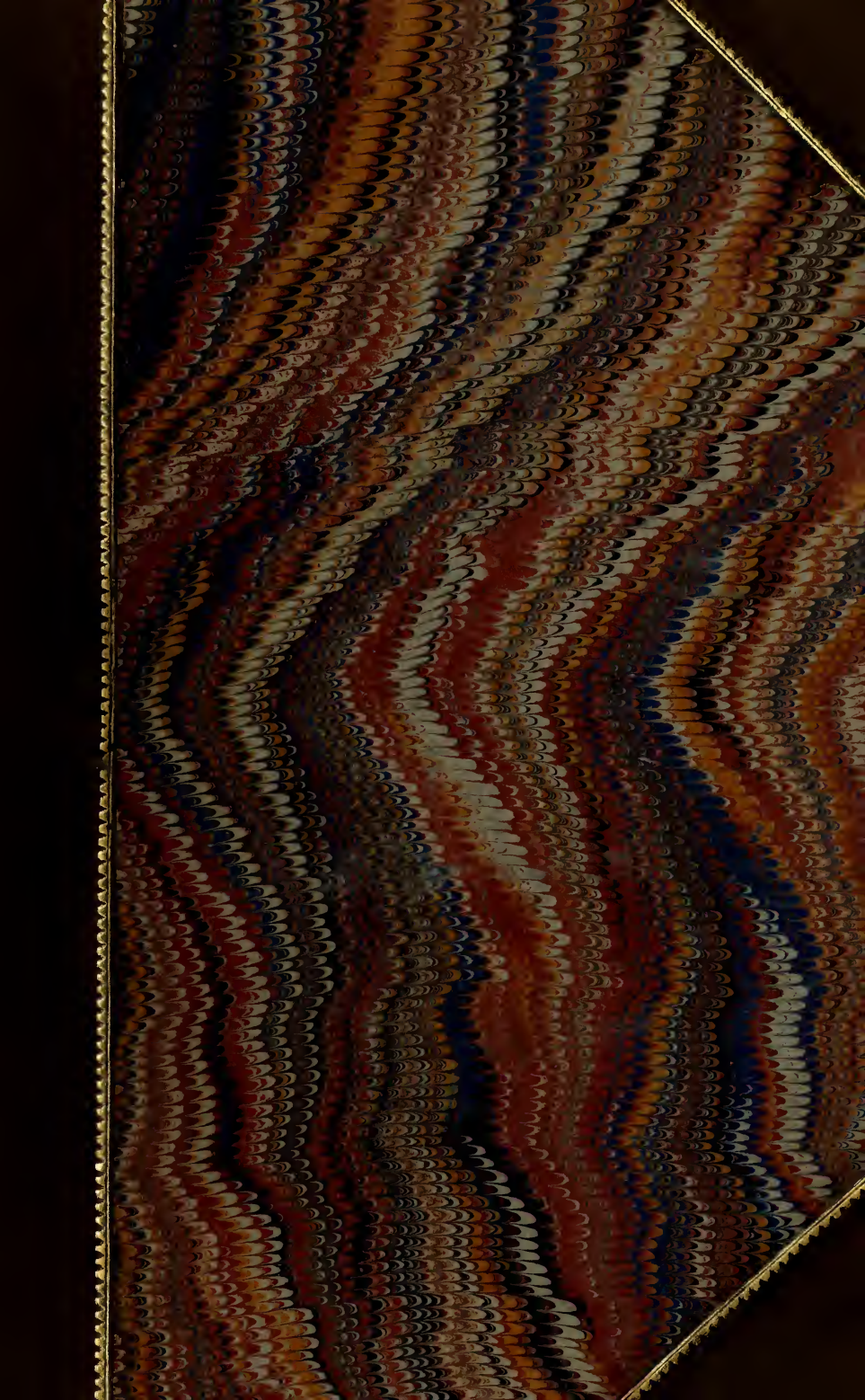

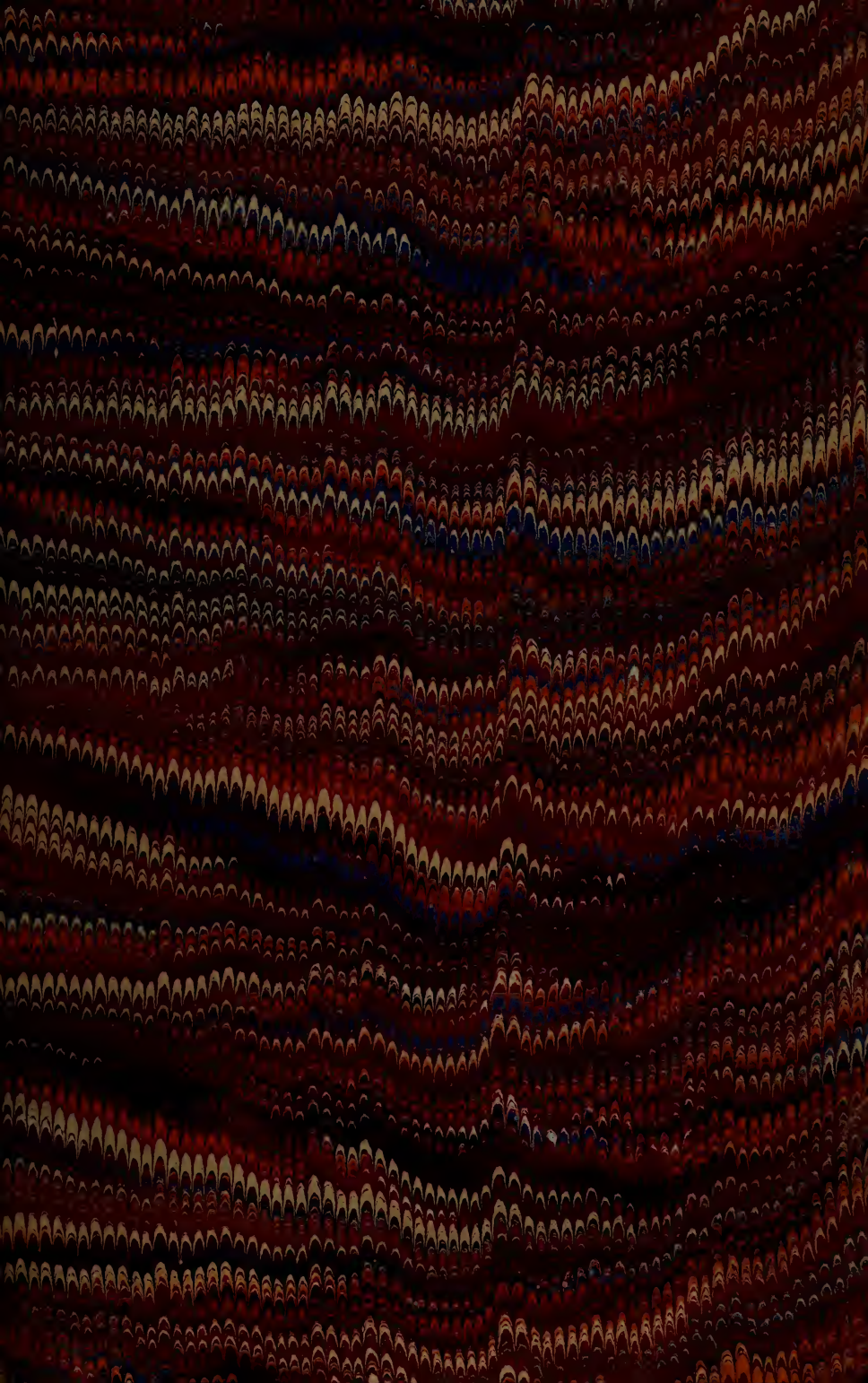

THE

ZOOLOGIST:

A

POPULAR MISCELLANY

OF

NATURAL HISTORY.

CONDUCTED BY

EDWARD NEWMAN, F.L.S., Memb. Imp. L.-C. Acad.

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"Hæc studia adolescentiam agunt, senectutem oblectant, secundas resornant, adversis perfugium ac solatium præbent, delectant domi, peregrinantur rusticantur." —Cicero.

"What can be a greater example of infinite power than a little portion of inactive earth rendered capable of contemplating itself as the work of infinite wisdom; and of considering the innumerable effects of that wisdom displayed in the surrounding creation."—Linneus.

"Natural history conducts us to a knowledge of the manners and œconomy of different animals, and their places and dependencies on each other in the great scheme of creation. Here the most insensible mind cannot fail to be struck with the infinite variety of means by which similar ends are accomplished; while amid the richest profusion of variety and beauty nothing is superfluous, nor any end attained, but by the most advantageous and compendious means."—Sir James E. Smith.

"One advantage of the study of Nature is that it is inexhaustible; but it boasts a still greater, that as far as I have been able to observe, it never loses its relish at the decline of life."—Id.

"Another great recommendation of natural history is the habit it necessarily gives of arranging our ideas and exercising our powers of discrimination. In this it vies with the study of Grammar and the Mathematics. It is the pursuit of truth,—a love of which is as inherent in every sound mind as the love of life. It is a science of facts; and the only way by which it can of itself be advanced, or contribute to the improvement of our understandings and powers, is by practical observation and enquiry. It teaches us to see and discriminate, and then to reason. The worm that crawls on the ground can *perceive*; the bird that flies in the air and builds its curious nest can *contrive*; but man only is allowed to contemplate, compare and weigh the designs of Infinite Wisdom."—Id.

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THE ZOOLOGIST

FOR 1863.

Acclimation and Breeding of Emeus in Surrey.

By William Bennett, Esq.

On the 23rd of June, 1860, by favour of the late Captain Neatby, of the 'Duncan Dunbar,' I received a pair of emeus, just imported by him from Sydney. They were somewhat unmanageable when first landed; and proving too large, and requiring too much room for the person at Sydenham for whom they were originally intended, they were kindly taken in for a short time by the authorities of the Crystal Palace, from whence they were removed here direct.

The first thing was to provide the best conditions I could to make them comfortable. For this purpose a space or paddock, of about a quarter of an acre, well shaded on one side, with a southern slope towards the river Mole, was inclosed by iron hurdles, with the house in which they were imported placed in one corner for night shelter. They were protected from the river, because, though fond of water, they do not know how to manage themselves out of their depth, the bottom in this part being very uncertain, and full of great holes. As soon as their propensity for bathing was discovered, a pond of a graduated depth was made for the purpose, in which they disport themselves precisely in the manner as a fowl in a dust-bath. They were driven into the house the first two or three nights; but exhibiting an invincible repugnance to this process from the moment they obtained their freedom, and not appearing to suffer, they were ever after left to their liberty in this respect; and though it was resumed in the winter, they never voluntarily sought shelter in any weather beyond that of the trees, but generally settled in the dampest spot they could find for the night. They did not appear at all to suffer even from being out in the snow, and I have seen them eat pieces of solid ice thrown out of the water-bucket, though their

acquaintance with either of these phenomena, I apprehend, must be very rare in their native country.

From the moment the birds came into my possession, I put myself in communication with the Zoological Gardens, Regent's Park, in order to learn what I could of their habits, food and treatment: and here let me acknowledge the more than readiness with which all my enquiries were constantly met, and the effective advice and assistance that was always rendered, both by the intelligent keeper, Benjamin Misselbrook, and the indefatigable superintendent, Mr. A. D. Bartlett, at all times, both personally and by correspondence. The staple food is dog-biscuit, broken up into moderately small pieces, as the emeu has no means of mastication or fracturing, varied with bread, boiled rice, Indian corn occasionally, with a large proportion of chopped-up vegetables, such as lettuce and cabbage, greatly preferring the former, or, in its deficiency, any other succulent, milky sort will do, as dandelion, sow-thistle, &c. They are also very fond of fruit of any kind, in any condition of maturity, from the smallest apples that begin to fall, green gooseberries, unripe or ripe strawberries or raspberries, up to grapes or even wall-fruit, so that it is not decayed, about which they are very particular. The apple-parings are all saved for them in winter time. They feed likewise considerably on grass, some kinds of leaves, and will pick up green acorns; so that their bill of fare offers no anxiety. The young birds are fed on meal, mixed with hard boiled egg and vegetables chopped fine, together made into a ball with water or milk, dry enough to crumble. Besides their adult stock they had at that time one young one in the Gardens, hatched by means of an incubator, and nursed by a great Cochin hen. It was amusing to see the tall long-legged bantling trying to nestle to its strange foster-mother. The poor little thing lived to about four months, and then died of diphtheria. The young emeus are full-fledged and striped longitudinally, and nestle with their heads only beneath the parent bird.

From the information of the captain, my birds were either in their fifth or sixth year at the time of their arrival, and of course at full maturity. They appeared to prosper well, and improved in feather considerably. They became also much more gentle in manners, and at times very playful, with the most grotesque attitudes in the way of dancing, sometimes performing a regular *pirouette*, with their tall figures, and feathers acting as crinoline.

The severity of the winter was passing, when one morning, the 9th of February, 1861, on a heap of litter just outside the emeu-house, and slightly concealed by the straw being drawn over, was discovered an egg.

When first brought to me, having no idea there was any egg of that colour and character, I thought it the most wonderful natural production I had ever seen. It was very heavy, of a perfectly symmetrical form, dark green in colour, slightly fretted or shagreened, and looking more like a mass of polished malachite than any organized product. The beauty of the shell was displayed in the late International Exhibition, where the emeu's egg might be seen made up into ornamental drinking-cups, mounted in silver, of a variety of patterns, in the Australian department.

I communicated directly with the Zoological Gardens, and was duly informed that the egg was a perfectly normal one, that I might expect a batch of from ten to fourteen, at intervals of about three days each, and that in due course, if things went on favourably, the *male bird* would collect the eggs together in a rude sort of nest, would sit indefatigably for the long period of eight weeks, and would wholly take the charge of, tend and bring up the young ones when hatched.

My second egg was not laid till the ninth day, and then I was presented with one every third day regularly, up to the thirteenth egg, which took four days in making its appearance, and was the largest and heaviest of the batch, weighing 1 lb. 5½ oz. They had steadily increased in size and weight from the first. After the deposit of the second outside the house, being still cold weather, and anxious to secure their vitality, I replaced each egg by imitation ones I had made and painted, and succeeded in inducing the process to take place while the birds were within the house at night. As the number increased, the two first real eggs were put back, in order to run as little risk as possible of dissatisfying the bird, and subsequently they were left as laid. They all underwent the process of arrangement and re-arrangement with every addition. One morning I found one of the birds busily engaged in shifting the eggs in the usual manner with its beak, and suspicion of its intentions being excited, I watched it till it succeeded in rolling one out of the house. I replaced it. The same thing was repeated the following morning. As there was a fall of snow of several inches, "This won't do," says I to myself, for fear of breakage, and I set my thoughts to work to interpret the meaning. I came to the conclusion that it was a certain indication the bird would not sit in that house, but was in search of some other place. By observing narrowly I noticed a partiality to one particular and moderately sheltered corner of the open ground, not very far off. I immediately had four poles erected, and an awning put over a sufficient space. Under this was scooped out a slight hollow, a layer of sand

placed therein, with a covering of dry litter, and the nest-eggs removed thereto. To my great satisfaction the next egg was laid there, and on the 24th of March, 1861, the bird finally sat down.

Now comes the proper time for the question, Which bird really was it? The next day, as soon as I was satisfied the bird was fairly settled, I hastened up to the Zoological Gardens and informed the authorities of my success so far, and that their information was correct in every particular, except that my *female* bird was the one that, *secundem artem*, had taken to the nest,—at least the one the captain who imported them said and I had always taken to be the female emeu. With this the keeper seemed much surprised and dissatisfied, and began to question whether I really had the sexes. Upon his cross-examining me as to the marks and signs, especially as to the voices of the two birds,—upon the evidence of which I had greatly relied as determining the one with the deep and distinct call being the male bird,—he assured me I was mistaken; that that bird, which was still at large with me, was the female, and that consequently it was the male bird that had normally sat down. I was still, I confess, incredulous.

