMIA INDUSIATA IN ABERDEENSHIRE.

In July, 1847, two specimens of a Buxbaumia were found in a wood near the village of Ballater, in Aberdeenshire. Mr. Alexander Cruickshank, who gathered them, gave me one, which was placed in my herbarium as B. aphylla. Some months ago, at a meeting of the Edinburgh Botanical Society, it was reported that an immature specimen of B. indusiata, Brid., had been found in Ross-shire. This report led me to re-examine Mr. Cruickshank's plant, which differed in general appearance from the true B. aphylla.* I had now no doubt that Mr. Cruickshank was the discoverer of B. indusiata in this district.

On 24th May last I visited the place, but failed to trace any of the plant. A few weeks later Mr. Cruickshank and Mr. Roy were equally unsuccessful. The original station was in an old wood of Scotch fir, which was cut down a few years ago, and the surface thus very much altered. It then occurred to me that near the village of Aboyne, where decayed stumps and prostrate stems of fir are plentiful, the Buxbaumia might probably be found. Accordingly, in company with Mr. John Roy, a very diligent muscologist, I went to the place. We had searched but a short time when Mr. Roy found a few specimens on a prostrate stem. Further search yielded in all eleven specimens, some of which were imperfect. On the 29th of July I revisited the locality, and found on one decaying stem of fir eleven setæ, some with and some without fragments of capsules, and one perfect specimen, the largest of all as yet gathered here.

This very fine and rare species will doubtless be met with in other places. At Aboyne it occurs on rotten stems of fir, in moist spots shaded by the common Brake Fern. G. Dickie, M.D.

* It may be necessary to mention that Vol. II. of Hooker's "British Floræ" was the only authority accessible at the time; in that work B. indusiata is given as a synonyme of B. aphylla.—*G. D.*

"ECHOES FROM THE CLUB."

WHAT CLUB?—That depends very much upon circumstances. In our own case, and many of our readers', "the club" is represented by the association of fellow-workers at the microscope, which has now for upwards of two years borne the name of the Quekett Microscopical Club. So quickly does Time "move on," that we can scarcely believe it to be twelve months since the issue of the first report of this Association imposed upon us the pleasing duty of placing its claims before our readers. Documentary evidence is strong against us in the issue of the Second Annual Report, which now lies beside us, and we at once proceed to give it welcome. In 1865 its first announcements appeared in our columns, in 1866 (page 193) we bade it God-speed, and in 1867 we renew the strain.

We have already briefly indicated the origin and progress of this Association up to the period at which we wrote; we have given an outline of its objects and constitution; and we have chronicled its unprecedented success. Although it needs no advocacy from us, we esteem it an honour whenever a suitable occasion presents itself to become the medium of communication between the Club and our readers. It is easy to speak well of a thriving business, to eulogize a successful enterprize; and that the present is thriving and successful, a few lines from the late report will afford evidence. "Experienced microscopists and students of kindred tastes have now regular and frequent opportunities of meeting to discuss those special subjects in which they are mutually interested, and frequent Field Excursions, under experienced guides, to well-known localities around the metropolis, afford to the members generally valuable facilities for becoming more intimately acquainted with the haunts and habits of those living organisms which form the subjects of their study, or serve to recreate their leisure hours." At the usual monthly meetings during the past year no less than nineteen papers have been read on topics interesting to the microscopical student. We need not enumerate them, since the majority have already been named in our pages at the time of their perusal, and some have been published either in copious extract or in full.

The Excursions announced for the year have been eleven, and "the attendances at those which the weather has permitted to take place indicated no abatement in the interest hitherto exhibited." The Library has been augmented both by presentations and purchases, and it is to be hoped that so valuable an adjunct to an Association of this character will continue to interest publishers and authors, and all liberally disposed persons, and lead to a far greater augmentation in the year which has just commenced. The hint which the Committee has given that "a commodious oaken bookcase has been secured to the Club, for the safe keeping and proper working of its growing Library," is exceedingly *apropos*, and we trust will produce the desired effect. The cabinet of objects includes more than double the number of slides which it held in 1866, having now reached a total of 263, some of which have been contributed by persons who are not members, and have no personal interest in the Club. This augurs well for the good feeling and kindly disposition of microscopical students, and deserves commendation.

A new feature has recently been introduced at the ordinary meetings; "a question-box has been placed on the table for the reception of questions relating to microscopical science; such questions when read to the meetings on convenient occasions having generally elicited satisfactory replies."

The Committee also announce, with gratification, that "the exchange of specimens has now become a recognized feature, and scarcely a meeting takes place without many interesting specimens being freely distributed amongst the members. In furtherance of this object, and to afford still greater facilities for the exchange of slides, a sub-committee has been formed," and a code of rules adopted to regulate exchanges.

One of the most positive evidences, however, which this report gives of the success of the Club lies in the declaration that "since the last annual meeting 130 gentlemen have enrolled themselves as members, and during the same period only 12 names have been removed from the list in consequence of death or other causes, leaving the present number at 273." Having assumed the position of prophet at the commencement of the year, it was matter of some anxiety to us to compare the prophecy with this report at the close of the year. The result of this comparison proves us to have been no "false prophet," for our prediction has been fulfilled. We declared (p. 194), "it would cause in us but little surprise if the number of its members should be nearly doubled during the ensuing year." The first year enrolled 155 members and the second 130, so that the numbers being nearly doubled, we claim the right to be regarded as a true prophet. We cannot hope for a similar increase in the third year, but there is good reason to believe that steady increase will be maintained; although the number of new members, if we may prophesy again, may not exceed half the number enrolled in the first year, the ratio promises more than one hundred.

Finally, a balance in hand of thirty five pounds, proves that the finances, notwithstanding the low rate of subscription, are in a healthy condition. Nothing remains for us but to urge all metropolitan microscopists who are not yet members, to lose no time in making themselves acquainted with the details, and if these prove satisfactory, in which

they can scarcely fail, to act thereupon in accordance with the dictates of their own consciences. To the microscopists of our cities and large towns, we present the example of the Quekett Club, and beg of them to take courage and establish for themselves similar local associations which shall bind hand and heart in a noble enterprise all good men and true, who are fellow explorers in the new world of little things, and who would discover more of the hidden mysteries of life.

ZOOLOGY.

Varieties of Butterflies.—On a recent visit to the Isle of Wight I captured a male specimen of Colias edusa, the hind legs of which, on the upper side, present in certain lights a most beautiful display of colour, "shot" (as we may call it) in the same way as the wings of Apatura iris, only in Edusa the colour is *rich plum*. I should like to know whether this play of colour has been observed before. I may mention, for the information of Lepidopterists, that on a visit to the New Forest in July, I took the variety of the female A. paphia figured in plate xii., fig. 3, of Westwood and Humphries' "Book of British Butterflies," and described therein as being *then* "unique." I should much like to know whether it has been taken since the publication of that work. My specimen has rather lighter patches on the upper portion of the wing than in the figure, but is in ground colour and in other respects identical. To those who have not yet tried the American moth trap (procurable at Cooke's, naturalist, New Oxford Street), I would say try it. C. cytherea and Leucania pygmina are among my captures by its means.—*Windsor Hambrough.*

Bees at Large.—On the 19th of August a strange scene was witnessed in the shop of a well-known fruiterer and dairyman of Bath. On the previous Saturday evening two hives of honey were conveyed to his premises, which were duly secured after business hours, and remained unopened till the following Monday morning, when to the amazement and discomfort of the proprietor and his family, it was found that the supposed suffocated bees had become resuscitated, and were as busy as bees can be, although confined within a fruiterer's window. The latter was a very unusual and attractive spectacle to many of the public throughout the day; and although it is to be regretted that the worthy inmates experienced a loss of trade, and had several practical illustrations that bees possess stings, it is satisfactory to know that, as evening approached, the bees returned to their hives, and long ere this, we fear, have met with a fate too cruel for insects so industrious and provident as the English honey-bees.—*R. H. M.*

The Kingfisher.—In the reedy, grassy banks of the Brathay a pair of kingfishers had a nest, and it was beautiful to see them dart like a flash of emerald light into the stream, catch the fish they had marked, dexterously kill their prey by knocking its head against a stone, and then retreat with it into the hole, which I supposed was a deserted rat-hole, of which there were many in the bank. About a foot within the hole was a layer of fish bones, no doubt the skeletons of the eaten prey, and on these were laid the eggs, seldom, I think, more than two in number, of a very pale bluish colour. My son has repeatedly noticed the same circumstances in his fishing expeditions along the banks of the Yorkshire Derwent.—*P. S. B.*

The Mole Cricket.—In the reprint of Knight's "English Cyclopædia," in the article "Gryllidæ," it is stated, "As yet it is doubtful whether these insects (Mole Crickets) prey upon worms or other insects, or whether they feed upon roots." I kept one in a box of earth some time ago, and fed it entirely upon worms, of which it ate on an average about three a day. It used to take the worms between its spades or diggers, and suck out the flesh, leaving the skin entire. A large Indian Centipede which I also possessed fed in a similar manner, steadying the worm between its pincers.—*W. R. Tate, Grove House, Hackney.*

Chaffinch Nest.—In May, 1866, I found a nest of the chaffinch (Fringilla cœlebs); it was placed in the cleft of a hawthorn bush, and contained two eggs; but was constructed of a novel material. It was of the usual chaffinch, with its neatly rounded edges, but instead of the lichens with which they are generally adorned, it was entirely covered with pieces of *paper* of a pearly whiteness, procured, no doubt, from a heap of refuse lying near it, and which, upon examination, I found to be house paper, with the colour bleached out of it. Altogether, it presented quite a unique appearance, and suggested the idea of a shower of snow having caught it.—*Thos. H. Hedworth.*

A Mediæval Anecdote of a Dog.—When Duke Robert and Richard duke of Capua besieged Palermo, which the ferocious Prince Gisolfe defended, the sufferings of the inhabitants through hunger and misery are described by the monk of Monte Cassino, as resembling those experienced during the siege of Jerusalem by the Romans. The interests of humanity required that an end should be put to the horrible despotism of Gisolfe, by winning the town, so that these sufferings were unavoidable; but the Norman Princes nevertheless found occasion to evince mercy to vast numbers, while persevering in their laudable enterprise. Two young men on this occasion, followed by a dog, contrived to escape from the city, and came to

where the duke was, and begged bread for God's sake, which was given to them, and the boys gave a third part of it to their dog; and the dog that evening ran back to the city, carrying the bread to their father's house, and placed it at his feet, and then returned to the lads; and the next day they had bread enough, and gave more to the dog, though they knew not what he had done with it before; and the next evening again the dog carried it to their father, and the third day likewise; and the father believing that some Christian sent him bread for the love of God, tied a card round the dog's neck, on which he wrote, "I thank God for him who has given me these alms, and I cease not to pray to God for him." With this the dog returned, and when the boys had read the card, they carried the dog, having it still hanging from his neck, to the duchess; but she would not believe their report. However, she caused a little sack of bread to be fastened to the dog; and the dog seemed to be afraid of the people, as if he expected to be accused before the prince; but after sunset, as usual, he set off, and carried the bread to the city; and on his return, another card was found, on which was written, "Greater thanks I render thee for these greater alms." At length the prince heard of this circumstance; by his orders the dog was slain, and his master cast into prison and put to a cruel death.—(*Mores Catholici*, vol. ii., pp. 357, 358.)—*G. S. A.*

Sparrows and Martens.—We had a good opportunity this month (May), of observing the strong and amusing contest carried on between the common sparrows and the house martens; the latter began their nests in the angle of our gable quite independent of, but in close proximity to, a colony of sparrows already established beneath the slates. However, before the martens had made much progress with their plastering work the sparrows seemed to think it would suit them very well, so usurped the martens' yet unfinished nest, and fought hard to retain possession, actually throwing down portions of the plaster and using it as weapons of defence against the martens, while the latter attempted to recover their legal rights. This was carried on for some time, but eventually, to our no small delight, the martens gained complete victory.—*W. P.*

Anecdote of a Horse.—Last year, during a tour for toadstools, I made a temporary stay at a small house in Bedfordshire, when a horse in the back-yard grasped with his mouth the handle of the door of the room in which I was sitting, and by a twist of his head turned the spindle and entered the room. The mistress of the house knowing his habit, put a piece of loaf-sugar into his mouth, when he immediately backed out and again grasping the handle closed the door after him. The woman told me that when the horse was disengaged in the yard he often came inside for a piece of sugar in that way.—*W. G. S.*

Anecdote of a Monkey.—Last week I was watching the antics of an organ-grinder's monkey at Stoke Newington. I noticed the monkey carefully searching under the coping of an old brick wall, and on closely observing him, I saw him, with his fore-finger and thumb, fetch out three or four large full-grown spiders, and *eat them*, apparently with the highest relish.—*W. G. S.*

Barn Rat eating Worms.—I have never seen the barn rats eat the "Marsh worm," though it is very likely they will do so. Last summer the meadows seemed to be invested with the barn rat, and before the grass was mown, their beaten tracks could be seen almost everywhere from one hedge to another. After the grass had been cut, I frequently used to go into the meadows entomologizing in the evenings, and was often much interested to see the manner in which the rats secured and devoured the common earth-worm out of the grass, sitting upon their haunches squirrel like, as "H. Smith" describes in the March number of Science-Gossip. It was often amusing to see them when they had to pull the worm out of its burrow. The rat would seize the worm and try to pull it out of its subterranean retreat, but finding the worm of such a length, the rat would stretch up his neck to a considerable extent, or stand on his hind legs and pull, never leaving his hold till the worm was fairly out of its tunnel, as if he well knew that letting it once go would be losing it altogether. Doubtless every reader of Science-Gossip has observed how a thrush stretches up his neck and pulls when extracting an earth-worm from its retreat, and the rat acts in somewhat the same manner. Having completely dislodged the worm, the rat takes it in his paws and proceeds to devour it as a squirrel would a nut or acorn. During the past cold weather I think a large number of those rats perished from hunger. I shot a number of them, and they were apparently in a starving condition.—*G. B. C., Ringwood.*

Disguises of Insects.—The little Hunting-Spider (*Salticus scenicus*), of which I have a large number on a sunny wall in my garden, so exactly resembles a grain of mortar as to be quite indistinguishable, except when the creature is in motion (indeed its movements are sometimes so slow as to be imperceptible). This disguise is of immense advantage to the spider in securing its prey, as flies frequently walk into close proximity to it without detecting its presence. Although common, it is extremely difficult to find, except on very sunny days, when the little shadow which it casts helps to betray its whereabouts.—*W. G. S.*

Toads and Frogs.—I have a collection of these in my garden. The toads invariably select the sunniest, hottest, and driest places, and there bask or crawl about in the sun. I never see them in damp shady corners. The frogs appear to object to moisture; when it rains, they leave the beds and get under shelter. This is always the case. I have seen them climbing up the walls; they get over one ten feet high. They frequently get three or four feet up the stem of a medlar tree, and there rest, or creep about the branches of an American creeper nailed to a wall. In one part of the garden there are five stone steps; the frogs know them quite well, and go up and down, springing one step at a time in the most methodical and laughable manner. Should the garden door be open in wet weather, they come in and sit round the kitchen fire. They are lively at night, squeaking and hopping about in a sprightly manner. I saw a *frog* sitting on the top of an agaric a few days ago, in the manner of the sketch I made for Science-Gossip last year.—*W. G. S.*

Frog in Gooseberry Bush.—I have, like most others, frequently seen frogs take refuge in holes, ditches, ponds, or banks, also underneath grass, heather, stones, or roots, but never until yesterday morning (August 20th) up a gooseberry bush. I believe the occurrence to be worthy of remark. The frog in question had been frequently worried by a terrier, whose especial delight consisted in hunting the wretched thing out of its hiding-place and carrying it about the garden for short distances in its mouth, so that there was a good reason for its choosing so unusual a position. The gooseberry bush is of a fair size, and the branch on which our friend was seated very slender, and overhanging the ground about a foot and a half above the soil. He was partially hidden from view, though hardly out of reach of the dog's mouth, which had frequently been brought very near him. It would have been impossible for the frog to have hopped to this seat, as the branch was too slight to have borne the shock caused by his weight, its occupant being very fat and heavy, so that he must have climbed up the stem, and thence gradually have proceeded along the branch. Anyhow, there he was, and there he remained for upwards of an hour. —*J. G. T.*

[In answer to our correspondent we append a similar occurrence recorded by a well-known author some years ago.]

Climbing Frogs and Toads.—Have any of your readers experience of the climbing propensities of the British Batrachians? Some few years since I was summoned by my children into my drawing-room "to see a frog climbing up the glass of the window." This seemed a fool's errand, but it was a fact; a halfgrown frog was adhering by its stomach to the outside of the damp glass, and slowly making its way upwards. More recently, a pet frog, which I had kept in my greenhouse to destroy insects, elected to take up his residence among the branches of a very fine tree-mignonette which I had trained up to be a shrub five-and-a-half feet high. Only a few days since I was called away by a young friend to see a toad which had found a retreat and shelter from the broiling sun in an old blackbird's nest, constructed in a dense thorn hedge, some three or four feet from the ground. All these incidents I can satisfactorily verify if required. Do any books on Natural History record similar facts? —*C. A. Johns.*

Tortoises.—Last autumn I obtained several tortoises from the river Douro; being recently captured, they would eat nothing until the spring, when they became familiar, receiving food from the hand, as flesh of any kind, cooked or raw, snails, bread, &c. In feeding, they much remind one of a dog in the way they snap, and continue the snapping until the whole piece is in the mouth; but if too large for one mouthful, they tear it asunder by placing the fore-feet firmly against it, whilst with outstretched neck they hold the piece in the beak, and retracting the head, swallow the morsel so detached, renewing the attack with surprising dexterity, showing the wonderful fitness of these clumsy looking creatures for the place in nature assigned to them by God.—*G. S., Oporto.*

Field Mouse.—My children found a very young field mouse, apparently dying; it however took food, recovered, and became a favourite. I made a small revolving cage for it, similar to those sometimes used for squirrels. He grew fast, and became very fat. At dusk he habitually left the dormitory, where he slept during the greater part of the day, and worked away at the cylinder for hours, not attempting to escape, but as far as we could judge being pleased with the exercise, whether in a lighted room or in the dark. He ate most kinds of grain, and fruits, biscuits, cakes, &c., but his standing dish was bread and milk. After being kept for eight or ten months, he became morose, biting when handled, and was liberated.—*G. S., Oporto.*

Disguises of Insects.—Will you allow me to supply an omission made by Mr. A. R. Wallace on page 198 of your last month's issue? I refer to the larvæ of the Swallow-tail Butterfly, with regard to which it should have been stated that the boxes containing them were opened and exposed to the fullest light as soon as the larvæ had attached themselves permanently to the insides for the purpose of changing into pupæ. This is of importance, as I have no doubt that light has a strong influence in producing the effect mentioned.—*T. W. Wood.*

BOTANY.

Œnanthe pimpinelloides.—There seems to be some confusion in the names given to this plant by different British botanists; at least, the plant so named by Smith, Withering, and Macgillivray is not the same as that called by the same name by Babington and Sowerby. The Œnanthe pimpinelloides of the former is the Œnanthe lachenalii of the latter. I am now speaking of the Œnanthe pimpinelloides of Sowerby's "British Botany." In that work, now in course of publication, this plant is stated to be *rare;* only one habitat, Fifehead Neville, is given for Dorset. A short time ago I found it very abundant in a field about six miles from Sherborne in that county. The locality is in the parish of Bishop's Caundle, adjoining the footpath from Holwell Rectory to Bishop's Caundle: there were scores of plants. As it is expected that a new Flora of Dorsetshire is about to be published, perhaps it may interest the compilers thereof to know also that the somewhat uncommon plant, Monotropa hypopitys, var. glabra (Bernh-), grows in the beech-woods surrounding the beautiful park at Milton abbey in the same county.—*R. W.*

Blue Pimpernel.—This is not so uncommon as "G." supposes; in limestone districts I have often found it in profusion. On Lincoln Heath it occurs in almost every field, and not sparingly. In addition to the blue variety, I have often found pink, buff, and cream-coloured flowers.—*L.*

The Blue Pimpernel (*Anagallis cærulea*) p. 209.—This very pretty little plant, although by no means common, is scarcely as rare as your correspondent "G." implies. The comital estimate, as given in the "Cybele Britannica," is thirty. Mr. Borrer inclined to the belief that A. cærulea was a true species, although A. arvensis occasionally varies with blue flowers. I fancy it is hardly necessary to record every locality for the Blue Pimpernel, but I have observed it for two or three years in succession in two localities near High Wycombe.—*B.*

Double Bittercress.—Some years ago I found a large plot of ground at Dalhousie covered with double Cardamine pratensis, which had the singular characters noticed by "C. B." There were many scores of the double blossomed plants.—*L.*

The Marsh Sowthistle (p. 210).—May I, as one who takes considerable interest in the distribution of our British plants, request your correspondent "Jas. W. White" to publish at least the name of the *county* in which he made his fortunate discovery? The Sonchus still, I believe, grows in the neighbourhood of the Plumstead Marshes; but I would not ask for the definite locality of Mr. White's discovery, having as great a horror of "depredators" as he has.—*B.*

Primroses and Oxlips.—We must again call the attention of our contributors ("A. C. E.," "A. C. P.," "G. E.," "R. S.," and others) to the fact that at least two different plants bear the popular name of "Oxlip." One of these is only a variety of the primrose, with the flowers in umbels; or rather it is a hybrid between the cowslip and the primrose, and often found in company with them. It is Primula officinali vulgaris (pl. 1132, 1133 of "English Botany," 3rd edition). Most of our correspondents evidently allude to this as the "oxlip." The other plant (see "Phytologist," vol. i., pp. 232, 1001), is Jacquin's oxlip ("English Botany," 3rd edition, pl. 1131), the Primula elatior. Mr. H. C. Watson writes of it thus: "In the cowslip and primrose, and all their varieties, a circle of scale-like glands surrounds the orifice of the tube of the corolla. These glands are absent from the Primula elatior. It is difficult to specify any other sufficient character." We hope that in any future communications greater care will be taken in noticing this distinction.

Boletus impolitus, *Fr.*—This fungus may not unfrequently be observed in this neighbourhood, growing under oaks, in the vicinity of the upland woods. It often attains a large size, looking in colour and form not unlike a huge underdone batch-cake. In Berkeley's "Outlines of British Fungology" it is aptly described as having the taste of sprouted walnuts, and moreover that it is *esculent*. Being one of the species which turns blue when broken asunder, and which are generally held in bad repute, I have been induced to make a trial of its edible qualities. Having selected a promising specimen, I had it nicely cooked; and on tasting it found that the peculiar bitter flavour, instead of being dissipated, had become more developed; indeed, to my palate it was altogether unsatisfactory; and I do not hesitate to say that if this fungus is *esculent*, it is certainly not *excellent*, or worthy of commendation. Now that many persons are turning their attention to a number of our native fungi which have been recommended as really both palatable and wholesome, it is desirable that none should be enumerated as such of which there may be any doubt, otherwise a prejudice is easily raised, leading to an undeserved condemnation of all.—*H. B., Cheltenham.*

The Yew proved fatal to three of our kings. Harold was killed by an arrow at the battle of Hastings, in Sussex; William II. was slain by an arrow in the New Forest, Hampshire—

> Lo! Rufus, tugging at the deadly dart,
> Bleeds in the forest like a wounded hart—(Pope);

and Richard Cœur de Lion received his death wound from the same weapon, at the siege of Chalus, near Limoges, in the department of Upper Vienne, in France.—*Sylva Florifera.*

MICROSCOPY.

Apparatus for Drawing Objects.—I have read several suggestions in Science-Gossip upon microscopical drawings, but have not seen mentioned a very simple method I have tried, and which any person with a little ingenuity could manage easily. Having myself done a deal of microscopical drawing, I can answer for the plan I describe below. Get a common deal muscatelle box at any grocer's shop, cut a hole in one end large enough to fit the body of the microscope; the wood from the opposite end of the box should be taken entirely away, and in its place fitted a sheet of common window glass. Then place the microscope in a horizontal position, inserting the eye-piece end of the body into the hole made for it in the box (the eye-piece is not used), then with a bull's-eye condenser concentrate direct rays of light from a lamp through the object, which can now be focussed, in the same way as the magic-lantern, on to a sheet of paper which is placed over the glass for drawing. With a 1 or 2-inch object-glass, very excellent outline drawings can be made. The above figure (fig. 249) will immediately explain its simplicity.—*John Robins, Bartholomew Close.*

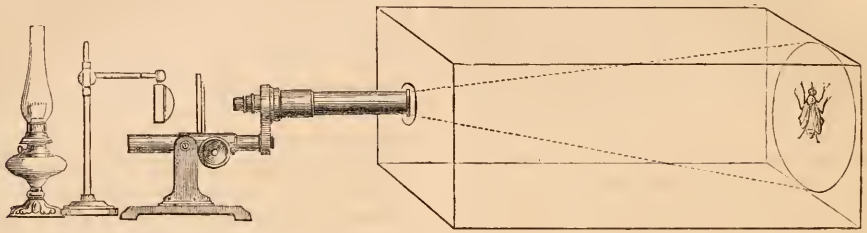


Fig. 249. Apparatus for Drawing.

The Chalk.—Searching the chalk for foraminifera, a diatom is occasionally found, and by dissolving the chalk in dilute nitric acid, and afterwards boiling the residuum in strong acid, as with other infusorial earths, a variety of spongispicules and diatoms may be obtained. These are, indeed, few and far between as compared with those of the rich Toome Bridge earth, and yet the same forms are found in both, with one or two exceptions. The beautiful little circular discs with fine markings are conspicious in both. Chalk being a marine deposit, it would appear that the Toome Bridge earth is so likewise, and that the country bordering the river Bann, where it is found, has been covered with salt water since the formation of the peat mentioned in Mr. Gray's interesting paper. I find no diatoms in the lower chalk from Folkestone; in the upper chalk here they are frequent, though not abundant. —*S. S., Brighton.*

Polarizing Object.—One of the most beautiful objects under the polariscope with which I am acquainted is the fresh-water shrimp, which may be found in any stream.—*Samuel Morris.*

Phyllactidium.—In an interesting article on Phyllactidium in the August number of your periodical, there is an intimation to the effect that you will be glad to record any additional localities where that beautiful water-weed has been found. I have noticed the plant in question adhering in great numbers to the sides of an aquarium which I established in 1862, the material of which I got from ponds in the neighbourhood. Last year I had an accident with it in the shape of a breakage. I set up another soon after, but hitherto I have not seen a single specimen of Phyllactidium; it seems to have given place to that beautiful polyp the Hydra viridis. —*Samuel Morris, Casterton, Kirkby Lonsdale, Westmoreland.*

Foraminifera.—(Reply to J. H. G.)—The object of washing the pounded chalk is entirely to remove all traces of it from the fossils; the washing must therefore be continued until this result be obtained; whether in one washing or several must of course depend upon the length of time allowed, the nature of the chalk used, and the expertness of the operator. Some chalk, particularly the lower, contains no fossils whatever, whilst other samples, as the Kentish, say from Gravesend, Charlton, &c., abound with them—as a rule, that containing many large fossils will be found rich in foraminifera. It is better, before operating on a piece, to wash the surface with a brush under a stream of water; if upon viewing it with a magnifying glass, no minute shells are visible, it will probably yield few when prepared, and *vice versâ*. The milky fluid should not be thrown away, but carefully washed, as it contains the most minute fossils. J. H. G. perhaps washes his chalk too little, instead of too much, and should try another piece; unless well washed, the particles of chalk adhere so tenaciously to the fossils that their form is not easily discerned. The masses alluded to are probably pieces of the tests of echini, &c., and the pencil species of spatangi. The fossils must either be viewed as opaque objects—dry, or mounted in balsam, if as transparent objects.—*Edward H. Robertson.*

NOTES AND QUERIES.

Is the Poison of the Viper Fatal?—Your correspondent who signs "Henry H. Ullyett" asks if there is any known instance of the viper's poison having proved directly fatal, and I will tell him of one which I heard of from an eye-witness a few days since. Two summers ago a poor woman was found dead on Poundberry, near Dorchester (Poundberry is a wild kind of spot, a sort of waste); the body was swollen and much discoloured,—there were evident marks of the bite, and the viper was discovered curled up in her flannel petticoat. Some respectable persons came forward to state that they had met the woman seemingly in perfect health early that morning, on her way to the town. It was late in the evening when the body was found, and the general opinion was that, fatigued by the heat, she had sat down on the heath to rest, that the reptile had made its way up her dress, and on her moving had bitten her on her side just where the small mark was visible, that the poison took effect almost immediately, that she became too weak to continue her journey and died in a few hours. The youth (a young relative of mine), who saw the dead body, and the living viper, will, I am sure, be glad to give Mr. Henry Ullyett any further information in his power. I remember when I lived in Carmarthenshire, South Wales, hearing of a woman having died at Pembry, a village distant about five miles from my home, of the bite of a viper: she had gone to Cwm-Cethin, a wood in the neighbourhood, to gather sticks for firewood, and was bitten in the hand. She went to an old herb "doctress" who applied a poultice of charms, and proper restoratives not being administered the poor creature died. But there was a legend about these Cwm-Cethin *snakes*, as the country folks called them. They were said to be *red* in colour, and to have the power of *flying*; one having, the tale stated, escaped from a vessel which had been wrecked on the sands about fifty years ago, consequently they were not true Welch vipers, but a highly poisonous importation, according to "Rural Natural History."—*Helen E. Watney.*

Atomechanics.—A novel chemical hypothesis is now being taught by Professor Gustavus Heinrichs, of the Iowa State University, U.S. He assumes that the atoms of the different chemical elements only differ with regard to *quantity*—the number and relative position of the atoms of some one primary matter; and since everything would thus be composed of this one primary matter, he calls it "pantogen," and its atoms "panatoms." Professor Heinrichs demonstrates that this hypothesis explains the numerical relation of the atomic weights, and that the chemical, physical, and morphological properties of the elements, and their combinations, may be calculated just as the orbit of a planet is calculated. In answer to any doubt that may be raised as to the existence of "pantogen," Professor Heinrichs asks, Can you mention one single property which is not in some degree common to all elements? the difference being simply quantitative. The theory has at least the advantages of plausibility, and its development certainly opens a large field for useful research, owing to the enormous benefit which would result from the application of the theory, should it prove to be a sound one.—*Mining Journal.*

A Child Bitten by a Viper.—The distressing narrative which follows has been communicated to us. "Two little children, aged respectively nine and eleven, were looking for blackberries in Handsworth Wood, yesterday (Thursday), when the younger (a little girl) was suddenly bitten in the leg by a snake (supposed to be a viper). The elder (a boy) screamed for assistance, but, being frightened at the reptile, ran to his home, in a lane adjoining the wood. His mother was at home, and came to the assistance of the girl (her niece). But the poor thing was in her last agony. It looked piteously in her aunt's face, and died without saying a word."—*Birmingham Daily Post, Friday, Sept.* 13, 1867.

[The above account was sent to us by five or six correspondents, one of whom furnishes the following comment: "In reference to the paragraph from yesterday's *Birmingham Daily Post* which I sent you, I find by to-day's *Post* that Mr. Downes contradicts the report, and says that there is no truth whatever in any part of it. No death has occurred; no inquest is to be held; consequently the report is a wicked hoax."]

Fangs of Spiders.—At the risk of seeming very hard of belief, I venture again to refer to the subject of spiders poisoning their prey. In vol. ii., p. 229, Mr. Mills gives an account of the supposed poison gland of a spider. Now I don't quite understand it. The fang ends in a *point*, but Mr. Mills says the gland is a sac, and that it is attached to the base of the fang by its narrow end. How could the wide end reach up to the point, and how is it attached to the aperture, and how can the poison get out as it is a "*closed sac*"? I have tried, but however I cannot find anything more than the muscular fibre, and, not succeeding, I left this, and tried for the apertnre. First, as a transparent object. As the late Mr. Beck said, I could not see it, trying all kinds of ways. Most fangs are lined, and of course, if there were an aperture, there would be a break in the lines; but I cannot make out that it is so. Then I tried as an opaque object, and in one or two fangs I thought I had found a most evident opening; but discovered it was only a bubble of air, though it gives a capital representation of an opening. Next I enclosed a bubble of air in a fang under water. This I could work backward and forward; but never a bit could I force it through the opening, if there be one, not even when pressing the fang hard enough to break it. I have now and then seen what had something of the appearance of an aperture, but it turned out only a deception. It is quite certain that if there be an apertnre, pressure should drive either air or water out of it. Then, again, it don't seem to me to agree with the action of a spider. In killing an insect by stabbing it, you must do so in one particular part, and it will die very quickly—nearly as soon as when a spider kills it. I think it will be found that a spider always grips a fly in the same spot. It does not always die at once, for I have seen a fly retain life for a minute or more. Then the spider somehow sucks the contents of the fly, keeping hold of it all the while with its fangs, and turning it round and round till a shapeless mass of skin is left, which he at last throws away. Very different is its action to that of a snake, which bites its prey, injecting the poison into the wound, and leaving it to produce its effect. I think this should be examined rather more before deciding that the spider kills its prey by driving two fangs into the poor fly, and injecting

poison, as it must do, from both, and then holding the fly by the same fangs while it consumes its contents.—*E. T. S.*

Hedgehog Eccentricities.—Whilst one correspondent writes sceptically on the subject of the communication in our last number, two others send us similar narratives. In the face of four independent assertions of the fact, we think that the assumption is strongly in its favour, and that all who are still disposed to be sceptical must for a while suspend their judgment.

Fossil Coleoptera.—In a freestone quarry near Fifeness, the workmen recently came upon a stratum of de-bituminized peat thirty yards in length, fourteen inches thick, and about the same in breadth; at the top it had somewhat the appearance of cubic coal, but gradually changing, till at the bottom it resembled a dirty sand. The greater part of it had been carted away as rubbish before it attracted attention; but in what remained there were a few inches in the middle thickly studded with the remains of coleopteran insects in a very perfect state of preservation. There were wing cases, mandibles, and legs of a dark but bright green colour; four species have been detected, but whether or not the same as any at present in existence, I am unable to say. Along with them there was a small piece of unfossilized wood, apparently allied to the bamboo, a fruit with a corrugated shining pericarp, and a hazel nut was also stated to have been found in the same deposit. The rock containing that stratum is a gritty sandstone, about fifty feet in thickness, and has always been considered as belonging to the lower carboniferous series, and does not appear to be unconformable to the rocks on the beach in the immediate neighbourhood, which undoubtedly belong to that system; indeed, what *seems* to be a part of it is overlaid by them. But the fact of these remains being so different from those which are said to have existed during the deposition of the carboniferous strata, makes it a matter of almost positive certainty that they are the product of a more recent era, although, on the other hand, that is almost incompatible with the lie of the rocks; but on account of the overlying soil, and of the way in which the quarry is wrought, it is very difficult to obtain a complete section. The upper part of the deposit was about ten feet from the surface, and, according to the report of the workmen, above it was solid rock. Another brownish deposit was found, but void of organic remains.—*S., Fifeshire.*

Poisoned by Mushrooms.—A year or two ago, a man in the north of England cooked a large batch of what he called mushrooms for supper, and succeeded in poisoning his wife and family to death, and himself nearly so. Part of the things he cooked were sent to me for identification, and lo! he had gathered everything he could lay his hands upon; large and small, sweet and foul—off horsedung rotten palings, or wherever he could find anything with a stalk, and a top to it after the manner of an umbrella. When he had buried his family, and recovered his own health, he carelessly walked into a well, and either killed or much damaged himself, I forget which. I mention this to show the sort of men they are who poison themselves with mushrooms. They would poison themselves with anything else if they had the opportunity, would get under a cart-wheel, or do any absurd thing.—*W. G. Smith's "Mushrooms and Toadstools."*

False Champignon (*Marasmius urens*).—I think I was once poisoned by it in Bedfordshire. I well remember on my way home, late one evening, gathering a quantity of champignons for supper; as it was dark, I imagine I gathered both species. I did not cook them myself, neither did I examine them after they were taken from the basket; but I noticed at supper-time they were unusually hot, and I thought the old woman who cooked them had put too much pepper in the stew. I never suspected the fungi. In about half an hour after partaking of them, my head began to ache, my brain to swim, and my throat and stomach to burn as if in contact with fire. After being ill for some hours, a terrible fit of purging and vomiting set in, which appeared soon to set me to rights, for after a day or so I was no worse for it.—*Smith's "Mushrooms and Toadstools."*

Worms in Cockroaches.—In reply to your correspondent W. Hanwell, the *worms* (?) found in cockroaches are doubtless Gregarinidæ. They are inhabitants, for the most part, of the bodies of invertebrates, but are also found in vetebrate animals, and are very common indeed in the intestines of the cockroach and earthworm. They may be said to consist of a sac, enclosed by an almost structureless membrane containing a somewhat fluid substance, in which lies a delicate vesicle within which is a more solid particle. In this group there is no distinction of the body into separate layers, &c. As they live entirely by absorbing the juices of their "host" through their membraneous coat, they are devoid of mouth and alimentary canal. The most striking signs of life shown by them are certain expansions and contractions of their bodies. Some have a constricted body, some are stalked with horny heads, but generally gelatinous, and not distinguishable.—*Archibald Liversedge.*

Cleaning Aquaria.—I have seen various modes of cleaning aquaria suggested, but know of none so efficient as the following:—Take a small piece of coarse brown paper, and apply it to the side of the aquarium, and rub it freely over the surface. If the aquarium is large, roll up a mass of the paper into a ball, and scrub with this. This method entirely removes all confervoid growth, and has the merit of not scratching the glass.—*L.*

Ophiocytium.—The species figured in the June number of Science-Gossip, p. 127, as O. majus, seems to be rather the O. apiculatum (Näg.) Figures of both forms may be seen on Tab. iv. of Nägeli's "Gattungen Einzelliger Algen," from which it would appear that majus, in addition to being much larger, affects a sigmoid rather than a spiral mode of growth. O. apiculatum I found in March, 1853, amongst other algæ, chiefly Tetraspora gelatinosa, in a small boggy pool on Cannock Chase, Staffordshire.—*Robert C. Douglas.*

Chara.—I fancy that there is something particularly favourable to the growth of conferva in the sulphuretted hydrogen-like smell which all the characeæ emit. If water-snails won't keep the aquarium free, I know not what to suggest—the March shell and the Trumpet snail are the best scavengers. The singular crust of carbonate of lime with which the stems of some of the genus are covered, renders them pretty objects in an aquarium. Sir David Brewster made an interesting discovery relative to these minute particles of lime. —*Helen E. Watney.*

Double Honeysuckle (*Lonicera Periclymenium*)—(G. R. R.)—The double-flowered honeysuckle is not of very frequent occurrence, nor is it, so far as we know, in cultivation. In your specimen the blossoms are more than ordinarily numerous, and very closely packed. Each flower is "doubled" by the formation of two or even three additional corollas within the first; the stamens and ovary are wholly wanting, but the calyx is present in the form of five small leafy teeth. It would be very desirable to introduce this variety into gardens, for which purpose cuttings should be at once taken. There is a similar variety occasionally met with in hedges, which is equally curious, but decidedly less generally attractive, inasmuch as its blossoms, though double, are all green and scentless.—*M. T. M.*

Plantain—(J. G.)—Your specimens belong to the panicled variety of Plantago major, P. major var. paniculata. Our common plantains seem very liable to changes of this kind in their flower-spikes, but what is curious is that to a great extent each species has its own special form of variation; thus in Plantago major we have the inflorescence (as in your specimen) forming a much-branched pyramidal panicle, covered with small bracts, but rarely producing perfect flowers. A corresponding variation, so far as we have observed, does not occur in the other species. In other cases the lower bracts of P. major become large and leaf-like, the flower-spike remaining simple, or sometimes dividing irregularly into two or three divisions. The "Rose" plantain, sometimes found in old-fashioned gardens, is a form of P. media in which the bracts form flat leafy tufts at the top of the flower-spike, the flowers themselves being generally deficient, though when they are produced the tuft gradually lengthens out so as to assume more or less of its normal spike-like aspect. This modification does not occur in the other species. P. lanceolata and P. maritima are sometimes found with much-branched or compound spikes, with perfect flowers. P. lanceolata, too, may be sometimes met with a rosette or tuft on the top of the flower-stalk, the rosette being composed of leaves and secondary flower-stalks, so that the whole looks like a miniature plant raised on the top of the flower-stalk. As there are numerous intermediate forms, the above must be taken as a general statement only.—*M. T. M.*

The Elk.—Your correspondent F. A. Allen, in Science-Gossip for September, page 199, states that "the bones and antlers of the elk are found in the peat-bogs of Ireland and the Isle of Man, in excellent preservation; but we have no records of their existence in our land, even in the time of the Romans." Allow me to inform him and your readers generally that the bones and antlers of the elk have been found here in Kent's Cavern, in the Brixham Bone Cavern, and I believe they have also been dredged up from Torbay. Those found in Kent's Cavern are supposed to belong to a period greatly anterior to the time of the Romans.—*A. J. D., Torquay.*

The Ash.—Lightfoot says that in many parts of the Highlands of Scotland, at the birth of a child, the nurse or midwife puts one end of a great stick of this tree into the fire, and while it is burning receives into a spoon the sap or juice which oozes out at the other end, and administers this as the first spoonful of liquor to the new-born babe.—*Sylva Florifera.*

Novel Situation for a Chrysalis.—A few days since I was scrambling over the rocks at the back of the north fortifications, in search of anemones and other marine treasures, when my thoughts were turned from zoology to geology by seeing a large piece of rock—which had been thrown by the sappers from the works above—lying at my feet, and which contained three or four tolerably perfect specimens of Cerithium portlandicum and an Ostrea. Wishing to obtain at least one of the fossils, and having no tools, I resorted to the primitive method of dashing the stone against a rock, in order to split it into pieces small enough to carry home. After several trials, it broke into three pieces; but as a matter of course the finest Cerithium was shattered by the concussion. As I was mournfully gazing at the fragments, my eye was attracted by something in the last whorl of another shell. I looked closer, and there, snugly laid, was a little chrysalis. What renders this remarkable is the fact that this portion of the shell is quite an inch from the surface, and that the aperture in the centre of the volutions seems far too small for the larva to have crawled through. I cannot, neither can those friends to whom I have shown the stone, detect a crack which might have served for a passage-way. Can any one elucidate the mystery, or must it, like the presence of a toad in an almost similar predicament, remain a questionable point?—questionable only as to how it got there, not to the fact of its being there, for I have it now lying as first found within the whorl; indeed I could not remove it without destroying it. Should it ever cast off its pupa dress, I will send a description of the perfect insect; but I much fear the severe concussions it has received have quite destroyed its dormant life.—*M. Pope, Weymouth.*

Yellow Violets.—A few years since, whilst travelling in Norway, I spent a day or two on the Fille Fjeld, and, searching for microscopic objects in a small copse a few hundred yards from the station at Maristuen, I was surprised to discover, amongst other wild flowers, a large number of yellow violets, the sweet odour of violets being as powerful in them as in the English violet. Upon mentioning the fact to several botanical friends, upon my return to England, they expressed some doubts about the flowers being violets at all, hinting that I had probably mistaken the wild pansy for a violet. However, although no botanist in the scientific sense of the term, I am sufficiently well acquainted with the external characters of the commoner plants not to be so easily deceived by a mere general resemblance; and, in addition, the wild heartsease, which is so wonderfully abundant in some parts of Norway, was ready to my hand for comparison. Will some botanical correspondent kindly inform me if yellow violets are known to botanists, or whether those observed by me were an accidental departure from the normal colour of the flower?—*Edward H. Robertson.*

Hint about Labels.—During a recent visit to Neufchatel, I noticed in the Natural History Museum there a plan of labelling specimens which may be worth recording. Different parts of the world, Europe, Asia, Africa, America, North and South Australasia, &c., are distinguished by different colours, and the labels surrounded by a border of the colour or colours indicating the district to which the specimen belongs. In the case of insects, the pin is stuck into a small paper disc of the proper colour. The geographical distribution of animals is thus brought very plainly before the eye.—*B. W. S.*

NOTICES TO CORRESPONDENTS.

All communications relative to advertisements, post-office orders, and orders for the supply of this Journal should be addressed to the Publisher. All contributions, books, and pamphlets for the Editor should be sent to 192, Piccadilly, London, W. To avoid disappointment, contributions should not be received later than the 15th of each month. *No notice whatever can be taken of communications which do not contain the name and address of the writer,* not necessarily for publication, if desired to be withheld. We do not undertake to answer any queries not specially connected with Natural History, in accordance with our acceptance of that term; nor can we answer queries which might be solved by the correspondent by an appeal to any elementary book on the subject.

J. R. W.—No. 6, Bartramia fontana; 7, Myrica gale.—*R. B.*

T. H., Jun.—No. 6, Hypnum striatum; 8, 9, 11, Hypnum cuspidatum.—*R. B.*

R. B.—Bryum atropurpureum.

F. W.—No. 1, Barbula fallax; 2, Dicranella varia.—*R. B.*

W. E. H.—The scaly (metamorphosed bud) gall on oak is called the "artichoke gall," and is very common.

M. C. T. S.—Archæology is beyond our province.

W. D. N.—British Neuroptera. A list of British species is included in Morris's "Catalogue of British Insects." There is no special work on British Neuroptera. Curtis's British Entomology, republished by Reeve & Co.; the section "Neuroptera" may be had in parts separately. A catalogue of British Neuroptera is published by the trustees of the British Museum.

J. P., Bridgewater.—Consult fig. 167 at p. 181 of our volume for 1866. Is it not the same?

J. D. R.—If you send us in a quill specimens of the parasite, we will inform you.

J. C. D.—The *Colias Edusa* is common enough on the Sussex coast this autumn.

A. W.—The eleventh number of Newman's British Moths, with each species figured, is advertised to appear in the middle of October.

G. O. may obtain Nitella or Vallisneria (growing plants) of Mr. Kennedy, Covent Garden Market, W.C.

H. C. is a careless reader of Science-Gossip, or he would have noticed what he calls "Fungi on oak leaves" figured and described as "Galls," in vol. ii., 1866, p. 228, fig. 217.

W. T. H.—Place the animal in an ant's nest, and they will anatomize it for you.

A. J.—No. 1, Bryum pseudotriquetrum; 2, Hypnum stellatum; 3, Hypnum examulatum.—*R. B.*

E. C.—Bryum capillare.—*R. B.*

S. H.—Did not enclose name and address, nor stamped envelope for name and address, which was requested, and we have no authority to publish it here.

T. H., Jun.—Not a *Veronica* at all, but Alchemilla arvensis.

H. W. is thanked, but a long extract from Middleton's Geography is scarcely the answer required to the query about the Maelström.

Diptera.—The only work on British Diptera which we know of, that approaches completeness, is F. Walker's Diptera, 3 vols., 8vo., published by Reeve at 25s. per volume.

Blue Pimpernel.—Several correspondents send us notices of the occurrence of the Blue Pimpernel, which is by no means rare.

M. S. B. H.—The fly is *Tabanus bovinus*, and commonly called the "Horse Fly."—*F. W.*

S. C.—Cases of caddis worms; nothing novel.

J. S.—No insects, only a crushed leaf, in your letter. We suppose it was the common aphis found on beans.

W. W. S.—The species called *Chaitophorus aceris*, Koch., in Walker's list, is the same as *Aphis aceris* of Science-Gossip, p. 204.—*F. W.*

R. V. T.—The grass is *Gastridium lendigerum*, rather an uncommon species.—*J. G. B.*

J. B.—Your variety of caterpillar of Death's-Head Moth is well figured in pl. 3 of Fuessly's Archives.

J. G.—Hints on the Formation of Local Museums. London. Hardwicke. One Shilling.

C. E. D.—Too much of a list to insert, and queries without conscience to answer for one individual. We may do a little for you.

B. T.—No. 5 is Notania loriculata; 6, Membranipora pilosa.—*E. C.*

X.—A common complaint. We fear that we cannot help you.

W. J. B.—The prevailing form on the Raby slide appears to be Surirella biseriata.—*J. B.*

Ignoramus is quite worthy of the signature adopted. We neither attempt to name objects from description, nor to answer anonymous querists.

H. M. H.—No 1, Hogweed, Heracleum spondylium.

G. A.—Very probably of Mr. Kennedy, Covent Garden.

M. A. L.—We are not partial to guesses or guessing.

Harvest Moon, Maelström, and answers to several other queries, are unavoidably postponed for want of space.

EXCHANGES.

Vicia sylvatica for Gonepteryx rhamni, or Arge Galathea.—W. D. Robinson, 2, Shandwick-place, Edinburgh.

Lepidoptera of South Coast in exchange for others.—J. D. R., Conservatory Cottage, Charlton, Dover.

Greensand Fossils (Cambridge) in exchange for Silurian fossils.—Rev. J. S. Tute, Markington, Ripley, Yorks.

Plumatella repens in exchange for any other fresh-water Polyzoa (except Cristatella mucedo) in a living state.—C. J. Richardson, Old Change, E.C.

Alpine Plants in exchange for rare British or others.—T. Howse, Jun., Garrybank, West Hill, Upper Sydenham.

Coleoptera and Lepidoptera, well set, and in good condition, for other Coleoptera.—J. Barlow, 1, Thompson-street, Stantonbury, Wolverton, Bucks.

Recent Shells.—Vertigo edentula for other British Shells.—J. Beaulah, Bracken Hill, Brigg.

Fossil Fish Teeth and Bones (mounted) for slides of Photographs.—John Sim, West Cramlington.

Richmond Earth, for good mounted objects.—W. Freeman, 2, Ravensbourne Hill, Lewisham-road, Greenwich, S.E.

Fossils from Chalk, London Clay, and Woolwich Beds, for fossils from other formations.—F. Stanley, 3, Dane-terrace, The Dane, Margate.

Planorbis albus and P. lineatus.—I have a few to distribute, on receipt of stamp and small box.—W. H. G., Vernon Cottage, Thornhill-road, N.

British Bird's Eggs in exchange for British Lepidoptera (Nocturnæ).—Send lists to F. Jonas, 13, Canterbury-villas, Maida Vale, London.

Amphora minutissima parasitic upon Nitzschia sigmoidea for other rare Diatoms.—E. W., 21, West-street, Banbury.

Gorse Web-Spinning Mite (see Science-Gossip for June), in exchange for mounted objects.—J. C. White, Montpellier House, Budleigh Salterton, Devon.

British Ferns.—Rare plants for other varieties. Iron-sand and Kawri Gum from New Zealand, for other objects of interest.—J. E. M., Woodfield, Moseley, Birmingham.

Euperia fulvago, *Dianthœcia capsincola* and *Larentia cæsiata*, for other Macro-lepidoptera.—A. Ford, 38, Mowbray-street, Sheffield.

British Mollusces.—Prepared tongues of Cyclostoma and other species, for the *Animals* of Valvata, Assiminia, Testacella, Clausilia or Ancylus.—W. R. May, 20, Trinidad-place, Islington.

BOOKS RECEIVED.

"Mushrooms and Toadstools: How to distinguish easily the differences between Edible and Poisonous Fungi," with two large sheets containing figures of 29 Edible, and 31 Poisonous Species (coloured). By Worthington G. Smith. London: Hardwicke.

"Letter to His Grace the Duke of Buccleuch on the Quadrature and Rectification of the Circle." By James Smith. Liverpool: E. Howell.

"The American Naturalist." No. 6, August, 1867. Salem, U.S., Essex Institute.

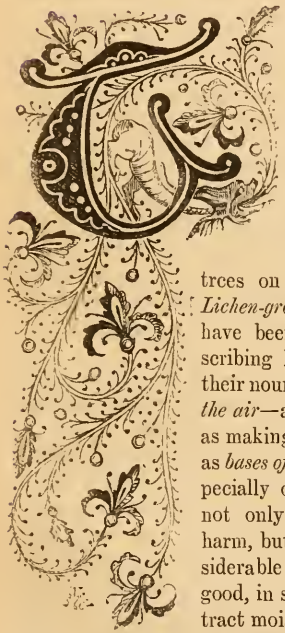
"The Naturalist's Circular, August and September, 1867. London: H. Hall.

"Country Life." Nos. 1 to 6. London. Aug. and Sept.

Communications Received.—J. B. W.—A. C. (is right).—S. D. L. A.—B.—J. K.—C. W.—F. G. B.—M. P.—W. M. C.—W. G. S.—W. F. H.—F. A. A.—M. C. T. S.—W. D. R.—C. S. S.—W. H.—A. C. P.—C. H. G.—F. B. W.—C. L. J.—W. E. H.—R. H. M.—R. B. S.—A. J.—R. H. M.—R. T. L.—W. W.—W. B.—C. R. B.—F. R. A. S.—J. D. R.—R. V. T.—H. W.—J. P.—W. F. F.—L.—E. T. S.—R. C. D.—H. E. W.—J. S. T.—E. S.—J. C. D.—H. H. O'F.—W. R. T.—W. T. H.—J. A., Jun.—H. C.—T. B. H.—B. W. S.—C. J. R.—T. H., Jun.—H. W.—E. H. R—H. A.—A. D. M.—S. H.—A. W.—M. B.—J. B.—A. J. D.—G. G.—J. B. B.—S. C.—R. G.—F. C.—C. T.—A. R. M.—H. A. A.—J. S.—W. F.—F. S.—A. B.—J. G.—C. E. D.—R. V. T.—F. J.—W. F. H.—H. C. L.—H. U.—W. H. G.—J. G. B.—E. W.—G. D.—J. G.—G. B.—C. G.—A. M.—T. A. H.—H. B.—H. J. H.—J B. W.—J. L. M.—A. F. J. C. W.—X.—J. H. M.—J. E. M.—C. J. T.—J. W. S.—G. G.—T. J. S.—J. B. B.—G. A.—W. R. M.—M. A. L.—J. Y. H.

IS LICHEN-GROWTH DETRIMENTAL TO TREES?

By DR. LAUDER LINDSAY, F.L.S.*



HERE is, it would appear, a radical difference of opinion between lichenologists on the one hand, and arboriculturists on the other, as to the effect on the value of the timber and bark of the trees on which it occurs, of *Lichen-growth*. Lichenologists have been in the habit of describing Lichens as deriving their nourishment *wholly from the air*—as non-parasitic—and as making use of trees simply as *bases of support*.† Some, especially of the earlier writers, not only deny any possible harm, but demonstrate a considerable amount of actual good, in so far as Lichens attract moisture to the trees on which they occur, and thus assist in their nourishment and growth.‡ All "practical men," on the other hand, all those who are concerned with the cultivation of timber, bark, or fruit trees, without theorising on the subject, are unanimous in describing Lichens as detrimental to growth, and as depreciative of value. My friend Mr. Anderson, of the Kinnoull Nurseries, Perth, tells me that trees or shrubs coated with Lichens, are "immediately *discarded as unsaleable*;" while Mr. Bell, factor on the Kinfauns estates, gives me a similar assurance as to the diminished value of oak-bark when infested by Lichens.* Mr. Gorrie, Horticultural Editor of the *Farmer*, and one of the most experienced and discriminating arboriculturists in Scotland, Mr. Moore, of the Sydney Botanic Garden, New South Wales, and other practical authorities, whose opinions carry great weight in such a question, have borne similar testimony. My inference from their testimony is that they regard Lichens as *true parasites*, living, in great measure at least, at the expense of the bark on which they occur; interfering with its healthy action and growth. While regarding Lichen-growth, however, as in a certain sense, or in some measure, a *cause* of unhealthiness or disease in the trees which it affects, they also admit that, in a certain other sense, it is a *result* of unhealthiness or disease. The evidence appears uniform that Lichen-growth should never occur in forests or nurseries, which are the subject of proper care, where the trees or shrubs are properly thinned,† where the conditions of healthy growth are sedulously provided. Not only so, but I am assured that the disease of Lichen-growth, when it occurs, can be removed or dissipated by removal of

* The substance of a paper read before Section D of the British Association at Dundee.

† Nylander, in his "Synopsis" (Introduction, p. 1), says that the *majority* are *exclusively nourished by the atmosphere*.

Berkeley in the "Treasury of Botany" (p. 679), says Lichens are "distinguished from Fungi by their *not* deriving nourishment in general from the substances on which they grow, but from the surrounding medium."

‡ Vide "Tentamen Historiæ Lichenum." By J. A. Luyken, M.D. Göttingen, 1809, p. 32 and seq.

* He writes to me (March, 1867), "It is much against the growth of the trees as well as the bark. You will scarcely find it in a good thriving plantation."

† My own observations are here somewhat at variance with the statements of Arboriculturists. In the Kinfauns Plantations I find some trees bare: others copiously covered: but the latter are as frequently in vigorous life, with a plentiful foliage, as dead. It is impossible in such instances to infer that Lichens are necessarily either a *cause* or *result* of *disease*. Moreover, all my experience in different parts of the world goes to prove that Lichen-growth is most abundant and vigorous in those situations, which are *most freely exposed to light and air*: of which familiar illustrations are to be found in maritime rocks and Druidical stones, that are frequently "shaggy" with a plentiful mantle of Ramalina scopulorum and other Lichens.

the tree which it affects to more favourable conditions of development. Mr. Moore, of Sydney, tells me he has seen Lichen-growth disappear from a tree simply by transferring the latter to a richer soil or more favourable locality, or by supplying it with proper manure.

It is inconceivable that there should be such unanimity of opinion among arboriculturists, totally devoid of bias or theory, and expressing only the results of repeated observations in very different quarters of the world, without the existence of some good ground for their assertions. My impression is that arboriculturists are right to a greater extent than are the lichenologists, and that Lichens must be regarded as, in some measure at least, *parasitic, drawing the constituents of their thallus from the objects on which they grow.* I pointed out in 1856, in my preliminary work on "British Lichens" (p. 50), that the filamentous Lichens, belonging to such genera as Usnea, Ramalina, Evernia, and Parmelia, which coat, with shaggy flowing masses, oak, firs, and other trees, and whose growth is the main subject of dispute between lichenologists and arboriculturists, contain such bases as Silica and Alumina, Lime, Potash, Soda, Magnesia, Manganese, and Iron, in combination, or not, with Carbonic, Sulphuric, Hydrochloric, Phosphoric, or other acids. The most of these could not have been derived from the atmosphere; and indeed we are shut up to the conclusion that, as in the case of higher plants, they are derived from the surfaces or substances on which the Lichens containing them grow.* This conclusion is further supported by the recorded facts that chemists have detected iron in greatest amount in species affecting ferruginous soils, and silica in those growing on quartzose rocks, or their *débris*. I am not, however, prepared to contribute any new facts towards the settlement of the interesting question which forms the heading or title of this communication, or of the other equally interesting, but less practical and economically important questions, which naturally suggest themselves for consideration in connexion therewith. My purpose is rather to call attention to the paucity and unsatisfactory character of the facts or opinions that have hitherto been recorded, and to invite the record of *facts* as contradistinguished from mere *opinions*, bearing upon the following points more especially:

I. What is the precise ground on which the assertion is founded that Lichen-growth is detrimental to timber and other trees?

II. In what way does such growth injuriously affect the timber, bark, fruit, or foliage of such trees?

III. How far is Lichen-growth a *cause* of unhealthy or diseased development in the trees on which it occurs?

IV. How far is it a *result* of such development?

V. To what extent do Lichens draw their constituents (A. *organic*, B. *inorganic*) from the *atmosphere?*

VI. To what extent from their *bases of support*, —the bodies on which they grow?

* In a paper by the late Dr. Dundas Thomson, of Glasgow and London, on "The *Inorganic Food* of Lichens" (*Edinburgh New Philosophical Journal*, vol. xxxvii., 1845, p. 187), he says, "Contrary to the usually received opinion.....Lichens require inorganic matter as part of their food, which they *must* derive from the localities upon which they are fixed." He points out that the Lichen thallus contains from 5 to 7 per cent. of *ash*: and that the same inorganic constituents are found in corticolous as in saxicolous species.

A BOUQUET FROM HELVELLYN.