It is proper here to observe that in the emeu, as in several other Australian species, there is no characteristic male plumage, or rather the little difference there is, and various other usual outward signs, is *reversed*. Of my pair one is considerably larger than the other, stouter in limb and more robust in every feature; it has a slight top-knot, and goes strutting about, especially in damp weather, with its breast-feathers fully out, like a pouter pigeon, or rather some huge turkey-cock. It is usually the more courageous and pugilistic. It makes a deep, hollow guttural boom when under any gentle excitement of pride or pleasure, especially on damp evenings or in the still hours of the night, sounding like a small gong or distant muffled drum. The other is more agile and graceful in all its movements, corresponding with its slenderer frame, more docile and inquisitive, fleeter of foot, and with no voice beyond a suppressed hiss when angry, and a sort of grunt when distressed. The former is the one we took to be the male, the latter the female, and all our visitors, farmers and other natural judges who had the opportunity of observing their manners, agreed in the opinion. It was this last which took sole notice of the eggs (they were usually laid at night, when the birds were always together, so that it was not detected *which* actually laid them the first season), in the way of arranging and concealment, and that finally sat down upon them.

For the first month the bird sat most assiduously, not being observed to come off the nest, for the necessary food and water, oftener than twice in the week, and then for scarcely more than a minute at a time. Nine eggs was the number the birds had been set upon. Three were taken to the Zoological Gardens to be tried by an incubator. One or two got accidentally broken. The first good observation that was obtained of the nest when the bird was off, there were found to be *twelve* eggs in it, so that three more had been laid in to the original number. Which bird deposited these last? The total number of eggs was sixteen.

During the fifth week the bird became restless, and I began to be afraid would not hold out the long period. I thought it possible a change might be going to take place in the duties of incubation. But no relief was offered. The bird at large continued to walk about with the most stolid indifference. The one on the nest settled again, only coming off for refreshment twice a-day instead of twice a-week.

Everything went on prosperously till the seventh week had expired. My family were absent at our place of worship: on coming home, immediately on entering the premises and catching sight of the bird at large, with that instinctive perception we cannot always trace to any particular cause, I saw that something was wrong. I hastened to the nest, and found it deserted! The bird that ought to have been there was wandering about in a state of irritation and excitement, and had evidently been disturbed. All my hopes of young emeus suddenly sunk down to zero. I did everything I could devise to entice the bird back again to the nest, but it was all of no avail. When, from further observation, I was quite convinced it was a case of hopeless disturbance from some unknown cause, I reported the state of affairs in-doors, where the disappointment was fully equal to mine, and sat down to think.

It was really touching to see that fine nest of eggs,—not an every-day production in this country, and so near completion of their period for bursting into fresh life,—exposed to the cold world without protection! The first thing I did was to take out a bucket of moderately warm water, into which the eggs were all plunged, to arrest their further chilling, in case of there being any life in them. My wife then improvised a sand-bath, by means of a large saucepan or fish-kettle, which was placed over the boiler by the side of the kitchen fire. Into this the most likely eggs were transferred, and carefully covered with flannel. In the mean time she had performed the old farm-house experiment of immersing them individually in hot water, and pro-

nounced that there was actual life in at least five of them. This encouraged us to persevere. I had previously ascertained, for the sake of information, the heat of an ordinary sitting hen, and found it to be about 93°—94°. I allowed 10° more, as probable for these large semi-tropical birds. I got my sand-bath, therefore, up to 104°, and endeavoured to keep it within the range of 100° to 108°. I wrote off to the Zoological Gardens, stating my misfortune, hardly supposing, but asking if anything could be done, and begging, if so, they would let me know by telegram; and I sat up with the sand-bath nearly all night, regulating the temperature, and occasionally turning the eggs.

The next afternoon—delayed, from our post-address not happening to coincide with our nearest railroad station—I received the following telegraphic message, "*Send up the eggs; we have a bird that will hatch them.*" The effect was almost electrical! Though how—what bird, what hopes, what certainty—was all a mystery, we had nothing to do but gratefully and implicitly to obey in faith, to the best of our ability. It was then just too late to catch our last train, with time to return the same evening, and having mastered the regulation of the temperature, and feeling confident there was no further injury being sustained, I did not think it well to run the risk of hurry, but took another night at watching and regulating.

The next morning a quantity of bran was made hot, the eggs carefully packed with it in a tin case, the whole rapidly enveloped in many folds of flannel, and despatched per first train by the hands of a careful messenger, with instructions to use every reasonable celerity. He arrived at the Gardens with them quite safely, and found the Superintendent ready to receive them: they were taken out still quite warm, and immediately placed under an emeu, which for the last fortnight had wanted to sit, without any eggs!

The reward of this care and perseverance against such a multitude of chances, and the really extraordinary part of the business, is that in the course of the following week four young emeus were hatched out, to the no small interest and gratification of all concerned, and no doubt to the astonishment of the bird, which had sat such an abnormally short time for the living result. The brood formed one of the advertised attractions of the Gardens during the early part of last season. One of them lived only about six weeks; another, which grew up with a defective spine, died in the winter; the other two still grace the Gardens, having arrived at nearly full emeu's estate. There was also a fine chick in an egg that had received a crack, and two or

three other immature ones that did not come to the birth. The eggs in the incubator did not hatch.

My poor emeu, which had sat so long, and then was deprived of the natural reward, was very emaciated and out of spirits for some time. On close scrutiny, a day or two after, I found emeus' foot-marks along several beds in the garden, and tracked one pretty evidently forced between bushes, where it would not voluntarily have gone, as if driven. I learned subsequently they were seen that morning out of their boundaries. My interpretation is, that, knowing of the absence of the family, some stranger entered the premises, which are easily accessible, with or without evil intention, perhaps in ignorance of the bird and its critical condition, perhaps from curiosity, possibly with dog and gun for the purpose of shooting, or with rod and line for fishing, and unwittingly disturbed it,—a strange dog would lead to a fearful commotion,—had left the gate of the enclosure open, carelessly or in alarm, through which the emeus had rushed, had got them back again somehow, and effected his escape, uncognisant, it might be, of the whole mischief.

During the summer my birds improved, both in plumage and condition, upon the previous season. From all I could observe, I still believed the smaller one to be the female, the larger the male. On the 29th of December I went down, as was often my custom, about four o'clock in the afternoon, to see after their welfare. I was alarmed at finding the larger bird with symptoms of being very unwell. It hissed at me, and strained with its neck violently, as if choking, and I thought it must have got something in its throat. I was going immediately for assistance, when I bethought me I would try and get it into its house first, and for this purpose attempted to drive it, when it gave another great retch, and—*an egg dropped upon the ground!* The illness was all over; this bird quietly walked off with the most perfect indifference, and at the same moment down rushed the other one, in a state of the greatest excitement, rolled the egg—fortunately unbroken by the fall—over and over till pleased with its location, and finally covered it with leaves, thus definitively settling the question of sexes, the extraordinary *reversal* of habits and manners by which we had been misled, and the crowning fact of the *male* bird doing all the sitting, and, as I had afterwards the opportunity of witnessing, of bringing up the young ones entirely.

It was nearly six weeks earlier than the previous season for the laying to commence. In preparation, however, for the occurrence, I had had a much more suitable house built, better protected from

casualties, open still in front,—in order not to give the air of confinement to these freedom-loving birds,—and hung inside with branches of the evergreen Conifers, to present somewhat of a natural and homeish appearance. The next egg followed on the fourth day after the first one, namely, on the second day of the new year; the third on the fifth day after that; and then there was an addition every third day, with perfect regularity, up to the thirteenth, which again took four days, and the fourteenth six days. There was no difficulty in inducing the laying bird to take to the new house. The same precautions were adopted as last season in removing the eggs as deposited, during the severe weather, and replacing them by artificial ones. Precisely at the same relative period as before, namely, after the laying of the thirteenth egg, the other bird—whom we may now unhesitatingly designate by his proper pronoun *he*—became increasingly busy about the eggs, and began to show symptoms of making the same kind of rude nest in the hollow provided, and finally settled on St. Valentine's Day, the 14th of February, 1862. The eggs, as last year, had almost regularly increased in size and weight from 1 lb. 2½ oz. to 1 lb. 7 oz., the average being considerably above the previous season. It was thought best to keep back the four first, as the smallest and least to be depended upon, and *he* was therefore set upon ten eggs, being perhaps as many as was prudent.

The next day I was favoured with a visit from Mr. A. D. Bartlett, the prompt and energetic Superintendent of the Zoological Gardens, who had been duly informed, from time to time, of the progress of events. He was pleased to approve of the arrangements entirely; but thought the bird would cover the whole number of eggs, and that therefore the four which had been kept back—and which I wished him to take to experiment upon, but he declined, as they had no bird then likely to adopt them, and he had no faith in the incubator—might be safely added to the nest. I divided the matter, giving the bird two more, quite sufficient, as it afterwards proved, and attempted to hatch the other two by means of an *impromptu* incubator, which I need scarcely say failed entirely.

We made several experiments to ascertain the heat generated by the bird, with a very susceptible Nigretti and Zambra's thermometer he had brought for the purpose, but probably from not giving time enough, or the normal heat not being yet developed, did not obtain up to quite 90° while the Superintendent was here. I pursued the experiments afterwards with one of Casella's pretty little instruments made for the purpose; but the last time it was put under the bird for

night I was unable to find it again in the morning, without more disturbance than I liked to risk with so large an area of search. When discovered, which was not till the sitting was over, it was unfortunately broken. The highest temperature I actually observed was 96°. A large Dorking hen, with the same instrument, registered 103° as the maximum; average 98°.

Last season I noted that three more eggs were laid into the nest after the bird was settled. This year we had the opportunity of seeing the female bird deliberately walk up to the nest, and therein deposit another egg, without materially disturbing the sitting bird, who immediately took proper charge of it. The process did not take above one minute, so that it required to be in luck's way to have the opportunity of witnessing it. This must have been repeated four times, for the first time the bird was off long enough to enable me to get a good view of the nest, there were sixteen eggs in it! This, I believe, was too many. At times, during the long period of incubation, they were not all completely covered. The sitting was as assiduous as last year, but this season I adopted the plan of feeding the bird regularly on the nest, rather than he should famish himself as before. He took comparatively little, but the restless period at the end of four weeks did not supervene.

In the fifth week I found one of the eggs broken in the nest, with an embryo chick in process of formation. This was encouraging, independently of the loss. Exactly a fortnight afterwards the same thing occurred again. The progress towards chickenhood was very marked; the head, beak and legs were perfectly formed, and the feathers over the body had made their appearance. I was somewhat uneasy at the cause of these accidents, when, a day or two afterwards, happening to catch the bird off the nest, I saw the one that was at large—the hen bird—deliberately walk up, and, with a scolding air, endeavour, with her strong neck acting as a lever, to force her faithful partner down upon the nest again. In this attempt, of course, a struggle ensued, and thus it was no doubt the fractures had occurred. Not being disposed to run any further risk from the same cause, I shut the hen bird off from that time.

Eight weeks were completed without further accident. We were on the tiptoe of daily expectation. Nine weeks elapsed without result. We all began to look serious. Two days more expired fruitlessly, and I believe all but myself had quite given up all hopes. The bird still continued to sit unweariedly, and I thought of the last four eggs laid into the nest, the normal time for all of which could not

have yet been exhausted. Judge of the reaction, when, on visiting the nest in a half melancholy, desponding mood, the first thing on the morning of Easter Sunday, the 20th of April, I descried an evident cast-out shell, and, on looking more closely, the striped body of a young emeu protruding from under,—not the wing, for it has none,—but the fostering side of its parent. I hardly knew how to break the tidings in-doors! The next day produced another, and two days more a third broke its way out of the shell. The bird continued to sit to the end of the week. Two dead chicks were found in two other eggs; the rest proved addled.

The eldest young emeu was weakly from the first. A pellicle of skin continued drawn over one eye for several days, and I am not sure it ever obtained its full sight. It died in the fifth week. The other two are in high health and thriving. They are now towards eight months old, have long lost their infantile striped plumage, are apparently about half-grown, and very saucy, and are beginning to think themselves veritable emeus.

I must not omit one remarkable set of phenomena that now became developed. For the first month the young ones were very tenderly watched and guarded within their house, the father being most assiduous, gentle and attentive in their nurturing. Having somewhat established themselves in the world, they were given a little more liberty. The first time the mother bird caught sight of the little ones she became much excited, seized one of them by the head and threw it a regular summersault up into the air. A scuffle ensued between the big birds, by which I became alarmed for the safety of the young ones, and was obliged to interfere. At first I thought it might be only jealousy or natural excitement that would soon subside, or an odd and antipodean way of showing pleasure, but, with further experience, became convinced it meant mischief on the part of the mother bird. They were therefore continued to be kept separated, but only by a wire fence, in order that they might be so far in company and become familiarized.

The time arrived when we thought the parent birds at least ought again to associate, and would no doubt be glad of each other's society. They were introduced accordingly by removal of a portion of the fence, when the female bird rushed upon the male, and drove him round and round, endeavouring to strike him with her strong foot forward, whenever she could get him into a corner, till I was obliged at last to separate them again. The loss of feathers, if not of blood, was considerable. Here was an unexpected dilemma, beyond the juris-

diction of Sir Cresswell. The experiment was repeated several times with the same result, until, in fact, the persecuted "weaker vessel" was driven by a fierce charge to leap the fence, in doing which he tore a long wound in his neck, and might have been seriously injured. This evidenced real hostility on the one part and fear on the other. Thinking the presence of the young ones might possibly be the cause of offence, and deeming they were now able to shift for themselves, I determined to wean them, and, as a preparatory step, removed them and their father to another inclosure, as much out of sight and hearing as could be arranged. They were some time in getting settled in their new habitat, especially the little ones, who appear to have the organ of locality very largely developed. In introducing the male bird again to his companion, it was necessary to take the young ones as well, as they would not be parted. Precisely the same scene recurred as at first, namely, a violent charge, by which the male was overpowered by the female and obliged to run; but, after a little while, the former gained courage, beat off the latter, and completely turned the tables, the young ones joining heartily in the chase with either party. This was repeated day after day, without any progress towards a settlement of the domestic difficulty, and to the extent of the heavier bulk of the hen bird becoming distressed by exhaustion, and she showed symptoms of being sorely frightened whenever she saw the approach of her lawful mate. I now separated the young ones entirely, and shut the male bird up to reduce his spirit in turn. This had the desired effect. On being let out together, after three days' confinement, *she* was again master. They were now transferred into a field, where there was plenty of room for them to run, without danger of doing much mischief to each other. Here the more agile and lithesome male readily escaped from his persecutor, and she had to give it up for awhile, until sufficiently recovered to renew the chase, with the same result. They are getting weary, after a fortnight, with this sort of daily occupation, and are gradually becoming more reconciled to each other's presence. I expect very shortly the male bird will turn again, assert his natural equality at least, and that then they will make it up for another season.

The final parting of the young ones with their father was very hard work. The poor little things, as soon as they found themselves alone, set up the most plaintive cries, lasting all through the night, and the following day or two, and beat themselves about, until one had made its head and neck quite sore, against the sides of the inclosure,—incessantly haunting that side towards where their paternal guardian, friend and

playmate had been taken. He appeared to forget them in about a week. They still commence every morning with their plaintive cry of distress, though now the third week since their separation.

I ought to have mentioned, in the first place, that the species in my possession is Dromius irroratus.

W. Bennett.

Brockham Lodge, Betchworth,
November 15, 1862.

Zoology of Sakhalia Island.—In 'The Russians on the Amur, &c.' by E. G. Ravenstein, F.R.G.S. (1861), p. 269 *et seq.*, a letter is cited giving an account of Schrenk's journey to Sakhalia Island.* It is remarked that the "Tymy is a rather considerable river, which runs towards the north-east, through a wide valley, and before entering the sea of Okhotsk penetrates through the mountains of the east coast. The study of nature in this valley, as far as the season would permit, was not a little interesting to me. On the 15th of January the temperature of the water was 33°12′ Fahr. The river affords a refuge for numerous kinds of ducks and other birds, Anas boschas, Fuligula cristata, Cinclus Pallasii, &c. On the rocks which bound its banks it is not rare to meet with a very large eagle, Haliæëtus pelagicus, the symmetrical feathers of which furnish to the inhabitants an article of a very advantageous commerce with the Japanese. * * * The geographical distribution of animals accords with that of the trees. This island, in fact, or at all events its northern portions, may be included in the same zone with the mouth of the Amur and the nearest coast of the Okhotsk Sea. We find besides the reindeer, the common stag (*Cervus Elaphus*)†, the roe,‡ elk and musk ox, which inhabit the depths of the thickest forests in the interior. There is still in Sakhalia a wandering tribe who keep reindeer, while among the Tungurians that animal has disappeared, and with it the traces of a nomadic life." The notice of the musk ox must be a mistake, for this animal does not inhabit forests, but appears to be quite peculiar, at the present epoch, to the arctic "barren grounds" of America, which correspond to the Tundras of Siberia, with physical features similar to those of the interior of Lapland, so forcibly described by Linnæus. I have no doubt that the equivalent of "musk animal" has been translated "musk ox," and that the Moschus moschiferus is intended, for this is a species known to inhabit the Amur territories, and is included as such in Mr. Ravenstein's list of the Mammalia of that region (p. 316). At page 320 this author notices that the tiger crosses over the Sakhalia.—*Edward Blyth; Calcutta, September* 17, 1862.