THE top of Helvellyn when fairly reached is chiefly occupied by a sort of mossy plain or table-land, probably once formed of *sphagnum*, which is now dried up and overrun by smaller and more arid mosses, intermixed with very dwarf specimens of thyme grass and other plants, and here and there stiff close bunches of coralline-like Lycopodium alpinum, and netted with the ropes, often yards in length, of the tough, creeping stems of the Tod's-tails, or Stag-horn (Lycopodium clavatum), which might easily catch the feet and trip up the unwary pedestrian. These two Lycopodiums, and perhaps also the coarser Lycopodium selago, are as fond of exposed barren situations as are some of their congeners, such as Lycopodium undatum and Lycopodium selaginoides of wet sheltered nooks.

But while enjoying a repose on this beautiful mossy height, we must not forget that Helvellyn, in common with most if not all the lake mountains, is really encumbered with quantities of loose stones, apparently disintegrations constantly going on from the effects of weather on the slaty cleavage of the fundamental rocks, starting up in places completely denuded, far above the surface of the mountain, and adding so much to the savage grandeur of the scenery, as, for instance, "Striding edge," ending in the fine precipices round the Red Tarn. These detached pieces of rock, by whatever ancient or modern agency they may have been shivered off from the general mass, roll or slide down the sides of the mountain, helped on by the winter snows and torrents and the summer thunderstorms, their course, however, generally guided by some inequality or furrow-like depression of surface; and here gliding down, they collect from the dews and rains imperceptible rills of moisture underneath them, which serve as nurseries for many of our choicest and loveliest sub-alpine plants. I do not mean to restrict my bouquet solely to Helvellyn, because on Fairfield, Loughrigg, Oxenfell, Dunmail Raise, and other adjacent and similar localities, I have found the very same plants, and *many more* than I can venture to load the pages of the Gossip

with the mere names of; but I may be allowed to specify a few, whose intrinsic beauty and their rarity, except in favoured mountain districts, must attract the interest of observant ramblers. The feathery tufts of the Parsley-fern (Allosorus crispus) seem to delight in sporting themselves on the highest and driest stones, as if they disdained to seek their nourishment from aught but the atmosphere; yet round the lower edges of the stones on which they grow, and below the barren Parsley-cut fronds that surround the more upright fertile ones, there may frequently be found beautiful mosses, sometimes even the glowing golden Apple-moss (Bartramia Halleriana), and other of the Bartramias, with their conspicuous globular fruits, whose presence sufficiently indicate the presence of moisture. Lower down, and in damp soil, are rosettes of thick unctuous leaves, curled round their edges, and sending up three or four slender stalks, each bearing a nodding-flower something like a violet; this is the Pinguicula or Butterwort, so called from the greasy feel of its leaves—and hence its French name of Grassette. On somewhat drier ground grows the little Fairy Auricula, with its lilac flowers and powdered leaves and stem (Primula farinosa), and little Polygalas, both blue and white and pink; and the twining fumitory (Fumeria capreolata) throws its elegant garlands round two or three pieces of loose rock, as if it would bind them together with its fragile links. Sparkling in a bed of moist moss, we see a cluster of gem-like leaves, each set round with a number of brilliant rubies, and each ruby set on a slender trembling hair: this is the exquisite Sundew (Drosera rotundifolia, or longifolia). Their small upright spikes of white flowers are not very conspicuous—but see, growing near, a kindred plant with large shining white flowers, each on its slender stalk raised some inches above the crown of dark, heart-shaped, green leaves round the root: this is the Grass of Parnassus (Parnassia palustris), and it is difficult to convey in words an idea of its beauty, the milky opal of its petals being daintily traversed by veins of the most delicate chrysophrase green; and at the bottom of each petal is a fleshy scale, fringed at the edge into fine rays, and each ray tipped at the point with a pellucid greenish gland. The rubies of the Drosera are similarly constituted glands, which are confined to her trembling leaves, and disappear in her flowers, whereas in Parnassia they are placed only in the flowers, the leaves and stalks being devoid of glands. Dr. Lindley placed both Parnassia and Drosera in the Saxifrage tribe; and if we pluck any of the numerous Saxifrages which grow scattered among the rocks, and examine the flower, we may see a great similarity in their formation. The constant dripping from the wet mossy bed of these two sister beauties has formed a little pool, almost a miniature Tarn, in the bank; and growing in it is a small green weed, looking at first sight like some Alga or Nitella, with its finely-cut verticillated leaves; but among them are curious little bottles, which give the name to the plant (Utricularia). These bottles or bladders are filled with air; and, during the growth of the long slender stalks which bear the upper leaves and the flowers, they buoy these up on the surface of the water, so as to keep them dry, until the pollen has been scattered on the ovary and the seeds formed in the Pericarp; then the bladders burst, the plant sinks to the bottom, there to perfect and preserve the seed-vessels till the next season calls forth the new young embryo plants into growth.

Schleiden speaks of the affinity of structure of these little bladders to the magnificent pitchers of the Nepenthes; but our good little bottles remain closed while they are wanted as floats, thus seeming to fulfil the same office as the tender spiral foot-stalks which uncoil to raise the female flowers of Valisneria above water: the economy of both is identical. The male flowers of Valisneria become detached from their stalks, and rise spontaneously to the surface, thus reminding one of the pretty fable of the powerful Water-Nixei Prince, who floated about so merrily in the sunshine while wooing the fair nymph Valisneria; but the moment she consented to be his bride, he carried her off into the darkness of his oozy palace at the bottom of the lake.

However, we must not diverge so far from the "stones on Helvellyn" as to add to our bouquet the very numerous and curious aquatic and half-aquatic treasures of bogs, marshes, and tarns; but if any readers of this slight sketch should feel sufficient interest in the subject, I would say to them, go and *search*, not heeding wet feet, torn dresses, or a few scratches and tumbles; for the botany, as well as the geology, of the lake district, is a subject of inexhaustible interest, and the locality teems with pleasant memories, in association with first-rate characters, though so many of them are now, alas, passed away. I am thankful to have enjoyed the great privilege and advantage of acquaintance with some of them.

"It was," says Professor Sedgwick, "near the summit of Helvellyn that I first met Dalton, a truth-loving man of a rare simplicity of manners, who, with humble instruments and very humble means, ministered without flinching in the service of high philosophy, and won for himself a name greatly honoured among all the civilized nations of the earth." The *Athenæum* remarks, in recording the recent honour paid to his memory in Carlisle, "Cumberland may well be proud of the poor weaver's son, who sent his name forth to the ends of the world as the propounder of the '*Atomic Theory*.'"

It was also during the late geologist's rambles

in Cumberland that he became acquainted with Southey, sometimes shared in the simple intellectual pleasures of his household, and profited by his boundless stores of knowledge. "Here also," he says, "I held invaluable communication with Wordsworth, . . who joined me in many an excursion, and delighted me among the dry details of my own study with the outpourings of his manly sense, and with the beauteous and healthy images which were ever starting up within his mind during his communion with Nature."

There have been men who, after a long poetical communion with the outer world, and imaginative intercourse with the outer glories of Nature, have learnt at length to be idolaters of Nature in a pantheistic sense, bordering on Atheism!—and there have not been wanting men who, calling themselves of the "Wordsworth school," have adopted this perverted and idolatrous dream. But Wordsworth was a man of firm religious convictions, "and many a time," says Professor Sedgwick, "when it was my great happiness to roam with him over his native mountains, have I heard him pour out his thanks, that while he had been permitted to slake his innermost thirst at Nature's spring, he had been led to think of the God of Nature, and never to forget His redeeming love!"

Safe under this belief, surely not only the poetical but most reflective minds, while endeavouring to study somewhat of Nature's wonders, and the course of secondary causes which are ever working out the original fiat of the all-powerful Creator, may delight to trace the constant creative and sustaining influence of that Divine essence which permeates and acts on and in all things, with a "continuity" (to borrow Mr. President Grove's word), which controls and harmonises all, from the "strength of the mountains," built up of the dislocated, torn, twisted, riven, and molten materials of some former condition of the earth! even down to our little friends that spring on its sides, or—

> The meanest herb and flower
> That drinks the morning dew!

P. S. Bury.

HELPS TO DISTRIBUTION.

IN the course of a walk lately through a shady lane near Bath, I came suddenly upon three or four harvest spiders (Phalangium opilio). As they scampered away, I observed that one of them had a dark object on its right fore leg, which evidently formed no part of its normal structure. On securing my long-legged friend, and examining the object with a lens, I found, to my great surprise, that it was a specimen of Chelifer caneroides, which had fixed itself to the leg, and was holding on "like grim death." Indeed, so tightly was the little creature attached, that I had some difficulty in making it let go, in order to transfer it to a bottle.

The question at once arose in my mind: What business had Chelifer in such a strange position? It could not be with a view to a dinner; one would as soon expect to see a weasel attack a lion, as a Chelifer seize on a Phalangium. Besides, it had attached itself, not to the part usually infested by parasites, the soft juicy abdomen, but to the middle of the hard dry tibia. As far as I know, the Pseudoscorpions feed exclusively on insects, smaller than themselves, such as Atropos, the Acarina, &c., hence their occasional occurrence among books and papers, where they are of great service to the student.

I am inclined to think that in this little incident is involved a circumstance connected with the life history of the lower animals, which deserves to be more thoroughly investigated. I mean, the method taken by them (or rather provided for them) of transporting themselves from one spot to another.

With regard to the vegetable world, we know that special precautions are taken by the dispersion of seeds, to insure the wide dissemination of plants, and to prevent them from overcrowding and thereby starving each other. A stroll on a fine day during summer will generally show us the pappus of the thistle or dandelion floating high above the ground. Later in the year, we may see the winged samara of the sycamore twisting and twirling through the air, or hear the cracking of the furze-pods, as they expel their contents with a force sufficient to carry the seed a considerable distance. And the chances are, that on returning from our walk, we find our trowser legs bristling with the hooked fruit of the bed-straw and burdock. These, and a thousand similar phenomena are so easy of observation, and the methods employed are so patent, that the veriest tyro in botany must often have had his attention drawn to them. Moreover, the purpose for which these curious contrivances are brought into play, are in all cases the same—viz., 1st, to found new colonies, far away from the parent plant; 2nd, to prevent the exhaustion of the soil by the too close proximity of plants of the same species, a calamity which would inevitably take place, if the seed were always dropped straight to the ground, as we may see in the familiar instance of the fairy-ring.

Now why should not laws of a like nature be applicable to the humbler members of the animal world?

The Scorpion tribe generally (and, I suppose Chelifer among them) are blest with "long" families, possessed of huge appetites, but with restricted powers of locomotion. Hungry mouths have to be filled as surely among crustaceans as Christians; and doubtless a healthy brood of Pseudoscorpions, moving, as they can, forwards,

backwards, or sideways, with equal ease, will quickly clear a neighbourhood of the minute organisms that go to form their food; this being accomplished, the family, or at least some of its members, must either starve or emigrate. Nature, no doubt, has pointed out to them that the latter is the preferable proceeding, and that the best method of carrying it out is by riding on the back or limbs of some more gigantic relative. Hence the finding of a Chelifer on the anterior leg of Phalangium opilio; for there (had he not been interrupted) he might have passed over in ten minutes, a space of ground, which it would have taken him a week to traverse on his own feeble limbs; and thus, with little inconvenience to his bearer, or trouble to himself, he might be carried to fresh scenes, teeming with the food best suited to sustain him.

No doubt, too, the same mode of locomotion aids in disseminating insects, with a view to the foundation of new colonies. Female ants are supplied temporarily with wings for this purpose. A week or two ago the air in this neighbourhood was filled with female ants, careering across the country in search of suitable spots in which to lay their eggs, and establish new kingdoms. The case of gossamer spiders is familiar to every dweller in the country; the tiny threads on which these animals float from one point to another being constantly seen in the air, often in great abundance.

However, it is to transportation by the aid of other animals that I wish to direct the attention of all who may have witnessed instances of the tinier creatures (not parasites) being carried about by the larger and more quickly moving members of the Animal Kingdom. If such would record their experience, they would materially aid in elucidating an obscure chapter in Natural History.

W. W. Spicer.

THE UNITY OF MANKIND.

I HAVE read with some interest the articles in Science-Gossip on the Unity of Mankind; and to me it seems "F. A. A.," in his reply to Mr. Milton, not only fails to answer his opponent's objections, but departs from several of his former theories and propositions. In his first article he proposes to establish, in place of the complex classifications formerly in use, a simple one founded on colour, and so divides man into three groups,—white, brown, and black; brown he afterwards states to be a mere transition-state between white and black, so that in reality we only have two groups or classes—white and black. Simple enough division certainly, but is it satisfactory? A classification, to be scientific, must be based upon some peculiarity or peculiarities which are well marked, and which occur invariably in all the individuals of each different class; but "F. A. A." himself says that races are always changing their colour, that whites become browns, and browns black when exposed to certain climatic influences; and that, by his own showing, his classification wants the element of stability. Besides, as Mr. Milton has proved, instead of "F. A. A.'s" simple black, brown, and white, we have human beings of many different colours,—yellow, green of various tints, chocolate colour, and brown of every conceivable depth of hue, so that I am afraid, if we took colour as the distinguishing mark, we should have fifty instead of five races of mankind, and this certainly would not be advancing in simplicity from Prichard. Besides "F. A. A." shows so little confidence in his own system that, in the same article in which he proposes it, he used another which surpasses the colour one in simplicity and correctness when he speaks of Circassians, Moguls, &c., and then he states that the brown Hindu is the only coloured representative of the *Circassian race*. The fact which he quotes as to children, &c., of the Hindus being white, *if true*, would only prove, I think, that the Hindus were not a brown race at all, but a white one; for surely he would not attach any scientific importance to tanning from exposure occuring in individuals.

Which is the primeval race? he asks, but does not attempt to answer. From the general tenor of the articles one would think that he considered white the primeval colour, but in the August number, abandoning the charming simplicity of white, brown, and black, he introduces another colour, red, which he thinks may have some claim to be the original one: if so, to what influences are due the extinction of the red, or its conversion into white? If all mankind is descended from one forefather, what was his colour? and will climatic influences sufficiently account for the production of the varied hues of mankind now? May he not have been black? and instead of the negro being a degenerated white man, may we not be improved negroes? If climate can degenerate, can it not regenerate? It may be answered that the Mosaic account teaches differently, but I would say with all reverence that the history in the Bible was written for a peculiar people and time, and should not be imported into scientific discussions at the present day.

In his last article "F. A. A." modifies his argument as to the influence of heat; he says, "I do not believe that heat alone produces a dark skin, but heat, an unhealthy climate, and prolonged isolation will, I think it is impossible to doubt, produce and perpetuate the most marked and extraordinary peculiarities." Would he kindly inform us what nation or body of men have been subjected to these three influences simultaneously, and the peculiarities produced thereby? Certainly colour is not one of these peculiarities, for if we take them separately, heat, "F. A. A." allows, alone would not make a

white man black"; an unhealthy climate, and by this I suppose is meant a climate unhealthy to white men, for unhealthy is a comparative term, would certainly produce disease, but the result of disease would more likely be death than a dark skin. As for isolation, it would help to perpetnate any peculiarities which might arise amongst them, but if neither heat nor an unhealthy climate produced duskiness, of course it could not be perpetuated. The influences and effects of the three combined might be expressed shortly in a proposition. Given a community of white men, and subject them to great solar heat, an unhealthy climate, and complete isolation. What would be the effect produced? Answer: *Disease, Death, and Extermination.*

This is only one of the many argnments which convinces me that man differs in species, and not in variety only. Is it not more in accordance with the idea of Divine justice to believe that several races of men have been created admirably adapted for the character and circumstance of their places of abode, and calculated to fill their appropriate and necessary place in the grand circle of creation, than that, having created the world for the habitation of mankind, He has so ordered it that a large share of the globe could not be occupied by them till they were reduced to a state of degradation so great as in some cases to make them more resemble the beasts of the fields than their fellow men? I can look upon a Negro not as a blackened and distorted caricature of myself, but as a being created like me to serve a given purpose upon earth, deficient, it may be, in certain qualities, bnt eqnalling me in others, and superior, at all events, in this—that he is fitted to inhabit and bring under the sway of man regions where it would be death to me to follow. And I do not believe that any amount of education and training will ever give the negro the intellect of the European any more than it will deprive him of the capability he possesses of withstanding the malarions influences of his native climate.

R. G.

SKELETON LEAVES.

IN a former number of Science-Gossip I encountered a paragraph relative to a question asked by "I. S. S.," who was wishing to know how skeleton leaves are prevented from sticking to the paper by which they are lifted out of the water after bleaching. To this question I can answer with a few words. Skeleton leaves will not stick to paper if they are washed thoroughly in water after removing them from the bleaching liquid; or if oil-paper is used, it is impossible for the leaves to stick to that. Perhaps a few remarks on my simple scheme may be useful, or at least interesting to "I. S. S.," as well as a few more readers of Science-Gossip. Just before the leaves begin to fall is the season I take advantage of for skeletonizing leaves, simply because at that time the fibrous substance is become tougher and firmer, consequently less liable to break dnring the process of this tedious and delicate work. I do not use any leaves for this purpose, such ones for instance as the walnut, chestnut, oak, elm, and sycamore, as they contain so much resin, and so would not decay themselves. They also prevent other leaves that are mixed with them from decaying, because the resinous quality in them would effect the water. Herewith I subjoin a list of my choice of leaves and seed-vessels which I gather for skeletonizing. The seed-vessels must be collected just before the seed is ripe. The leaves are those of the orange, lemon, lime, poplar, tnlip-tree, magnolia, holly, ivy, box, passion-flower, and moss, and all of the figs. Then I add the calyxes of several plants, as the Nicandra, poppy, Dictamnus, mallow, Campanula, and several others, also a few stalks of flax, hemp, cabbage, and stinging-nettles. I like to procure a good quantity of each, as that helps the decay. They are all then put into a pan, in which I pour boiling soft water over them. The advantage in using boiling water is that it destroys the vitality and hastens the decay. The pan is then placed in a situation exposed to the sun for about six weeks, frequently stirring it and adding fresh rain water as the other evaporates. By this time the leaves will show some of their fibrous formation; the laxer tissues may be seen partly falling away into the water. I then carefully take them individnally out of the water by their stalks, and hold them under the tap of a butt. The stream of water quickly washes away all the remaining fleshy decayed green part, and leaves the leaf a skeleton. They are then placed carefully in some clean water, while the whole bulk is undergoing the same process. Now and then one gives more trouble, being so tender, the force of the water will burst the fibrous substance and make them unsightly; but in the case of a more delicate leaf I generally employ a little piece of board, and holding the two together between my finger and thumb, the stream of water then passes over and through the leaf without breaking it. If there are any that will not yield to this operation without much difficulty, I after carefully rubbing them with the fingers return them to the pan to be soaked a few more days. For bleaching them I procure a hat-box, and across the top I fasten the skeleton leaves by means of strings. A cup containing sulphur is placed at the bottom, which is set on fire. The lid being then shut down, I leave it closed for the sulphur to bleach the leaves, which it will do gradually. I have tried various ways, such as using chloride of lime, and also chloride of soda, which I poured into separate shallow vessels, and immersed the leaves in each for a few minutes. In this way the skeleton leaves may

be seen graudally losing their dirty appearance. I once saw another way of managing skeleton leaves that interested me greatly. The leaves were boiled for two minutes, and then transferred to a strong solution of permanganate of potash and gently heated. In an hour or two the laxer tissues were easily removed by means of a brush. Sulphurous acid was used for bleaching them, and this liquid also employed with much facility for the removing of the stains on the fingers caused by the permanganate of potash. GEORGE NEWLYN.

Dangstein, Petersfield.

FRESH-WATER SPONGE.

(*Spongilla fluviatilis.*)

I HAD often heard and read of fresh-water sponges, and, in consequence, endeavoured to find them, but was never successful till May of this year. Previous to that time, I had often found the spicules in boilings of diatoms, and therefore suspected the sponge's existence in the canal which runs from Leamington to Oxford; but while collecting fresh-water mussels for an aquarium, I found a fine specimen attached to a stone. This I carefully removed, and on reaching home made a microscopic examination of a small portion, which shewed the spicules supporting the amæba like particles, forming the living part of the sponge.

Afterwards, I found other specimens, in which I was able to view the system of currents, so characteristic of the class Spongidæ. The sponge is a variously shaped mass, rough and firm to the touch, of a greenish colour, attached to stones, in crevices, and other dark spots, at a depth in the water of from two to three feet.

Running throughout its substance are a number of small channels, opening at the top into larger openings, called oscula, or exhalent orifices. Between these are smaller openings, called the pores, or inhalent orifices. By watching carefully, there may be observed a current from the oscula, setting outwards, fed by the inward current of the pores. If the sponge is cut open, the channels are observed to be dilated at intervals, and in the chambers thus formed, are placed the means for producing the currents. Each of the sponge particles lining these cavities is provided with a vibratile cilium, and by the constant waving of these cilia in one direction, the exhalent current is produced. This current can only be seen at times, as its action is not continuous, only taking place when required.

The main object of these currents is doubtless the supply of the sponge with food; as the current moves along, laden with nutritive particles, each inhabitant of the sponge appropriates what he requires. It also serves purposes of respiration, and removes fœtal products.

The propagation of the sponge during the summer is of a sexual character. Certain sponge particles become ova, and others fill with granules, which become converted into spermatozoa. The impregnation effected, the ovum develops into a perfect sponge. This can be observed only during the summer.

Having left my sponges for four weeks, on going to them afterwards, in August, I found the bottom layer full of seedlike bodies, the "winter germs," in fact. Each of these bodies consisted of a hard coat, inclosing the germs inside. This coat was composed of spicules, each of which resembled two toothed wheels, joined by an axis, with a small opening at one part. In November, the sponge dies down, and the germs remain till spring, when they develop into sponges like their parent.

Besides the common form, there is also a branched species. This must be looked for attached to timber, and is the favourite food of swans.

The spicules of the Spongilla are straight, and pointed at both ends. The germ case spicules are much smaller than the others. Great care is necessary, after boiling in nitric acid, to remove extraneous matter. G. T.

NEST OF WOOD WASP.

(*Vespa holsatica.*)

EARLY in the month of May this rather uncommon wasp commenced building its nest in the south-east porch of my rectory; and as it is a somewhat rare insect about here, and as Mr. Smith, *the* great authority on the wasps and bees, tells me he never knew the Holsatica build above

Fig. 250. Male and Female of Vespa holsatica (nat. size).

ground, although he says it may do so occasionally, I send you a short account of it. Early in May I observed a queen commencing her curious

domicile. She began by gnawing up slight irregularities on the surface of the wooden roof of the porch; on this she built a kind of peduncle or short footstalk, the keystone of the house springing from this; and around it she then built a kind of inverted cup of about the size of an old china teacup. This occupied two days. She then contracted the mouth of the cup until she reduced it to an orifice no larger than sufficient to admit a pea; she then built another envelope on this, and again another. The building now seemed to cease for about ten days or a fortnight; but she could be seen going in and out, apparently busy with her first brood. At the expiration of about a month other wasps appeared upon the scene—a few only; but they now began to work with a will upon their future home, and it increased prodigiously, until it reached the very unusual size of 8 inches in width, 7 inches across, and 7½ inches deep. It is now full of wasps, who are busy enough with their late brood, and has the appearance of a monstrous dead rose, or cabbage, fixed to the rafters of the roof. Last week they were busy doing what is, to my mind, so singular an illustration of their sagacity—I mean killing and carrying out of the nest the late grubs, who they know, being hatched so late in the year, will not come to perfection. I enclose you a sketch of the nest in the inside of the roof of the porch.

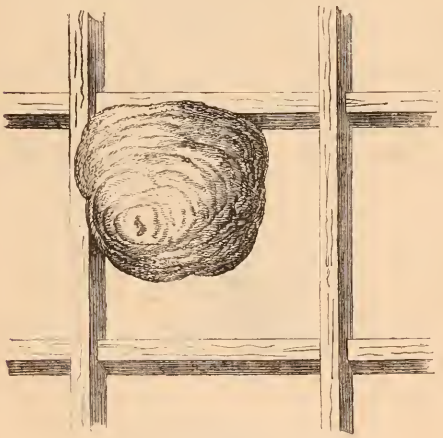


Fig. 251. Nest attached, reduced.

Ultimately I carried the wasp's nest by assault, and reduced the citadel. It is now under a glass case in my study, safe and sound, and is a most curious structure. It was attached to its support in the roof by the peduncle or stalk above mentioned; to this is appended the first cup-shaped foundation. Immediately below this, and overshadowed by it, is a kind of circular gallery free from cells, under which hangs, as you may say, the first tier of cells; this is circular in form, three-quarters of an inch deep, five inches in diameter, and closely packed with cells. Under that, again, comes another tier or layer of cells, of the same depth, but about six inches in diameter, also, like the last-mentioned, closely packed with cells. Under this, again, comes another tier, less in diameter, but equally well filled with cells. In the larger central tier alone there are 576 cells; in the three tiers of cells there are about 1,250 cells. The material of the structure is of a fine vegetable papier-maché-like substance, which

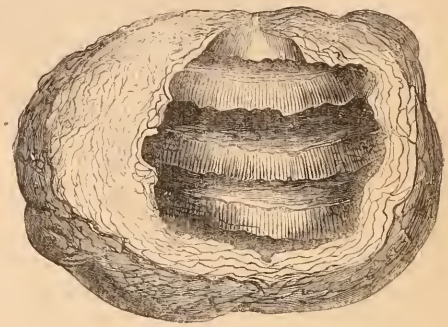


Fig. 252. Section of Nest.

under the microscope seems evidently to be comminuted pieces of woody fibre. The cells are not very neatly made, and although intended to be hexagonal, more commonly degenerate into an irregular cylinder. The cells are surrounded by an envelope of twenty-four folded leaves, giving the nest the appearance of a huge Provence rose of a leaden-grey colour. The figure shows the nest with one side carefully removed to show the interior, and it gives a very fair idea of its structure. On one side are a group of larger cells, five in number, more carefully made, doubtless the apartments of the future queens. The garrison had supplied itself with honey of a sweet sickening taste, and light colour. There is but one aperture or door, but this immediately breaks off into several passages, all communicating with the different galleries.

Latreille describes the nest of *V. holsatica* as being of a very slender papyraceous texture, scarcely two inches long, and almost globular in form, with one end, where is the aperture, truncated; its envelope composed of three pieces, of which the basal one resembles the cup of the acorn. One of these nests was found in a beehive, another in an empty room. Reaumur figures a nest nearly agreeing with this description attached to a branch, and Kirby and Spence describe another (vol. i., p. 510). A correspondent of the *Magazine of Natural History* has figured another, which was found attached to a reed inside the roof of a barn (Jan., 1830). A similar nest is represented by Knapp ("Journal of a Naturalist," p. 333), which he gives as a distinct species under the name of *Vespa campanaria*. Shaw also (Misc., vol. xv., pl. 603) has figured the nest of the Campanular wasp; and Prof. Westwood has figured one of these nests in a still more immature state

("Entomological Text-Book," p. 389), in which the saucer-like cup and half of the envelope only had been completed, leaving the cells exposed (see Westwood, Introd., vol. ii., p. 250). This wasp is included in Saussure's "Guêpes Sociales" (p. 122) under the name of *Vespa sylvestris*, but the nest is not figured.

CHARLES H. GRIFFITH.

THE ORGANIZATION OF MOSSES.*

BY R. BRAITHWAITE, M.D., F.L.S.

IN former times many of the smaller cryptogamic plants were termed mosses, and although no order of plants is better defined or more readily recognized, the name is still vulgarly applied to lichens, as Iceland Moss, Cup Moss, and the shaggy forms growing on old trees; to Algæ as Irish Moss; and even to some fungi. But the plants we have to consider are the mosses *par excellence*, Musci veri, or frondosi, as they have been termed, to distinguish them from the Musci hepatici, or Liverworts.

By the ancients this group was but little regarded, for then plants were sought after on account of their real or supposed medicinal virtues; yet they had a Muscus cranii humani, or moss of a dead man's skull, which no doubt in the days of signature medicine was found of great service in head complaints. The first special work on the subject is the Historia Muscorum of Dillenius, published in 1741, remarkable for the excellence of its engravings, and containing also lichens and algæ.

Linnæus enumerates many mosses in his Species Plantarum, but he seems to have paid little attention to cryptogamic plants, and hence often confounded them. His erroneous notion that the Capsule was an anther, and the spores pollen, led his followers astray, though we may chiefly attribute it to the want of sufficient optical assistance.

John Hedwig, however, now gave to the world those great works which have rendered his name immortal, and fully entitle him to rank as the founder of Bryology. He was undoubtedly the first to discover the sexual organs in these plants, and his clear diagnosis of species is indicated by the great number which still bear the names he imposed.

These were followed by the valuable Bryologia Universa, and other works of the learned Bridel, whose critical eye greatly augmented the number of species; and in our day Wilson, and Mitten, and lastly Professor Schimper have immensely extended our knowledge of them, the Bryologia Europæa of the last named author being the grandest contribution ever made to a single department of botanical study.

* Read before the Quekett Microscopical Club, June 28th.

Bridel heads the first chapter of his Muscologia Recentiorum with the query, "Quid sit muscus?" (What may a moss be?), and this I hope you will be able to answer, after becoming acquainted with the details of their structure.

The mosses, to a cursory observer, may appear uninviting from their minuteness and apparent similarity, yet when we call the microscope to our aid, the exquisite beauty of their structure is at once apparent. They are entirely cellular, and is it not surely a subject for admiration, that by mere diversity in form, arrangement, and construction of cells, we are able to characterize near 9,000 species in this one class of plants?

The Seed or Spore.—This is very minute, yet varying in diameter between $\frac{1}{5}$ and $\frac{1}{100}$ of a millimetre; in some minute mosses it is of large size, the capsule containing only ten or twenty spores; in others it is very minute and innumerable. The spore is globose, of a yellow, rufous, or brown colour; its surface smooth or covered with rough points, and it consists of a mother cell, or primordial utricle, enveloped in an outer coat, or exospore, the contents being chlorophyl, starch, and oil globules, with mucus.

The first result of germination is the rupture of the outer coat, and protrusion of the primordial utricle or cell, which immediately commences division, the new cells repeating the process, until a

Fig 253. Spore of Funaria hygrometrica.

Fig. 254. Spore of Funaria hygrometrica germinating.

Fig. 255. Prothallium and young plant.

dense felt of branched confervoid threads results, which we term the prothallium, and forming the green film we may often notice in spring coating damp walls and banks, and long mistaken for species of algæ (figs. 253, 254, 255). From various cells of this young plants are developed, whose fine radicles penetrate the soil; their leaves shoot up, and they become like the parent from which the spore emanated; and being now capable of maintaining an independent existence, the prothallium, no longer needed, dies away, except in a few minute annual

mosses of delicate texture, where it is persistent during their whole life. But some mosses rarely produce fruit; yet it is necessary that their reproduction should be ensured, and we find prothallium also developed from tubercles on the roots, from gemmæ or buds occurring on the leaves, or even from the cell-tissue of leaves themselves; while in some mosses a portion of the leaves become altered into gemmæ, and clustered in a head on the top of a naked stalk called a pseudopodium, as in Tetraphis pellucida and Aulacomnium (fig. 256).

Fig. 256. Pseudopodium of Aulacomnium androgynum, with one of the gemmæ.

The Roots.—These are slender fibrils, by which the plants are attached to their place of growth—the soil, crevices in the bark of trees, or rocks—and consisting of a single series of cells, the septa between which are always oblique to the axis of the filament. Adventitious radicles or rhizinæ of a brown or purple colour also frequently occur on the stem, uniting the plants into a dense matted tuft, and like a sponge conveying water to every portion.

The Stem.—Often simple, and sometimes so short as to appear wanting, it is in the terminal fruited mosses repeatedly forked, for on the cessation of each annual growth, a lateral bud is thrown off at the apex, producing an innovation or secondary stem; in the lateral fruited mosses, however, the stem is truly and repeatedly branched. It is of the same thickness throughout, for it grows only at the apex, or is acrogenic, and is composed of dense elongated cells, which thus render it firm and tough, those of the outer layer being often richly coloured.

The Leaves.—These are always sessile and simple, their form usually ovate or lanceolate, but varying in every degree between orbicular and awl-shaped. They are inserted spirally on the stem, though sometimes appearing to be distichous, or in two opposite rows; they may be erect, or spreading, or reflexed, or curled, and again they may be secund, or all turned to one side. The margin may be simple, or have a thickened border, entire or toothed, plane or wavy, involute or revolute.

The leaves may also be nerveless, but usually there is a central nerve, which may be short, or reach the apex, or be excurrent in a point, or long hair, and some mosses have two nerves. In the Polytricha, the nerve consists of a number of erect lamellæ, on its upper surface. The leaves consist of a single, sometimes of a double, or triple stratum of cells, the form and arrangement of which constitute the areolation, and afford characters of the greatest importance in the diagnosis of species, indeed used by some recent Bryologists, as Carl Müller and Hampe, for the chief divisions in classification.

In form, the cells are hexagonal, but varying to quadrate, rhomboidal, or linear, according to the density of their arrangement, and their surface may be smooth, or covered with minute papillæ. They contain granules of chlorophyl, which is often beautifully distinct, and the cause of the fine green colour, well seen in Bryum capillare, while in others it is expended on the growth of the cell, or the thickening of its walls, and thus in many mosses, while the cells in the upper part of the leaf retain their chlorophyl, those at the base are empty, hyaline, and elongated; in a few mosses the chlorophyl is wanting, and hence they have a white aspect, as in the family Leucobryaceæ.

Occasionally the basal wing of the leaf is occupied by cells, which differ from the rest, being enlarged or deeply coloured, and the presence or absence of these alar cells has been conveniently used by Prof. Schimper to divide the great genus Dicranum into two (fig. 170). When the cell ends join by horizontal walls, they are termed Parenchymatous, and in one form of these, the cell walls are thickened, and the cell proper reduced to a mere point, producing the dotted areolations of Grimmiaceæ and others (figs. 257, 258). When the cell ends are pointed,

Fig. 257. Areolation of Pottia truncata.

Fig. 258. Areolation of Grimmia apocarpa.

we have rhombic areolæ, and these are termed Prosenchymatous, as in Bryum (figs. 259, 260). I must add that occasionally stipuliform organs occur intermixed with the stem leaves, as in Hypnum molluscum; these are named Paraphyllia.

An anomalous form of leaf occurs in the genus Fissidens, in which it appears to be vertical, and split into two laminæ for a part of its length. This split portion is, however, the true leaf, but the nerve and one wing have taken upon themselves

extraordinary development, and there is also a lamina formed along the back of the nerve, these

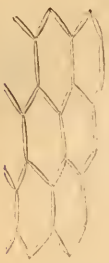


Fig. 259. Areolation of Bryum cæspiticium.

Fig. 260. Areolation of Hypnum rutabulum.

additional parts being named the apical and dorsal laminæ (fig. 261).

Fig. 261. Leaf of Fissidens taxifolius.

The Reproductive Organs.—It is now satisfactorily determined that these are of two kinds, male and female, and unless they occur near each other, the fruit is not produced; as an instance, I may refer to Fissidens grandifrons, of which male plants only have been found in Europe, female only in America, hence the fruit is unknown.

Hedwig was the first who pointed out the nature of these minute organs, but his views were long opposed, for Roth and Meese asserted that when sown, they produced young plants, and hence were gemmæ or buds.

As in flowering plants, we find the sexual organs present three modes of arrangement, and the species may be—

Synoicous—when male and female organs are combined.

Monoicous—when they are separate, but on the same plant.

Dioicous—when separate, and on different plants.

The male or barren flowers are either terminal or lateral, and consist of an involucre of minute leaves termed the perigonium; these perigonial leaves vary in number, and in form and texture differ considerably from those of the stem, becoming gradually thinner and more delicate toward the centre. Some mosses have no perigone, but the male organs nestle in the axils of the stem leaves; in others the flower terminates the stem as a beautiful disc or rosette, well seen in the coloured heads of Polytrichum; and again it may be gemmiform, or like a minute bud composed of a few imbricated leaves, as in Hypnum.

Enclosed by the perigone are the antheridia, organs analogous to the stamens of flowering plants; these vary in number, are somewhat sausage-shaped, and usually intermixed with them are numerous jointed threads termed paraphyses, whose use no doubt, by the mucus they contain, is to keep moist and preserve the vitality of the antheridia, for in the open discoid flower they are most numerous, but in the closed gemmiform flower few or none (fig. 262). The antheridial sac contains the Spermatozoids, minute clavato-filiform bodies with two cilia, and coiled spirally, which on the rupture of the antheridium move about with great activity; they are most readily seen in the Polytricha (fig. 263).

Fig. 262. Two Antheridia and Paraphyses of Polytrichum.

The female or fertile flower, in a similar way, consists of leaves forming a perigynium, which enclose the archegonia, corresponding to the pistils of flowering plants; and so the oval base of an archegonium is named the germen, enclosing in its centre the germinal cell, and the tapering upper part the stylidium (fig. 264).

Fig. 263. Spermatozoids.

Fig. 264. Three Archegonia and Paraphyses of Bryum.

The inner leaves of the peryginium, as the fruit forms, become enlarged into a sheath round the base of the fruit stalk, forming what is called the perichætium, which is very distinct in Hypnaceæ.

Of the archegonia in each flower, seldom more than one is fertilized; sometimes, however, four or five may be, and we have as many fruits enclosed in one perichætium in Mnium undulatum and Dicranum majus.

Having made you acquainted with the reproductive organs, we shall be prepared to follow out their functions. As stated, the antheridium at maturity bursts at the apex, and out pass the spermatozoids as a cloud of active particles; the archegonium equally prepares for their reception, the apex of the stylidium ruptures, the edges of the aperture roll back forming a trumpet-shaped orifice, from which we can trace a fine duct passing down to the germinal cell, and more evident now because it has acquired a reddish tinge. Both Hofmeister and Schimper have seen the spermatozoids within this canal.

The germinal cell, now fertilized, immediately commences its own proper development, first downward; perforating the base of the archegonium, it fixes itself in the receptacle or apex of the stem, just as a stake is driven into the earth; then upward to form the seta or fruit stalk, and the contents of the archegonium being thus consumed, its delicate walls are ruptured, the lower part remaining attached to a process of the receptacle, as a little sheath—the vaginula (fig. 265); the upper, carried aloft,

Fig 265. Young fruit of Orthotrichum crispum, showing Vaginula and hairy Calyptra.

Fig. 266. Mitriform calyptra of Encalypta.

becomes the calyptra, or veil, and the seta, having attained its full length, begins to enlarge at the apex to form the capsule.

The Calyptra or Veil envelops the young fruit, and is thin and membranous; it is sometimes torn irregularly, or it remains even at the base, when it is termed mitriform, or it is slit up on one side, when we call it cucullate or dimidiate; it is usually smooth, but sometimes densely hairy (figs. 266, 267, 268).

The Theca or Capsule.—This presents an infinite variety of forms, but all of the greatest elegance; it may be globose, ovate, pear-shaped, or cylindric, straight or arched, erect or pendulous, smooth or furrowed. In some it is swollen all round at the base, and this part is usually of a different colour,

Fig. 267. Cucullate inflated Calyptra of Funaria.

Fig. 268. Cucullate conic Calyptra of Fissidens.

and is named the apophysis (fig. 269); in others it bulges out on one side of the base, and is then said to be strumose (fig. 270).

Fig. 269. Fruit of Splachnum ampullaceum with small conic lid, cylindric capsule, and obovate apophysis.

Fig. 270. Strumose capsule of Dicranum Starkii, with rostrate lid and annulus.

Closing the mouth of the capsule, we see a little cap—the operculum or lid, in shape flat, conical, or beaked; this, at maturity, is thrown off, either by the swelling of the contents or by the shrinking of a contractile ring of cells interposed between the lid and mouth of the capsule, which is named the annulus; well seen in the common Funaria. In the genus Andreæa there is no lid, and the capsule opens by splitting into four valves (fig. 271); and in another section there is also no lid, the capsule

Fig. 271. Schistocarpous fruit of Andreæa.

Fig. 272. Cleistocarpous fruit of Pleuridium subulatum.

giving exit to the spores by breaking up from decay (fig. 272). These characters enable us conveniently to arrange mosses in three divisions:—

Schistocarpi—the Split-fruited Mosses.
Cleistocarpi—the Closed-fruited Mosses.
Stegocarpi—the Lid-fruited Mosses.

The wall of the capsule consists of several layers

of cells, the outer of which becomes indurated at maturity, and often richly coloured.

Enclosed within the capsule is the Sporangium, or Spore sac, consisting of two strata of cells, the outer of which is contiguous to the lining membrane of the capsule, or is suspended from it by delicate threads; the inner is united to a pillar, occupying the central axis of the capsule, and named the Columella, the apex of which joins the lid, and sometimes falls

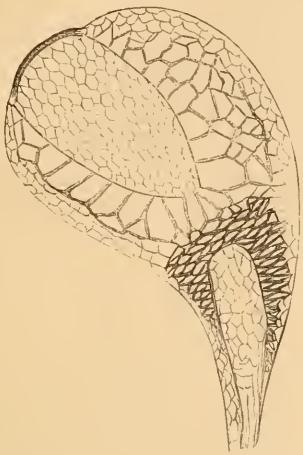


Fig. 273. Section of Fruit of Funaria, showing Sporangium suspended by threads.

away with it, though occasionally we see the columella projecting from the mouth of the capsule like a style (figs. 273, 274). The lid having fallen

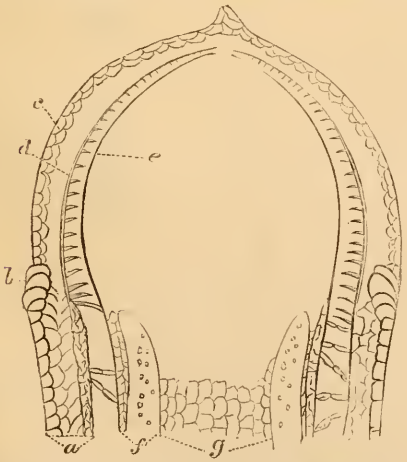


Fig. 274. Section of upper part of fruit of Mnium hornum, *a*. wall of capsule, *b*. annulus, *c*. lid, *d*. tooth of outer peristome, *e*. tooth of inner peristome, *f*. cavity of sporangium and spores, *g*. Columella.

away, the mouth of the capsule is seen, sometimes naked, when it is termed gymnostomous, but usually adorned by the beautiful appendage named the Peristome, consisting of curious hygroscopic tooth-like processes in a single or double series.

The simple peristome, or the outer one when double, originates from the lining membrane of the capsule; its teeth are always constant in number, 4, 8, 16, 32, or 64, and present an infinite variety of

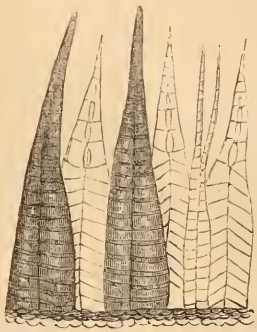


Fig. 275. Part of inner and outer peristomes of same.

forms (figs. 277, 278, 279). They consist of two strata of cells, the outer in two rows, transversely jointed (trabeculate), richly-coloured, and often separated for a part of their length, in the central or divisural line; the inner in one row, thin and hygroscopic, and projecting inward as transverse lamellæ (figs. 275, 276, 280). In the Polytrichaceæ, however, they are quite different, and consist of a mass of agglutinated filaments, and Mr. Mitten uses this

Fig. 276. Transverse section of tooth of outer peristome.

Fig. 277. Fruit of Tetraphis pellucida, peristome of four teeth.

Fig. 278. Splachnum sphæricum, with eight bigeminate teeth, and exserted columella.

distinction to separate all mosses into two sections, Arthrodonti, those with jointed teeth, and Nematodonti, those with filamentous teeth. In the Polytricha, also, the top of the columella is dilated into a membrane, closing the mouth of the capsule, and joined to the points of the teeth; this expansion has been named the epiphragm or tympanum (fig. 280).

The inner peristome takes its origin from the

outer wall of the spore sac, and is a thin plicate, or keeled membrane, divided into processes or cilia, which usually stand opposite the interspaces of the outer teeth, and occasionally 1 to 3 still finer ciliola, occur between the cilia (fig. 275).

Fig. 279. Bifid tooth from peristome of Fissidens.

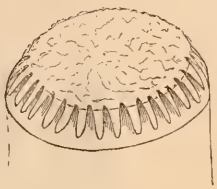


Fig. 280. Peristome and tympanum of Pogonatum aloïdes.

The spores are formed from the cells, filling the spore sac, and are always free from the spiral threads found in the Hepaticæ.

In the above account I have not included the Sphagnina or Bog-mosses, as the views of recent writers tend to separate them as a distinct class, parallel with Mosses and Hepaticæ.

ANTHRENUS.

Fig. 281. *a*. Anthrenus museorum, L.; *b*. Anthrenus varius, F.; both magnified.

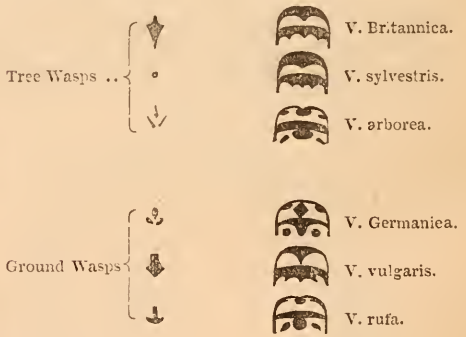
THE above figures, illustrative of the paper on "Hairs of Dermestes," page 206, represent the two species of Anthrenus therein alluded to. They have been drawn from well-authenticated specimens, by an excellent authority on these insects, who remarks, "The antennæ in the three common species of Anthrenus have a different number of joints (a curious circumstance in the same genus). Thus in *varius*, the antennæ seem to be eleven-jointed (the normal scheme in Coleoptera), and the club consists of three joints. In *museorum* they are eight-jointed, with a two-jointed club; and in the very common little *claviger* (smaller than *muscorum*) the club is only apparently one-jointed. Anthrenus museorum is very indistinctly marked, and a much duller insect than *varius*, of which some of the bands of lighter colour are spotted with white. The scheme of pattern seems alike in both. The edges of the pattern not clearly defined, as the insects are covered with broad scales that form the bands, giving an irregular outline." Woodcuts can scarcely give satisfactory representations of the insects.

WASPS.

THE following communication on British Wasps appeared in the *Gardeners' Chronicle* for October 19th:—

You published, some little time ago, a letter requesting some of your readers to assist me in procuring a specimen of the nest of *Vespa arborea* That letter has brought me some kind communications on the subject, but not the nest, which I am still in search of. As the subject has attracted the attention of some of your readers, perhaps you will allow me a little space to explain more clearly what I, with every other naturalist who studies wasps, really do want.

There are seven species of British social wasps, including the hornet. Three of these are tree wasps, distinguished by having the scape of the antennæ yellow in front in both the sexes. Three are ground wasps, in which the scape of the antennæ is yellow in front in the male only. The species are readily distinguished by the forms of the markings on the face, and on the dorsal aspect of the first two rings of the abdomen, as shown in the following diagram:—



As to their nests:—

1. *V. Germanica*, the large common wasp, builds in the ground; the case of her nest is made in shelly patches, and is of a grey and white colour.

2. *V. vulgaris*, the small common wasp, also builds in the ground; her nest being formed likewise in shelly patches, but of a pretty fawn colour, and of a very brittle nature.

3. *V. rufa* is an earlier wasp than the others. Her nest is of a dull grey, and is built in rings, not in patches. The name of "anchor-faced wasp" has been unfortunately applied to this as well as to the preceding species.

Of the tree wasps:—

1. *V. sylvestris* builds in the ground, or under

eaves, or anywhere; her nest is formed in layers. Every bee-keeper has a word for or against her. She is the owner of the very pretty bell-nests, which have gained for her the name of Vespa campanaria.

2. *V. Britannica, Norwegica,* or *borealis,* builds also in layers, which are less regular than those of the preceding species, and generally prefers low bushes.

3. *V. arborea* is the blank I wish to fill up. This wasp is found in Gloucestershire and in Savoy. It was first discovered by Mr. F. Smith, of the British Museum, among some firs, on a ridge about four miles north of Wakefield, in Yorkshire. The promise of a reward for a nest of this species, circulated in that neighbourhood, has as yet failed to procure me a specimen to engrave for a work on wasps which I hope shortly to have the pleasure of publishing. If this note shall prove the means of enabling me to complete my series of drawings, I shall feel thankful.

Brighton. EDWARD L. ORMEROD, M.D.

ZOOLOGY.

COLIAS EDUSA IN IRELAND.—Having taken a specimen of the Clouded Yellow Butterfly (*Colias Edusa*) on the 31st of August last at Kilkee, on the coast of the county Clare, I wish to know if it is an uncommon insect in Ireland. Neither my friends nor any of the books I have consulted can inform me if it has ever occurred in Ireland before. —*W. B., Ireland.*

[It is recorded in "Stainton's Manual" as having occurred in Ireland.—ED.]

WOOD-BORING BEETLES.—One of the principal oak rafters of the roof over the north-east corner of the Triforium of Norwich Cathedral being in a dangerous state, it was examined in order to discover where the rain came through. Some holes were found pierced through the lead, immediately above the decayed rafter, and, on turning up the sheet of metal, the holes were found to correspond exactly with the worm-eaten holes in the oak cladding. Several dead insects were found in the lead, some of which appear to have wings; those enclosed were found in the cladding, and are, I suppose, a species of weavil.—*E. A., Norwich.*

The insect is *Anobium pulsator,* Schäll (the *A. tessellatum* of most authors), one ½ of our largest species of the so-called Death-watch Beetles. The late Mr. Spence ("Ent. Trans.," vol. ii., p. 11) has given an account of the great injury produced by its larvæ in the timbers of houses at Brussels; and we have known it to occur in profusion in houses in Northamptonshire, the oak beams being riddled by it. It has been also reared from whitethorn, and appears to remain more than three years before arriving at the perfect state. The larvæ seem to have the instinct of continuing their burrows until nearly reaching the surface, so that there is only left a slight barrier, through which the perfect insects escape. Westwood ("Mag. Nat. Hist.," Sept. 1834) is inclined to believe that the ticking noise made by the perfect insect is also produced by the larva, whilst gnawing the wood on which it feeds. The larva is figured by Ratzeburg ("Die Forst Insecten," pl. 2, fig. 19, B) and Westwood (Introd., vol. i., p. 269, 11). It is also described by the latter author and by Bouché ("Naturg. der Ins.," p. 187). The larva much resembles that of a small Lamellicorn Beetle, and constructs a cocoon of silky matter, mixed with *débris* of its food. The wings mentioned in Mr. Athow's letter would appear to be those of a species of Tachina, a dipterous insect much resembling the common house-fly, and which is evidently parasitic on the beetle; at least I judge so from a cocoon found in the wood sent, and from my own experience in rearing other larvæ. The larva of *Callidium Bajulus,* one of the Longicorn Beetles, has long been recorded as boring through the lead covering of houses, making circular holes. See Westwood (*loc. cit.* p. 366), and Audouin ("Annales de la Soc. Ent. de France," ii., 76). The larvæ of some Hymenopterous insects have been recorded by a French entomologist as penetrating leaden bullets!—*E. C. R.*

THE OTTER (*Lutra vulgaris*).—The breeding season in Scandinavia certainly takes place in February or early in March, and the female brings forth in May from three to four blind young ones. As I have been told from very reliable authority that the otter in England breeds in the winter, I have made very particular inquiries here of men who well know the habits of the otter, and all corroborate the above statement.—*Ten Years in Sweden.*

WEASEL (*Mustela vulgaris,* Erx). It has been doubted whether the weasel, like the stoat, becomes white in the winter. I can prove that this is the case from pure white specimens killed in Wermland in the winter. I can also prove by specimens kept in confinement that the change of colour from the red summer dress to the white of winter takes place by an actual change or shedding of the old coat, and not by the old hair changing colour.—*Ten Years in Sweden.*

A NEIGHBOURLY SPIDER!—A friend writes me: "I was witness this morning of a curious incident. A large 'bluebottle' having got entangled in the web of a spider, was immediately secured and killed in the usual manner. In this condition—dead and wound round with thread—the fly was deliberately lowered into the web of a smaller spider, who at once seized and carried it off." I never knew, and did not imagine that spiders were sufficiently sociable to feed each other.—*Gilbert Green.*

Lasiccampa Quercus.—I think the following deserving of notice. Last September, a friend of mine found three larvæ of the above, full grown, and which spun up about the middle of the month. According to the general routine of this insect's changes, the moths should have appeared early this summer. But no; the first one, a female, came out last week, and there are two others waiting their change. Whether they intend to make their appearance this year, or whether they will wait till the more genial summer days, time will show. I do not perceive any difference between this late specimen and those of the usual time.—*Richard Tyrer.*

Hawk and Weasel.—I am indebted to a friend of mine (a keen observer of nature) for the following. Whilst out walking, a kestrel hawk rose at his feet, which attracted his attention by the strangeness of its flight. Instead of its usual hovering, it darted upwards till almost lost to view, when it suddenly descended powerless to the earth. Upon his hastening to the spot he was surprised to see a weasel retreat from the hawk, which was dead, the throat being fearfully torn.—*C. Denny, Kelvedon.*

Quail.—I received a single specimen of this bird some short time since which was shot in this neighbourhood. With us they are extremely rare.—*C. Denny, Kelvedon.*

Lizard Tails.—I think it is not generally known that the common lizard has the power to cast off its tail when suddenly alarmed. I saw a striking instance of this a few days since when collecting insects upon some chalk hills near Beckworth. I have frequently seen these little fellows run without taking their tails with them, when I have attempted their capture, and have mentioned the subject to friends who have expressed their unbelief, stating that it was impossible for a reptile with a tail containing so much substance to have the power to become detached without receiving a severe blow from some hard substance. But in this instance I was in the company of two well-known naturalists when we discovered a lizard. I suddenly placed my hand over it, when up sprang its tail from between my fingers, and, to our astonishment, not only continued to leap about the ground for two or three minutes but crept along with a snake-like motion, and concealed itself in some grass. The tail was divided a short distance from the legs, so that the thickest part was of nearly the same circumference as its body. This appears to be a provision of nature to spare the animal's life, in the event of being surprised by birds or other enemies, the tail being left to satisfy their appetite, whilst the creature takes its departure.—*J. B. Waters.*

"Animal Grafting, and on the Regeneration of the Spleen in Mammals, and of the Limbs in Aquatic Salamanders," by M. Philipeaux, from "Annales des Sciences Naturelles," Jan., 1867.

Since the numerous experiments made in 1856 on the extirpation of the supra-renal capsules, the spleen, and the thyroid body, and communicated to the Academie des Sciences, M. Philipeaux has several times observed, in animals which had been operated on some months previously, a new supra-renal capsule, or a new spleen, more or less completely reproduced. He has also, during his investigations, made some interesting observations on animal grafting, and on the reproduction of the limbs of the newt. The following is a *resumé* of the facts which he has recorded:—

1. *On Grafting the Spleen in Mammals.*—After completely removing the spleen from field-mice (surmulots) thirty days old, the organ was returned into the abdominal cavity, and after a period varying from five to ten months, it was found to have grown to the peritoneum at some point, most commonly to the stomach, or on the left side: in one instance only to the right side. The point of attachment was always by the hilum of the spleen, and new vessels were seen to be formed which could be traced to the mesentery. The spleen retained its normal form in some cases; in others became folded on itself, and occasionally was rounded or triangular in form. The structure was found to be always normal; sometimes the spleen had completely disappeared, and not a trace of it could be found, or else a small cyst remained, containing purulent matter. In some cases the spleen was pale and ensanguined, in others very black, and filled with pigment. The animals operated on attained their full development, but were not so large as those which had not been thus treated.

2. *On the Regeneration of the Spleen in Mammals.*—The first experiments on this subject led M. Philipeaux to believe that the spleen was reproduced after complete extirpation, but this opinion was proved to be incorrect by M. Peyrani, who repeated M. Philipeaux's experiments. The latter instituted a new inquiry, and found that Peyrani's statement was correct—that the spleen when completely extirpated is never reproduced; but that when not completely removed, reproduction always occurs. The same remarks hold good with regard to the infra-renal capsules.

3. *On the Regeneration of the Limbs of the Salamander.*—M. Philipeaux found that when the limbs and eyes were completely removed, no reproduction took place: if the anterior limb, with the scapula, for instance, were amputated, other entire eyeball removed; but if a portion of the eye were left, then regeneration occurred, or if the scapula were left complete, reproduction of all the bones ensued.—*L.*

Chærocampa celerio.—A fine specimen was captured here on Wednesday (August 28) by Mr. Horrocks, a collector in this town. It is a very fine insect, and, judging from its condition, I should think it was fresh from the pupa state. Having no net with him at the time, he was obliged to take it in an old matchbox. This is the second specimen taken in Ipswich, one having been caught some time since by Mr. Eaton, and now in the possession of Mr. Ransome.—*W. M. Cole, Ipswich.*

Chameleon.—Several weeks ago a friend from Cadiz presented me with a fine chameleon, about a foot long. I have known persons fail to remark, until their attention was called to it, the very curious motion of the eyes, which can be worked quite independently of each other, or in conjunction; for instance, one eye may be stationary, whilst the other revolves freely, or both may be moved in different or even contrary directions; but when about to strike at a fly, both eyes are brought to bear on the object. I have seen it protrude its tongue and catch a fly at about seven inches distance, but its favourite range seems to be three or four inches, and if the prey be nearer than one inch, it generally retreats when practicable to increase the distance. The chameleon sleeps soundly, lying longitudinally on a perch, or clinging to any object on which night overtakes him, and will bear a little gentle handling without awaking. Asleep and in the dark, the general colour is straw below, and light pea-green above, delicately shaded off. The passions appear to influence the colour, as it often changes when the animal is approached. Still I can observe no fixed rule by which the colours are governed, though generally the brightest light produces the darkest colour, and *vice versâ*. Sometimes the side exposed to the sun becomes dark brown, approaching to black, more or less spotted; sometimes dark chocolate; and I have seen it in direct sunlight deep yellow and light green, in spots, bars, &c., with some darker markings, and in some parts the green approached very much to blue. When light coloured, *two* rows of dark marks generally appear along *each* side. The intensity of colour on one side may often be, and generally is, different from that on the other side. The tongue is slightly protruded from the mouth preparatory to striking a fly, which is effected with great celerity and much precision, although it is often obliged so to contort its body as to seem very unfavourably placed for attacking its prey. On retracting, the tongue is considerably deflected, depending much on the distance; and the free end, which is considerably the thicker, may be seen to be concave, and in this cavity is the fly; but it is by no means easy at all times to observe the concavity, owing to the rapidity of the act. The motion of the limbs, though slow, is very free, and the grasp of the feet very firm. These are shaped much like those of a parrot. The tail is prehensile. I have never succeeded in keeping a chameleon alive for more than two months, and should feel obliged if any of the readers of Science-Gossip could give me any hints about such treatment as may conduce to their longevity.—*G. S., Oporto.*

BOTANY.