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* For some account of the adventures of Leopold von Schrenk and Charles Maximowiez, the former of whom directed his especial attention to the animal world, while the latter investigated the Botany of the new territories of the Amur, &c., on the part of the Russian Government in 1854, see chap. xi. of the same work.

† Probably Cervus Wallichii.

‡ Capreolus pygargus.

Uniformity in size of Pamphlets on Natural History, Botany, &c.—There are often pamphlets published on various branches of Natural History, and lovers of the Science are induced to purchase, either from the novelty of the subject or the known abilities of the writers. These tracts after you have read them too often become useless; they cannot be bound in volumes from the fact of their being published of all sizes, and not of one uniform size. I have three pamphlets that I should like to preserve, but they are each of them too small to be bound separately, and they all differ in size. I would respectfully suggest to your readers that if any of them publish separate papers, it would confer a favour on the lovers of Science if they would print them of the same size as the 'Zoologist,' with which they might be bound, and so preserved. The fact of their being that size would be an additional inducement to buy, and it would be no detriment to the general reader.—*John Whatt; Kirby Moorside, Yorkshire.*

The Kite (Falco Milvus) *near Kingsbridge.*—A fine old male of the common kite was shot on the banks of the Avon, near this place, on the 13th of October. Its general plumage is much lighter than any other specimen I have seen.—*Henry Nicholls, jun.; Kingsbridge, South Devon, October* 18, 1862.

The Roughlegged Buzzard (Buteo lagopus) *on the Norfolk Coast.*—On the 10th of November an immature specimen of the roughlegged buzzard was shot on Hasboro' beach. This bird was observed by a man who was shooting small birds flying slowly over the sea towards the shore, on reaching which it immediately alighted, and was shot whilst sitting on a heap of shingle. About the same time another fine bird, very nearly adult, was killed at Graton, near Lowestoft, in the adjoining county.—*H. Stevenson; Norwich, November* 18, 1862.

Occurrence of the Honey Buzzard (Falco apivorus) *near Eastbourne.*—A very fine honey buzzard was shot in an apple tree in the garden of Mr. J. Govvinge, of Birling Farm, near Eastbourne, on the 17th of September last. It had been seen about the neighbourhood several days. Its companion, which was also seen about the spot, was shot at Seaford a few days after, and is in the collection of the Rev. Mr. Dennis of that place.—*J. Dutton; Eastbourne, November* 16, 1862.

Ashcoloured Harrier (Falco cineraceus) *near Norwich.*—About the 10th or 11th of August a birdstuffer in this city received three young specimens of the ashcoloured harrier, from a nest found at Sutton, two of which were sent to the Zoological Gardens. These birds still breed with us occasionally in the eastern parts of the county.—*H. Stevenson; Norwich.*

The Great Gray Shrike (Lanius Excubitor) *at Leyton Marsh.*—A fine male specimen of the great gray shrike was shot by a young man named Watson, on the 28th of October, in a garden adjacent to Leyton Marsh.—*William Morris; Leyton, Essex, November* 3, 1862.

The Pied Flycatcher (Muscicapa luctuosa) *in the Isle of Wight.*—Several specimens of this bird were seen here in May last, and scarcely a year passes but a few specimens occur. I obtained one good specimen last summer, and have taken a nest and eggs. I have no doubt it would breed here annually if unmolested.—*Henry Rogers; Freshwater, Isle of Wight, November* 3, 1862.

Blackbird's Nest.—Last year a blackbird built its nest in a ventilator in a cowhouse. The hole was the breadth of the bricks, and in height about eighteen inches. The

sides of the nest were pressed in by the bricks, and the whole nest was oval instead of round. The builders reared a family of five in it.—*John Whatt; Kirby Moorside, Yorkshire.*

Thrushes Singing in October.—This fact is noticed (Zool. 8281) by the Rev. H. Hornby as unusual. For five years out of six, for the last twenty, I have heard thrushes sing for a few days in October, generally between the 18th and 25th of that month; but in this month these birds are perched much higher in tall trees than in the breeding season, and it seems to me doubtful whether they are not young birds of the hatching of the same year, six or seven months previously. The birds do not sing so loud, nor do they go on in that unbroken routine usual in nesting time, but mutter out their notes a few at a time, and break off suddenly at the end of three or four notes, and commence again, seldom giving ten or eleven varieties of note at once, as they do in the joyous time of pairing. Their song in October is generally made on an extremely mild day. Considering the thrush as inferior only to the nightingale I have particularly noticed its movements at all seasons. On the 9th of February, 1847, I found a thrush's nest with three eggs in one of my shrubberies. This nest must have been begun to be "built," as they term it, in January. But a few days after I found it a heavy fall of snow, to the depth of twelve inches, destroyed all the hopes of the parent birds, as the eggs were never hatched.—*H. W. Newman; Hillside, Cheltenham, December* 1, 1862.

[In my brief editorial note the word "old" is omitted. It would have read correctly thus: "My own experience is that the old thrush is usually silent in October. The male birds of the year always make their first essay in song during that month."—*Edward Newman*].

Skylarks congregating in October.—The congregating of these birds so early as stated by Mr. Saxby (Zool. 8281) is a very rare occurrence, as I have heard them sing and seen them soar as late as the second week in November, particularly in 1852,—a warm November, and dry up to the 15th. To account for this, it is probable that the larks were sensible by some wonderful instinct that some unusually severe frost was not far distant, and were inclined to get a little more to the southward. In 1837—8 the winter did not commence in this county until after the 10th of January, 1838 (Murphy's year), but three days before that memorable frost visited us. I remarked to a friend that the thrushes, as well as some minor song birds, had ceased suddenly to charm us with their beautiful music. I can add that in the present autumn, about the last few days in October and first week in November, I observed missel thrushes and other birds visiting the berries of the mountain ash in a very public situation, in the road near my dwelling house, and eagerly searching for food; and the redwings and fieldfares were unusually tame several days before the late severe and early frost set in, and appeared suddenly in great numbers.—*Id.*

Golden Oriole (Oriolus galbula) *in the Isle of Wight.*—In May last a male oriole was seen in the garden of Plumley's Hotel. Mr. Lambert, the proprietor, snapped his gun three times at it, but it missed fire, and the bird sat apparently unconcerned preening its feathers. Many persons saw it and agreed as to the brightness of its yellow. At last some of them threw stones at it and drove it away, so that when Mr. Lambert sent for me it had flown.—*Henry Rogers; Freshwater, Isle of Wight, November* 3, 1862.

The Query respecting the Robin.—Like your correspondent Mr. Ransom, I have been in the constant habit of hearing it said that the young robins kill off the old ones.

The saying is a popular one, and implicitly believed in North Yorkshire. The robin is an early builder, and generally lays five eggs, and rears at least two broods a year. The general respect in which they are held causes their nests to be spared by plundering schoolboys, so that they may be supposed to rear their young with less drawbacks than other birds; yet the appearance of the ruddy breast, either in our gardens or hedgerows, in the latter end of July or August, is a rare occurrence, though the young birds with their peculiar plumage are numerous. Considering the advantages they enjoy they ought to be very common, and yet they cannot be said to be so. The hedge-sparrows, whose nests are plundered so frequently and so cruelly, are in all localities much more numerous; in my garden they are at least ten to one. There must be some cause or causes at work to keep down their numbers, for it must be admitted that they have advantages over all other birds in the laying of their eggs and rearing of their young. The question is what are those causes?—*John Whatt; Kirby Moorside, Yorkshire.*

The Bluethroated Warbler (Sylvia suecica) *at Brighton.*—On the 7th of November I saw a most beautiful specimen of the bluethroated warbler at Mr. Pratt's, taxidermist, Brighton. It was caught by a boy on the Downs, and is sold for £2.—*John Dutton; South Street, Eastbourne.* [See also Zool. 8281.—*E. N.*]

The Black Redstart (Sylvia Tithys) *in the Isle of Wight.*—Yesterday, being Sunday, the 2nd of November, no less than six male specimens were seen near Freshwater Gate, and I have had one specimen, a magnificent male, brought to me this morning by Mr. C. Theobald; a second was wounded, but not being carefully marked down was lost. No doubt that others will be obtained, as they have been observed to-day by different persons. Yesterday I heard an unusual call-note from a bird in an elm tree on which the leaves were rather thick. The call was something like "fid-fid, tack-tack." I think it was a bird of this species, but I could not get to see it. Since writing the above I have obtained three other specimens, two females and a male, so that I have now two pairs in excellent condition.—*Henry Rogers; Freshwater, Isle of Wight, November* 3, 1862.

Parrot Crossbill and Common Crossbill supposed one species.—Mr. Bree doubts the existence of the parrot crossbill (Zool. 8033) as a particular race. If that bird is to be united to Loxia curvirostra, why not also the small species of the Himalayas—Loxia himalayana? in which case the difference in size of the two extremes is great indeed. In America the L. mexicana corresponds to the L. pityopsittacus of Europe, but on the former continent L. mexicana is a more southern race than L. curvirostra, whereas in Europe L. pityopsittacus is the more northern race of the two. If all these are to be regarded as varieties of one species (in a more special sense than—say—the different kinds of siskin) why not also the two whitewinged crossbills of Europe and America respectively? And why does not the allied Strobilophaga Enucleator vary in like manner? I have seen many parrot crossbills, and consider them to be better distinguished from the common sort than are the greater and smaller European bullfinches, the single and double bullfinch of the French, the former of which is the true (Loxia) Pyrrhula of Linneus, and the latter of course the Pyrrhula vulgaris of Ray. Strange that the former of these birds should likewise prove an inhabitant of the Azores! There is a nearly allied bullfinch of Japan which Mr. Gould has figured in his 'Birds of Asia' as P. japonica of Temminck and Schlegel; perhaps an older name for this bird is P. griseoventris of Lafresnaye (Rev. Zool. de la Soc. Cuv. 1841, p. 24). In the Himalayas four species of this bird have been discovered, *viz.*, P. nipalensis of Hodgson, P.

erythrocephala of Vigors, P. aurantia of Gould, and P. erythaca of Blyth, a description of which last will appear in the forthcoming number of the 'Journal of the Asiatic Society.'—*Edward Blyth; Calcutta, October* 1, 1862.

Deposition of Eggs by the Cuckoo.—No one can say that this subject has not been well ventilated in the columns of the 'Zoologist, and Mr. Saxby deserves great credit for authenticating several rather novel facts. I am obliged to him also for adding one more singing bird to the number of foster-parents, the chaffinch. I believe most of the undermentioned birds are all noted down by Dr. Jenner, Mr. White of Selborne, and other great observers: the hedge accentor or common hedgesparrow, gray water wagtail, titlark, robin redbreast, redstart, chaffinch and the meadow pipit. The three first named are the prime favourites. Up to this time I have never heard or read of the young cuckoo being found in any other nest. The redstart is the only migratory bird, I think, among those named, and this last is very much in favour of Mr. Saxby's theory, as that bird generally builds in a wall or hole in a hollow tree, and others in cramped places most difficult for the cuckoo to enter. I now bid adieu for some time to this subject, and have to thank Mr. Saxby for an unmerited compliment in the last number of the 'Zoologist];' and when the middle of April arrives we may hope to welcome this extraordinary and eccentric bird in the words of a minor poet:—

Hail! beauteous stranger of the grove,
Thou messenger of spring;
Now heaven repairs thy rural seat,
And woods thy welcome ring.

What time the daisy decks the green
Thy certain voice we hear.
Hast thou a star to guide thy path,
Or mark the rolling year?

The schoolboy wandering through the wood
To pluck the primrose gay,
Starts, thy curious voice to hear,
And imitates thy lay.

In addition to the number of singing birds named I had forgotten the whitethroat, mentioned by Mr. White, in the 'Natural History of Selborne;' this makes two migratory birds. Mr. Willughby, a close observer, about a century ago, mentions the stock dove also, but I should doubt this being the case. But in corroboration of Mr. Saxby again, Captain Brown, F.L.S., in his edition of White's 'Selborne,' dated 1828, mentions having watched a cuckoo visiting the nest of a wagtail, and on the bird's return from the nest he fired a gun at the cuckoo, which dropped something from its mouth; and on looking at the spot where he observed this on the ground, he discovered the egg of a wagtail on the grass: he afterwards visited the nest of the wagtail and found one cuckoo's egg, an exchange having been evidently made by the cuckoo.—*H. W. Newman; Hillside, Cheltenham, November* 5, 1862.

A Young Cuckoo in a Redstart's Nest.—In 1859 a redstart built her nest in a hole of my garden wall. The entrance to the hole was so small that I could hardly get my hand in. I found the nest when it had only one egg in it, and I did not disturb it,

as the redstart is a good friend to the gardener. Some time after, when I was working in that part of the garden where they had built, my attention was drawn to the hole by the loud clamour of a young bird, much too large for the young of the redstart. The bird was a young cuckoo, whose wants kept the foster-parents constantly coming and going. Before it was able to fly it found the hole very inconvenient, and took up its abode in the branches of a currant bush that overshadowed it. I have not the least doubt about the inability of the old cuckoo to get into the hole to lay her egg in the nest, for it was an impossibility. Did she lay the egg first and then introduce it into the nest by her bill? To this question I can give no definite answer, except that I know of no other way.—*John Whatt; Kirby Moorside, Yorkshire.*

Birds of the Amur: Zosterops chloronotus, Acanthylis caudacuta, Reguloides superciliosus.—Mr. Ravenstein's list of the birds of the Amur territories is avowedly copied from Schrenk, and M. von Schrenck's list has been criticised in the 'Proceedings of the Linnean Society' for January, 1861. The nomenclature would in some few cases be more satisfactory were it carefully revised, from inspection of Amurian specimens, by a qualified ornithologist of Western Europe. The Australian Zosterops chloronotus can hardly occur (absolutely one and the same) in North-east Asia; and as for Acanthylis caudacuta, so far is this from being specially an Australian species, it is not only the Hirundo ciris of Pallas, but the Acanthylis leuconotus of Hodgson, common in the Himalayan regions and found also in China. Mr. Gould, in the Introduction to his work on the Birds of Australia, mentions its having been killed in England, which is much less remarkable than the occurrence there of Reguloides superciliosus (Regulus modestus of Gould), another Amurian bird which is not uncommon in Lower Bengal during the cold season, and other feeble-winged species that might be adduced. But though I have not at this moment of writing the critique on M. von Schrenk's bird-catalogue handy of access, I feel that I have been anticipated in the above and other remarks that occur to me upon looking over the list as copied by Mr. Ravenstein. —*Edward Blyth; Calcutta, October* 1, 1862.

Acanthylis caudacuta and Reguloides superciliosus.—The only record of the occurrence of the spinetailed swallow (*Acanthylis caudacuta*) in Britain is by myself, in the 'Zoologist' for 1846 (Zool. 1492). The specimen in question was shot at Great Horkesley, near Colchester, was sent in the flesh to the late Thomas Hall, birdstuffer, of the City Road, and while there was examined by the late Mr. Yarrell, by the late Mr. Edward Doubleday, by Mr. W. R. Fisher, and by myself. It was then stuffed and returned to the owner, Mr. Catchpool of Colchester. It is the best authenticated record of any single straggler that has yet appeared in the British list. I think, however, that I was in error in giving this bird too hastily the name of "Australian" spinetailed swallow, which has led our superficial ornithologists to regard its simple history with doubt, so easily are non-practicals misled by a name. It must be candidly admitted that sufficient pains were not taken at the time either to identify it with, or separate it from, the spinetailed swallow of China, Nepal, or other parts of Asia. With regard to Reguloides superciliosus it is much to be regretted that Mr. Yarrell does not mention the country of the specimen from which his elegant figure was taken. I cannot conceive how this feeble-winged Asiatic species could have crossed Asia, Europe and the German Ocean, and I think a doubt may fairly be entertained whether Mr. Hancock's solitary example is really distinct from our ordinary goldcrest, of which it may possibly be a variety or an immature example.—*Edward Newman.*

The Purple Heron (Ardea purpurea) *in Norfolk.*—On the 1st of July an immature

purple heron was shot on Hoveton Broad. This bird was extremely fat, both internally and externally, and was, I believe, a young female, there being no perceptible indications of sexual distinctions. I found the remains of two good-sized roach in the stomach, one at least five inches long.—*Henry Stevenson; Norwich.*

The White Spoonbill (Platalea leucorodia) *near Plymouth.* — On the 3rd of this month three white spoonbills were killed at one shot, out of a flock of four, on the banks of the St. Germain's River, in the vicinity of Plymouth. They were all young birds of the year, and two of them are now in the possession of Mr. F. C. Hingston, who has prepared them for his fine collection of British birds. The third was too much shattered to be preserved.—*John Gatcombe; Plymouth, November* 15, 1862.

Blacktailed Godwit (Limosa melanura) *at Yarmouth.* — On the 4th of September a pair of blacktailed godwits, in immature plumage, were killed at Yarmouth.—*Henry Stevenson; Norwich.*

Occurrence of the Solitary Snipe near Leeds.—Since my last communication (Zool. 8196) the solitary snipe has been seen in this county several times. On the 18th of September my brothers saw two near my father's house (Hornby Grange, Great Smeaton); the next day another, or probably one of the same two, was seen by a man fishing in the same neighbourhood. About the middle of last month my brother saw another of these birds, and last week I myself, while pike-fishing there, flushed another. I may also add that my brother killed (at Hornby), on the 22nd or 23rd of September, a very fine specimen of the green sandpiper. — *W. Christy Horsfall; Horsforth Low Hall, near Leeds, November* 8, 1862.

The Little Crake (Gallinula pusilla) *in Pevensey Marshes.* — A specimen of the little crake was caught in Pevensey Marshes about March last. It is in the possession of a mechanic here, who showed it to me in the flesh. — *John Dutton; South Street, Eastbourne.*

The Spotted Crake (Gallinula porzana) *in Pevensey Marshes.*— A specimen of the spotted crake has been lately shot in Pevensey Marshes, where they are not uncommon. It is now in my collection.—*Id.*

Occurrence of the Spotted Crake near Cambridge. — During October I had several examples sent me of this elegant species, and have been fortunate enough to see four or five others in the game-shops, besides specimens which had become the property of the various fen gunners. These men generally bring me anything they consider curious: they are, as a body, an intelligent class, and many reliable facts relative to the migration of the wild fowl, &c., may be gained from them. The spotted crake has been much more numerous this season than is its wont. I have noticed that their appearance has been as near as possible in a straight line through the north-eastern portions of this county (Cambridgeshire), and extending their line of appearance in the same direction through the adjacent counties of Huntingdon and Northamptonshire, and, I have no doubt, as far as the sea. It is a curious fact, but I am persuaded of its truth, from the experience of some years of careful observation, that various migrants—such, for example, as the hoopoe, grosbeak, rosecoloured pastor, &c.— have a peculiar trait of choosing a straight line, direct from the sea, through various counties. I have invariably found it to be so in the instance of the spotted crakes under consideration; not one has been shot or seen except in the straight line, as mentioned. The plumage of this species appears to become lighter, or rather darker, in its winter dress than in summer, and its legs and beak are also visibly darker in tone than those of summer.—*S. P. Saville; Cambridge, November* 7, 1862.

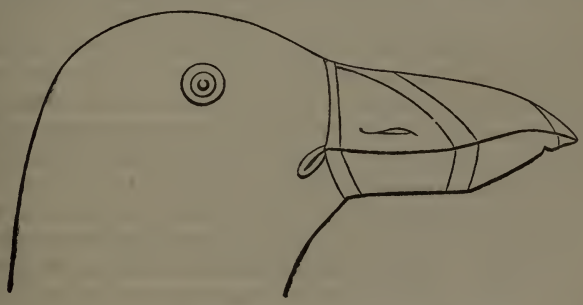
The Gray Phalarope (Phalaropus platyrhynchus) *in Norfolk.* — On the 31st of October a very beautiful specimen of the gray phalarope was killed at Salthouse, a very favourite locality; and another close by, at Wells.—*Henry Stevenson; Norwich.*

The Gray Phalarope at Brighton. — I have seen several specimens of the gray phalarope at Mr. A. Bryant's, at Brighton.—*John Dutton; South Street, Eastbourne.*

The Egyptian Goose (Anser ægyptiacus) *in the Cambridgeshire Fens.*—A week or so since I received a call from a gunner who had two magnificent specimens of this goose, one alive but winged, which he shot on the night previously in Burwell Fen, Cambridgeshire: they were in beautiful feather. It is sometimes asserted that these birds are only escaped captives from some ornamental piece of water. I would inform sportsmen holding this opinion that only about four or five years since I saw six which were shot out of a large flock on Whittlesea Mere; the flock consisted of twenty or thirty. The species generally makes its visits to us once in three or four years.—*S. P. Saville.*

The Redthroated Diver (Colymbus septentrionalis) *in Norfolk.* — Between the 1st and 15th of October three fine specimens of the redthroated diver, in full summer plumage, were killed at Cromer, Blakeney and Sutton; and more recently I learn that about a dozen of these birds have been shot off Sherringham, having probably followed the shoals of herring along our eastern coast. One of these birds being held up by the legs when dead, sixteen small fish dropped from its capacious throat.—*Henry Stevenson; Norwich.*

The Normal and Abnormal Puffins. — In the 'Zoologist' (Zool. 8003) there is a very interesting paragraph on the normal and abnormal puffins, in which the heads of the two birds are figured. In the latter end of last October I shot a specimen of the puffin, whose beak does not correspond with either of those figured. It is of a brown colour, without grooves; the lines represented on it are slightly elevated, and of a paler colour than the surrounding parts. The cheeks are pale smoke-colour. Eyes encircled by a narrow, naked, brown skin. Feet flesh-colour. This bird is certainly and distinctly the young of the common puffin; and if the bird only takes one



year to arrive at maturity, the abnormal must be a distinct bird; but is the puffin mature in so short a time, or does it, like others of the sea-fowl, require three years to attain maturity? I am of opinion it does, and consequently I consider the abnormal the young of the normal in first winter; the bird I figure is the same in second winter. How easily this complicated question of the normal and abnormal might be solved by procuring specimens of the young puffin before the autumnal migration! If the birds thus procured corresponded with the abnormal, the question would be ended; if, on

the other hand, they correspond with my figure, it stands to reason the bill would not shrink during the winter to the size of the abnormal, and also lose its oblique bars. The razorbilled auk in its first winter is very analogous to the abnormal puffin, and was considered formerly a distinct bird. — *H. Blake-Knox; Bartragh, Dalkey, Co. Dublin, November* 14, 1862.

Postscript to the preceding Paper. — Pardon me for again troubling you with a sketch of a puffin's head shot by me on the 17th of this month. It bears a strong resemblance in shape to that previously sent you; it is, however, deeper, the upper mandible more arched, and the line where the two mandibles meet less curved. The bars on the surface are wanting; the line crossing it on the upper mandible indicates a narrow rather deep groove; that on the under mandible is much shallower. From the tip of both mandibles to this groove is deep orange-brown; the basal half of upper very soft, of a lead-colour; the corresponding part of under mandible dull flesh-colour. The wrinkled flesh about gape lemon-yellow; that round the eye brown. Cheeks pale smoke-colour. Toes—flesh, webs and sole—ochre. This description may be interesting to you, as showing the development of this bird. I am not aware of any author who describes the puffin in its young state during its various stages. I am uncertain if these birds are in their first winter or not; and yet I am convinced that the puffin could not acquire such a bill in one year. I do not like filling the pages of the 'Zoologist' with perhaps useless notes on this subject; but if you desire I will send a description of this bird; it may perhaps be interesting, as showing the progress towards maturity. Until it is decided how long the puffi remains immature, little can be done in distinguishing the two birds. The question seems to me far from being settled.—*H. Blake-Knox; November* 24, 1862.

[I have not thought it necessary to have this second figure cut, as my correspondent has most accurately defined the difference between the two.—*Edward Newman.*]

Sandwich Tern (Sterna Boysii) *in Norfolk.* — On the 13th of August a fine male specimen of the Sandwich tern was shot at Blakeney.—*Henry Stevenson; Norwich.*

Pomarine Skuas in the Orkneys. — On the 10th instant I saw a very fine adult pomarine skua (*Lestris pomarinus*) here, as it flew slowly past and within a few yards of me. I could not be mistaken about it. Unfortunately I had not my gun with me at the time, or I could have shot it easily. In November, 1857, I shot several immature specimens here, but since then I have not seen any. About that time I heard of an adult specimen being obtained near Kirkwall; but the one mentioned above is the only adult I ever saw here myself. On one of my collecting tours in Iceland I got adult specimens, as well as their eggs; but I did not see many altogether.—*J. H. Dunn; Stromness, Orkney, November* 17, 1862.

The Pomarine Skua in the Isle of Wight. — Another specimen of the pomarine skua was shot by Sir John Simeon's keeper at Swainstone, about six miles from here, on the 24th of October. I have no doubt it was one of those which were in company with the fine old male I shot on the 23rd (Zool. 8286): the present specimen is a young female, in a very interesting state of plumage. The neck is brown, the nape tinged with gray, the breast mottled with brown and dingy yellow: back dark umber-brown, margined with paler brown: middle tail-feathers two inches longer than the others. A third specimen was shot by Mr. Sawley on the 4th of November, but so damaged that it is worthless.—*H. Rogers; Freshwater, Isle of Wight, November* 5, 1862.

Skuas on the Coast of Dublin. — Skuas have been very plentiful on this coast this year; three or four may commonly be seen pursuing one gull. I have shot specimens

of the pomarine and Richardson's (*Lestris Richardsoni*). A gentleman with me missed a splendid adult bird of L. catarractes, a much rarer bird here than the pomarine.—*H. Blake-Knox ; November* 7, 1862.

The Pomarine Skua off Beachy Head. — I shot a fine specimen of the pomarine skua off Beachy Head, in September last, which is now in my collection.—*J. Dutton.*

Pomarine Skuas on the English Coast. — Anonymous writers, whose communications I cannot quote *because anonymous*, and therefore of no authority, have published, in the ' Field ' and a variety of local papers, accounts of skuas having been killed on our coast. These accounts are too numerous, and the character of the elongate tail-feathers is too marked, for us to suppose them erroneous; and I cannot but feel regret that occurrences of such interest should not be recorded in such a way as to insure their preservation.—*Edward Newman.*

The Land Tortoise Breeding in England.—I am not aware that there is any authenticated instance on record of the land tortoise's eggs proving productive in Great Britain, but having just returned from a visit at Tregullow, the seat of Mr. William Williams, I was made acquainted with the fact of two eggs of the tortoise having produced two young ones about five weeks since, and that they were alive and well in one of the pine-houses in the gardens. The accompanying particulars, furnished me by Mrs. Williams, will be read with interest, and I have much pleasure in forwarding them for insertion in the ' Zoologist.' I have only to add that I have, as a matter of course, visited the nursery this morning, and seen and handled the babies. They have the free use of their limbs, and move and walk exactly as full-grown tortoises do. They are now about the size of a small palm of a hand, the shell fully developed and indurated.—*Edward Hearle Rodd ; Penzance, November* 22, 1862.

" Tregullow, November 13, 1862.—The female land tortoise came from the West Indies, and was given to Mrs. Williams's mother upwards of fifty years ago ; it was then about the size of a watch. It has been in the garden at Tregullow about thirty-two years. Four years ago another tortoise was obtained, which turned out to be a male : they were allowed to roam about the garden at their will. In 1860 some eggs were found, but from insufficient heat they were not hatched. About the 25th of July last the gardener, on passing a south border, observed the female tortoise making a pit with her hind legs in a very peculiar manner. On watching her, he found she had made a hole of some four inches deep, quite flat at the bottom. On returning, in about five minutes, he found she had deposited six eggs, and was in the act of covering them with earth. He immediately removed them in a flower-pot stand about two inches deep, filled with white sand, to a pine-pit, and placed them on a bed of tan. On the 19th of October last he observed two of the eggs had been hatched, and on looking around he found, much to his astonishment, two young live tortoises. The eggs are about the size and appearance of those of a pigeon. The young ones are kept in a wooden box in a pine pit, with some earth and moss, under which they nestle. They are fond of lettuces and strawberries, but do not eat much. They appear quite well and lively, moving about briskly. They are now a little larger than a half-crown. The eggs were not disturbed while in the pine-pit, the temperature of which during

the time they were there was from 85 to 90 degrees by day, and from 65 to 70 degrees at night. The female measures 12 inches long, by 12¼ inches wide. The male, 8 inches long by 8½ inches wide, each over the back.

Immense take of Flounders on the Danish Coast.—In a letter from my brother, dated Gothenburg, November 28, 1862, he writes:—"There have been caught, after the late storms on the coast of Denmark, a quantity of flounders, estimated at two and a half millions in number, and they say the sea is still literally full of them. They don't know what to do with any more that they may take, though there is a salting establishment in full work already. Five hundred men were employed day and night for three weeks in catching these fish."—*N. F. Dobrée; Hull, December* 2, 1862.

Rambles in search of Land-shells. By Arthur Adams, Esq., F.L.S.

One of the earliest rambles I find recorded in my journal is at Rio, where the 'Actæon' was engaged some time in surveying the islands at the entrance of the harbour. In the month of February, 1857, as I jump ashore at Praya do Botafogo, the white sandy beach is strewn with shield-like Clypeasters and the bleaching forms of Ocypode and Hippa. All around rise lichen-varied granite rocks, large and smooth, and speckled over with green clumps of huge columnar Cacti. As I go inland I encounter a host of floral beauties—coronate, trumpet-shaped and star-like; and among them I notice the modest flowers of Thunbergia, the blue blossoms of Plumbago, and the crimson corymbs of Asclepias. At the bottom of a well I cast a covetous eye on a long-necked water-tortoise, a species of Emys, which, however, cannot be persuaded to enter the bucket which is usually suspended above him. The green-topped tapering palms are splendid, and there are numerous delicate pink-flowered orchids clustering among the branches of the trees. Here, among the humid undergrowth, crawling on the decaying leaves of plantains and bananas, I discover that singular snail, Streptaxis contusa, *Fer.* The animal is of a deep straw-colour, inclining to orange; the ocular tentacles are long and very slender, with the eyes at the extreme tips of the slightly swollen bulbs. In the only other account of the animal published, Couthnoy has described the oral or inferior tentacles as bifurcate, but they are in reality short, with a small knob at the ends, and with a subulate oral appendage, nearly as long as themselves, attached to their inner side. The buccal mass or mouth can be extended in the form of a short

proboscis, similar to that of Glandina truncata, *Say*, beautifully figured in Binney, Plate 59. Like Glandina and Testacella, the body is slender and much produced in front; the sole of the foot is narrow, with nearly parallel sides; and the tail is pointed and simple behind.

In Von Marten's last edition of Alber's 'Heliceen' Streptaxis is placed at the end between Pupa and Succinea, but our examination of the animal shows that it should be removed altogether from the herbivorous Pulmoniferæ and form a separate subfamily, Streptaxinæ, to be placed between Testacellinæ and Oleacininæ, the two other groups of zoophagous Pulmoniferæ.

Raza, a small island off the entrance of Rio harbour, is, I find on landing, a vast mass of granite, partly bare and partly covered with vegetation. The winds and the waves have acted on the primal mass in the course of ages, and have in some parts reduced the constituents to powder, obliging you to tread on golden dust, composed of hornblende and mica. In the deep blue sky above soars the man-of-war bird, hundreds of restless gulls hover and scream around the base, and from his barnacle-clad rock the redbilled oystercatcher scans the stranger with curious eye. As I scramble up the rough-hewn granite steps, myriads of Ligiæ or sea-lice swarm across the path, golden-eyed lizards dart among the loose stones, ants swarm up our legs, Polydesmi and Juli abound, a black Gecko pokes out his warty head to look at us, and a huge black cockroach gathers around her a numerous brood as a hen does her chickens. Opatrums are found on the barren spots; blue, brown and yellow butterflies hover gaily over the flowers of Convolvulus and Tradescantia, and leaping among the stunted brushwood are of course legions of noisy long-shanked grasshoppers. There is a revolving light on the islet, and the bland custodian of the lighthouse informs me that—attracted by the brilliancy thrown back from his highly-polished reflectors—winged insects come by thousands round his lantern, tapping at the glass all night long. The only mollusk I find on the island is a little Pupula hiding in the crevices of the rocks.