Tea-tree (*Lycium barbarum*).—I have at this time one of these plants covered with the beautiful bright red berries, so that it is a perfect spectacle. Although the plant is common enough in gardens, I think that it is not so common to observe it so full of fruit.—*W. C. C.*

Sonchus palustris.—Would you be kind enough to state for the information of "B." that it was in the county of Essex that I became acquainted with *Sonchus palustris*, L., as described in Science-Gossip for September. Having considerable acquaintance with the flora of Dorsetshire, I am able to supplement the remarks of "R. W." respecting the occurrence of *Œnanthe pimpinelloides*, L., in that county. I have found it growing luxuriantly in several places in the vicinity of Weymouth; a bank to the south-west of Lodmoor adjoining the Preston road, and the east shore of the Backwater near Radipole, are two of the habitats, but not the only ones in that neighbourhood.—*J. W. White.*

Jumping Seeds.—I have read occasionally in Natural History journals of what are termed "jumping seeds;" but it was only this summer that something similar came under my own observation, the particulars of which may possibly interest some of your readers. A friend sent me a small excrescence taken off a hawthorn; it was about a sixth of an inch in length, pear-shaped, and in size and form much resembled one of the small stones of a grape or raisin; it appeared to have been attached by the apex. Its curious jumping movements having attracted attention, it was brought to me to ascertain the cause of its activity, which was naturally attributed to some living creature concealed within. When it came into my hands it was perfectly quiet, and as it remained so in spite of all attempts to rouse it, I imagined the inmate was defunct. However, in the course of the evening it was heard going through its performances in the pill-box, and on removing the lid it was seen oscillating and leaping with a smart jerk, which carried it a quarter of an inch or more from its starting-point. I was told that it had jumped nearly an inch in length and a fourth of an inch high, but I did not see it do so much after it came into my possession, by which time possibly it might have lost some of its vigour. The movements were sharp and sudden, but usually

stopped awhile after it had been disturbed. These actions continued all that evening, but the next day not observing any movement, I concluded it was dead (though I afterwards learnt that it had been seen to move on that day), and the evening of the day following, still finding no signs of life, I opened it, and, as anticipated, found it was tenanted by a larva, which, contrary to expectation, was alive. It was a whitish maggot, with a small yellowish scaly head, the body bent into a semicircle, and the tail end slightly flattened. It had no legs, but the shining skin was deeply corrugated, or thrown into folds, which appeared to serve in some degree as limbs; a very few hairs could be detected on the body. The movements when extracted from the case, though pretty vigorous, had nothing of a leaping character, and consisted in twisting about in a helpless manner. As the walls of the case were thin and shewed little material left for food, it would appear that the larva was near its change. That any living thing entirely enclosed in a rigid box or envelope as this appeared to be, should be able to "jump" the said box from one spot to another as easily as a boy jumps in a sack, is not a little marvellous. The oscillating or rolling motion is more easily explained, as the mere shifting of the centre of gravity in a body with a round or cylindrical (in this case rather conical) exterior would be likely to cause the whole to change place. Possibly the envelope being thin, might be somewhat elastic, and capable of transmitting the force of the blows given from within, otherwise it would remind one of the accounts sometimes related of coffins being found upright, supposed to be so placed by the struggles of the wretched inmate buried alive—a feat of strength that would defy the efforts of the greatest athlete the world ever saw.—*G. Guyon, Ventnor, Isle of Wight.*

Boletus cyanescens.—On the 17th September this extremely rare and beautiful species of Boletus was growing in comparative abundance on the grassy banks near the north gate of Richmond Park. It grew in batches of all sizes, under oaks. In the immediate neighbourhood, also under oaks, I came upon a considerable colony of *B. piperatus*, a lovely fungus, but possessing fearful pungency. *B. felleus* also occurred under the same trees.—*W. G. Smith.*

Boletus impolitus, Fr.—Surely your correspondent "H. B." is in error regarding this excellent Boletus. I know it well; it is pleasant and mild when raw, and nutty, crisp, and most delicious when cooked; in fact I consider it preferable to *Boletus edulis*. Its comparative rarity was the only cause of its omission in the sheets published by Mr. Hardwicke. Has "H. B." mistaken the *bitter* and disagreeable *Boletus felleus*, for *Boletus impolitus?* They resemble each other to a certain degree, the former (as far as my experience goes) is much the commoner of the two. *Boletus impolitus* is one of the best of all our fungi.—*W. G. S.*

Primary Colours.—Having noticed in this month's number of Science-Gossip a record of the blue pimpernel having been found near Ilfracombe, I would remark that (in this spot at least) it seems to be more than usually common this season, occurring almost as plentifully as the red variety. I was led to notice this from a conversation I had with a friend a short time since, on the limited number of plants which produce flowers of the three primary colours. The pimpernel is certainly one of the few that does so. The anemone is another; the red and blue being well known, and the yellow I have found growing in the Pyrenees. If any of the readers of Science-Gossip would kindly mention any other class of plants possessing the same properties, I think the subject might prove of interest.—*J. W. M., Cawston Rectory, Norwich.*

Yellow Violets.—Pliny mentions yellow violets, so they were known in the time of the author of the "Historia Naturalis;" and there are several members of the order Violaceæ bearing yellow flowers found in America. I imagine the particular plant mentioned by Mr. "Edward H. Robertson" in Science-Gossip must be the *Viola biflora* of the Swiss Alps. I am a great admirer of the American violets; but they must be grown in peat mould, and some of them would, I should say, require greenhouse culture in this country. Muhlenberg's violet, with its large, pale-blue violets on long peduncles, is very lovely.—*Helen G. Watney.*

Hampshire Lycopod (see p. 209).—The *Gardeners' Chronicle* of September 28 again alludes to this plant, and states, on the authority of Mr. Lloyd, that it is certainly *Lycopodium alpinum*. Mr. Lloyd maintains that *Lycopodium alpinum* has not been correctly described as to its habit of growth, a repent above-ground stem being attributed to it; and this opinion he supports by specimens of the Welsh plant still growing in the sod of earth, in which a subterranean rhizome is distinctly evident. It is therefore clear that, in addition to a stem threading its way on the surface, amongst the surrounding herbage this Alpine Lycopod does also produce a true underground stem, in which it agrees with the Hampshire plant.

Linnæa borealis in Yorkshire.—The *Scarborough Mercury* of August 24 states that *Linnæa borealis* "has been discovered in a wood on the moors in the neighbourhood of Scarborough," where it was found by Mr. John Tissiman of that town. —*B.*

MICROSCOPY.

Origin of Rocks revealed by the Microscope.—When sedimentary rocks are of subaqueous origin, as is by far the most common case, subaërial or subaqueous outbursts may force into the sea eruptive rocks, which, being at once broken up into a state of division, more or less fine, in proportion to the greater or lesser cooling power of the water, mass in immediate contact, may be spread out into beds by the action of the waves: the texture of these rocks may vary from that of the coarsest breccia down to the finest mud, and, as is usually the case, such deposits may present themselves as alternating beds of coarse and fine character. Upon the consolidation of such formations, rocks are formed, identical in chemical and mineralogical composition with the original eruptive rock from which they were derived, and which, particularly when close-grained, often present an external appearance so like the original rocks as to be frequently undistinguishable from them by the naked eye; in such deposits it is often easy to pick out specimens having all gradations in appearance from the above described down to such as would be attributed to the consolidation of mere detrital mud. No wonder, therefore, if the field geologist finds himself bewildered under such circumstances, and inclined to settle down in the comfortable belief of the transmutation or transition of sedimentary rocks into eruptive, &c., and even the chemist feels puzzled, when he finds that a rock taken out of apparently normal stratified deposits has the same chemical composition with one of undoubtedly intrusive nature. The microscopic examination, however, soon shows that, however similar the external appearance of two such rocks might be, their internal structure is totally different; showing in the primary rock the crystallised structure and arrangement previously described, whilst the secondary rock is resolved into a mere agglomeration of more or less broken fragments of the same minerals constituting the former. In beds formed from the consolidation of volcanic ashes, the microscopic examination occasionally affords evidence as to whether such ashes had been deposited on land, or had fallen into water.—*Dr. Forbes, F.R.S., in "Popular Science Review."*

Noctiluca Miliaris.—I have for some years endeavoured to obtain a supply of *Noctiluca miliaris* from acquaintances and friends who travel by sea to various parts of the globe, but up to the present time all my efforts to obtain them have been unsuccessful. Will you permit me to recommend any of the readers of Science-Gossip who reside near the sea-coast to make a gathering of Noctilucæ on any night when they present themselves in abundance? Their presence is indicated by extensive phosphorescence on the surface of the ocean, each splash of an oar or ripple of a wave exhibits a phosphorescent luminous appearance—the cause being the presence of myriads of Noctilucæ. If a cambric net be run over the surface of the ocean when the phosphoric light referred to is visible, it will be found on examination to contain a mass of jelly-like matter, which will consist of innumerable specimens of Noctilucæ. The reason why I desire specially to possess a gathering is, because they generally contain splendid specimens of diatomaceæ in a beautiful condition of purity. I shall esteem it a great favour if any of your sea-side readers would take an opportunity of making a gathering and send me a portion of the jelly-like mass. It is of course of no importance whether the Noctilucæ be living or dead, the object of chief importance is that they be clearly gathered and be placed in a clean bottle.—*T. P. Barkas, Newcastle-on-Tyne.*

Elastic Glue.—As there exists some little difficulty in manipulating, not to say obtaining, marine glue, allow me to bring under notice a cement used by bootmakers, which answers admirably for aquaria, troughs, and also cells. I send you a stick herewith, the cost of which is only 2d. It is obtainable at any of the leather-grindery warehouses, and will, I think, be found a desideratum to microscopists, and is known as "elastic glue."—*John Bockett.*

Campanularia geniculata.—From the egg of this Campanularia there springs a ciliated larva, which attaches itself to a solid body, becomes flattened, and then resembles a little cake, which has a cavity hollowed in its substance. In the centre of this, granulations make their appearance, and gradually increase in size, elongate, and are converted into a straight hollow stem, which is soon covered by a transparent horny sheath. The current which traverses the internal canal of the stem accumulates the granules at the extremity of this latter, and develops a true bud, which becomes organized, and assumes the form of an inverted bell, closed at its orifice by a horny membrane. The organized material is soon detached from the inner surface of this structure, and converted into a sort of conical button, from which tentacles are pushed out. Finally, in the centre of this mass there appears an orifice, which eventually constitutes a mouth like that of Hydra. The first polyp is then complete, and, bursting through the membrane, it grows out like a flower which has unfolded its floral envelopes. —*Quatrefages' Metamorphoses.*

Quekett Microscopical Club.—In answer to those who complain that we did not insert any address in our late article, letters may be sent to "The Secretary," at No. 192, Piccadilly, London, W.

NOTES AND QUERIES.

Enemy to Bugs.—The *Reduvius personatus* is a valued friend to man, as in Europe it destroys the bed-bug. Its specific name is derived from its habit, while immature, of concealing itself in a case of dust, the better to approach its prey. Besides the Reduvius, the cockroach is the natural enemy of the bed-bug, and destroys large numbers. Houses have been cleared of them after being thoroughly fumigated with brimstone.—*American Naturalist.*

Fish Increase.—A rough calculation shows that were one per cent. of the eggs of the salmon to result in full-grown fish, and were they and their progeny to continue to increase in the same ratio, they would, in about sixty years amount in bulk to many times the size of the earth. Nor is the salmon among the most prolific species. I have counted in a perch (*Perca flavescens*), weighing three ounces and a half, 9,943 eggs; and in a smelt (*Osmerus viridescens*), ten inches in length, 25,141. Some of the larger fishes produce millions at each spawning. An interesting experiment was made in Sweden, in 1761, by Charles Frederick Lund. He obtained from fifty female breams 3,100,000 young; from one hundred female perch 3,215,000 young; and from one hundred female mullets 4,000,000 young. These are certainly wonderful results.—*C. G. Atkins, in American Naturalist.*

The Blind Worm.—I have kept many of these at different times, and fed them on the small grey slug, as mentioned in the August number. I should think they would prove a valuable assistance to gardeners whose premises were infested with these little pests. I once told a gardener this, but he evidently had the usual horror of the blind worm, for he said he would sooner have the slugs. Sometimes when I fed them the slugs had mould attached to their bodies, and then the blind worm, seizing its prey by the middle, would take it to a stone, and by gently moving its head from side to side, gradually detach all unnecessary particles. This showed no inconsiderable amount of reasoning power, for it did not treat all its food so. "F. T.," in his article, did not refer to the faculty it possesses of parting with its tail, and reproducing it, perhaps because the fact is now pretty well known to naturalists. One that I picked up by the caudal member left about two inches of it in my hand, and this commenced a series of twistings and jumpings such as those Mr. Wood has somewhere described; meanwhile the animal glided away. I took the tail home with me, and it would twitch about when I touched it a couple of hours after. The part where the separation takes place is red, but no blood flows. I have found several specimens of *Anguis fragilis* without a tail, but it has grown again in a short time. I have never seen the creature climb, but there is no doubt it can, for a friend of mine kept some in his garden, whence one escaped to the premises of his neighbour. The garden was surrounded by a high wall, and there was no way of escape except through the house into the street.—*Henry Ullyett, Folkestone.*

Fishhooks cut out of Shells.—These curious fishhooks are employed in New Zealand, especially for taking a fish called Kawaï; they are cut so that the pearly part has the shape of a small fish, and simulates a bait. Would any one have the kindness to tell me the scientific name of the Kawaï?—*B. M.*

Rat-tail Venom.—In the Notes and Queries in the June number I find a statement by one "R. J. J." that Norfolk people possess a notion that rats' tails are venomous. Now it is possible that this absurd notion may be entertained by some poor ignorant rustics in a particular locality; but although I have lived in Norfolk since my infancy, I have never heard of such a thing before. It can hardly be expected that visitors are able to arrive at correct conclusions respecting the popular notions of a whole county after a short stay in it, further than with regard to a few of the ideas of the rural population in some very small place. Even in the latter case, their observations must of necessity be extremely desultory in their nature, and cannot consequently be relied upon.—*J. H. F.*

Odd Fishes.—*The Sudas gigas.*—The scales and the bony palate of the Sudas gigas, or Pirarucú, of the Amazonas, are employed in Brazil for grating the Guaraná, a paste made of the seeds of Paullinia sorbilis;—a few grains of the powder are added to water, and drunk as a substitute for tea. Scales of Pirarucú, and palates or tongues, as they were called, were exhibited in the Brazilian Court at the Great Exhibition.—*B. M.*

Larvæ in Mushrooms.—These must be remarkably quick growing creatures, and I should say are evidently bred in the mushroom, as you may trace them from the largest size down to such small ones, that they almost require a magnifying glass to see them. I should suppose the eggs must be laid in the stem of the mushroom ere it rises much above the surface of the ground, to give them a little longer time to grow. I should be glad to know what the perfect insect is. Butterfly?—*E. T. Scott.*

Planaria.—The paper by Mr. Ray Lankester in the *Popular Science Review*, leads me to send to Science-Gossip a few observations I have at one time or other made, on what I suppose to be some species of planaria. I have particularly noticed two species. One has apparently two eyes placed thus ·· the other four ·· The body of the two-eyed one is not above half an inch long. It is opaque, and of a black colour. The other is, when young, quite transparent, and almost colourless, though as it grows older it has a greenish hue. The largest I have seen of these was rather more than an inch long when stretched out. When touched they contract themselves into a hard lump, as a healthy leech does; and they fix themselves and move something in the same way. They produce their young alive. They are contained in the lower part of their bodies, and are quite lively in the body of their parent; and may often be seen stretching out their heads on each side, which gives the animal a very curious look. I have not particularly noticed how many they produce at a time, but I have counted between two and three dozen in one animal. They feed on other animalcules, but seem barely to suck them. I have seen them feeding on the round Lynceus.—*E. T. Scott.*

Gnat Bites.—On my return from Switzerland a few weeks ago, I read in Science-Gossip some inquiries for a good remedy for gnat bites. I suffered very much from gnat bites this summer, until told to apply salad oil to them. This relieved them in a few hours when at the worst, or if applied at once, prevented all inflammation.—*H. Richardson.*

The Rattlesnake.—It is rather surprising that any person should, after the comments which have been published upon the late sensational adventure with the rattlesnake, be still inclined to bring forward the subject as worthy of scientific discussion. It is only necessary, I am sure, to refer your correspondent "C. M." to the article "A Rattlesnake at large," published in *Land and Water* for August 10, 1867, to convince him that the whole is a wretched *canard*. In case, however, the periodical in question should not be procurable, I beg leave to add the following extracts, which more especially bear reference to his query about the habits of the reptile. The article commences, "To the Editor,—Sir—A rare bit of penny-a-lining, copied from the *Liverpool Daily Mercury*, has been going the round of some of the newspapers under the above heading, which must, indeed, excite the consternation of our American cousins who dwell in the land of the rattlesnake. Such nonsense is not worth repeating in our columns, but people are in general so very ignorant about snakes that they will believe anything said of them, no matter how absurd the exaggeration. Be it understood that the rattlesnake is a sluggish reptile, by no means rapid in its gait, and most easily disabled by a blow on the spine. It does not spring its rattle when in the act of progression, and one that had really got loose would immediately make for the nearest retreat, and be somewhat difficult to dislodge therefrom. . . . . 'On arriving opposite the caravan containing the bonassus—an immense animal, weighing upwards of two tons [the weight of a fine bull of its kind, *i.e.*, the American bison, being about 14 cwt.!], the rattlesnake made a spring, fastened (!) on the bonassus, and hit it in the left nostril. The reptile then let go its grip [grip!] and shaking its rattles(!) glided through an opening between two of the caravans, where some of Mr. Mander's grooms were filling a cart with straw. To this cart was attached a fine horse. The rattlesnake fastened (!) on the off-fetlock of the horse, which immediately plunged and reared to such an extent as to shake the reptile off (!), and before it could move away it was crushed to pieces beneath the hoofs of the horse.' Of course the two large quadrupeds died in the course of a few minutes, in frightful agonies, 'and were buried in a field just outside Tunbridge Wells in the latter part of the same day.' . . . . So many parts of the story are palpably false, that we incline to disbelieve the whole of it. It is not true that any snake holds on with a 'grip' like a bull-dog. The stroke and the withdrawal of the fangs are instantaneous; and that a rattlesnake with its fangs extracted would kill a mature bull bison and a fine horse in succession, may do very well for people who have not the necessary knowledge to criticise, but it is quite incredible to the naturalist." A few parts have been omitted in the above extract, but the pith is there, and emanating as it does from the pen of one of the first zoologists of the day, I offer no apology for so long an extract, as it may serve to dispel doubts in the minds of other inquirers besides "C. M.," who are credulous enough to believe all they read, and do not, as in your correspondent's case, notice facts when at variance with their own experience or what they have read.—*R. B. Sharpe, Zoological Society of London, Hanover Square, W.*

N.B.—The bison is still alive, at Mr. Rice's, being in perfect health last week (September 3).

Worms—to Quit.—Can you inform me how to get rid of worms which are ruining the grassplots of my garden?—*J. W. W.*

The Chameleon.—"H. S." inquires whether the chameleon is oviparous or viviparous. The following quotation from "Clermont's Reptiles of Europe" will furnish the reply. "The female lays about thirty eggs in a hollow in the ground, and covers them over with loose earth." Apropos of the geographical range of this reptile, the same author remarks, "Its geographical range extends along the entire of the African shores of the Mediterranean, but is confined to the northern portion of that continent." Hence it is not a native of the Cape of Good Hope, as "H. S." believes.

Rotation of Embryo in Gastropods.—Will you kindly inform me whether or not any researches have been published concerning the development and rotation of the ova of the Limnæa stagnalis (fresh-water snail), or of the Planorbis? If the interesting changes which occur during the egg state of these animals have been described, perhaps you will kindly inform me in your Notices to Correspondents where I may find such a description, and by whom this subject has been treated.—*M. A. P.*

Answer to "M. A. P."—Few points in the development of molluscs have received more attention than those relating to the rotation of the embryo of the lung-bearing Gastropods, and the genera Lymnæus and Planorbis have been especially studied in this particular. Carpenter in his "Microscopy" refers to the rotation, and most English writers on Comparative Anatomy have described the phenomenon. I cannot call to mind which of our English zoologists has gone minutely into the question, but if my memory serves me, there have been papers on it in the earlier numbers of the *Microscopical Journal*. Abroad, it has formed the subject of several valuable memoirs, of which the following may be referred to by "M. A. P." with advantage:—

On *Lymnæus*, by Prevost, in the Annales des Sciences Naturelles, xxx., 1833, p. 40.

On *Lymnæus* and *Planorbis*, by Dr. Quatrefages, in the Annales des Sciences Naturelles, ii., 1834, p. 107.

On *Planorbis*, by Jacquemin, in the Annales des Sciences Naturelles, v., 1836, p. 117.

On *Lymnæus*, by Pouchet, Annales des Sciences Naturelles, x., 1838, p. 63.

On *Lymnæus*, *Planorbis*, and *Helix*, by Rathke, in Frorieps Neue Notizen, xxiv., 1842, p. 161.—*H. L.*

Incarcerated Frogs.—Does not the paragraph thus headed (p. 207) refute itself by its own inconsistencies? Bones are solid, muscles not transparent, but man exaggerates much, and believes much. Such correspondents act wisely in withholding their names. As a satire, the paragraph might pass. Can it be aught else?—*C. M.*

Disguises of Insects.—The perusal of the article thus entitled in Science-Gossip led me to institute a very simple experiment. I enclosed some caterpillars of the small white butterfly Pontia Rapæ in two boxes, one black and the other white in the inside; the consequence was that the colour of the chrysalis was modified to suit the colour of the box. I am aware that the chrysalis in question does not invariably assume the hue of the surface to which it is attached—as, for instance, I have seen nearly a white chrysalis on a black wall, yet generally the darker the surface, the darker the chrysalis. It would be interesting to learn how far this is true of other butterflies.—*Harry C. Leslie.*

Cleaning Diatoms.—I shall be very greatly obliged if you will favour me with a word of instruction as to the cleansing of diatoms. In common with several friends beginning the study, I have been attempting the preparation of diatoms, both fossil and otherwise. We are all in the same difficulty, and it still remains, after using all the processes described in Mr. Davis's book of instructions. After boilings in sulphuric, hydrochloric, and nitric acids, and following every direction given, our diatoms are still mixed with a kind of *flocculent matter* of which we cannot get rid. Water washings and separations of every kind we can devise are all of no avail.—*W. Winsford.*

Death's-Head Moth.—I have several times had the larvæ of the Death's-Head Moth brought to me. Last year, as I had previously done, I put a larva of the above in the garden, under a glass cover, with some potato-leaves. In two or three days it buried itself. After waiting about a fortnight, I took the pupa out of the ground; and as I held it in my hand, between my forefinger and thumb, it made the same shrill, squeaking noise as I have heard the perfect insect make. The sound it made was similar, but much fainter.—*W. F. Foottit, Newark, Notts.*

Death's-Head Larvæ.—I expected to see in your last month's issue of Science-Gossip an answer from some of our leading entomologists to the remarks of your correspondent as to the power which the pupæ of A. atropos have to produce noise. The only authority which he mentions for this fact is Newman, but it has been recorded by many others, amongst which are De Geer, Fuessly, Reaumur, Kirby, Spence, &c., some of whom your correspondent will do well to consult before expressing his doubts on the subject. Having myself heard this noise, I trust a short account of my own observations may not be uninteresting to your readers. Last season I had a large number of the above species dug up, amongst which was a very large and fine specimen, which, however, was unfortunately injured, having a small crack in the cephalotheca or head-case, although so small that but little matter exuded from it. Thinking that I might save it, I tied some lint carefully over the crack, and in a day or two the injured part was quite healed. The other pupæ were removed to the breeding-cage, and being buried I had of course no chance of hearing whether they made a noise or not, but the one that had been injured I kept in a little damp moss, for the purpose of seeing if it would recover. In this position it was kept for about two months, during which time I repeatedly heard the noise which your correspondent doubted. On being touched it would emit a noise resembling the chirrup of a grasshopper. After remaining in this state for the time before mentioned, it gave up the ghost, much to my disappointment. The means by which this noise is made is simply by the pupæ elongating and contracting their cases, the noise being produced by the sudden snap of the rings resuming their original position after the contraction.—*A. Mercer.*

The Death's-Head Moth (*Acherontia atropos*).—I have during my entomological experience had dozens of larvæ—of all sizes—of this interesting and peculiar species. I quite agree with Mr. Newman and other authors that in three stages of its metamorphosis it has the power of producing a noise. The larva turns its head from side to side with great quickness, as if by a spring, when disturbed, and during this contortion I have frequently heard a sort of snapping noise; however I have observed that some larvæ *never* make the noise, and others only occasionally, though all have the twisting motion of the head; so the sound must be a voluntary peculiarity of the larva. I have once or twice heard the pupa squeak, but in each case a moth was produced from the squeaking pupa in a few hours after. Before the moth emerges, the pupa will often appear upon the surface of the ground, caused I suppose by the movements of the enclosed imago.—*G. B. C., Ringwood.*

Pupa of Death's-Head Moth producing Sound.—I see in your pages a discussion as to the ability of the pupa of *Acherontia atropos* (Death's-Head Moth) to produce sound. One season I had a very large quantity of these pupæ; they were laid on the surface of soil in a box, and covered with damp moss; they were kept in the corner of a warm room to facilitate the exit of the imago. Many a time did the pupæ "squeak," although more faintly than does the perfect insect, and it was noticeable that this usually occurred shortly prior to the appearance of a moth. On first hearing these sounds we concluded that an imago had emerged; not, however, finding any on the sides of the box, we sought among the moss, but without success. After a few such occurrences, we became aware that the sound preceded an exit of a perfect insect. It was a usual remark, when the sound was heard by those in the room, that "another moth will soon be out." Of course no one now doubts the ability of the imago to produce sound; we could at any time elicit the "squeak" by giving the moth a poke, or by otherwise annoying it.—*George Gascoyne, Newark.*

Death's-Head Moth.—Some correspondents in your last number expressed a doubt as to whether the larva and pupa make any noise. I cannot answer for the latter, but I have frequently heard a sound from the caterpillar. It was generally short and abrupt, like the tick of a watch, but sometimes more prolonged. I could always induce the creature to make the noise by touching it rather smartly with my finger about the middle. It nearly always turned its head round at the moment the sound escaped. The noise made by the imago is much longer and shriller, and might really sometimes be called a "shriek."—*Henry Ullyett, Folkestone.*

Preserving Objects.—Can any of your readers give me a recipe for preserving insects? I want to keep them from summer until winter in some way that will keep them moist (and not injure them), so that they may be dissected and mounted for the microscope as if fresh killed. I have tried spirit, spirit and water, and also turpentine, but without much success. The spirit seems to do best, but it injures some insects very much. If the object is dried, I cannot succeed in softening it, so as to make it like a fresh-killed one. I should not trouble you, but I cannot get this information, and I am sure many of your readers must have felt the want of some ready way of disposing of newly-caught insects when time will not allow of their being dissected at once.—*C. L. J.*

Preserving Spiders.—Can you or any of your correspondents tell me the best way of preserving spiders, so as to keep them from shrivelling up, and retain their markings?—*B. W. S.*

As Dead as a Herring.—The following extract from "Anderson on the State of the Hebrides," is quoted in "Selections from the Portfolio of the late John Brady, Esq." (London, Whitaker, 1826). "The herring is a delicate fish, which is killed by a very small degree of violence. Whenever it is taken out of the water, even though it seems to have received no hurt, it gives a squeak, and immediately expires; and though it be thrown back instantly into the water, it never recovers. Hence arises the proverb 'as dead as a herring.'"—*R. A.*

Coloured Labels.—I am glad of an opportunity to endorse the remarks made by "B. W. S.," p. 239, respecting the desirability of attaching coloured labels to specimens in Museums, the colours being intended to designate different portions of the earth's surface. The plan is, I believe, in general use in France, if not everywhere on the Continent, and I have before now been struck by its great utility. Each of the main divisions of the globe is marked by a special colour; say, yellow for Asia, black for Africa, and so on. The principal countries are made prominent by bars or squares, or some analogous markings of a different colour; for example, a red bar on a black ground might designate Egypt. Tables of the colours, and of the lands which they symbolise, are suspended in conspicuous parts of the room. It is astonishing how much the sight aids the memory in fixing the locality of any given object; for of course the eye, and through it the brain, is much more quickly and deeply impressed by a piece of bold colouring, than by a single name printed or written in one corner of a card. It frequently happens that students, either for the sake of comparison, or some similar purpose, wish to investigate the Fauna of a single country or district only. To such the plan is invaluable, as the eye catches almost at a glance the reds or blues, or whatever it is in search of, passing by without an effort the colours in which it is not interested. I think that curators of museums would do well to turn their attention to this simple, but very efficacious, aid to knowledge. —*W. W. S.*

The Harvest Moon.—The following considerations may help your querist C. T. Richardson to comprehend the phenomenon of the harvest moon. The moon rises later and later every night, as is perfectly well known, on account of her own proper eastward motion among the stars. It is also familiar to most people that in our latitudes objects on the same hour circle rise sooner as their declination is further north. Let us now, for simplicity of explanation, suppose that the moon moves in the plane of the ecliptic. If your correspondent will trace this circle on a globe, he will find that the arc of it comprehended between the vernal and autumnal equinoxes is all to the north of the equator; so that, starting from the vernal equinox, our satellite is acquiring more and more north declination on each succeeding night. The sun, then, being in the autumnal equinox, of course the *full* moon will be directly opposite to it, or in the vernal equinox. As she travels eastward from this, such motion must evidently retard her rising; but it will be seen that she is also travelling northward, which accelerates it, and it happens that these two effects almost neutralize each other for two or three days, when the moon is about the vernal equinox. She then of course rises for these two or three nights at very nearly the same hour. Now, the moon can only be full in the vernal equinox—as I have said, when the sun is in the autumnal equinox; and this can obviously only happen in our harvest month, September. Hence the term "harvest moon." Of course this rising of the moon at nearly the same time for two or three consecutive nights occurs at every lunation, but as she is not at such other times nearly full, it attracts no observation. In the foregoing description I have assumed that the full moon occurs at the instant of the equinox, which it very rarely does; and that the moon's path coincides with the ecliptic, while she really moves in a curve inclined some 5° to it; but these suppositions, as will be easily seen, in no way affect the principle on which the phenomenon is explicable.—*F. R. A. S.*

The Maelström.—In reply to your correspondent's inquiry on the above head, so very various are the accounts given by different travellers of the Maelström (or grinding stream) that it is difficult to arrive at any positive conclusion as to its real magnitude. There is, however, no doubt of the existence of this strange whirlpool, the dangers of which have been perhaps much exaggerated. It is probable that the many traditions of Norway have lent their aid to throw a halo of mystery over its dark waters. The Maelström is situated between two of the South Lofoden Islands, lat. 67° 68′ long. 16°. Lord Dufferin, in his "Letters from High Latitudes," mentions his anxiety to visit this far-famed phenomenon. He appears to have approached the Maelström, but owing to the fearful height and raging of the waves, his little vessel had to stand out to sea to prevent its being swallowed up in the vortex. Bayard Taylor, in his "Northern Travels," referring to the Maelström, says that "it is the general opinion that some of the rocks, which formerly made it so terrible, have been broken away, or that some submarine convulsion has taken place which has changed the action of the waters." Weighing the various grains of information which we can gather together, we may conclude that the Maelström is a whirlpool of extraordinary violence (produced by *cross* tidal currents and sunken rocks), which in an agitated state is most dangerous to small craft venturing in too close proximity; but the stories of ships not being able to venture nearer than seven miles may be regarded as quite fabulous. —*H. Allingham.*

Crickets.—I have crickets in my house; they must leave it or I must. Can any of your readers tell me how to get rid of them? Two months ago I had not one—now they are killed by the dozen, and still their numbers increase. In the early numbers of Science-Gossip, several of your correspondents told us what they eat, and very interesting was their information, particularly to those who "haug them up in cages to sing" (page 84); but they can imagine how much more interesting to me would be the information I ask.—*Geo. B.*

Foraminifera from Shells.—A few days ago, while looking at a Conch shell purchased from a stall in Brighton market at least three years ago, a few grains of a white substance dropped on my hand from a small cavity in the shell, containing about half a teaspoonful of what appeared to be sand, which, on examination under the microscope, proved to be nearly all various forms of Foraminifera. An examination of the foreign shells in the possession of the readers of Science-Gossip will probably furnish them with similar treasures.—*J. Wheatley, Lewes.*

NOTICES TO CORRESPONDENTS.