On nearing the shallow bay at Praya-do-Tinboy horseman crabs are seen careering over the yellow sand, and I capture with much trouble about a dozen of beautiful silvery white Cicindelæ, which alight upon the sand, run a little way and are off again. Growing from the fissures of the rocks that skirt the shore are numbers of magnificent aloes, with flowering stems twenty and even thirty feet high. The minute investigation of one of these astonishes me quite as much as did the strawberry plant St. Pierre. Helicinæ lurk under the decaying footstalks; Hemiptera of extravagant shapes repose on the long green leaves;

Nephilæ, giant spiders, with gold and silver spotted bodies, hang head downwards in the middle of wide-spread webs suspended from point to point; other spiders, shortlegged and bloated, guard silken bags filled with little ones, in the deep axils of the leaves, while among the ragged fibres of the root are Juli, Centipedes, and Polydesmi. Besides the Helicinæ I find a little brown Bulimulus.

At the little precipitous Ilha-do-Foucinhos, I discover Cyclotus Inca or an allied species among the dead leaves on the summit, and in a little pond at the base a Planorbis and a Cyclæus. In kindling a beacon-fire our hands become smutty, when looking around we spy an excellent basin formed by Nature out of the core of a decapitated aloe, and containing about a quart of clean rain water. At the base I unearth a huge annelid, eighteen inches in length, a species of Chætogaster I believe. Turkey buzzards watch our movements from aloft, and solitary on a pointed crag is a noble bare-legged falcon. Another day I cross the "hidden waters," as the Indians call the harbour, and find myself among groups of negroes holding a market squatting on the ground; they are laughing and chattering as is their wont, gaily discussing each others merits and recommending the flavour of their durians, mammy-apples and bananas. In the far distance are the Organ Mountains, and glorious glimpses of purple valleys and emerald hills. Under my feet, among old fallen trees, are crawling Veronicellæ, singular members of the slug tribe hitherto unknown to me.

The uniform sober features of the Cape offer a striking contrast to the glowing scenery of Rio, but I must linger there a moment, if only to mention a peculiarity in the habits of Helix globulus, *Müll.* As I am wandering about the broad base of Simonsberg I take refuge from a storm of wind and rain in a fish-house near the shore, and the amount of fish I encounter is quite startling. There are fish in great salt tubs, heaps of fish lying on the ground, cartloads of fish, boatloads of fish, fish split open on long tables, fish covering all the rocks outside, stacks of fish, fish by thousands drying on poles. The weather has been stormy of late, and as I proceed along the shore I encounter a stranded fiddle-fish or Rhinobatis, half shark and half ray. The strand is covered with other casualties to fish and crab, and an entire flotilla of violet snails or Ianthina has suffered shipwreck. Out at sea only two little boats are visible fishing for snook, between Noah's Ark and the Roman Rocks. The wild waves come tumbling in with a deep hollow roar, and on the huge bare rocks sit the cormorants drying their dusky wings, and the foolish penguins, gorged with fish, dozing in the fitful sungleams. Three skulls of the right whale are bleaching

on the sand, and the eye of the great sea eagle watches us from above. On passing inland from the beach I observe, crawling on the bare spots between the scanty scrub which grows on the sandy soil, numbers of snails. These I find are Helix globulus of Müller, a species of snail belonging to the Old World group, Dorcasia, examples of which occur in China, India and Australia, as well as in Southern Africa. The only indication of their habits I have met with occurs at page 108 of Albers' 'Heliceen,' where H. fodiens, *Pfr.* is stated to have been found in the ground by Mr. Cuming in the island of Luzon. In dry weather not a single example of Helix globulus is to be seen on the sand, but no sooner does the rain penetrate the soil than hundreds make their way to the surface, moving quickly by means of a greatly expanded, flattened, creeping disk, the "colour of the desert." Among the broom-like brushwood under the leaves, creeping timidly forth, but always on the surface of the moist sand, I observe another Pulmonifer, a little pale reversed Pupa, Faula Kurrii, which Albers says, on the authority of Krauss, "leben auf Pflanzen."

We have enjoyed a ramble about Rio and another at the Cape, and now we will transport ourselves in imagination to China and Japan.

On all the elevated breezy downs, and they are very numerous along the sea-board of Shantung and Liatung, and more especially on their exposed and rounded summits, where the soil is scant and stony, and where hardly anything flourishes but thistles, I find Helix pyrozona, *Phil.*, Acasta ravida, *Bens.*, a species of the Nanina group, and Helix (Dorcasia) bolus, *Bens.* Two new species have also occurred to me in similar situations, but which have not yet been christened. But none of these snails are half so attractive as the humming-bird hawk-moths, with which these localities are always associated in my mind. The sedums are in full flower, and cover the surface of the earth with little golden pyramids, and around these magazines of nectar hover the Macroglossæ, the only sentient things save the snails one claims acquaintance with on these barren heights, unless, indeed, you cross the highest ridge at the highest point, and look down upon the jagged fractured rocks of black basalt, when you may see the gulls and the oystercatchers, and hear their melancholy wail and the harsh cry of the fishing cormorant, mingling with the roar of the great toppling waves as they come thundering in upon the boulders at the base. But in the quiet sunny spots where the sedums bloom, round and round hover the pretty moths, vibrating their wings and probing with their spiral tongues the yellow pyramids of stars which gladden the dull earth.

As far as my experience goes I have found North China very unproductive in land shells, and Mr. Fortune, who has explored the woods and mountainous parts of Chi-kiang, informs me that slugs and snails are by no means abundant. Acusta Redfieldi, *Pfr.*, is not very uncommon, a little Streptaxis (Fortunei, *Pfr.*) was found. Zua hebrica and Ena Fortunei, besides one or two little species of the Pupa tribe not yet described, are among the few North China Pulmonifera already known. This scarcity of Helicidæ may possibly be owing to the barren granite nature of the hills, and also to the high state of cultivation of the plains and valleys. On the hills you may breathe very pure air, and gaze your fill on picturesque rugged rocks, but you will see few flowers and no blooming heather, nor will the red sandy loam below reveal the outline of fairy tarn or lakelet. Snails are said to have a great partiality for limestone, but here all is granite. The vegetation, moreover, is never varied or luxuriant enough to supply the wants of any great herbivorous snails whose *pabulum vitæ* is leaves. On upland slopes the pale yellow stars of Chrysanthemum chinense may attract the eye, and sometimes a modest violet peeps out from beneath the shelter of a clod, or a dull purple Ranunculus is seen, or a little deep blue gentian emerges from the sandy loam. The rest of the vegetation is made up of burdock, wormwood, toad-flax and hawkweed, and the sandy parts are covered with a hard spiky grass.

In Japan, on the east coast of Niphon, and not far from Tatiyama, are two small islets named Takano-Sima and Okino-Sima. We are prohibited from rambling on the mainland, for it belongs to a Daimio unfriendly to foreigners, but the two little islets are placed at our disposal for the purpose of exercise and recreation during our stay at this anchorage. Here undisturbed I am enabled to watch the habits of many molluscous creatures, for my observatories are exposed to the rolling waves of the Pacific, and have not been disturbed, except by fishermen, for ages. The narrow beach is fringed with a low brushwood, in which the white umbellate flowers of Crinum asiaticum are conspicuous, while the interior of the islets is occupied by huge fig trees (*Ficus nitida*), which with firs and larches form dark shady labyrinths, the chosen abode of Helix Simodæ, *Jay*, and a little Bulimulus. The proliferous fronds of the handsome fern Woodwardia japonica spring in profusion from the humid soil, and the trunks of the Coniferæ are green with Drymoglossum, a curious fern with narrow fertile fronds growing erect from slender twisted stems. Here in the calm warm days come fishermen to haul the seine, and boatloads of women follow from the mainland to assist their husbands. The song and merry

laughter of the women hauling at the rope, and the noise and splashing of the men in the water, mingle with the loud cawing of the rooks in the great fig trees, and produce an impression on the mind novel and pleasing. As the seine comes slowly in, besides goodly fish of the larger sort, we notice cow-fishes and sea-scorpions, squids, cuttles, file-fishes and long-clawed flat-legged swimming crabs. Crawling on the rocks between tide-marks, where the boulders are covered with soft green Fuci, or hiding in the fissures and furrows, are numbers of Perionia Tongana, *Quoy and Gaimard*, looking like shell-less Chitons, but which are veritable Pulmonifers living in the sea.

Not far from Tatiyama is a snug little harbour called Tago, in which are numerous little caves, where one may escape from the prying inquisitiveness of the people and collect in peace. In all these small bays, sandstone rocks, clothed with stunted oaks and dwarf firs, rise abruptly from the shingle of the beach, and a few miles inland are green mountains which tower up all around. Against the water-worn rocks on the beach are loose rounded stones heaped up by the efforts of the ever-restless tide. The yellow flowers of Hemerocallis, the red-spotted turbans of the tiger-lily, a trailing Clematis and a pretty blue Scilla grow on the shingly soil, while Pitcairnia straminea, Lycopodium lineare, Pteris cretica and Dendrolium fill up the fissures of the cliffs. Above high-water mark, but exposed to the saline influence of the tides, adhering to the under surface of the stones, crawling in damp shady corners, or nestling in the weed-grown crannies, are thousands of Realiæ, small cyclostomatous snails. Not only Realiæ, however, for Lygiæ run out in great excitement, Armidillidia roll themselves up in balls, crickets hop nimbly aside, and sinuous Geophili hastily seek the shelter of surrounding stones. The animal of this species of Realia is light black; the tentacles are short, cylindrical and obtuse at the tips; the eyes, large and black, are placed on tubercles connate with the bases of the tentacles; the muzzle is broad, annular, depressed and rounded in front; the foot is short, narrowed in the middle and obtuse at both ends, and carries the operculum close to the body under the shell. The creature crawls quickly, exactly like Assiminia, placing the muzzle in advance, moving forward the fore part of the body and rapidly bringing up the hind part. The operculum is not visible when the animal is on the march. Thus we see that Realia affects the same localities, and has all the habits and mode of progression of Assiminia. Both genera live within the influence of the tides above high-water line, and when on the coast always within reach of the spray. The only difference between the two is in the position of the eyes, which

in Realia are basal. I think the genus might with propriety be removed from Cyclophonidæ and be placed in the family Assiminiidæ.

We are now at Nagasaki in the South, and leaving the town I ascend the hill on the right of the harbour through fields of ground-nuts and bearded wheat. The grassy banks which form the boundaries of the land are planted at intervals with elegant wax trees, which are often garlanded with Cissus, vines and ivy. Among the loose stones glides the slender blue-tailed lizard, and the abundant red fruit of a species of Potentilla offers a sorry substitute for the strawberry. My road next lies in a sunken rocky path, overarched with trees like some of the North Devon lanes, and here among the dead leaves on the ground I capture specimens of a very fine Carabus, and as I emerge once more into the merry sunshine I see Apoderus, Hispa, and Cassida alighting on the sunlit leaves. At this season of the year there are but few flowers, but you will notice everywhere the white clustering blossoms of Delphinium, the white dog-rose and the welcome fragrant honeysuckle.

And now I reach the pine-clad summit of the hill. All is silent and solemn; no other bird is seen but a large kite which hovers above the trees, no other sound is heard but the continuous cawing of the rooks and the loud grating noise of the Cicada. The hills of Tsu-Sima are composed of slate-stone, and in that island among the loose moss-grown stones among the trees I discover a new species of Pterocyclos, Cyclotus Fortunei, *Pfr.*, Cyclophorus japonicus, *Ad.*, Alycæus spiracellum, *Ad. and Rve.*, and Pupinella mindorensis, *Ad. and Rve.*, but here the basis of the hills is granite, and I cannot find a single species of operculate land shell. Among the foliage of the trees I notice Hadra orientalis, *Ad. and Rve.*, a handsome banded snail, and Hadra peliomphala, *Pfr.* In the dense brushwood on earthy banks I find Trochomorpha japonica and the common Acusta Sieboldi. With the exception of some dark-winged butterflies insect life seems very scarce, the flat stones even on being turned reveal nothing but woodlice, centipedes and Cymatiæ. A small yelping cur detects me in the act of transporting some bundles of brushwood in search of snails, and, anon, his owner, a broad-faced smiling Caliban, appears. The honest woodcutter is even more astonished at my voluntary labour than even his "friend on all fours," but muttering "Moosi," which means "creeping things," he rattles a bit of chain, saying interrogatively, "Ma?" which being interpreted signifies "Have you seen my pony pass this way?" I shake my head and pointing to my collecting-bottle repeat "Esha." On this hint, which means "Doctor," I am treated with profound respect,

and Caliban suddenly vanishes in the bush, but speedily returns both hands filled with beetles. Thus we are mutually understood by the use of three words only.

From my elevated position in the fir-clearing I now look down upon the land-locked harbour. To the right is Desima and to the left is Pappenberg, down whose steep sides it is said fifteen thousand Christians were once precipitated. All around green-wooded hills, checkered with fields of yellow wheat, rise up from the water's edge; the dark smooth surface of the harbour is dotted with strange-fashioned craft; the monotonous loud cries of the boatmen, "ush-shia, ush-shia," faintly reach my ear, as bending to their powerful sculls these semi-nude Athletæ urge their sharp-prowed boats swiftly through the water. Parties of women sing gaily as they voyage from shore to shore, fishing boats are casting their nets, clean unpainted trading junks spread their white sails to the favouring breeze, and the dark banner-bearing barge of the Japanese Governor, propelled by many oars, and looking like a galley of old Rome, moves with slow and solemn state to the sound of music.

ARTHUR ADAMS.

Cyclas pallida, Gray: *Sphærium ovale*, Ferussac.—Mr. Jeffreys, in his excellent and interesting 'Manual of the British Mollusca,' at page 9, says, "Mr. Daniel found this species in the Grand Surrey Canal," &c. It was in the year 1851 I found a single example, in company with C. rivicola and C. cornea: it was my first year of entering on the study of Conchology, and I was in London for only a few days; and after that a long absence from England prevented my again searching for it. However, on my return this summer I have had the satisfaction of finding it in great abundance in the same and another near locality, always in company with C. caliculata, *var.* Broctonianum. They are precisely similar to those from the Regent's Canal, but a little paler and brighter than from the Leeds and Liverpool Canal.—*John E. Daniel;* 10, *Trigon Terrace, Clapham Road, S., November* 11, 1862.

Mutation of Species.—Most of your readers will have perused the admirable paper of Mr. Edwin Brown (Zool. 8249) on the mutability of species. This subject has so much interest for me that I hope I may be pardoned for retouching a subject already so ably handled. During the spring of this year, which was spent in an entomological excursion to the Canary Islands, I have captured about 340 species of Coleoptera, 120 species of Hemiptera, and 130 species of Lepidoptera. Of course, since my return my attention has been largely given to the arrangement and nomenclature of these specimens. Many of them differ very slightly from European forms, *e.g.*, Dasytes subæneus, *Woll.*, and D. flavipes, *Fab.* In these and analogous cases may

we not admit the principle of mutation? Should we not rather read D. flavipes, *var.* canariensis, &c., than multiply cognate species? Variations, due apparently to nutrition, especially demand attention. Haltica Allardii, which feeds on the Physalis aristata, differs but very minutely from our H. Atropæ, whose food-plant, as implied by the name, shares the same natural order, and somewhat similar properties. Multitudes of our Tineina seem thus to vary from the effects of nutrition, *e.g.*, Cemiostoma laburnella and C. spartifoliella; or, to draw an illustration from the Canaries, our Catoptria ulicetana, and an almost identical form from the Retama, growing at an elevation of 9000 feet on the Canadas of the Peak of Teneriffe. But the unity of such species is seldom sought, but rather their distinctiveness, though it may fairly be questioned which of these is the more desirable investigation. In some species an obvious capability of variation exists, as in the genus Coccinella; whilst others, though cosmopolitan, are everywhere identical, as Cynthia Cardui and Deiopeia pulchella. May we not, then, well inquire at least which species are thus variable, and thus unite, with supplementary climatal, local and nutrital appellations, many of those forms which now, as distinct species, so encumber our catalogues? Some of our most eminent botanists have recognized the existence of segregate as well as aggregate species; why cannot we do the same for Zoology? but our investigators are, almost without exception, segregators. Variations have been considered as tending to the improvement or preservation of the species; certainly the existing habits of many lead to their destruction. The brilliant colouring of the larva of Trachea piniperda or Acronycta Alni, and the exposed condition of that of Bombyx Rubi, contrasts strangely with the twig-like forms of Rumia cratægata, just as the blue eggs of the thrush or hedgesparrow are opposed to the eggs of the ringed plover or partridge, which so closely assimilate with the soil on which they are laid. Surely no theory, save one which involves mutations, can account for such apparent anomalies as these; and such a principle once fairly admitted, we may hope to see our nomenclature accommodated to our advanced knowledge.—*W. D. Crotch; Uphill House, November* 9, 1862.

Colias Edusa on the 24th of October.—Is it worth notice that I saw a Colias Edusa on Woking Heath on the 24th of October? It was fresh and vigorous, but as there was ice on the night of that day it was probably its last.—*W. C. Hewitson; Outlands.*

Occurrence of Eupithecia arceuthata of Frey in Great Britain.—During my three years' residence in Buckinghamshire I have each autumn taken the larva of the above-named insect upon wild juniper, upon our hilly chalk downs. When first I found it—in 1860—I imagined it to be the larva of E. helveticata, but when the perfect insects appeared the following spring they seemed so different in size, colour and general appearance that I could not bring myself to believe that they were this species, and I determined to investigate the matter. During the past season I had an opportunity of sending a pair of the moths to Professor Zeller at Mesnitz. He replied at once that they were E. arceuthata, *Frey*, but added that he considered this species and E. helveticata, *Bdv.*, to be identical, the latter a northern variety of the former. He admitted, however, that he knew little or nothing of the larva and economy of the latter species, and had seen but few specimens of the perfect insect. Mr. Doubleday and Mr. Bond were inclined to concur in this opinion, but they also were imperfectly

acquainted with the larva of either insect. M. Zeller very kindly sent me some fine bred specimens of E. arceuthata, which appears to occur freely in the neighbourhood of Mesnitz. They precisely tallied with my Buckinghamshire insects. I could not in any way convince myself that this species and E. helveticata were identical, and determined to make further investigations. I succeeded this summer in getting a number of impregnated eggs of E. arceuthata: these I distributed among different friends. Mr. Greene, Mr. Hellins and myself succeeded in rearing a few larvæ. Early in the autumn Mr. Andrew Wilson kindly sent me some living larvæ of E. helveticata, taken by himself in the neighbourhood of Edinburgh. I at once saw that there appeared to be annoying distinctive differences between the respective larvæ. After having taken careful descriptions of both I forwarded them to Mr. Buckler of Emsworth, who with his usual kindness sent me back two exquisitely life-like drawings. These I showed to Mr. Doubleday and Mr. Bond, who both expressed their conviction that the species might probably prove to be distinct. I have myself but little doubt on the matter; at any rate I am convinced that Dr. Staudinger has been very premature in amalgamating them in his lately published 'Catalogue of European Lepidoptera.—*H. Harpur Crewe; The Rectory, Drayton Beauchamp, December* 13, 1862.

Description of the Larva of Eupithecia arceuthata of Frey.—Stout and plump, same thickness from head to tail. Nearly a quarter larger than the larva of E. helveticata. Ground colour grass-green. Central dorsal line dark green. Subdorsal lines pale yellow or yellowish white, posteriorly dark green. Spiracular line white or yellowish. Segmental divisions yellow. Head somewhat bifid, when at rest slightly curved inwards, invariably uniform dull green. Belly bright green. Central ventral line yellow, and tip of central dorsal line always dark green. Spaces between subdorsal and spiracular lines darker green than rest of body. Feeds on wild juniper from end of September to middle of November; seldom full-fed till towards the end of October. Will feed on cypress if reared from the egg in confinement. Pupa enclosed in a slight earthen cocoon. Wing-cases transparent yellowish green. Thorax and abdomen rather paler. Tip of abdomen dull red. Perfect insect appears in confinement in May.—*Id.*

Description of the Larva of Eupithecia helveticata, Bdv.—Rather short and stumpy, much more so than preceding insect, altogether a most dumpy-looking larva. Same thickness from tip to tail. Ground colour grass-green, duller than E. arceuthata. Central dorsal line dark green, slender, and tip always dusky purplish brown or purple. Subdorsal lines broader dark green, edged anteriorly with pale straw-colour, and posteriorly sometimes with purple. Spiracular line waved, pale yellow or straw-colour. Head slightly bifid, when at rest curved inwards, invariably dusky purple, sometimes almost black. Segmental divisions yellowish. Belly duller green. Central ventral line yellowish. Feeds on wild juniper. Full-fed from beginning to middle of September, often a month or six weeks earlier than E. arceuthata.—*Id.*

Sirex Gigas an Enemy of the Hive Bee.— The following account of a curious fact connected with the habits of Sirex Gigas, communicated to me by my friend Miss Flora Jeston, of Henley-on-Thames, may not be uninteresting to your readers. She writes thus:—"One day about the last week in July we noticed an unusual commotion round the largest of the bee-hives of my friend Mr. Pennington. It had been for some time observed that very few bees were to be seen coming out, and he had wondered as to the cause, inasmuch as it was the strongest of the hives, and a supply of thirty pounds of honey had been left in November for the consumption of the bees

during the winter. On the morning in question the hive was beset by hundreds of the Sirex Gigas, which were passing in and out, and the bees apparently engaged in trying to turn them out of the hive, from which they were issuing in great numbers. There was a battle of some hours, during which the bees killed many of their enemies. The Sirex, however, retained possession of the hive, and towards evening the last of the bees took their departure. The next morning every one of the Sirices had also disappeared. On examining the hive it was found nearly empty. No honey remained. The old comb was there, but there was no appearance of any new comb having been built during the summer. In fact nothing remained except some dead bees and Sirices, and a portion of old comb containing a little bee-bread." Miss Jeston gave me some of the insects in question. I presume that this was a foray of a Sirex army in search of honey or other food, and that they decamped when they had secured it. I never, however, before heard of the insect congregating in such numbers, but have generally seen only solitary individuals. I believe, too, that it is usually attached to the region of fir trees, and there is, if I am not mistaken, no fir plantation of any kind within a considerable distance of Henley. It is rather singular that a weak state of the hive should have been noticed where it was expected to be strong; but of course it is not to be supposed that the Sirices bred in the hive, after the fashion of Sitaris or Ripiphorus; for I believe their habit is to bore into fir trees to deposit their ova; and, moreover, remains of their pupæ, &c., could not have failed to be found and noticed.—*John A. Power;* 52, *Burton Crescent, October* 17, 1862.

Food-plants of Hypera Polygoni, Cionus Scrophulariæ, and one other of the Curculionidæ.—I noticed in the summer, at Llandudno, the larvæ of these beetles, and their depredations on three somewhat local plants—Silene nutans, Scrophularia vernalis and Medicago maculata. Silene nutans (the Nottingham catchfly) is a tenant of the limestone ledges that overhang the town. It flowers and seeds abundantly, and its capsules, besides yielding food to the Dianthœciæ, are preyed upon by the larvæ of Hypera Polygoni. The larva is pale green, pitted and spotted with black, with a pale line extending along the back. The head is black, and more or less of hairiness is visible throughout the body by the aid of the microscope. I often found the larva with its head buried in the capsule, the seeds of which it greedily devours. On passing into the pupal stage of its existence it attaches its light green semi-transparent cocoon to the axils of the dichotomous stems, so transparent, indeed, that the wrigglings of the pupa may be readily observed within its case. I picked off numbers of them, and had no difficulty in hatching the imago. The Scrophularia vernalis, another local plant, which I had previously only seen truly wild in Surrey, was completely stripped by the larvæ of Cionus. These feed seemingly gregariously on the leaves of the plant, and stick their brown granulated cases to the capsules. I procured them in plenty, as also the larvæ, which were as slimy as slugs. They were of an olive-green, with a darker line along the back. The head was black, with two black square spots immediately behind it. The little weevil emerged from the cases in due course, and I was disappointed that it was not something better than my old acquaintance Cionus Scrophulariæ. And now for my last beetle discovery. This was feeding on the leaves of Medicago maculata (the shamrock, I believe, of the North of Ireland), revelling, for aught I know, on the drop of St. Patrick s blood that stains each leaflet of the ternate leaf. The case was of loosely constructed net-work, with the interstices far apart. It was fixed to the withered leaves at the bottom of the

stem. I found about a dozen such cases, which gave exit in a few weeks to a pretty brown weevil, apparently closely related to Hypera.—*Peter Inchbald; Storthes Hall.*

Acclimation of Sponges.—M. L'Amiral, whose departure for the coast of Syria with a view to obtain sponges for transplantation was mentioned in the 'Times' of April last, has now returned, and has presented a detailed report of his proceedings to the Société d'Acclimatation. M. L'Amiral distinguishes three kinds of sponges for which there is a demand—the fine and soft sponge, called *abiand*; the fine and hard sort, called *achmar*; and lastly the common sort, called *cabar* by the Arabs. These sponges are found in the Levant, within the 36th and 33rd degrees of latitude—that is, between Alexandretta and Saida. When the sponge is first gathered at the bottom of the sea, it is covered with a black but transparent gelatinous substance, resembling vegetable granulations, among which microscopic white and oviform bodies may be distinguished. These are the larvæ destined to perpetuate the species. When arrived at maturity they are washed out by the sea water which incessantly flows through the sponge; they then swim along, by the aid of the vibrating cilia or hairs with which they are provided, until they reach a suitable rock, to which they attach themselves, and there commence a new life. This emigration of larvæ from the parent sponge occurs about the end of of June and beginning of July. The fine qualities of sponges are chiefly found at a depth of fifteen fathoms or thereabout; the common sponge lies at depths varying between twenty and thirty fathoms. At Tripoli (on the coast of Syria, not of Africa) M. L'Amiral engaged some divers, who commenced operations on the 21st of May. The sponges gathered were immediately placed in boxes, through which a stream of sea-water was constantly made to flow, the animal matter being of course left on them, and protected from injury. These sponges arrived at Marseilles on the 17th of June; thence they were taken to Toulon and the islands of Hyères, where stone troughs, with five sponges in each, were sunk in different places. The success of the experiment will not of course be known until next season.

Proceedings of Societies.

Entomological Society.

November 3, 1862.—Frederick Smith, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the respective donors:—'Sitzungsberichte der Königl. bayer. Akademie der Wissenschaften zu München,' 1862, I. Heft. 2 and 3; presented by the Academy. 'The Canadian Naturalist,' Vol. vii. No. 4; by the Natural-History Society of Montreal. 'A Catalogue of the Lepidoptera of Devon and Cornwall,' Part 1; by the Author, J. J. Reading, M.E.S. 'The Zoologist' for November; by the Editor. 'The Journal of the Society of Arts' for October; by the Society. 'The Athenæum' for October; by the Editor. 'The Intellectual Observer,' No. 10; by the Publishers, Messrs. Groombridge and Sons.

'Entomological Botany' (Reprinted from the 'Zoologist' for 1854, 1855 and 1856); by the Author, H. T. Stainton. 'Stettiner Entomologische Zeitung,' 1862, Nos. 7—9; by the Entomological Society of Stettin. 'Journal of the Proceedings of the Linnean Society,' Vol. vi. No. 24; by the Society.

Election of Member.

John S. Stevens, Esq., of 24, Bloomsbury Street, London, was balloted for and elected a Member of the Society.

Alteration of the Bye-Laws.

A copy of the Bye-Laws of the Society, with certain proposed alterations therein, was laid on the table and taken as read to the Meeting. Notice was given that a Special General Meeting would be held, for the consideration of such alterations, on Monday, the 1st of December next, at 7 P.M.

Exhibitions, &c.

Sir John Hearsey exhibited Smerinthus denticulatus from Barrackpore, near Calcutta, and drawings of the larvæ feeding on Cordia Sebistena. In addition to a caudal horn the young larva had a frontal one, which, however, was entirely cast off at the last change of skin.

Mr. Bond exhibited two specimens of Lithosia Caniola, bred from the egg by Dr. Knaggs. They had remained ten days in the oval, eleven months in the larval, and ten days in the pupal state. The larva (a coloured drawing of which was shown) fed on clover, and changed its skin about forty times.

Mr. Bond also exhibited a monstrosity of Acherontia Atropos, the right side of which was of the usual form and hue, whilst the wings on the left side were darker, suffused and without distinct markings, and singularly jagged on the costa and outer margin.

Mr. Stainton exhibited bred specimens of Bactra uliginosana which he had received from Stettin, where the larva had been found rather plentifully on Lythrum salicaria. The species is one of the few Tortrices which are double-brooded, appearing in June and again in September. The June specimens have almost invariably a quadrate black spot on the disc, but in the September specimens, which vary considerably in other respects, the discoidal spot is generally wanting. Of the six specimens exhibited two belonged to the June, four to the September brood.

Mr. Stainton also called the attention of the Meeting to a very valuable paper on the genus Nepticula from the pen of Von Heinemann, of Brunswick, which has just appeared in the August and October numbers of the 'Wiener Entomologische Monatschrift.' It extends to fifty-two pages; thirty-three species are described, of which no less than ten are new, and independently of the value of the descriptive portion of the paper, it contains some very interesting observations; for instance, on the remarkable shortness of life of many of the Nepticula larvæ. How short that life actually was had not at present been determined, but a friend of Von Heinemann's had observed that on some apple twigs, which he examined with great attention, and carefully picked off every leaf in which he could find a mine, he actually found empty mines on some of the leaves after the lapse of thirty-six hours, showing that in that short time larvæ which had been previously invisible had fed up and gone away. This extreme shortness of larval life was only manifested in the summer broods of larvæ, the autumnal

larvæ living considerably longer. Mr. Stainton remarked that it was but two years ago he was reading a paper at the British Association at Oxford, in which he commented on the extraordinary fact that the larvæ of Nepticula never moulted. Now the observations of Von Heinemann show that they do moult: of course there is something abnormal in the moulting of these mining larvæ, but after the larva has been inactive for a short time its skin cracks at the head, and it thus proceeds to eat its way forward, because it can only by eating a path before it obtain space to draw itself from its old skin; this in the confined space of the mine gets drawn forward for a slight distance, and is eventually lost to sight in the excremental track. Von Heinemann had observed the moulting in several species, and had remarked that it generally took place at some part of the mine where the latter changed its character, either from a slender gallery to a blotch, or from a spiral mine to an irregular one, or from a very narrow gallery to a broader one. With regard to the specific distinctions Von Heinemann found important characters were afforded by the cilia and by the length of the antennæ, only as the latter varied in the sexes it was necessary in this respect to compare males with males and females with females. In examining the wing-veins of these insects, which he had done in a number of species, Von Heinemann found there were three distinct forms, a complicated form, a comparatively simple one, and an intermediate form between the other two.

Mr. Stainton then read the following brief notes on the ten new species:—

1. *N. Æneella.* Closely allied to N. ruficapitella. Larva on hawthorn, in a mine like that of N. Oxyacanthella.

2. *N. Samiatella.* A black-headed oak species, distinct from N. atricapitella; the mines not distinguishable.

3. *N. Nitidella.* A single caught specimen, with polished pale bronze anterior wings.

4. *N. Basiguttella.* A new species from an oak-feeding larva, whose mine is entirely filled with green excrement.

5. *N. Pretiosa.* Bred from Geum urbanum. Allied to N. Æneofasciata.

6. *N. Dulcella.* Allied to N. Continuella. Bred from strawberry leaves; larvæ in mines similar to those of N. Fragariella.

7. *N. Inæqualis.* Also bred from strawberry leaves; the wings narrow and the fascia placed very posteriorly.

8. *N. Distinguenda.* Bred from birch, mine not sufficiently observed. Allied to N. Betulicola and to N. Glutinosæ.

9. *N. Obliquella.* Captured specimens. Perhaps most nearly allied to N. Salicis.

10. *N. Simplicella.* Captured specimens; on beech trunks. Allied to N. Immundella.

Mr. Stainton said he thought it was rather hazardous describing Nepticulæ from captured specimens, but that he must admit the whole paper of Von Heinemann showed such sharp-sightedness and so much acumen that all his remarks were entitled to considerable weight. It might be mentioned, for instance, that Von Heinemann had found a character often useful for separating species which we could not see in any of our specimens, because it was in the centre of the prothorax, exactly where we put the pin; hence this character could be observed only in those specimens which were pinned through the abdomen.