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

J. G.—We are of opinion that if tobacco possesses any disinfecting properties at all, they are exceedingly minute. Many believe that camphor and tobacco smoke are either of them disinfectants. It is undoubtedly a popular error in both cases. If the only defence which a smoker can advance in favour of his pipe is its disinfectant power, we fear that logically he must give it up.

W. M. C.—Impossible to tell, from its crushed condition, what the insect is.

W. R. F.—The moss was undoubtedly *Funaria hygrometrica*, which is very common.

E. C. J.—We have no knowledge of the name.

J. B. L.—The American Moth Trap was fully described and figured in *Entomologists' Monthly Magazine*, vol. ii., p. 199.

C. H. G.—The Domestic Barometer you describe is much more general than you suppose. We saw it in use in Norfolk many months ago.

M. A.—We do not know the Coccus on ferns as a species peculiarly attached to those plants, it is very like the species found on the rose, and may have strayed by accident to the ferns from some other infested plant.—*I. O. W.*

A. M. E.—We are not aware that any are published.

C. A. J.—Two or three species of Serpula have the tufts banded with blue. Animals in aquaria require little or no feeding. Lean raw meat in small fragments is recommended.

E. B.—Don't trouble about feeding them, especially if the tank is large, and not overstocked.

J. G. A.—It *is* a gall, but what insect produces it we cannot inform you; probably a species of Cecidomyia.

H. T.—Consult "Bechstein's Cage Birds," or "Beeton's Home Pets."

M. C. T. S.—The Maidenhair Spleenwort is a troublesome fern under cultivation; at least around London.

C. L.—Common as swallows in summer.

B. L. W.—The subject was so extensively commented upon in all the Natural History journals, a year or two since, that we cannot afford space to repeat it.

T. L. D.—We cannot afford to guess.

B. G.—We had received a copy of the "List of British Insects" from the author when we made the announcement. The publisher's name was erased, but the author afterwards replied to a querist that it was published by Longmans. Beyond this our own knowledge does not extend.

F. C. W.—Nos. 1 and 2, Diatoma elongatum. 3 and 4, Diatoma vulgare, front and side views.

Sea-horse (*Hippocampus*).—We are informed that Mr. King, of Great Portland-street, has some of these singular fish, "all alive," which those who are interested therein should take an early opportunity of seeing.

W. D. R.—The Beetle is *Phratora vitellinæ*.—*L.*

J. G.—We are afraid that the address is mislaid.

J. W. I.—The species of Aregma on Rose, raspberry, and wild strawberry often approximate very closely to each other. Too much reliance must not be placed on the figure of a single spore. Some authors unite the rose and raspberry brands under one species. Yours is *Aregma gracile* if they are really distinct.

H. G. L. D.—1, *Achillæa*. 2, Five shillings.

EXCHANGES.

Good British Lepidoptera for good exotic shells.—Send lists to W. Cash, 14, Clarence-street, Halifax.

Foreign Land Shells for good British marine.—E. C. J., Eldon Villa, Redland, Bristol.

Silurian Corals and Fossils in exchange for Ammonites or fossils of other formations.—H. M. Gwyther, Whittington, Oswestry.

Todea pellucida (seedlings) for any other Todea, except *barbara* and *Africana*, or any *Hymenophyllum* except *Tunbridgense*.—H. J. Charlton, 2, Richmond-grove, Everton, Liverpool.

British Plants.—Ajuga chamæpitys, Spiranthes autumnalis, Phy. orbiculare, and others, for local species, especially Scotch and Alpine.—W. R. Hayward, Heath Villas, Penge.

Microscopical Journal.—Early numbers for microscopic objects neatly mounted.—M. Webb, bookbinder, Ventnor, Isle of Wight.

Pupæ of F. conspicuata for good British Lepidoptera, or pupæ of the same.—W. M. Cole, 93, St. Helen-street, Ipswich.

Taranaki Steel Sand for other objects.—E. M., 6, Holford-square, Pentonville, W.C.

Wrentham Deposit.—Good slides in exchange for other good objects.—W. Freeman, 2, Ravensbourne-hill, Lewisham-road, Greenwich.

Macroglossa stellatarum, A. bucephala, or Arge galathea, for Thecla quercus or Leucophasia sinapis.—James Glass, Chipping Norton, Oxon.

Cast Skins of larvæ of Day fly (mounted) for other mounted objects of interest.—W. Blackburn, 1, Portman-street, Whalley Range, Manchester.

Lada ovum and Kynchonella tetrahedra from the lias, and spines of Cidaris from great oolite, for small fossils from other formations.—E. W., 21, West-street, Banbury.

Good British Land Shells for Limnæa glutinosa, Unio margartiferus, &c.—Thos. Ball, Brigg, Lincolnshire.

Monstera deliciosa.—Pollen. Stamped envelopes, addressed to Charles T. Parsons, Portland-road, Edgbaston.

*** Announcements of Exchange will not be inserted in future unless written in full (with the scientific names distinct), and in the form in which it is desired that they should appear. Only objects of Natural History are eligible, and the paragraphs should not exceed three lines of printed matter.

BOOKS RECEIVED.

The Quarterly Magazine of the High Wycombe Natural History Society, No. VI., October, 1867. Wycombe: W. Butler.

Hooper & Co.'s General Autumn Catalogue. Covent Garden Market, London.

"The Naturalist's Circular," No. XVII., October, 1867. London: Henry Hall.

"Country Life," Nos. VII. to X., October, 1867. London: Bolt-court.

"Everybody's Year-book," a Popular Annual for 1868. London: Wyman & Sons.

Communications Received.—G. M.—W. W. S.—F. T.—W. M. C.—T. H. H.—W. R. F.—M. J. P.—W. G. S.—H. D.—C. W.—W. R. H.—W. B. (Limerick).—C. A. J.—J. G.—J. W.—H. R.—A. M. E.—H. J. C.—E. T. S.—J. W.—C. W. B.—J. T. Y.—R. A.—L. L.—F. K.—E. C. J.—J. C. W.—C. D.—J. B. L.—C. D.—M. A. L.—R. T.—T. J. S.—G. G.—J. B.—C. J. T.—T. H. M.—J. B. W.—H. M. G.—W. C.—W. C. C.—J. W. W.—G. Green.—H. E. W.—C. H. G.—J. R.—G. B.—R. B.—E. S.—F. S.—H. W.—W. T. H.—E. T. S.—W. W.—L. L.—T. L. D.—S. B. M.—J. H.—T. B.—F. A.—J. C. H.—C. A.—H. G.—A. C.—E. B.—E. W.—E. J. L.—B. L. W.—W. B.—K.—C. L.—S. M.—T. R.—M. C. T. S.—W. D. R.—B. G.—J. B. B.—H. T.—J. G. A.—J. G.—W. F.—B. (no!)—K. Teignmouth (not eligible)—J. R.—H. J. B.—F. W. C.—W. H.—E. G. M.—C. N.—J. F. O.—W. J. S.—J. W. I.—W. B.—H. G. L. D.—H. G.—C. T. P.

IDES BRUMALIÆ.

THE last rose of Summer, with all its perfume and pleasant associations, has shed its fragrant petals on the damp cold earth; and the fading leaves,

> That with their rich variety of shades
> Made yonder forest in the slanting sun
> So beautiful,—

are whirling in a "dance of death" over the bare fallows. The air is crisp, the breeze is keen, and

> There is a fragrance in its breath
> Which is not of the flowers, but death.

The sights that attract the eye, the sounds that greet the ear, and the odours that invade the nose, all declare

> That there hath passed away
> A glory from the earth.

Myriads of insect forms which lately thronged the air have retired from active life. A solitary Dragon-fly flits now and then, ghost-like and grim, through the fitful gleams of pallid sunshine. The Thrush and the Blackbird are mute, and the Skylark trills an intermitting lay. The Hooded Crow and the Coddy-moddy Gull stalk in stately silence over the gossamer-webbed fields. Spring, with its smiles and tears, its toils and hopes; Summer, with its glowing vigour and glorious promises; Autumn, with its anxious cares and rich enjoyments, are all gone, all passed away; and Winter, boisterous in his exultation, rushes over the hills, down into the valleys, and away through the woods, wild with glee at the prospect of a coming time when he shall be monarch of all he surveys. Have we not already seen him on the hill-tops, shaking the folds out of his ermine mantle, and heard him crashing through the dank woods, shaking down the brown nuts, snapping the dead branches, and tossing the red rustling leaves from his path? Have we not felt his cold hand on our shoulder, and, shuddering, said, "Yes, the Winter is here?" Did we not love the blooming Spring, with its bursting buds, fragrant Violets, and yellow Primroses? Did we not rejoice when we first saw the Spotted Arum, and caught a playful young zephyr tolling the purple clapper

> That hangs in its clear green bell?

And did we not laugh outright when the Hawthorn donned his mantle of odorous blossom? And did we not love, too, "the thousand charms belonging to the Summer's day"—the sweet birds carolling the morn, the fresh breeze laden with the odour of new-mown hay, the glowing noon with its glittering swarms, the beauteous flowers, the rich green leaves, "the voices of the forest range, and the music of the rill"? And when Autumn came, did we not love it, too, with its broad rich fields of yellow grain, its rich ripe fruits and gorgeous foliage? Did we not stay to hear the soothing hum of "the yellow Bee in the Ivy bloom"? Did we not revel in its crisp cool air and yellow light, its glorious days and just less glorious nights?

But now

> The warm sun is failing, the bleak wind is wailing,
> The bare boughs are sighing, the pale flowers are dying.
> And the year
> On the earth, her death bier, in a shroud of leaves, dead
> Is lying,

slain by the ruthless hand of pitiless Winter, and her garments, once so beautiful, are torn from her corpse, and scattered in tatters, stained by the sanguinary fingers of her destroyer! How can we welcome him, or how can we rejoice at his coming, for does he not drive away joy and gladness from the earth, and bring desolation and death?

> Behold, fond man,
> See here, thy pictured life; pass some few years
> Thy flowering Spring, thy Summer's ardent strength,
> And pale concluding Winter comes at last,
> Thy sober Autumn fading into age,
> And shuts the scene.

And though at all times in the midst of life we are in death, Winter is still the time of death, as death is the winter of our lives; aud as in proportion to our love of Summer must be our sorrow at its departure, so in proportion to our love of life must we look forward to its termiuation with regret. The fear of death is but the complement to that desire for self-preservation which He who made the beating heart implanted there, and,

> Whatever crazy sorrow saith,
> No life that breathes with human breath
> Has ever truly longed for death.

Midst racking pains and overwhelmiug griefs, death may, and often does, appear the lesser evil, but

> 'Tis life—whereof our nerves are scant,
> Oh life—not death, for which we pant:
> More life, and fuller, that we want.

But death will come, as came the Winter, surely, inevitably; and as we

> See the leaves around us falling,
> Dry and withered, to the ground,

the salutary warning is refreshed in our minds, "Work while it is called to-day, for the night cometh in which no man can work." W. C.

LICHEN-DYES.*

I DESIRE particularly to avail myself of the present opportuuity of directiug the attention of this section of the Association to what I am compelled to regard as the present *unsatisfactory state of the chemistry of Lichens*—more especially of the Lichen-dyes. I have studied the literature of this subject for nearly twenty years, aud my inquiries have led to the conclusion that—

I. The results obtained by analysts are—frequently at least—not stated with due perspicuity.

II. The nomenclature of the various colorific or other principles is most confused.

III. What are apparently the same priuciples are described uuder different names by differeut authors.

IV. Error and confusion have arisen in some measure from the inaccurate determination of the botanical species operated on.

V. There is a want of concentration and classificatiou of the results obtaiued in Britaiu and the Continent up to this date, with the desirability of a uniform and simple nomenclature.

VI. There is room for a new series of researches to be undertaken conjointly by competent chemists aud lichenologists, so that the one may assist or correct (as the case may be) the other.

There is every reason for believing that orchill will *not* be superseded by the coal-tar or other dyes; and that the Lichen-dyes are of sufficient importance to commerce to merit an exhaustive examination by modern methods of research. I am persuaded the result would be to raise still higher the comparative place or value of the Lichen colouring-matters among accredited commercial dyes, and to develop and utilise some beautiful colours which have been hitherto ignored (such as the brilliant reds produced from parietinic acid by the action of potash).

It is not irrelevant, I think, here to express the opinion that our two International Exhibitions were most useful in indicating distinctly the past and preseut—and, to a certain extent also, the future—applications of Lichens to the purposes of the dyer or colorist; aud the same is probably true of the similar Expositious at Paris. But I regret I cannot speak in the same terms of commeudation of the illustrations of Lichen-products contained iu our priucipal public museums. The Museums of Economic Botany at Kew and Edinburgh, the Technological Museum of the Crystal Palace, the Museum of Scieuce and Art, Edinburgh, and the Museum of Irish Industry, Dublin, as well as minor museums in various provincial towns, contain suites of specimens illustrative of the pictorial applications of Lichens. Of these, the best I have seeu is that of Kew. But in none of the museums which I have visited have I found the illustrations in question properly cared for or arranged: in none is there what I cousider as anything approaching a fair display of the colorific value of Lichens. In the majority of instances the fluid dyes are destroyed from want of due aëration or oxygeuation, apparently; many colours are faded from undue exposure to light; mauy articles are *un*named, while others are wrongly named. In a word, there is a necessity iu all cases for rearrangement by a lichenologist possessed of competent chemical knowledge. Moreover, marvellously few are the standard works of reference, whether technological, chemical, or botanical, which contain correct accounts of Lichens, their products and applications. Even the rceeutly issued "Treasury of Botany" perpetuates obsolete terms and exploded errors which only serve to confuse aud mislead the studeut.

* Being the concluding paragraphs of a paper "On the Present Uses of Lichens as Dye-stuffs," read before Section B (Chemical Science) of the British Association at Dundee, in September last, by Dr. Lauder Lindsay, of Perth.

The Study of Nature.—From the schoolboy to the philosopher, all grades find in it something admirably suited to their minds. It brings us iuto closer presence of the great mysteries of life; and while quickening our sense of the infinite marvels which surround the simplest object, teaches us mauy and pregnant lessons which may help us through our daily needs.—*Lewes' Seaside Studies.*

THE "UNITY" CONTROVERSY.

YOUR correspondent, "R. G.," complains, in the November number of Science Gossip, that I have not been successful in answering Mr. Milton's objections to the theory propounded in the May number. I will now, with your permission, attempt to satisfy his cravings, and likewise pass a few criticisms upon the theory which he would substitute for mine. I should like to state, however, before commencing, that I in no way lay claim to originality in the few remarks which have excited so much animadversion; my desire was simply to put old truths in a new light.

In support of the time-honoured idea that the different races of mankind sprang from one pair, as stated in the Book of Genesis, and that the subsequent differences in colour and *physique* arose from the combined influence of solar heat and other external agencies, exerted during a long series of years, I adduced the cases of the Arabic, Jewish, and Indo-Circassian nations, all of which have a small minority of dark, and a large majority of white, tribes amongst them.

I attempted to deduce from this undeniable fact that it was the minority which had changed colour, solely on account of the circumstances in which it had been placed; for intermarriage with other races has been, in every one of these instances, strictly forbidden. To this very plain and intelligible argument, Mr. Milton gave the following answer:—"It (history) does not tell us whether the Jews of Cochin were or were not black when, at the mandate of Nebuchadnezzar, they went forth from the land of the Euphrates to settle in Malabar." Now, this is scarcely an ingenuous reply, for Mr. Milton must know that the colour of all the Shemitic races, as represented on the walls of the Nineveh palaces and on the Egyptian obelisks and temples, was not black, but a warm red-brown; and, just before, he had himself quoted these very monuments as undeniable authorities concerning the colour of the negro 2,400 years ago!

Again, to show how quickly changes in the colour of entire races might be effected, I cited the fact that all along the west coast of Africa, the tribes on the coast were becoming extinct, and fresh tribes pouring in from the interior, and changing in colour from brown to black on deserting their native highlands—a result particularly noticeable according to Mr. Winwood Reade, a well-known African traveller, amongst the Camma and Foulah tribes. Mr. Milton could not disprove this, but only replied by a sneer—intended, I presume, to depreciate the value of Mr. Reade's evidence. Now, as Du Chaillu, Burton, and, indeed, almost all who have visited this coast, mention this fact, it requires something more than mere flippancy to explain it away.

Since writing the above, I have met with the following confirmatory evidence in Mr. Charles Brooke's work, entitled, "Ten Years in Sarawak." That gentleman says, on page 71, in reference to the Dyaks: "The colour of their skin varies considerably, *not so much between one tribe and another, as in various localities;* and whether it be attributable to different kinds of water, or food, or increase of shade from old jungle, is a question. But there is no doubt that all who reside in the interior are much fairer than those who have moved towards the mouths of the rivers, *and a very few years* is able to effect the change of appearance."

A third consideration which I brought forward, *i.e.*, that my theory was the only one which accounted for the presence of brown adults amongst black races, the brown individuals being generally found in the highlands, was completely unnoticed. May I beg Mr. Milton and "R. G." to devote their best attention to this point?

Mr. Milton cites the case of the "gipsies" to prove that races do not change colour by changing climate, saying that "their residence here extends beyond historic times; yet climate has as little assimilated them in complexion as in temper." Mr. Milton is very unfortunate in this venture, for it happens that the gipsies, according to the best authorities, did not enter England, or, indeed, western Europe, till about A.D. 1427, when they pretended to have letters commendatory from the King of Hungary. Then, as to the last part of the assertion, may I not fairly retaliate in the style adopted by Mr. Milton, when treating of the Malabar Jews? How do you know what their colour was when they arrived? and how can you prove that their complexion has *not* been modified by residence in our climate?

But while Mr. Milton is satisfied with demolishing, or attempting to demolish, my humble theories, "R. G." boldly endeavours to raise his own upon their ruins. Certainly, he is candid enough to confess his do not agree very well with Revealed Truth; but then they combine the amiable characteristics of consoling the black (inferior) races, and flattering the *amour propre* of the white (superior) nations.

Let me give them in "R. G.'s" own words: "This is only one of the many arguments which convinces me that man differs in species, and not in variety only. Is it not more in accordance with the idea of Divine justice to believe that several races of men have been created admirably adapted for the character and circumstance of their places of abode, &c?" And again: "I do not believe that any amount of education and training will ever give the negro the intellect of the European, any more than it will deprive him of the capability he possesses of withstanding the malarious influences of his native climate."

In these extracts, "R. G." evidently declares

himself a believer in different centres of creation for mankind, as well as for animals and plants. That is, he thinks that every distinct race had its own Adam and Eve. But then the following difficulties suggest themselves. Did *every* race have separate progenitors? What are the limits of this theory? If the black and white were separately created, why not also the fifty different coloured tribes to which "R. G." so touchingly referred in enumerating the difficulties of my hypothesis? And if "R. G." concedes this, how can he account for the universal diffusion of legends recording "the descent of mankind from one pair," "the deluge," "the confusion of tongues," &c.? But if he repudiates the design of carrying out his theory to such extremes, and allows that climate *has* power to modify races, then he adopts the principle for which I contend, and our difference becomes no longer one of essentials, but only of degree.

"R. G." says, as I have shown, that you can no more educate the negro up to the European standard, than you can deprive him of the power of resisting his own unhealthy climate. But is this true? On the contrary, as has been shown in several letters to the *Times*, the black troops brought from the West Indies, to join in the Ashantee war, had so completely lost the power, which their ancestors possessed, of resisting African fever, that there were actually more black than white soldiers disabled by disease! It is well known that the average duration of the negro's life in America is far longer than that enjoyed by his relative at home, and that his *physique* is much more strongly developed. These facts, then, seem to prove that "R. G.'s" theory is not correct; they seem to show that the negro *will* bear removal from the place of his birth as well as any other human being; and that, therefore, there is no ground for believing he was created only to inhabit his native land. Again, "R. G." denies that great solar heat, an unhealthy climate, and complete isolation would produce a race marked by strong physical peculiarities. On the contrary, he avers that a race subjected to such conditions would die out; and further says that "unhealthy climate" is merely a comparative term, meaning "a climate uncongenial to white men." In order to show "R. G." that I am by no means peculiar in the opinion he so flatly challenges, I subjoin the views of Professor Huxley, extracted from a lecture delivered by him at the Birmingham and Midland Institute, October 11, 1867. He said,—"Now and then a group of men were shut off for thousands and thousands of years in a limited area, under peculiar physical conditions. Within the epoch immediately preceding our own—when the fauna and flora were what they are now—the whole of the southern part of Africa was a vast island, like Australia. It was perfectly certain that for untold ages the great sandy desert of the Sahara was the bottom of the sea continuous with the Mediterranean. Imagine, in the course of these changes, a stock of men shut off, and mixing with themselves only for untold ages, and at length hardening down into something like what were called races among animals. Imagine another lot shut off in a different part of the world—in Australia; another in South America; others in Hindustan; and the result would be distinct breeds originating even from one homogeneous kind of men. These breeds were, he believed, what were now known as persistent modifications of mankind. They were persistent because they had persisted so long. They had become what they were in virtue of the selective influences of the different localities in which they were shut up." "R. G." will see in this a repetition, almost *verbatim*, of the assertions made, and illustrations used, in the August number of Science-Gossip. I, myself, cannot see how "R. G." can call unhealthiness a *comparative* term, since malaria and other air-poisons can suit no human constitution living, and certainly nowhere is human life shorter, and tribe-extinction more common, than on the malarious coast of western Africa.

"R. G." makes merry over my supposed doubt as to whether white or red was the original colour of man. I am inclined to think that the fact of the great primitive nations of antiquity being red or copper-coloured, proves that the original colour was white or yellow; that, as the more tropical and arid regions of the earth's surface were reached, it turned into red, and in isolated and low countries into a dark brown, very nearly approaching black. "R. G." says, why "may he (our progenitor) not have been black? and instead of the negro being a degenerated white man, may we not be improved negroes? If climate can degenerate, can it not regenerate?" I believe it can, and that the superior robustness and longevity of the negro in the New Continent to his own compatriot in Africa, is due to this. As to his preceding questions, perhaps the opinion of M. Quatrefuges, the celebrated French *savan*, may have some weight. He says, "All travellers who have lived in countries where only the negro race dwelt, have remarked that sometimes children were born of paler colour, less distant from the white type. This is to be explained by the influence of white ancestors, whose type reappears exceptionally amongst their negro descendants. This reappearance of the ancestral type is what is called *atavism*; and as black children are never found amongst the white races, it must be inferred that if the negroes descend from the whites, the whites do not descend from the negroes."* I think I have now answered most of the queries of "R. G." and Mr. Milton. I may add, in conclusion,—What is

* *British Medical Journal.*

the supposed use of this new theory of different centres of creation? It is opposed to the biblical account of the creation "R. G." acknowledges, and seems unnecessary to account for the universal diffusion of man. When we find the same races often speaking nearly the same tongues, inhabiting places so far removed from each other as Easter Island (near South America) and Madagascar (off Eastern Africa), the northern extremities of Europe and America, the Andaman Islands (in the Bay of Bengal), and the islands of Australia and Tasmania, the frozen regions of Rupert's Land, and antarctic Tierra del Fuego, we must see that no such theory as the one proposed is needed to account for the diffusion of mankind over the earth's surface. The wonderful similarity of customs and traditions, whether preserved and practised at the Arctic circle or in the torrid zone, the capabilities for locomotion and change of *habitat* possessed by all races in common, the identity of the physical conformation of mankind in all essential points, prove that man is homogeneous, and possesses, even in his lowest degradation, an intellect which is capable of high cultivation, and a power of deducing conclusions from experiences which the wisest brute does not share. These and other considerations amply prove to my mind, if not to that of "R. G.," not only the probability of, but the necessity for, a theory which insists upon the acknowledgment of "*The Unity of Mankind.*" F. A. A.

BUGS.

(*Acanthia lectularia.*)

VERY little appears to be known regarding the history and habits of our bed-bug; and as I was recently quartered in a room where there was an unusually large allowance of these creatures, and as the very thought of sleep was out of the question, I thought I would notice some of the habits of these appalling creatures, and send the notes on to Science-Gossip, in the hope of some other correspondents adding thereto. The wall of the sleeping-(?) room was papered with a white paper ornamented with spotty flowers. The first thing I noticed was that when the lamp was placed near the wall, to facilitate observation, the bugs, with one accord, scampered to the dark spots, and, there resting, became immediately invisible—in fact, they pretended to be spots, and not bugs at all; they evidently loathed *themselves*. Bugs, if hotly pursued on a perpendicular surface, let go their legs and drop to the floor. After taking a few steps, they either dip into crevices, or pretend to be heads of tin-tacks, or stains on the wood. They fall by a movement of the legs, and a slight upheaving of head and tail. The movement is instinctive; for when they are on a flat surface, I observed them make the same motions, evidently trying to *fall out of sight*. The velocity with which bugs can run is something incredible. When on a smooth surface, they are able to go at a terrible rate; but if they get in a blanket it is all over with them—the wool of the blanket gets entangled round their legs, and they make a poor hobble of it indeed. In the corners where the bugs most congregated I saw a good many corpses (bugs' corpses) and transparent skins. This leads me strongly to suspect that bugs are cannibals, and "do each other eat;" but as I saw none enjoying the pleasures of the table, I cannot say for certain. I noticed two or three invalids, fat indeed, but suffering from a disease that immediately reminded me of the autumnal fungus which attacks and kills flies (Sporeudonema muscæ). Whether this was the case or not, certain it is the bugs were marked with similar white powdery rings (I have recently read of a spider being similarly attacked). As I had a box of oil-colours with me, I thought I would give one or two a touch of spirits of turpentine; and I found they lived a long time (half an hour or more) when completely saturated in this elixir. I remembered hearing that salt and water was very fatal to bugs; I tried it, and found it produced almost instantaneous death. There are two sorts of bugs, varying in shape—one almost circular, the other very much longer. Can you tell me, Mr. Editor, whether these two forms represent the sexes? There is a certain odour attached to bugs, disagreeable (probably from its associations) to some people, but in reality aromatic, and far from unpleasant—indeed I know people who affirm the odour to be very agreeable. Many persons cannot detect it at all, so delicate is it; whilst others can discover the presence of bugs in a room by the scent alone. A few days ago I found the curious bug-scented Agaric (Lactarius quietus) in Epping Forest. The odour of the specimens found was very strong, and represented the concentrated "otto of bugs." In neighbourhoods where bugs abound, what becomes of the defunct creatures? I have been told, but I do not know it for truth, that sometimes when the flooring boards of dirty old houses are taken up, the spaces between the joists are completely filled with dead bugs, which the labourers have ere now removed in solid masses with spades, and carted away. Notwithstanding that every precaution is taken, bugs will now and then put in an appearance in houses where the utmost cleanliness is observed, and if not soon routed, they speedily establish a colony. A day or two ago I saw one in a freshly-opened newspaper. They are not uncommon, associated with lice, in and upon 'busses and cabs; on the seats in the parks the latter are common enough. In some warehouses in the city bugs are abundant; some shops are positively swarmed with them. They are very liable to be imported into new and clean dwelling-houses unless a strict watch be kept.—*W. G. Smith.*

FANGS OF SPIDERS.

"The point envenom'd too!
Then, Wenham, to thy work!"
Hamlet, Act v., Sc. ii.

NO character so bad but an apologist may be found for it: those wily murderers the spiders have an advocate in "E. T. S.," who is retained to prove them innocent of all poisonous intention or ability. But the case is a bad one; for the criminating evidence—both direct and circumstantial—is overwhelming.

As a modest witness for the prosecution, permit me to state briefly what I have done and seen, aided by that able detective, Wenham's Binocular. I took a female garden spider (Epeira diadema), soaked it in weak spirit and water for a fortnight; drew the mandibles from their half-rotten attachment, and found, protruding from each basal joint, broken filaments of muscle, and the rounded end of a large gland. I then broke up a portion of the horny integument of one mandible, and easily detached most of the muscle, leaving the glandular sac attached by a thread or duct to the fang, in the interior of which it could be traced for some distance. "From information I had received (*Mic. Dic.*, art. 'Arachnida'), I expected to find the poison-bag encircled by muscular bands, and, indeed, so found it; the fibres coiling spirally and very regularly round it. The other mandible was immersed in a solution of caustic potash, which

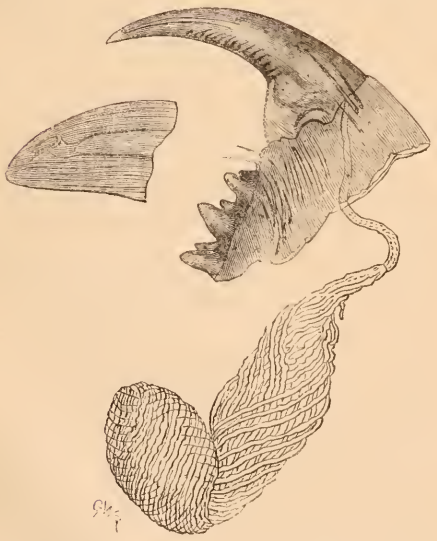


Fig. 282. Fang and poison-bag of Spider × 50; *a*. point × 800.

destroyed all the soft parts, but cleared the fang sufficiently to allow an evident orifice to be detected near the point, and an internal channel therefrom to be faintly indicated.