Professor Westwood called attention to an article by Mr. Newman in the 'Zool-

ogist' for October last (Zool. 8216), on the genus Acentropus. Referring to the date of his own memoir in the 'Transactions of the Entomological Society,' the Professor was surprised to find that Mr. Newman had assumed a share in the merit (whatever it might be) of the reference of the genus to the order Lepidoptera, which was due to himself and Dr. Hagen. His grounds for such reference were—1. The nature of the clothing of the wings. 2. The possession of tippets. 3. The possession of a bristle and socket connecting the wings. 4. (As proved by Mr. Edwin Brown's discovery of the preparatory states), the structure of the pupa. Mr. Newman's arguments were—1. That the scales in Acentropus are unlike those of any other Lepidopterous insect, and resemble those on the elytra of some beetles. 2. That tippets do not exist in the Psychidæ. 3. That the wings in Hymenoptera are fixed together by a series of hooklets. 4. That it is not stated how the pupa of Acentropus differs from that of Phryganea. To these arguments the Professor replied—1. That the clothing of the wings of Acentropus consists of scales (and not of hairs as in Trichoptera). They vary in their form, and Lyonnet has shown how infinitely the scales in a single species (Cossus) vary, whilst no one would think of assigning Acentropus to the order Coleoptera. 2. That (even if true), the absence of tippets in Psyche is not proof that another insect which does possess those appendages does not belong to the order in which tippets are exclusively characteristic. 3. The spring and socket of Acentropus are identical with those of nocturnal Lepidoptera, and totally unlike the hooklets of the Hymenoptera, with which order no one would think of uniting Acentropus. 4. The pupa of Acentropus agrees with those of nocturnal Lepidoptera, except in a modification of the spiracles, as stated by Professor Westwood in a paper read before the British Association at Oxford in 1860, of which a slight report is published in the volume of 'Reports' of that Meeting. It entirely differs from that of Phryganea both in general characters, and especially in wanting the peculiar mandibles of the pupa by which Phryganea is associated with the subnecromorphotic Neuroptera.

Professor Westwood exhibited a further series of leaves of plants mined by Lepidopterous and Dipterous larvæ, which had been arranged for the cabinet by Mr. Stone of Brighthampton, and by him presented to the Oxford Museum.

Professor Westwood also called attention to the ravages committed on celery plants by the larva of the Dipterous Tephritis Onopordinis.

The President exhibited the different stages of a species of sawfly which he conceived to be Nematus trimaculatus, *St. Farg.*, and read the following extract from a letter from F. M. Rayner, Esq., of Callowell, Stroud, dated the 7th of June, 1862:—

"Having seen several letters and papers in the 'Times' and other publications, with reference to the great destruction to the gooseberry and currant bushes by a grub said to be the caterpillar of a Lepidopterous insect (Phalæna wavaria), I directed my attention to the subject. I collected several of the larvæ in the beginning of May, and discovered at once by the number of the feet (18) that they were not Lepidopterous. I fed them upon the leaves of their respective trees, and examined them frequently during the day. No particular change occurred until the last casting of the skin, when the larva turned from a bluish green, covered with shining jet-black tubercles, each bearing a seta, to a beautiful yellowish green, the first and the last two segments being of a pale orange-colour, and having no tubercles or setæ, but quite smooth, with the exception of the last few posterior segments, which were slightly pubescent. The cocoon was at first green, but afterwards changed to black. In about three weeks the imago made its appearance in the form of a Hymenopterous insect. I think it belongs

to the Securifera, Tenthredinata, *Latreille*, but I know little or nothing about the Hymenoptera. I have sent you a small bottle containing specimens of the insect in its different stages, but the spirit has slightly altered their colour. One circumstance strikes me as being rather curious: all the larvæ I collected turned out females. I was obliged to procure the males by pinning a female to a piece of cork and placing it under the bushes."

Mr. S. Stevens mentioned that the Coleopterous insect described by Dr. Schaum at the September Meeting of the Society, under the name of Scaritarchus Midas, had been previously described under the name of Mouhotia gloriosa in Guérin's Magazine for August last, and, according to the rule of priority, the last mentioned name must prevail.

Mr. W. W. Saunders exhibited a dozen species of Catascopus collected by Mr. A. R. Wallace in the East Indian Isles, including the four new species described in the paper hereinafter referred to, in connection with which Professor Westwood stated that a paper had been published by the Natural History Society of Basle, in or about 1843, containing descriptions of Catascopi from Africa. This paper appears to have escaped notice, and he thought it not unlikely that some of the insects therein described would be found to be identical with some of those afterwards described by Hope and Andrew Murray.

Papers read.

Mr. W. W. Saunders read a paper "On the species of Catascopus found by Mr. Wallace in the Malay Peninsula and the East India Isles," containing descriptions of four new species, C. Schaumii, C. Aruensis, C. lævigatus and C. splendidus.

Mr. Waterhouse read a "Note upon certain British Species of the Genus Quedius, in which the elytra are more or less æneous and the scutellum punctured."—*J. W. D.*

Special General Meeting.

December 1, 1862.—Frederick Smith, Esq., President, in the chair.

Alteration of Bye-Laws.

The Secretary read a requisition signed by six Members of the Society, and presented to the President and Council, requesting that a Special General Meeting might be called for the consideration of the alterations in the Bye-Laws therein specified. He announced that the same had been read at three successive General Meetings of the Society, and also read the notice to Members convening the Special Meeting for that evening. The proposed alterations in the Bye-Laws were then put to the vote and adopted.

Ordinary Meeting.

The Ordinary Meeting of the Society was held the same day.

Donations.

The following donations were announced, and thanks ordered to be given to the respective donors:—'Classification of the Coleoptera of North America,' Part 1, by John L. Leconte, M.D.; 'Monographs of the Diptera of North America,' Part 1, by H. Loew;

'Synopsis of the Described Lepidoptera of North America,' Part 1 (Diurnal and Crepuscular Lepidoptera), by John G. Morris; 'Synopsis of the Neuroptera of North America, with a List of the South-American Species,' by Herman Hagen; all compiled for and presented by the Smithsonian Institute. 'Proceedings of the Entomological Society of Philadelphia for 1861 and 1862;' by the Society. 'Notes on the Thysanura,' Part 1 (Sminthuridæ); by the Author, John Lubbock, F.R.S., &c. 'Proceedings of the Literary and Philosophical Society of Liverpool during the Fifty-first Session, 1861—62,' No. xvi.; by the Society. 'The Zoologist' for December; by the Editor. 'On the Genus Colias in North America;' by the Author, Samuel H. Scudder. Taylor's 'Calendar of the Meetings of the Scientific Bodies of London for 1862—63;' by the Publishers. 'The Journal of the Society of Arts' for November; by the Society. 'Wiener Entomologische Monatschrift,' Band I—V; by Julius Lederer. 'Die Noctuinen Europa's mit Zuzichung einiger bisher meist dazu gezählten Arten des Asiatischen Russland's, Kleinasien's, Syrien's und Labrador's: systematisch bearbeitet von Julius Lederer;' by the Author.

New Members.

Percy C. Wormald, Esq., of 6, Brondesbury Terrace, Kilburn, was ballotted for and elected a Member of the Society.

Certificates in favour of F. Moore, Esq. (a Subscriber to the Society), and of E. A. Smith, Esq., of 27, Richmond Crescent, Islington, as Members, were read for the first time, and ordered to be suspended in the Meeting Room.

Exhibitions, &c.

Mr. Stevens exhibited a fine collection of Coleoptera and Diurnal Lepidoptera, collected by Mr. A. R. Wallace in New Guinea and the adjacent island of Salwatty.

Mr. F. Moore exhibited specimens of a white saccharine substance or kind of "manna," which is found abundantly on the leaves of certain Eucalypti (E. dumosa, &c.), in the north-west parts of Australia Felix, and is eaten by the natives, who call it "lerp" or "laap." This substance is stated by Mr. T. Dobson (Proc. Royal Society of Van Dieman's Land, 1851) to be the cup-like coverings of a species of Psylla (P. Eucalypti), formed by the insect whilst in the larva state.

Mr. Hewitson sent for exhibition some stems of laurel trees, with the following note in reference thereto:—

"In cutting down some laurels, at some four or five feet from the ground, I noticed that they were pierced longitudinally by a round hole about the size of a pistol-bullet, at first open and clear, afterwards filled with sawdust, but so loose that it was easily pushed out for the length of a foot with a very slender stick; but in cutting sections from the tree lower down, though the hole increased in size, it also became more obstructed until near the root, where (although there is still an indication of the perforation) the hole proceeds no further after passing through nearly five feet of solid wood. One piece of the tree shows where the hole commences, at the side where a branch has been cut off; the other was four feet lower down, where the hole becomes obstructed and looks more like decay than the boring of a grub. Is this a question for entomologists or for arboriculturists?"

To this query no satisfactory answer was given; but it was suggested that the perforation, if caused by a larva at all, was probably made by that of Zeuzera Æsculi.

Mr. Waterhouse exhibited the following four British species of Coleoptera, *viz*,

Oxytelus piceus, *Erichson*, *&c.*, Quedius umbrinus, *Erichson*, Haplocnemus nigricornis, *Fab.*, and Lathridius rugosus, *Herbst*, and communicated the following notes relating to them :—

"With regard to the Oxytelus I have to state that the species was introduced into my Catalogue from the determination of a single male specimen taken by myself, but of which I did not know the exact locality. Recently, however, I have discovered a second specimen (a female) amongst some Staphylinidæ which were procured by me from cow-dung in the well-known field immediately opposite the inn at Birchwood Corner, on the 1st of July, 1859. O. piceus most closely resembles O. laqueatus, but may be distinguished by the comparatively large size of the eye, by there being only a single groove on the back part of the head above (instead of three grooves, as in O. laqueatus), and by the head being less concave in front. In the male of O. laqueatus the longitudinal diameter of the head behind the eye is greater than that of the eye, whereas in O. piceus the eye presents the greater diameter. In the female of the last-mentioned insect, from the large size of the eye, and the great prominence of that organ, the head nearly resembles that of O. sculptus, but that insect is readily distinguished from O. piceus by its comparatively long antennæ and by certain peculiarities of structure. In O. piceus the fifth is the first of the dilated pubescent joints, and presents a peculiar modification of the peduncle: at first small and slender, to join the preceding joint it is suddenly dilated above the base into a shallow cup-like process, to which a nearly hemispherical apical part of the joint is attached; this latter part is rough and pubescent, whilst the peduncular part is smooth. In the following joints the peduncle is dilated above the base into a circular flat (or nearly flat) plate, attached to which is the body of the joint. In O. sculptus the peduncle of the fourth joint is dilated into a round, slightly concave (and in the following joints flat) plate; and the dilated pubescent joints may here be said to commence from the fourth instead of the fifth joint. This structure corresponds very closely with that which will be found in O. rugosus and O. insectatus, whilst all the remaining British species of Oxytelus correspond very closely in the structure of their antennæ with O. piceus.

"Of Quedius umbrinus I have long possessed a British specimen, but had never determined it until recently, when a second specimen was sent me to be named by Mr. Morris Young of Paisley. It most nearly resembles the dark (pitchy black) varieties of Quedius mauro-rufus, but may be distinguished by its less thickly and more strongly punctured elytra. The antennæ are rather stouter and the joints longer, and the head is somewhat broader than in Q. mauro-rufus.

"Haplocnemus nigricornis. Dr. Power long since called my attention to the fact that we possessed two species of Haplocnemus in England, and I subsequently obtained a second species from Charles Turner, who took it in the New Forest. It differs from our well-known H. impressus of Marsham in being a trifle smaller, in the general colouring of the upper parts (instead of being of a brassy bronze hue being more inclined to green, or, in parts to blue), and in the tibiæ, tarsi and apex of the femora being entirely of a palish testaceous colour. The three basal joints of the antennæ, moreover, are chiefly testaceous, the first and third joints being but slightly tinted with æneous. The thorax is rather narrower and longer, more contracted in front, and less thickly and less strongly punctured; the reflected lateral margin is rather broader, and is rufescent, as is likewise the lateral margin of the elytra on the under sides, and these parts are less distinctly crenulate. Lastly, the punctures of the elytra

are larger, less numerous and less clearly defined. Upon re-examining the descriptions of Fabricius, Gyllenhal, &c., I now believe that we must apply the name nigricornis to this insect, and retain that of impressus for the Marshamian species, with the tibiæ more or less dusky. The species would then stand thus:—

1. Haplocnemus nigricornis.
   Aplocnemus impressus, *var.*, *Steph. Illustr.*
   Dasytes nigricornis, *Fab. Syst. El.* ii. 73, 10; *Ent. Syst.* i. 2, 81, 16.
   ——— ———, *Payk. Faun. Suec.* ii. 158, 3.
   ——— ———, *Gyll. Ins. Suec.* i. 327, 4.

2. Haplocnemus impressus, *Steph. Illustr.* iii. 316 (Aplocnemus, *id.*) and collection.
   Criocĕris impressus, *Marsh. Ent. Brit.* 226, 16.
   Haplocnemus nigricornis, *Waterh. Catalogue.*

"Lathridius rugosus, *Herbst, Coleopt.* v. 6, 3, Tab. 44, fig. 3, c, C. (Latridius).
——— ———, *Gyll. Ins. Suec.* iv. 140, 20.
——— ———, *Mannerh. in Germar's Zeitsch. für Entom.* v. (1844), 90, sp. 28.

'L. oblongus, niger, glaber, ore antennis pedibusque ferrugineis, thorace brevi, lato, crebre punctato, lateribus dilatato-rotundatis, dorso convexo, medio obsolete canaliculato, postice transversim profunde impresso; elytris obsoletius striato-punctatis, interstitiis lævibus. Long. $\frac{5}{6}$—1 lin.; lat. $\frac{3}{8}$—$\frac{1}{2}$ lin.'

"The above description, from Mannerheim, agrees perfectlywell with the insect now exhibited, and which I long since separated in my English collection as a distinct species, but was unable to name. Finding some German specimens like it in the British Museum collection, and bearing the name 'rugosus,' I was led to examine the descriptions of that species, which I must formerly have overlooked. I suspect that the very inappropriate specific name applied to it was the cause of the oversight, it being distinguished by the smoothness of its elytra. I have seen specimens of this species in the Rev. A. Matthews' collection. It is usually smaller than L. minutus and of a shorter form, and approaches more nearly to my L. testaceus, but that insect is still shorter and broader, and has the elytra more distinctly punctate-striated. Its colour appears to be always testaceous, whereas L. rugosus is black."

Mr. M'Lachlan exhibited a Dipterous parasite on the larva of a Trichopterous insect. It had been bred by Mr. Parfitt, of Exeter, from a larva-case of Limnephilus marmoratus, and had emerged through the water, though the eggs had probably been laid by the parent fly when the case was floating on the surface. The name of Hydrotachina Limnephili was proposed for this novelty.

Papers read.

Major Parry communicated two papers: one entitled "Some Remarks on the Catalogue of Lucanidæ recently published by M. James Thomson in the 'Annales de la Société Entomologique de France';" the other entitled "Further Descriptions and Characters of undescribed Lucanoid Coleoptera." The latter paper was supplementary to that read by Major Parry at the October Meeting of the Society. The whole of these descriptions are intended to be incorporated with others in a general Catalogue of the family, to be published, with figures, in the 'Transactions' of the Society.—*J. W. D.*

*Descriptions of several new Species of Nepticulæ; with Critical Remarks on others.**

Group I.

1. N. POMELLA, *Stt.*, *Vgh.*

Capillis cum penicillis ferrugineis, antennarum conchula flavido-alba; alis anterioribus vix nitidis, cæruleo-nigris, ciliis obscure griseis. Exp. al. $2\frac{1}{6}$—$2\frac{1}{3}$. lin.

Vaughan, *Intell.* 1858. *Stainton*, *Man.* 2, 431. Pygmæella, *Frey*, *Tin.* 371, 3. *Linn. Ent.* xi. 371, 3 (excl. ref.)

The frontal tuft, as also the cervical tuft, is bright ochreous-yellow, the latter a little paler; the eye-caps are rather large, whitish, inclining somewhat to yellow; the antennæ of the female are half as long as the anterior wings; those of the male perceptibly longer, are blackish, at the base more or less silvery gray; the abdomen is blackish gray, beneath paler gray, especially towards the anus; the anal tuft not yellow; the legs are dark gray, the middle tibiæ and the tarsi yellowish white. The anterior wings are moderately broad, rather coarsely scaled, of a uniform bluish black-brown, with a faint olivaceous-bronzy tint; the apical cilia dark gray, those of the anal angle rather paler, at their bases with some scattered scales of the ground colour projecting into them. Posterior wings and their cilia are of the colour of the cilia at the anal angle of the anterior wings.