I next bought a very large spider (species unknown to me) at Gardner's, in Holborn, and in its enormous fang saw the expected hole so plainly and of such a size that I immediately thought of "E. T. S.," and how completely he had "put his foot in it!"

The aperture is not merely an oval slit, as it is generally figured, but the side towards the point is deeply bevelled, thus facilitating the emission and direction of the venom.

"E. T. S." does not mention on what species he has made experiment, which is an important omission, as it is quite possible that *all* spiders may not be venomous. Now, if your correspondent still remain incredulous, as is very likely, pray let him call on me, and he shall have proof the most certain,—proof ocular and proof binocular.

24, *Cornhill.* Henry Davis.

The same subject has brought us the following remarks by another correspondent:—

"E. T. S." reopens a question which I thought had been settled, in its main features, by the communications that have already appeared in your columns. He objects that he cannot find the poison-bag of the spider nor see the orifice in the fang; and he cannot understand how the poison could be expressed from the end of a "closed sac." I can assure your correspondent that the unsatisfactory results of his experiments are due to defective manipulation. The spider to be operated upon should be soaked in water for forty-eight hours. The second joint of one of the mandibles may then be seized *laterally* with the forceps, and pulled from the head. The jaws will come away together, and the two poison-bags will be exposed, the broad ends being free, and the narrow ends still attached *within the fangs*. If it be desired to get the entire bag with the extreme point of its neck, the spider must be left in soak for a longer time. The poison *gland* I have not seen; indeed, I have not looked for it; but there is little doubt that it lies immediately behind, and is attached to the broad end of the bag. I think I can see the mark of the attachment. These bags vary in size; a mounted one which I have just measured is about one-twelfth of an inch in length, exclusive of the neck or duct. They are clearly membranous, and are covered with bands of *striated* muscle obliquely disposed. There is therefore no difficulty in understanding how the poison is expressed from the bag, which it will be seen is not quite accurately described as a "closed sac." We are told that in the case of the poisonous snakes the immediate cause of the emission of the venom is purely mechanical, the erection of the fang creating a pressure upon the reservoir; but I do not think there is any similar arrangement in the spider. And this, taken in connexion with the disposition of the striated muscle, suggests an inte-

resting question, whether the spider may not have the power of ejecting or withholding the poison at will, in which case your correspondent's opinion that flies killed for food are not poisoned may be correct. The examination of the orifice near the end of the fang (or first joint of the mandible) is a less easy matter, but it is a mistake to say that it cannot be seen by transmitted light. If it were a simple perforation, of course there would be no difficulty, but being only an opening into the channel of which it is the termination, it is necessarily rather obscure. Still, I have traced it in a specimen mounted in the ordinary way in balsam, and if glycerine jelly be used, it can generally be seen readily enough with an inch object-glass. I shall be most happy, if your correspondent lives in London, and will drop me a line, to show him both bag and orifice.

John T. Young.

32, Mount Street, New Road, Whitechapel.

THE GENUS AMPHITETRAS.

THE genus Amphitetras was constituted by Ehrenberg for the reception of those species of Diatomaceæ whose frustules assume a cubical form. This generic distinction has, however, been rendered valueless by the discovery of four-sided varieties of Triceratium. Professor Smith says that "the projection of the connecting membrane beyond the suture of the valve is a circumstance that first meets us in this genus." This characteristic is not, however, peculiar to the genus Amphitetras, as it occurs in Biddulphia.

The mode of growth (in zigzag filaments) was at one time considered of sufficient importance to remove it far apart from its near relation, Triceratium; but the discovery of a species of Triceratium growing in zigzag chains has destroyed that distinction. A valued correspondent of mine states it as his belief that all recent species of Triceratium will ultimately be found growing in that manner; but whether the genus Amphitetras should be merged in that of Triceratium, or the two genera formed into a new genus with somewhat enlarged generic character, is a question which will require a more perfect knowledge of the two genera than we at present possess. The species and varieties I am about to describe I think belong to the genus Amphitetras as at present constituted.

Amphitetras antediluviana.—The so-called typical form of this species has cubical frustules, cohering at the angles, forming a zigzag filament; valve square, with straight sides, and the angles more or less rounded; the surface has coarsely cellular markings. This species is variable in size and widely distributed.

Var. β has the sides deeply incurved and the angles much produced; frequently mixed with the typical form.

Var. γ, with five incurved sides, and only differs from the preceding variety by the greater number of sides. This variety appears to be rare, as I know

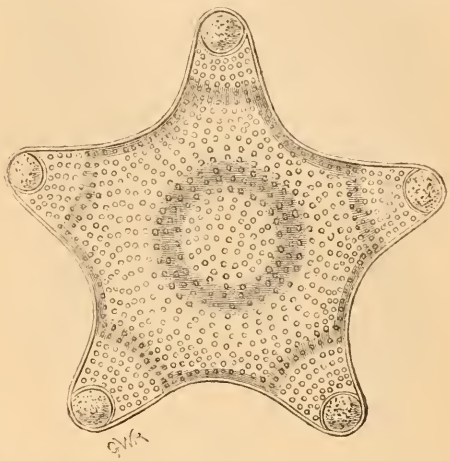


Fig. 283. Amphitetras antediluviana, var. γ.

of only one locality in which it has been found, viz., Hayling Island, Hants, in which it was rare. α and β were more plentiful in it. (Fig. 283, × 400 diam.)

Dr. Greville describes and figures, in the "Transactions of the Royal Micr. Soc.," vol. xiii., pl. ix., fig. 27, a form which he calls Amphitetras nobilis, and which seems to differ from var. γ in the produced tubular apices. His species was detected in dredgings from the Red Sea.

Fig. 284. Amphitetras antediluviana, var. δ × 400.

Fig. 285. Amphitetras crucifera, × 800.

Var. δ, with three straight or slightly convex sides, angles widely rounded; in other respects like the typical form. Rare; in a small gathering from Joppa. (Fig. 284, × 400 diam.)

Amphitetras crucifera.—Valve minute, with produced mammiform apices; surface of valve minutely punctate, with a cruciform blank space extending from the centre to the angles. Cleanings from West Indian shells. (Fig. 285, × 800 diam.)

Amphitetras ornata (?) var. β.—Valve with sides slightly incurved; angles produced, mammiform. Central portion of valve reticulate and punctate; the broad portions of the angles apparently girt with a punctate and costate band. This variety

differs from the typical forms described by Shadbolt, both in its large size, more conspicuous venation, and the curious band apparently girding and constricting the angles; but as it has, I believe, been

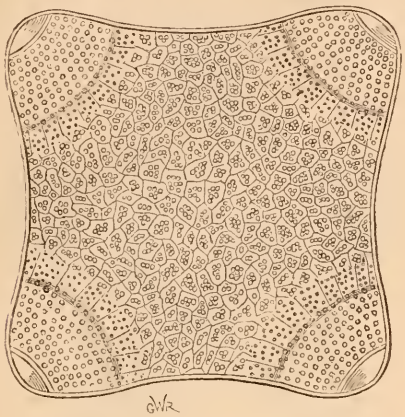


Fig. 286. Amphitetras ornata (?), var. β × 400.

only found in Algoa Bay guano, it would be rash to make it a new species. It may possibly be the sporangial state of Amphitetras ornata. (Fig. 284, × 400 diam.)

Norwich. Fred. Kitton.

TEMPERATURE OF LAKES.

Among the communications lately made to the Academy of Munich are some observations by Herr v. Schlagintweit on the temperature in the deeper parts of the Starnberger See and the Chiem See. A few observations on these measurements will not be out of place, as they prove, in an unexpected manner, that the Starnberger See, notwithstanding its having an influx and outflow of water, is sufficiently deep and large to be perfectly cold at the bottom.

In the salt lakes of Thibet (which first gave rise to investigations being made in the above-named Alpine lakes, for the sake of comparison) there is this peculiarity, that except on days when the fall of snow is at a minimum, there is no influx of water. Moreover, while the appearance of the surrounding country makes it evident that these lakes had once an in- and out-let, as well as a much higher level, now the surface lies lower than the ancient outlet: the gradual drying up, too, is plain enough, as is also the relative increase of the saline constituents —a circumstance of course dependent on the lessening of the amount of water, for the continual evaporation is much too great to be replaced by the rainfall.

In the large Atlas of his travels, the author has given five illustrations of the scenery surrounding these salt lakes—a perfect waste, but not without a certain grandeur. The illustrations are accompanied by the necessary topographical explanations.

His account demonstrates that the maximum of density (differing with the amount of salt contained in them) is reached in lakes which are situated at great heights above the sea, but which are sunk in depressions, in which there is so little difference in the warmth of the ground strata, that the balance of the temperature remains undisturbed. It is well known that water (unlike other fluid bodies) contracts during the process of cooling, until it reaches the freezing-point (distilled water, however, ceases to contract at 4° Cent.), and that it again expands as it gets colder: if it contains salt, this greatest contraction, or maximum of density, commences at a somewhat lower temperature.

Now, what relation has this to the distribution of temperature in the Alpine fresh-water lakes, which, besides, experience a considerable variation in the amount of water, owing to their having both an inlet and a means of escape?

According to Professor Jolly (whose careful observations, made much earlier than those of our author, were confined to the small very deep lakes of the Eastern Bavarian Alps) the temperature at the bottom of the Königs See (742 feet), and of the Walchen See (852 feet), registers 5·3° and 5·2° Cent. Herr v. Schlagintweit chose larger lakes for his experiments. He found that in the Starnberger See, in which the inflow of water is relatively small, the temperature of the bottom (though only 406 feet from the surface) betrayed "the maximum of density," or, in other words, the water is as cold as it can be. The conduction of heat from the ground strata, or in some instances by springs, may in the course of the year tend to modify this force of greatest density (3·5° Cent.), but it could never, it would seem, annul it altogether.

In the Chiem See the result was different, partly on account of the greater change of water, and partly because the depth is very much less—273 feet only, as determined by Von Schlagintweit, more than 130 feet less than that of the Starnberger See. It may be mentioned, *en passant*, that in Riedell's lake map, the depth is given at 504 feet, which is also the amount in the later map of Statzner,—a difference which can scarcely be accounted for by any change of bottom in the lake basin itself, though Riedell's measurements were made more than half a century ago, in 1810. The temperature of the water in the Chiem See was 7·1° Cent., a trifle colder than that registered at an equal depth in the Starnberger See, but far from reaching the temperature of maximum density.

These determinations of the temperature at great depths, are not without significance in regard to the conditions under which the fish of fresh-water lakes live. Similar observations made in other still larger lakes would be exceedingly interesting, because the

amount of water introduced into them by the Rhine or Rhone—as, for instance, in Lake Constance or the Lake of Geneva—must make a striking difference. Experiments, however, at these great depths cannot be carried out so easily as many might suppose. A minimum thermometer, for instance, owing to the pressure of the water, will stand too high. Ordinary thermometers must be protected not only against compression, but also against the variations which occur while being raised through the water, changes due to the great difference of temperature at the bottom and at the surface of the lake.

Both in Jolly's and Von Schlagintweit's experiments precautions are taken, though on totally different principles, against these sources of error. The instruments employed by the latter *savant* are the same which had already done him good service in the salt lakes of Tibet.

NEW BRITISH MOSS.

(*Amblystegium confervoides.*)

THIS addition to our moss Flora, we owe to Dr. Fraser, of Wolverhampton, who discovered it on damp stones in Dovedale, in November, 1866, and having kindly favoured me with specimens, I am enabled to give the accompanying illustrations.

Fig. 287. Amblystegium confervoides, 1. Plant, natural size; 2. Branch, with male flowers and fruit, magnified; 3. Capsule, with lid; 4. Perichætical leaf; 5. Stem leaf.

The genus Amblystegium is one of the groups into which Professor Schimper has broken up the heterogeneous collection of species hitherto referred to Hypnum, two other species of which (filicinum and commutatum) might, I think, with propriety be added, and riparium be removed to the aduncum group.

We should thus have three sections in the genus. 1, Serpentia; 2, Leptodictya; 3, Filicina.

The first section would number as European species.

A. Sprucei, subtile, tenuissimum, confervoides, enerve, serpens, densum, radicale, varium, serrulatum, pinnatum, irriguum, fluviatile.

Amblystegium confervoides, Schpr. (Hypnum confervoides, Bridel). Monoicous, in dense creeping tufts of a dull green colour, brownish when old, very slender, vaguely branched. Leaves minute distant, ovato-lanceolate, nerveless, perichætial lanceolate. Capsule oblong, cernuous. Lid convex with an oblique point.

Amblystegium subtile is closely allied, but has a more erect pale capsule, and shorter faintly nerved leaves.

As it occurs on beech-trees throughout Europe, we may also expect to find it in this country.

R. Braithwaite, M.D., F.L.S.

SNAKES.

SCIENCE GOSSIP for November has relieved me from great embarrassment regarding the account copied into the papers some time since, from the "Liverpool Daily Mercury," entitled "A Rattlesnake at large." I can assure the reader that I almost trembled in my shoes as I thought of the imminent danger I had so often unconsciously incurred from such peculiarly vicious reptiles! I have taken great pains in watching and studying the habits of Snakes, the country in which my observations occurred being as prolific in reptiles if not more so than any other on the globe.

In the tropical forests of Brazil, fostered in the swamps by the hot sun, they spring into life and live for many years. They are also infinitely more active in their movements than those in cooler climates, and their venom is more powerful; consequently they have greater powers of offence. But taking all their fatal capabilities into consideration, after a short time resident amongst them, I not only lost all the fear which I originally had of Snakes—and which such tales as that mentioned above served to cultivate in the minds of Londoners and others, who never having seen venomous Serpents in their native state, only know what is related about them—but would spend many an hour wandering in their favourite haunts to capture and preserve them.

This, you may imagine, brought me into contact with not only dangerously strong, but also venomous Serpents. Amongst the latter were included numerous Rattlesnakes. One, a fine specimen, was seven years old. This I came upon more suddenly than was at all pleasant, as it lay across the footpath asleep; but fortunately for me the noise of my approach awoke it, and the rattling

warning of the vicinity of death in its worst form, brought me to a sense of my situation only just in time, as four more steps must have brought me into contact with the dangerous reptile. My surprise was complete on discovering the glowing coil writhing at my feet, now contracting, now distending, as though about to burst.

What a chaos of fear and passion one might imagine pent up within that tight skin! Its glistening eyes, the nervous vibration of its forked tongue, and above all, the knowledge that it was possessed of a pair of fangs, the slightest scratch of which would be sufficient to cause death, alarmed me not a little, as I was entirely unprotected, having no stick or other weapon wherewith to despatch it.

In this awkward predicament I stood for some seconds, my eyes fixed upon those of the horrid creature before me.

From my feelings at that time I can understand the fear which some of the smaller animals have of Serpents. I felt for the moment rooted to the spot, and, as if suffering from night-mare, could not take the backward step which my reason told me should be made; however it was made at last, and another followed, and another, and yet another; when finding that my enemy did not follow, the blood seemed to flow freely in my veins again, and on placing several yards between myself and the reptile, I had the felicity of seeing it gradually unfold itself and slowly skulk into the adjoining underwood.

Now to return to my argument:—had these animals the natural love of destruction so vividly set forth in the newspapers, it is evident that my life at that auspicious time would not have been worth a year's purchase, for never had snake a better opportunity of making a human victim. You may therefore imagine how I thanked my lucky stars on reading the above-mentioned account that on that adventure with the rattle-snake and other similar occasions, I met not with the same unhappy fate as did the poor horse and Bonassus. I could hardly, however, reconcile the account with my own knowledge of facts founded entirely upon experience, and I am now happy to find the only case in point which could be brought forward against their accuracy removed.

I believe that snakes are, without an exception, most timid and cowardly creatures, infinitely more so than their wonderful power of subduing life and quickness in striking their victim would warrant or lead one to imagine.

In most snakes which it has been my fortune to come across, I have discovered their natural timidity and propensity for skedadling—as the Americans would say—on the slightest approach of danger, always provided that they can do so without fear of their tails. Not only are they venomous and swift in flight when it suits them to be so, but, in my opinion, they are not only traditionally cunning, but absolutely so; and the reader may laugh if he will, but I believe that when suddenly intruded upon they take all the chances of escape into consideration, and if they feel that they can get off without receiving a crack on the tail in the attempt, they will endeavour to do so; if, on the contrary, the chances of escape appear too slight—like a rat enclosed in a room without means of escape from its enemy, or even a cowardly man with a grain of sense in his head—they will chance the possible but improbable, and endeavour to escape, by first subduing their opponent. Further, I believe that all snakes, as a rule, attack man only in fancied defence of themselves or young, unless it should happen to be a big one—a python, for instance—then I allow that they act strictly on the offensive, but only so when hungry. There is none of that tiger-like pleasure of causing pain and death about them which I imagined was the case when I first left England; this I have proved in tempting a newly-caught boa-constrictor by placing live lizards and other small animals in its cage, but unless it was ready for a meal it took no notice of them.

As I am on the subject I may mention, in relation to Brazilian snakes, that many of them are exceedingly beautiful; the Coral Snake (Coluber corallinus, Lin.?) surpassing in loveliness any animal—birds included—that I have ever seen. Its body is beautifully banded with successive belts of brilliant jet black, pure white and coral red, bright and glowing in its beautiful colours almost beyond description. When alive and in motion they are really magnificent, moving in such an elegant curvilineal manner as to appear more like lovely toys than dangerous reptiles; in fact, the little naked children often come to premature graves through playing with them as such. I have one before me now, as I write, preserved in white rum and water, which I found to be the best mixture for their preservation; and although the brilliancy has much deteriorated, it s still a beautiful object.

Its capture was made under rather peculiar circumstances. I was talking and laughing with a company of Mulatto girls, who were sitting on the ground, when one of them suddenly sprang to her feet screaming, as she flung her hands on high, as though terribly alarmed—her companions, in accordance with woman's general character, followed her example, and the uproar was intense. I was quite at a loss to discover the cause of their fright, and this I did on perceiving about a foot of the creature's body hanging from beneath the girl's petticoat, where it had in some way got fixed. As she ran away, however, it fell, and I then put an end to its existence. The creature proved to be a beautiful specimen of its kind, measuring about four feet. Like most other snakes in Brazil, it is poisonous; in fact, the only ones I found to be non-venomous were a small green variety and a black

amphibian. The latter would sometimes enter the room whilst we were at dinner, creating a fine disturbance with the cat and dog, who—although at all other times antagonistic to each other—on such an occasion would act in unison, one on each side of the reptile, barking and swearing, and the abject fear of the poor snake was laughable to behold; it would wriggle about, tie itself into all sorts of loose knots, and hiss and dart about as if on a plate of hot iron. The natives believe that all snakes are venomous, and fear the black as much as any other.

I have often been checked in my snake-hunting expeditions, by coming across the cast-off skins; and once a skeleton of a boa constrictor that when alive must have been too large in circumference for me to span with both hands—a sight which checked my researches in ophiology a little, for I naturally thought that somewhere in the vicinity it was not improbable that I might come across some of its living relatives, which was anything but desirable; and such an effect had it upon my nerves, that I returned home without having caught a single specimen for my collection—but with the consolatory thought that no snake had caught me.

On killing a snake I generally found it difficult to tell when the creature was really dead, as the vital power remains so long after death, and the body—still retaining its muscular action—would wriggle about when placed in the bottle of rum as though endowed with fresh life. I also noticed a peculiar fact in the case of a very large snake which, having killed, I left in the garden until not the slightest movement occurred in the body, neither did it show any sign of sensibility in being touched or pushed about with a piece of stick; but, to my surprise, on touching it with my finger, a strong convulsive motion passed through the whole body. This I tried several times, and always with the same result.

Many of the snakes I found to be swift in their movements—one, the whip snake, exceedingly so; one moment it would be before me, perhaps not more than two yards off, and the next I knew not where; all that I could see of the movement was a sort of wave and like a flash of lightning the snake had disappeared. The rattlesnakes, however, from my experience of them, are rather sluggish than otherwise, and, fortunately for man, have not the love of slaughter which the correspondent of the *Liverpool Daily Mercury* would lead people unacquainted with the habits of snakes to believe.

Alfred Ikin.

Upper Kennington Lane.

Metallic Markings of Beetles.—The metallic markings on the Cassidæ, which vanish when dry, may be preserved for years by immersing the beetles in spirits whilst fresh, and keeping them moist.—*W. H. Walcott, in "The Zoologist,"* p. 5,929.

ZOOLOGY.

Rats.—The black rat becomes every year more scarce in Scandinavia wherever the large brown rat gains a footing. Was once common throughout the whole country. In the days of Linné, the brown rat was unknown in Sweden; about ninety years since the first was seen in Scania. It has now, however, become gradually spread over the land, and is met with in every part to the North Cape. Although at deadly enmity with its smaller brother, it does not interfere with the little mouse. Strange to say, much as this country is overrun with rats, I never saw either a ferret or a rat trap till I got some over from England. I know no country where a good ratcatcher could make a better living than in this. I once saw the rats drummed out of a house here which was full of them. It was a large wooden building. Two regimental drummers were sent for, who began at the very top of the house, and drummed in every room. The rats bolted very fast, and I had some capital shooting outside. It was long before any came back.—*Ten Years in Sweden.*

The Whale (*Balena mysticetus*).—Nilsson remarks that the weight of the common whale is 100 tons, or 220,000 lb., is equal to 88 elephants, or 440 bears. The whalebone in such a whale may be taken at 3,360 lbs., and the blubber at 140 to 170 tuns. The remains of the fossil whale (Balena prisca) which have been found on the coast of Ystad, in the Baltic, and even far inland in Wangapanse, Westergothland, betoken a whale which, although not more than between 50 and 60 feet long, must at least have had a body 27 times larger and heavier than the common whale.—*Ten Years in Sweden.*

Curious Nest of Hedge Sparrow.—The notice in Science-Gossip of a Chaffinch's nest calls to mind a similar instance which I witnessed a few years since. While searching a hedge row for the larva of the Black-veined butterfly, I discovered a beautifully made nest which had somewhat the appearance of a Linnet's, but as it was composed of such unusual materials, and contained four newly-hatched young, which I could see were not finches (and that was all I could decide upon) I took two, leaving the others in the nest; these I reared, and they turned out to be the Hedge Sparrow. The nest was made in the usual manner, but in the place of moss, &c., it was composed of woollen fibre of various colours, red being the most prominent, evidently a portion of an old carpet; it was lined with a mixture of moss and ends of cotton with a few feathers; all this gave it quite an artificial appearance, but containing the young as it did proved it genuine.—*J. B. Waters.*

Cat and Kestrel.—A cat belonging to a neighbour was lying concealed in a drain in a meadow (November, 1865), watching her opportunity to seize a field-mouse, when a kestrel swooped upon a mouse so close to her, that with a sudden spring she caught the bird, and eventually killed it; a termination to her hunt as unlooked for by her, as it was unexpected by the kestrel, who had probably been so intent upon the moving mouse, as to overlook the motionless cat. This was related to me by the owner of the cat, who took the bird from her a few minutes after the event.—*Harting's Birds of Middlesex.*

Black Redstart.—A male specimen of the Redstart (*Sylvia tithys*) was taken at Gedney, Drove-End, Lincolnshire, on October 25th. A Greenshank (*Totanus glottis*) was taken in a flight-net on the sea-marsh at the same place on October 3rd.—*C. E. R.*

Clouded Yellow in Ireland.—In your number for November, a correspondent mentions having taken a specimen of the Clouded Yellow (*Colias edusa*) at Kilkee, and asks if it is an uncommon insect in Ireland. I may inform you that it has been taken in considerable numbers during the past summer at Tramore, a bathing place in Co. Waterford, and at other localities in the neighbourhood of Waterford City. Two years ago it was very common, and many were captured. During the same season the Painted Lady (*Cynthia cardui*) was very abundant, continuing from June till the end of November. One insect I had emerged from the chrysalis on the 11th of December. This year they were again frequently seen, but were not nearly so plentiful, and last year very few were met with. —*E. Garnett, Newtown, Waterford.*

Fangs of Spiders.—After reading the sceptical remarks of your correspondent, "E. T. S." (page 237, Science-Gossip,) on the structure of the Spiders' Fangs, I determined to examine them carefully for myself. This I have ample opportunity to do, as my cabinet contains no fewer than four specimens of different species, three of which are whole, prepared by myself. The other slide contains the fangs only I had from Mr. Groves Tollington, London. Of these four specimens three show distinctly an aperture opening into the interior of the fang. The sketch by R. Beck, page 201, Vol. II. of Science-Gossip, accurately represents its form and position. There can be no mistake of its actual existence in my specimens. What relation these apertures may sustain to other parts of the insect's structure, or what special or general functional purpose they may have, I know not; nor can I boast of less ignorance respecting the "modus operandi" observed by the constitutional murder in seizing or holding its hapless victim.—*B. Taylor.*

Bugs.—In a rare and curious old book on insects, written in Latin, and published at London, in 1634, the title of which is "Insectorum sive Minimorum Animalium Theatrum," I find, amongst other things, a curious account of the common Bug. It states that this insect first occurred in this country at Mortlake, on the Thames, in the year 1563, and that those unhappy people who were first bitten by it, imagined that they had been attacked by a plague, but the writer says, "Tandem re cognitâ, ac bestiolis captis, risû timorem omnem excussit." He then gives a list of preparations which are calculated to destroy these insects, about which he writes, "Contra istos nocturnæ quietis hostes, Deus noster misericors, remedia nobis suggessit." The writer does not seem to have had much opinion about the cleanliness of foreigners, for he says, "Galli, Germani, et Itali qui munditiem minus curant, pariunt magis hanc pestem; Angli autem munditei et cultus studiosissimi rarius iis laborant." The accounts of the insects in this book are mos curious, and the figures mostly very roughly executed those of some of the Lepidoptera being scarcely recognisable; a great number of our rarer and reputed British insects are figured, doubtless, as British. There is no attempt at arrangement into genera, as neither generic nor specific names were then in use.—*Henry C. Lang.*

Submergence and Emergence.—In 1772 the greater part of one of the largest volcanic mountain in Java was swallowed up. A luminous cloud enveloped the mountain on the 11th of August, and soon after, the huge mass disappeared with a great noise, carrying with it about 90 square miles of the surrounding country, 40 villages, and 2,957 inhabitants. In 1819 a large tract of country, not far from the eastern mouth of the river Indus in India, underwent considerable change. A tract of probably not less than 750 square miles was raised 10 feet above its former level, and south of this another tract of perhaps 600 square miles became submerged, and occupied by the Lake of Sindree. In 1628, 1720, and 1811, islands have appeared and disappeared in the sea near the Azores. On the last occasion an island rose to the height of 600 feet, and was named "Sabrina." In the following year it disappeared. In 1831 an island appeared to the south west of Sicily, reached an elevation of nearly 200 feet and a diameter of 3 miles. After three months it gradually sank again, until nothing remains but its name of "Graham Island." Had the reported submergence of the island of Tortola taken place, it would have surpassed in terrible interest all previous and similar events, and impressed itself on the memory of all men living as the great catastrophe of 1867. Fortunately, however, the "sensation telegram" lacked being true.

MICROSCOPY.

Preparation of Snails' Tongues.—I present a plan devised many years ago, for such small forms as *Littorina* and the like, whose lingual ribbons are extremely tender, and difficult to see as well as handle. I use a rather strong solution of caustic potassa, the strength of which I cannot exactly specify, as it must vary with the species under manipulation, some having ribbons of such strength that they will bear the very strongest solution, while others will be injured by immersion in a comparatively weak liquid. Into this solution in a test tube or other convenient vessel, plunge the whole animal; in the case of the smaller creatures, shell and all. The specimen may be fresh, or preserved in alcohol, but on the former the potassa will act most vigorously. I have found that one good way is to let the animal stand in the shell until it dies and begins to decompose, when it can readily be removed, and falls in pieces. The lingual ribbon, as a general thing, is not easily decomposed. Now either set the potassa solution, with the animal in it, aside for some days, or boil it at once. You will then find that almost everything dissolves and becomes "soap," except the shell and operculum, a few shreds of muscular fibre, and the prized lingual ribbon. Frequent washing with fresh water now removes all the alkali, and leaves the teeth clean and in perfect order. It can then be mounted in any preservative fluid which is miscible with water, and is best removed to alcohol to be kept until it is mounted. To mount it, remove it from the spirit, and without drying plunge it in pure spirits of turpentine, in which it should be boiled for a short time to drive off some of the alcohol. It can now be mounted in Canada balsam, when it shows all its beauties in a remarkable manner, and, at the same time, shows its effects on polarized light. I would say, that the potassa cleans the shell and operculum beautifully.—*A. M. Edwards, New York.*

Chelifers formed the subject of a paper by Mr. S. J. McIntire at the meeting of the Quekett Microscopical Club on the 25th of October. During the discussion which ensued it was elicited that at least 54 species were known and described, of which 39 were European, 7 African, 7 American, and 1 Asiatic. Of the European only nine had at present been found in Great Britain, and of these it is believed that these species are peculiarly British. Only two species appear to have been known to Linnæus under the specific names of *cancroides* and *acaroides*, the former name being still applied to one of the commonest of European forms. Mr. McIntire exhibited living specimens as types of the two genera—of *Chelifer*, with two eyes, and *Obisium*, with four eyes. The subject excited considerable interest.

BOTANY.

Flora of Bucks.—May I again direct the attention of your readers to this subject? Since my first notice appeared in Science-Gossip, in March, 1865, I have been actively engaged in collecting materials for a Buckinghamshire Flora, with but partial success; indeed, I am almost as ignorant as I then was regarding the botany of the entire north of the county. My knowledge of South Bucks has, however, considerably increased, although it is by no means perfect at present; the district with which I am best acquainted being comprised within a radius of five miles from my residence at High Wycombe. The number of flowering plants and ferns at present recorded for the entire county is but 771: of these I hope soon to publish a list, which I shall be glad to send to any one who may desire it. I trust that this second appeal for help may not be made in vain; the smallest contributions will be thankfully received.—*James Britten, High Wycombe.*

Cucumbers.—It is related by Pliny that Tiberius the Emperor was so fond of cucumbers that there was not a day throughout the year but he had them served up at his table. The beds and gardens wherein they grew were made upon frames, so as to be removed every way with wheels; and in winter, during the cold and frosty days, they could be drawn back into certain high covered buildings, exposed to the sun, and there housed under roof. These appear to be the earliest accounts of the forcing of plants of which we read. It is probable, also, that artificial heat was used; as we find, by the remains of their villas in this country, how perfectly the Romans were acquainted with the method of warming their rooms with flues. — *Phillips's "Fruits of Great Britain."*

Ivy at Chadkirk.—There is a very curious ivy-tree at Chadkirk, a small village about four miles from Stockport. This ivy grows upon, and almost covers, the walls of (I believe) the clergyman's house. It is an old tree, the main stem being four or five inches in diameter. About *ten years ago* a door was made at one end of the house, and to give room for it, many of the largest branches of the ivy were cut through, the lower parts being taken away, the upper parts being left on the wall. Thus, at least one-third of this fine plant was severed from the main tree, and all supplies of nourishment from the soil cut off. Strange to say, the severed limbs have not died, as is usual in such cases, but the aërial roots by which the ivy fixes itself the wall, and of which the sole use is *usually* to enable it to cling, appear to have accommodated themselves to circumstances, and to have acted like true roots, drawing enough moisture from the stone walls to enable the ivy to live, and it is at the present

moment as green as any other part of the tree. The leaves are, however, a little smaller than the rest, looking more like the common wild ivy; so that the severed part is evidently short of food, and will, probably, sooner or later die.—*Robert Holland.*

The Rue (*Ruta graveolens*).—In botanical books the common garden rue is described as a tetramerous flower, having four petals and eight stamens; but it is not, I think, generally known that, like the *Adoxa*, it hath both tetramerous and pentamerous flowers. The uppermost flower of each bunch always opens first, and is, so far as I have seen, always pentamerous, having the parts in fives, with ten stamens, while all the other flowers of the bunch have four petals and eight stamens, as described in the books. The rue is interesting, as being one of those plants in which, like the saxifrages, nature seems to have made special provision for self-impregnation, by giving spontaneous motion to the stamens, which advance and stand over the pistil when they shed their pollen. The stamens are rather curiously arranged. One half of them are opposite to, and lie within, the hollow petals; the others are alternate, and have no petals behind them, but their filaments are bent *sideways*, so that their anthers may lie alongside of the others in the petals. The alternate stamens first rise up perpendicularly to shed their pollen upon the short pistil; shen the opposite stamens do the same, and finally all fall back and lie, extended straightly, upon or between the petals.—*Robert Holland.*

Boletus impolitus again.—The remarks of "W. G. S." in our last have resulted in another communication from "H. B.," and from his explanation, description, and drawings, there can be no doubt whatever that the Boletus alluded to in his communication at p. 235, was the true *Boletus impolitus*, Fr., and not *Boletus felleus* as suggested by "W. G. S." We must therefore conclude that difference of taste has led to a different appreciation of the edible qualities of this fungus.—Ed. S. G.

Art *versus* Nature.—That the laws of Nature are all-powerful, and that the force they exercise over animate and inanimate beings is stronger than the force of art, is well illustrated in the following circumstance:—A small spruce fir-tree, transplanted into a pot, was used at a children's party as a Christmas-tree. When it was done with, it was planted on the lawn as a memorial; but owing to some injury the top shoot died, and the tree was without a leader. I cut off the dead shoot, and, choosing what I thought to be the strongest of the five radiating sideshoots, I bent it upwards, fixing it in a perpendicular direction by means of wires and a stick, in the hope that it would make a new leader. At the end of six or eight months I took away the wires, and found that my new leader remained perfectly upright as I had wished it to do; but I observed at the same time that another of the side-shoots appeared to be bending upwards of its own accord, which it continued to do until, at the end of last year, it had far outstripped my artificial leader, quite ignoring the fact that I had already repaired the injury. During the present year it has gone on growing upwards, and it is now a fine healthy leading shoot more than a foot long, almost in a perfectly continuous line with the main stem, and with lateral shoots radiating from it, whilst *my* leader, owning itself vanquished, has bent down again into its old place, and become once more a lateral shoot.—*Robert Holland.*

Pink Primroses.—Wild primroses are sometimes found with the flowers of a dingy pink colour. This year I have seen two examples of apparently the same variety produced from seed saved from good garden polyanthuses; and I should, therefore, think that the wild pink ones are not varieties, but hybrids produced by impregnation with polyanthus pollen through the agency of insects, and that the plants in the garden had resulted from a similar cross with primrose pollen.—*Robert Holland.*

Filago Gallica (L.) in Surrey.—Perhaps some of the readers of Science-Gossip, and more particularly those who make Surrey the scene of their labours, will be glad to learn of the above mentioned addition to their Flora. It has been credited already from Herts, Kent, and one or two counties, as well as the old locality of Berechurch, Essex:—The Surrey locality is in a cornfield between the Chilworth Woods and St. Martha's Hill, near Guildford, through which the footpath to the chapel passes. I did not observe it in great profusion.—*J. C. M.*

Rat-tailed Radish.—Last spring a professedly new vegetable, and one said to be hitherto unknown in England, was offered to the public, and some of my friends caught the bait, expecting to grow some marvellous esculent as a table dainty. The *Raphanus caudatus* has I suspect disappointed the hopes of those who invested their sixpence for one of the precious seeds, and some were rather surprised when I told them that more than fifteen years ago some of the seed of this plant had been sent me by a relative from India. It grew like a weed in the gardens of friends in Cornwall and Hertfordshire, to whom I sent some, was soon voted a nuisance, and Raphanus was eradicated. The pendant pod, like the seed-pod of the common radish, is slightly pungent, but rather insipid than otherwise.—*J. Reynolds Gwatkin.*

Areca Spathe.—Many of the common drinking and baling utensils in the Malay boats are made from the spathe of the Areca palm.—*Bennett.*

NOTES AND QUERIES.

Dead Starlings.—A few days ago, rowing upon a large piece of water, the edges of which were fringed with tall reeds, I noticed from fifteen to twenty dead starlings lying upon the surface, in a parallel line with the reeds and about thirty yards distant. All lay downwards in exactly the same position,—wings slightly extended, legs stretched as if perching, and head and bill pointing straight down. I examined several: the wings and legs were unbroken, nor was any wound or blood to be seen. The plumage of all was unruffled, and on the backs was quite dry. Where the birds lay there was weed just reaching to the surface, which prevented them from drifting with the wind, and, no doubt, detained each bird in the exact spot where it fell. Multitudes of starlings roost every night in the weeds. The question is, How came these birds in the water? During the previous night there had been some extremely violent gusts of wind, and my only surmise is that they might have been blown off while in a state of sound sleep, and were drowned, or that their wings became too much wetted for use before sufficiently recovering from their stupor, the night being also pitch dark. We all know how ridiculously stupid a common fowl is when taken off its perch during the night, and how unable for many minutes to shake off its drowsiness.—*Delta.*

Asterina gibbosa.—On the 8th June last a friend, returning from Torquay, brought me a couple of starfishes, one Asterina gibbosa, the other Uraster rubens. The latter lived about seven weeks, but the former is now alive and well. About the first week in August I noticed a number of small pentagonal dots on different parts of the rockwork in my aquarium. I had not time to examine them microscopically, but suspected them to be young Urasters. On October 1st I noticed several young starfishes, presenting in a most marked manner the characters of Asterina gibbosa. The tips of the tentacles were of a beautiful orange colour, and one specimen measured then about one-eighth of an inch across. It is now (October 14th) about a quarter of an inch in diameter. They appear to be growing somewhat rapidly. Is it a common occurrence for starfishes to breed in aquaria?—*Charles Adcock, M.R.C.S., Birmingham.*

Disguises of Insects (p. 261).—I have had five caterpillars of the Emperor Moth this summer. One of them spun its cocoon attached to some *white* net; one in a box lined with *white* paper. These two cocoons are made of *white* silk. The other three caterpillars spun on the surface of the soil amongst dead, *brown* grass, and these three are of a dark *brown* colour.—*Robert Holland.*

Corals.—Can any of your correspondents give a receipt for cleaning corals which have become very dirty from age and long exposure to dust?—*Robert Holland.*

Crickets.—Although one should not cry till fairly out of the wood, I have hopes that these mischievous intruders have received their final *coup-de-grace* in my kitchen, not having heard the faintest sound of one for about six weeks; and I would recommend a similar remedy to your inquirer, "Geo. B." My method of extermination was the repeated syringing their haunts with boiling water. The cricket can endure almost any amount of dry heat, but is quickly killed with moisture, let alone its being in a boiling state. The stream should be strong, sudden, and in considerable quantity. The instrument employed in my case was an ordinary brass hand greenhouse syringe, with a flat finely-punctured nose. If this plan be adopted whenever the insect's noise directs to its place of retreat, in a very short time there will not remain even the ghost of a "cricket on the hearth" to furnish material for a Christmas tale.—*T. S.*

Worms—to Quit.—"J. W. W." asks in the last number of Science-Gossip how to get rid of worms which are ruining his grassplots. Somebody asked the very same question, a good many years ago, at a committee meeting of the Liverpool and Manchester Agricultural Society, when an old farmer answered very characteristically, "Why, make the ground so poor that it winnot keep 'em, to be sure." Worms are always most plentiful in the richest soil. and if "J. W. W." can manage to impoverish his land he will get rid of the worms. But this would be difficult, as his lawn will only become poorer in the course of years, by dint of constant mowing and never manuring; and it may be worth while to try other remedies. Salt, put on in just sufficient quantity as not to kill the grass, would greatly tend to the destruction of the worms; but if too great a quantity were put on, and the grass were accidentally killed in patches, no great harm would be done, for it would grow again next year, especially if some trefoil seed were raked into the bare places in the spring. It is a curious fact that when grass is thus killed with salt, a fine crop of mushrooms sometimes springs up on the land. I should, however, prefer giving the grass a good dressing with lime, which the worms would strongly object to, and which would make the herbage thick and very green. But whatever method "J. W. W." adopts to get rid of the worms, he will be greatly assisted by encouraging as many birds as possible. Thrushes, blackbirds, and robins all eat worms, and a few crumbs thrown out regularly in frosty weather will entice numbers of birds, which in return for his kindness will seize upon every worm that makes its appearance. I think that the lime and the birds together would soon effect what "J. W. W." desires.—*Robert Holland.*

An awkward Mistake.—We have alluded more than once to the stuffed lion and tiger of the Paris Exhibition. When we left Paris in May one of the jury informed us that a silver medal had been awarded to Mr. Ward for this group, but that the exhibition of other and inferior preserved animals by him was much to his prejudice. It now appears that the *other* animals were exhibited by another Mr. Ward, and that by some blunder the medal has been sent to him, and Mr. Ward of the lion and tiger group—that is, Mr. Edwin Ward—has lost what was undoubtedly intended for him, through having a competitor of the same surname. Some clerk or reporter to the jury has taken the wrong name from the catalogue, and Mr. Edwin Ward has not only been cheated of his medal, but its possessor adds insult to injury, and declares by public advertisement, that no mistake whatever has been committed. Let us hope that the public will endorse the award which the jury in reality made; and though another Mr. Ward may have got the medal, the honour belongs to Mr. Edwin Ward.

Hedgehogs.—As in the August and September numbers, you have published an account of hedgehogs apparently carrying away pears and crabs sticking on their spines, you may think the following statement worth insertion as a further corroboration. I have received this account in a letter dated August 5, 1867, from Mr. Swinhoe at Amoy:—"Mr. Gisbert, the Spanish Consul at Amoy, informs me that when he was an engineer on the roads in Spain some years ago, he was fond of shooting and roaming about the country. He states that in the Sierra Morena, a strawberry-tree (Arbutus unedo?) was very abundant, and bore large quantities of red, fruit-like, fine, large, red strawberries. These gave quite a glow to the woods. The district in the mountain chain he refers to, is on the divisional line between the provinces of Seville and Badajos. Under these trees hedgehogs occurred innumerable, and fed on the fruit, which the Spaniards call Madrône. Mr. Gisbert has often seen an Erizo (hedgehog) trotting along with at least a dozen of these strawberries sticking on its spines. He supposes that the hedgehogs were carrying the fruit to their holes to eat in quiet and security, and that to procure them they must have rolled themselves on the fruit which was scattered in great abundance all over the ground beneath the trees."—*Charles Darwin.*

The Viper.—I found a viper out on an open piece of ground the other day, and as his home was evidently at some distance, I detained him a short time for the purpose of "making observations." He did not move about much faster than I walked, and when I put my stick on him to hold him back he never darted at it, but hissed violently and tried to escape. Finding his efforts fruitless, he lay still, and even when I removed the stick, he only coiled himself round and drew back his head, following the point of the stick, but never aimed a blow at it. He then climbed to the top of a thistle about two feet high, and lying amongst its prickly leaves, treated me to another hissing performance. The climbing was done in a way that showed it to be perfectly natural to him, and frequently performed; he did not coil round the stems at all, but lay *across* the leaves and branches, lifting himself from one to another. I teased him from this post, and he hurried into a thick tuft of herbage, where I left him. Anent the reptile's bite, your correspondents evidently believe it sometimes deadly, but fail to cite a case; the one given at length by Mr. Hall proves my own views to have some truth in them. He says if the victim had been a child instead of a man, death would have been certain, but how can he tell that the constitution of a child would have been similarly affected? I still adhere to my former statement, that we are as yet without any well-authenticated case of a viper's bite proving fatal from its own simple nature. If any instance can be brought forward, I hope to see it in the pages of Science-Gossip.—*Henry Ullyett, Folkestone.*

Failure of Egg-hatching.—Many settings of fowl, turkey, and duck eggs have failed with me this summer. Some were valuable sorts. From settings of thirteen eggs, rarely more than five chickens have been hatched. Similar failure has been common with my neighbours, creating surprise as to the cause, such ill-success not having been observed before.—*S. B. M.*

Snails.—Can any of your readers recommend an effectual remedy for snails in a garden; I mean one that they have tested and found successful? The employment of gulls or ducks has been suggested; but they are objected to by some on the ground that they tread down the flowers, and devour strawberries and other fruit. The ivy affords them concealment in dry weather, but on damp mornings they swarm, and of course can be destroyed in numbers, though with little appreciable effect. Forty have been taken in a few minutes out of three or four yards of hedge, and young plants are rapidly stripped of their leaves and killed. A row of hollyhocks are their last victims, and ferns are terribly riddled. No doubt they are ably assisted by their shell-less cousins, the slugs, and also by the woodlice which are likewise more numerous than welcome. The garden being surrounded by stone walls, it is somewhat protected from outsiders, if the enemy within could be destroyed.—*G. Guyon, Ventnor, Isle of Wight.*

Is the Poison of the Viper Fatal?—It is a difficult thing to prove a negative; and, unquestionably, such a circumstance as is related by your correspondent, *may* have occurred at Poundbury, near Dorchester, within the last two or three years without my being acquainted with it. But, as one fond of Natural History, and being all my life in the immediate neighbourhood, I think I may say that it is passing strange if such should have been the case. I should be very glad if "the young relative" mentioned in the note, could afford any information whereby the matter may be elucidated. Poundbury is hardly to be called a wild kind of spot, a sort of waste. It is a bright open down, within half a mile of the county-town, with hardly a shrub or a stone, and certainly without any heath, which could have furnished a viper's lair, and constantly exposed to public observation. Assuredly no very extraordinary death could have happened there, without its being universally known throughout the county. —*C. W. Bingham.*

My Blackbird.—Two or three years ago I reared a blackbird from the nest, and he proved a first-rate songster, having beside his own natural song many variations which I had taught him; and his round, flute-like notes were the admiration of all who heard them. This season he has been quite unable to sing, though always attempting to do so, the cause of his silence being, I believe, some disease in his throat, which is sometimes very much swollen. A kind of blister rises, and breaks at the root of his beak frequently, and he often seems to have something in his throat which he tries to dislodge. His plumage has not that neat appearance it used to have, although the bird itself seems to be as lively and cheerful as ever. Can any reader of Science-Gossip kindly inform me how to treat my bird?—*G. B. C., Ringwood.*

Cockroaches beware.—I should recommend "J. G." to try the following remedy against cockroaches. Put two teaspoons of treacle in a soup-plate, and then fill it up with hot water. Then place several pieces of fire-wood up against the plate, to serve as ladders for the cockroaches to climb up. Some time ago our kitchen was swarming with these creatures, but we set three or four of these traps at a time (placing them by the holes from where the cockroaches came out), and in a week or two we were almost entirely free of them.—*E. F. B.*

Sonchus palustris.—Allow me to thank "J. W. White," for his kind answer to my inquiry. If he does not possess Gibson's "Flora of Essex," he may be interested to learn that this handsome *Sonchus* is there stated not to have been lately noticed in that county: its last observer being Mr. E. Forster, who saw it in the locality given by Ray. Mr. Forster died in 1849, so that it is probably upwards of twenty years since *Sonchus palustris* was seen in Essex. Its rediscovery must be interesting to every British botanist.—*B.*

Nasturtium Siifolium.—Is this very remarkable form of the Watercress (*N. officinale*) generally distributed? I have but recently made acquaintance with it, and consider it well worthy of notice. The stem is quite erect, except at the base, and very thick; the leaves are said by Professor Babington to resemble those of a *Sium*; hence the name: but those which I have examined are exactly similar to those of the Marshwort (*Helosciadium nodiflorum*). The flowers are small, and have a pinkish tinge; the whole plant is of a much lighter green than the common watercress. Not the least remarkable fact connected with it is that, at Buckingham, where it grows in profusion, it is known by the name of "Brooklime," and is considered quite distinct from the true watercress.—*B.*

How to get rid of Crickets.—These creatures may be effectually exterminated by sprinkling powdered arsenic, at night, over the crevices and places they frequent. Two or three applications generally prove sufficient. It is scarcely necessary to add that all domestic animals should, during the time, be excluded from the apartment.—*R. P.*

Noctiluca miliaris.—With reference to "Mr. T. P. Barkas's" request for a sample of Noctilucæ. I very much doubt if that gentleman would find any of those peculiar forms, amongst them, named Diatomaceæ? I have gathered the former in myriads, without detecting, in their company, any strange foreign acquaintances: in the day, the presence of these innumerable insects is indicated by a red filmy scum, which floats on the surface of the sea in calm weather in irregular streaks and patches of colour, that would induce a person to suppose some one had emptied a tub of ruddle overboard, that had not time to sink out of sight. So far as my observation goes, the Noctiluca is identical with the well-known food of the pilchard, herring, and mackerel; warm days bring the insects to the surface, and cold makes them retreat into the unseen deeps. I once dipped up half a gallon of them, and the first night I was the possessor of a bowl of liquid silver; but on the next, this magical glory had vanished like so much moonshine!—*W. B., Fowey.*

Crickets.—Your correspondent, "Geo. B.," is evidently not of the same opinion as Vincent Bourne with respect to the

Little inmate full of mirth,

since he asks in Science-Gossip how he is to destroy crickets. I cannot sympathize with him, for I like their merry chirping, and half believe in the old Welsh superstition, that it is unlucky to dislodge, or kill them, but since he is free from any weakness of this kind, I will tell him that a few pinches of *strong Scotch snuff* will effectually drive them away. It should be sprinkled in their haunts, though they dislike snuff, they are partial to beer, and some people entice, and entrap them, by half filling wide-mouthed vials with sweetened ale, and placing them in their runs.—*Helen E. Watney.*

The Salamander (*Salamandra maculosa*). —"C. S. G." inquires what is the ordinary food of this creature. It feeds on insects, slugs, and earthworms. In fact, the kind of dietary which would satisfy the common newt would doubtless gratify the taste of the salamander. All reptiles and batrachians can fast for long periods without serious inconvenience.

Who are you?—Reader, did you ever, for one moment, say to your own soul, "Who are you?" You know that you are a something, but *what* thing? You know that there is some living power, some knack within you, that helps you through life; that enables you to make a bargain with an eye to a good pennyworth; that even urges you to pick a wife from a few millions; that walks with you in your business walks, that broods with you at home over your ledger. But what is it? Did you ever try to bring it face to face with yourself? Did you ever manfully endeavour to pluck, for a moment, this mystery from your blood, and look at it eye to eye—this YOU? It may be a terrible meeting; but sit in the magic circle of your own thoughts, and conjure the thing. It may be devil—it may be angel. No; you will take the chance: you are not curious; you are content to jog on; you know that you are you; but for the *what* you, whether perfect as the angels, or scabbed like Lazarus, why should you seek to know? Rather, dwell in the hopeful sweetness of your no-knowing.—*Jerrold's "Chronicles of Clovernook."*

A Word for Hastings.—The writer of the interesting article entitled "Left by the Tide," in the October number of Science-Gossip, page 217, evidently does not regard Hastings as a very favourable spot for the naturalist or botanist to obtain rarities, but during a stay of some duration there last year I was lucky enough to obtain the exceedingly rare zoophyte *Beania mirabilis*, parasitical on *Salicornaria farciminoïdes*. Hastings is renowned for its zoophytes; among others I may mention *Flustra chartacea* (the Paper Horn Wrack) and *Actinia coriacea* (the Feathery Sea Anemone) which I believe are both very local. As far as seaweeds are concerned, I have obtained there two species of Cystoreina *C. fibrosa* (Ag.) and *C. granulata* (A.) The Horned Wrack, *Fucus ceranoïdes* (L.) the Feathery Sphacelaria *S. plumosa* (D.) *Dasya arbuscula* (A.) and many other rare and interesting Algæ, many of which, too, I had not observed at Torquay (the well-known head quarters for marine treasures), where I had been for some time previously staying.—*J. C. M.*

"Worms—to Quit."—Water the ground with lime-water twice a week, and it will banish the intruders from your "grassplots." Clear lime-water is easily made by throwing a good shovelful of quicklime into a hogshead of water, stirring it well, and then allowing it to stand from twelve to twenty-four hours, before using it. Nothing else is so safe, though other things are equally destructive to worms.—*George Newlyn, The Gardens, Dangstein.*

Selenite.—What is the best method of obtaining films of Selenite of even thickness throughout, and giving only one tint so as to be suitable for polarising purposes?—*E. M.*

NOTICES TO CORRESPONDENTS.

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

R. A. B., T. C.—We have had the paper with dendritic spots from several correspondents, and find them to consist of amorphous particles, and not of mucedinous threads. They were first noticed by Lyngbye, and are the *Byssocladium dendriticum* of Agardh.—*M. J. B.*

Upper Test Valley.—We would commend to J. B., and all others interested in Hampshire fossils and implements, a very useful and complete pamphlet on the subject, by Dr. Joseph Stevens, just published by Mr. James Tennant, Mineralogist, 149, Strand.

Bugs.—There is no other work on Hemiptera, containing all the British species, than Douglas and Scott's Hemiptera Heteroptera, which A. S. P. and J. G. should procure. It is an excellent example of a good book spoilt for the want of an index. Moreover, while German authors and German figures are quoted, the reader may look in vain to find English authors, synonyms, or figures. What a pity it is that scientific writers assume that everybody knows so much.

J. A. K.—*Hygrophorus coccineus.*—Fr.

C. P. C.—*Clavaria pistillaris* and *Clavaria fastigiata.*

S. S.—We believe that the "Bermuda earth" alluded to is from the Bermuda Hundred, in the valley of the Potomac Virginia, U.S.

J. S.—The work you name is such a recognized compilation that it would be unjust to quote it, and not quote the authority from which the information was first derived.

W. T. I.—The *Torrubia militaris*, which you call by its old name of *Sphæria militaris*, is figured on a chrysalis in Science-Gossip, 1866, pp. 128, fig. 120.

E. B. of W.—We do not recognize anything like your very rough sketch; should any probability occur to us, we will insert it.

W. D. N.—We know no English work on Swiss or general European Butterflies.

J. B. B.—We know no elementary work on the Entomology and Conchology of New Zealand.

S. A. S.—We hoped that after publishing such characteristic figures in Science-Gossip, 1866, p. 228, fig. 217, that we should not have had again to name the very common galls or oak spangles on the under surface of oak leaves. We are sorry that S. A. S. does not read his "Gossip" regularly.

J. C. M.—No. 1, *Madotheca platyphylla.*

Mosses (J. M.) No. 2, *Hypnum rutabulum.* 3, *Tortula unguiculata.* 4, *Hypnum lutescens.* 5, *Pottia cavifolia var. incana.* Should be glad of specimens of the latter when the fruit is perfect in February.—*R. B.*

F. C. B.—Your communication is such that we could not reply to here, and you only sent initials, and no full address, so that you are alone to blame in not having it answered.

T. G. P.—Ineligible for the "Exchanges."

Clifton.—The following are the dates of publication: Roth., "Tentamen," 1788–1800; Cavanilles, "Dissertationes," 1790; "Icones," 1791–1801; Ruiz and Pavon, "Flora Peruv," 1798–1802; Humboldt and Bonpland, 1808–9; Kunth, "Flora Berol," 1813.

T. R., jun.—"Rust, Smut, Mildew and Mould." Price six shillings. Published by R. Hardwicke, 192, Piccadilly.

EXCHANGES.

Hair of Australian Bat, and sections of Peccary, Elephant, and other hairs, mounted, for other objects.—George Potter, 7, Montpellier-road, Upper Holloway, N.

Areoma Bulbosum.—(Brand on Bramble leaf), for stamped envelop.—W. Spicer, 17, Brighton Park, Clifton.

Convolvulus Hawk for other rare moths.—Send list to H. H. O. Farrell, 10, Douro Place, Kensington.

Foraminiferous Sand in exchange for other unmounted objects.—Address, T. B. N., Cornbrook Abbey, Chester-road, Manchester.

Helix Pisana, from St. Clement's Bay, Jersey, in exchange for rare British or Foreign shells.—C. Adcock, 78, Stafford-street, Birmingham.

Eggs of British Birds for British Butterflies.—Send lists to Thomas H. Hedworth, Dunston, Gateshead.

Small Green Forester (*Ino Geryon*) and December moth (*P. Populi*) in exchange for other rare species.—C. R. Doward, 41, Copenhagen-street, Worcester.

Scales of the Gilt-head Fish (*Chrysophris auratus*).—Send stamped envelope. Address to J. P., Abbotsbury, Dorchester.

British Plants in exchange for others.—Apply, for list, to S. Payne, 5, Victoria Terrace, Weymouth.

Unmounted Objects for exchange (Hairs, &c. &c.), 60 varieties.—Send lists to G. W. Webb, 108, White Rock-street, Liverpool.

Acherontia atropos, and other Insects, for Foreign Shells.—John Taylor, 119, Garnett-street, Leeds-road, Bradford.

Orbitolites and Foraminifera (unmounted), in exchange for other unmounted objects of interest.—J. H., 6, Brewer-street, Pimlico.

BOOKS RECEIVED.

"New Facts and Old Records," a Plea for Genesis, by S. R. Pattison, F.G.S. 8vo. London: Jackson, Walford, & Hodder.

"The American Naturalist," a popular magazine of Natural History for September and October, 1867. Essex Institute, Salem, Mass., U.S.

"The Cabinet of the Earth Unlocked," by Edward Steane Jackson, M.A., F.G.S. London: Jackson, Walford, & Hodder.

"The Fourteenth Annual Report of the Brighton and Sussex Natural History Society." Brighton, 1867.

"Organic Philosophy." Vol. II. Outlines of Ontology, Eternal Forces, Laws, and Principles, by Hugh Doherty, M.D. 8vo., cloth, pp. 455. London: Trübner & Co.

"A Descriptive List of Flint Implements found at St. Mary Bourne, &c.," by Joseph Stevens, M.D. 8vo. London: Tennant, 1867.

"A Catalogue of the British Plants, Known or Reported to have been found in the County of Buckingham," by James Britten, Hon. Sec., High Wycombe Natural History Society. Wycombe.

"Young England's Almanack and Naturalist's Calendar for 1868" (a broadsheet). London: Tweedie.

"A Preliminary Notice of the Akazga Ordeal of West Africa." By Thomas R. Fraser, M.D., F.R.S.E. London: J. E. Adlard.

"The Physiological Action of the Calabar Bean (*Physostigma venenosum*)," by Thomas R. Fraser, M.D. From the Transactions of the Royal Society of Edinburgh. Edinburgh: Neill & Co.

Communications Received.—M. W.—E. M.—W. C.—H. E. W.—F. T. M.—S. S.—E. H. R.—H. H. O. F.—J. S. M. J. B. B.—S. A. S.—J. C. M.—R. A. S.—W. W.—W. D. N.—B.—G. N.—L. S.—J. S. M.—W. T. H.—B. T.—T. H., junr.—J. B. W.—R. O. D.—E. B. of W.—E. H. R.—H. B.—J. B. B.—J. S.—F. B. F.—W. T. I.—R. F. G.—A.—R. A. B.—R. P.—A. I.—L. C. M. G. (perfectly illegible).—R. W.—C. E. R.—J. A. K.—M. A. W.—J. G.—A. J.—J. W.—E. G.—J. C. M.—E. T. S.—F. A. A.—J. G.—C. P. C.—W. B. F.—J. D. H.—C. R. D.—J. P.—J. R. G.—T. R.—A. M. D.—S. P.—H. W.—M. D.—F. G. S.—W. W.—J. J.—T. S. S.—R. A.—W. P. P.—N. E.—W. P. R.—James.—F. C. B.—G. N.—A. H. T.—A. M. E.—H. C.—J. G.—H. B.—F. B.—G. R.—A. S.—K.—S. W. U.—J. H.—W. R. T.—J. B.—E. S. H.

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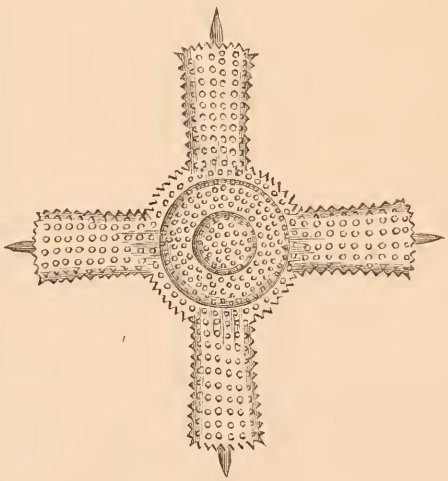

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