That the N. pygmæella of Frey should be referred to this is evident from a communicated specimen, which is only a little paler, and which was likewise bred from apple-mines; but I cannot believe that this species is the N. pygmæella of Stainton. Stainton, in the 'Natural History of the Tineina,' vol. i. p. 192, distinguishes the latter from its allies by the pale ashy gray ground colour of the anterior wings, and in his description calls the latter pale ashy gray, with a very faint violet tint towards the apex, with paler cilia; the colour of the posterior wings he calls whitish gray. All this does not suit for our N. pomella. On the other hand, I possess some caught specimens which I unhesitatingly refer to N. pygmæella, *Stt.*: they have

* Translated from 'Some Remarks on the Species of the Genus Nepticula, by H. von Heinemann in Braunschweig,' which appeared in the 8th and 10th numbers (August and October, 1862) of the 6th volume of the 'Wiener Entomologische Monatschrift.'

N.B. The introductory portion of that paper has been translated and published in the 'Entomologist's Annual' for 1863, pp. 36—50.

more finely scaled, more shining anterior wings, of ashy gray colour, towards the tip rather of a bluish violet, and the cervical tuft is whitish. If Frey received our N. pomella from Stainton as N. pygmæella, this may easily have happened before N. pomella was distinguished from N. pygmæella; for that both species were previously united under the latter name is manifest, since, in the 'Natural History,' p. 191, Stainton gives whitethorn and apple as the food of N. pygmæella, but in the 'Manual' he assigns whitethorn to N. pygmæella and apple to N. pomella.

Of the remaining allied red-headed unicolorous Nepticulæ, N. oxyacanthella, N. desperatella and N. Aucupariæ are much smaller, and have shorter antennæ. N. oxyacanthella comes nearest in colour, but the colour of the anterior wings is much brighter blue, especially towards the apex; the cilia are grayish black; the very small, often scarcely perceptible cervical tuft is whitish instead of yellow; the middle tibiæ are only a little paler. N. desperatella has no pale cervical tuft; the anterior wings are much smoother, with finer scales, as though polished, coppery brown or brownish or greenish bronze, entirely without violet or blue. In N. Aucupariæ the large cervical tuft is whitish; the anterior wings are smoother and more finely scaled, olivaceous, only with a violet gloss towards the tip. N. ruficapitella and N. æneella have also the cervical tuft more whitish, and the ground colour of the anterior wings greener; in the last-named species the violet tint is wanting, or at least much fainter; in N. ruficapitella it is much brighter at the apex of the wing. N. pomella may have the greatest resemblance to N. rhamniella, *H.-S.* (Corresp. Blatt. 1860, p. 60), a species with which I am unacquainted. This has likewise the cervical tuft orange; the anterior wings coarsely scaled, grayish violet, with the scales projecting irregularly into the cilia; but the remark that the eye-caps are less whitish than the cervical tuft, and that the anterior wings are shining, does not apply to our species.

The larva is ochreous-yellow, and mines in apple-leaves in October. The mine expands like a blotch, and is recognized by its rusty yellow colour. The cocoon is oval, rather flat, and of a reddish brown colour.

N. pomella has been observed in Brunswick, Hanover, Frankfort-on-the-Maine and Zurich, besides England.

2. N. ÆNEELLA.

Capillis ochraceis, penicillis et antennarum conchula flavida; alis anterioribus parum nitidis, olivaceo-æneis, apice obscurioribus parum violaceo tinctis. Exp. al. $2\frac{1}{2}$—$2\frac{3}{4}$ lin.

?Pygmæella, *H.-S.*, v. 348, 1090 (Corresp. Blatt. p. 53).

So like N. ruficapitella that it is hardly possible to distinguish them. The only difference which I can find out is that the anterior wings in N. æneella are somewhat smoother and more shining, and have a perceptibly fainter bluish violet tinge than N. ruficapitella, since only the extreme tip and the base have a slight violet gloss; whereas in N. ruficapitella there are more or less numerous violet scales on the entire disk, and the tip is much brighter blue or violet. It is also very near to N. Aucupariæ, but the latter has the anterior wings paler and more shining and more finely scaled, the frontal tuft pale ochreous-yellow, the cervical tuft and eye-caps whiter, and the antennæ shorter. N. anomalella and N. desperatella are likewise more finely scaled and more glossy, and have shorter antennæ; the former has, besides, a brighter violet at the apex of the wing, blackish gray instead of brown-gray posterior wings, and dark middle tibiæ; the latter species has the anterior wings more of a coppery olive-brown.

The frontal tuft rusty yellow, the cervical tuft and eye-caps yellowish white, the abdomen black-gray, beneath white-gray, with pale yellow anal tuft in the male. The middle legs are whitish, with only a faint gray tint on the tibiæ; the hind legs gray, with the tibiæ and tarsi whitish beneath. The anterior wings are more coarsely scaled, olivaceous-bronze, with somewhat of a golden gloss; a faint violet tint at the base; the tip for a slight extent brownish purple or violet; beyond it the cilia are dark gray. The posterior wings are pale brownish gray, with the cilia rather darker.

The larva and mine resemble very closely those of N. oxyacanthella. A year ago I had collected together the mines of N. oxyacanthella on whitethorn and apple, and obtained several specimens of N. æneella, which I took for N. oxyacanthella, and sent away under this name. Last autumn I separated the whitethorn-mines from the apple-mines, and obtained from the former N. oxyacanthella, from the latter N. æneella, and the last named certainly from mines both on wild and cultivated apple trees.

I suspect that Herrich-Schæffer's N. pygmæella belongs here; it is certainly not Stainton's species, since that has pale ashy gray anterior wings.

3. N. SAMIATELLA, *H.-S.* (*Zll.*)

Capillis atris, penicillis et antennarum conchula albis; alis anterioribus subnitidis, virescenti-æneis, apice violaceis, ciliis griseis. Exp. al. $2\frac{1}{3}$—$2\frac{1}{2}$ lin.

Zeller, Linn. Ent. iii. 303, 1 (♂). *Herrich-Schæffer*, v. 348, 1087, fig. 835.

4. N. ATRICAPITELLA, *Hw.*

Capillis cum penicillis atris, antennarum conchula alba; alis anterioribus subnitidis, virescenti-æneis, ciliis nigro-griseis. Exp. al. $2\frac{1}{4}$—$2\frac{1}{2}$ lin.

Stainton, List of the spec. of Br. Anim. xvi. 166; *Ins. Brit.* 297; *Man.* ii. 431. *Herrich-Schæffer*, v. 397, 1086. *Frey, Tin.* 370, 1. *Linn. Ent.* xi. 368, 1.

Frey refers Herrich-Schæffer's N. samiatella to N. atricapitella, *Stt.*, with the remark that one of Stainton's original specimens of N. atricapitella, communicated to him by Herrich-Schæffer, agreed precisely with a number of Frey's bred specimens, which Herrich-Schæffer had pronounced to be N. samiatella. Whether some error has here occurred in any way I will leave undecided, but at any rate amongst the black-headed oak Nepticulæ which come nearest to N. ruficapitella I certainly find two species to which the differential characters assigned by Herrich-Schæffer apply; only with regard to size I have observed no perceptible difference, since all specimens measure $2\frac{1}{2}$ lines, or rather more or less, yet on the whole N. samiatella appears to be a trifle larger, and to have the wings rather narrower, whereas in N. atricapitella the anterior wings are broader and shorter. The ground colour of the anterior wings is in both species of a shining greenish bronze, but more greenish in N. atricapitella, more bronzy and more shining in N. samiatella; the tips of the scales are more or less violet-blue, especially towards the apex of the wing, often also along the costa, but more so in N. atricapitella, where, especially in the female, the costa and apex of the wing are often entirely blue, and sometimes the entire wing has a bluish gloss. The cilia are blue-black; their apical half, from the apex of the wing to the anal angle, is pale gray, in N. samiatella perhaps a little paler; at the inner margin they are blackish gray, and in the female of N. atricapitella they extend nearly to the base of the wing, without perceptibly decreasing in length, and in set specimens they distinctly lie over the posterior wings. These latter are brownish gray in N. samiatella, bluish black in N. atricapitella,

with somewhat of a bronzy gloss; the cilia in the former are paler gray, in the latter bluish black, only grayish at the tips; the dark colour of the costal cilia is very striking in N. atricapitella, especially in the female. The male of N. samiatella has, from the anal angle to the middle of the inner margin of the posterior wings, a second row of stouter and shorter scale-like cilia, which are longest at the anal angle, and become gradually shorter and cease in the middle of this margin; they generally stand somewhat erect, with the tips turned upwards, and reach nearly to the middle of the other cilia, forming with their tips to some extent a divisional line in the cilia, which in the middle of the inner margin flows into it. These scales are wanting in N. atricapitella. The cervical tuft is yellowish white in N. samiatella, black in N. atricapitella. In the males of both species the antennæ are of nearly equal length, nearly two-thirds as long as the anterior wings. In the females of N. atricapitella the antennæ are scarcely perceptibly shorter, whereas in the females of N. samiatella they are barely half as long as the anterior wings. The anal tuft is grayish in N. atricapitella ♂, more yellowish in N. samiatella ♂; in the females of both species the tip of the abdomen is rusty yellowish, though to a different extent.

I do not doubt that these two species are those of Herrich-Schæffer, and that Stainton's species is identical with the species of the same name in Herrich-Schæffer. Frey's species seems doubtful, since his notices suit for both species. Zeller's N. samiatella ♂ is also probably Herrich-Schæffer's N. samiatella, since this comes nearest to N. ruficapitella in form and colour of the anterior wings.

I have bred numbers of both species from the larvæ, though but few males of N. samiatella, without being able to find any difference between the mines or larvæ, or between those of N. ruficapitella. The excremental track is very variable,—sometimes like a thin line, sometimes it almost fills the entire mine, but generally it is midway between the two extremes. I had attempted to separate the mines by the form of the excremental track: this was, however, not entirely practicable, owing to the very imperceptible gradations, and eventually all three species came from the same mines.

5. N. NITIDELLA.

Capillis ferrugineis, penicillis et antennarum conchula luteo-albidis; alis anterioribus valde nitidis, orichalceis, post medium dilutioribus apice fuscescentibus, ciliis fusco-griseis. Exp. al. $2\frac{1}{2}$ lin.

Easily distinguished by the smooth, polished disk and the pale colour of the anterior wings. The frontal tuft is bright rusty yellow, the cervical tuft and eye-caps are yellowish white; the antennæ and legs are pale gray; the middle legs hardly paler; the tarsi yellowish white. The anterior wings are very smooth, as though polished, with bright metallic gloss; their colour is a greenish brassy yellow, which is palest beyond the middle and at the tip, though to a trifling extent, and deepens at the base of the cilia to a very pale brown; the tips of the cilia are pale brownish gray, and the posterior wings with their cilia are of the same colour.

I took a beautiful fresh female at Brunswick, on the trunk of a beech tree, in May.

6. N. BASIGUTTELLA.

Capillis atris, penicillis et antennarum conchula albidis, thorace atro; alis anterioribus subnitidis, violaceo-æneis, basi flavidis, apice violaceo-purpureis, ciliis fusco-griseis. Exp. al. $2\frac{1}{6}$—$2\frac{1}{3}$ lin.

This species is very like N. Tiliæ, but larger and stouter: it is distinguished from that and from the remaining black-headed Nepticulæ which have no fasciæ by the pale basal spot of the anterior wings and the black thorax; from most of them also by the rusty yellow lower part of the face, and by the much paler silver-gray colour of the legs and the belly. The vertical tuft is black, the lower part of the face rusty yellow, or divided lengthwise by a rusty yellow line; the eye-caps are large in both sexes, and like the cervical tuft and palpi are white or yellowish white; the antennæ are shining silvery gray, thickly annulated with darker, reaching in the males along two-thirds of the costa of the anterior wings; the thorax, with the tippets, is deep black to the paler part of the metathorax, which is especially striking before the creature is pinned; the abdomen is blackish gray, with rusty yellow tip in the male; the under side of the body and the legs are pale silvery gray, the latter rather darker externally. The anterior wings have the ground colour of a very pale, almost whitish, shining bronze, but this is darkened and clouded by the more or less broad brownish violet tips of the scales. The clearest and palest part is the base, where the light ground colour forms a small, not sharply bordered, yellowish white spot, immediately beyond which the scales are most uniformly darkened; they become again gradually paler in the middle of the wing, especially at the inner margin, where, again, an undefined pale place, free from dark scales, occurs at the anal angle, which sometimes

extends almost fasciaform to the costa. The apex of the wing is dark violet-blue. The disk of the wing is shining and rather smooth, but not so glossy as in N. Tiliæ. Besides the anterior wings vary not inconsiderably, according as the light ground-colour or the dark scales predominate, but the pale spot at the base is always distinct, and strongly contrasts with the dark place beyond, as also with the black thorax. The base of the cilia dark violet-blue from the apex of the wing to the anal angle; their tips are dark gray; at the anal angle and inner margin the cilia are entirely pale gray; no divisional line occurs. The posterior wings without peculiarity are pale gray, with the cilia little darker.

The larva is green, and feeds in oak leaves in July, and again in September and October. The mine forms a long track, rather tortuous, of nearly uniform breadth, entirely filled up with the dark green excrement.

This species has been noticed at Brunswick and Hanover, and Frey has also found the larva at Zurich.

Group II.

7. N. Nylandriella, *H.-S.*

Capillis ♂ fuscis, ♀ ochraceis, antennarum conchula alba; alis anterioribus nitidis, lithargyreis. Exp. al. $1\frac{1}{4}$ lin.

Herrich-Schæffer, v. 359, 1133, fig. 927.

The frontal tuft of the male is brown, that of the female pale ochreous-yellow; the antennæ are short whitish gray; the eye-caps silvery white. I cannot distinctly perceive the cervical tuft, yet it appears in the male to be more whitish, in the female pale yellow; the abdomen black-gray; the legs silvery gray. The anterior wings are very smooth, as though polished, extremely shining; their colour is pale silvery gray, with very pale and faint yellowish tinge; the apex of the wing is scarcely darker, with a very faint pale violet gloss; the cilia are whitish gray, rather darker towards their bases. The posterior wings and cilia are pale gray.

I took this insect at Brunswick, in May, very sparingly on beech-trunks, and I still possess a pair. It agrees in size and colour completely with Herrich-Schæffer's figure, and is easily distinguished from all the other species by its small size and colour.

Group III.

I have removed from this group Frey's N. æneofasciella, and on the other hand have placed here N. regiella and N. latifasciella.

All the three species have the anterior wings more or less shining, and an indistinctly margined perpendicular metallic fascia beyond the middle.

8. N. LATIFASCIELLA, *H.-S.*

Capillis atris, antennarum conchula alba; alis anterioribus dilute aureo-brunneis, nitidis, apice purpureis, fascia post medium lata, sed obsoleta dilute aurea; ciliis apice griseis. Exp. al. $1\frac{3}{4}$ lin. *Herrich-Schæffer*, v. 352 (under N. gratiosella), fig. 832.

Very near to N. regiella, but distinguished by the black frontal tuft, the white cervical tuft, the rather paler, not violet-tinged, ground colour of the anterior wings, with the apex purple instead of violet or blue, and by the posterior wings being rather brown-gray than blackish gray. It also comes very near to N. aceris, but this latter has darker bronze-coloured anterior wings, and the fascia more whitish, only in certain directions with something of golden gloss, and less shining. In N. æneofasciella the fascia is bluish bronze-coloured.

The frontal tuft is coal-black; the antennæ short; the eye-caps, which are not very large, are white; the legs gray; the posterior tibiæ and tarsi whitish. The anterior wings are rather narrower than in N. regiella; up to the fascia their colour is pale golden brown or golden bronze, without the violet tinge of the former species; beyond the fascia they are violet-purple; the fascia is placed more posteriorly, is scarcely so broad, and appears rather attenuated towards the costa and inner margin; its colour is pale golden and very glossy. The disk of the anterior wings is certainly finely scaled, but not so smooth as in N. gratiosella. The cilia, as also the posterior wings and their cilia, are fuscous.

On the trunks of beech trees, at the beginning of May, near Brunswick.

Herrich-Schæffer refers N. latifasciella as a probable variety to N. gratiosella. His N. gratiosella is identical with that of Stainton. Of the different forms which Fischer-von-Röslerstamm (Linn. Ent. iii. 311, 59) introduces under this species I consider the first to be N. latifasciella, since the colour of the anterior wings and their cilia agrees with the latter. The specimens which Zeller received from Fischer are also smaller than the Metznerian specimen mentioned in Anm. i. 307, which probably belongs to N. gratiosella, *Stt.*; N. gratiosella, *F.-v.-R.*, would thus be the oldest name for N. Latifasciella, but I hesitate again to adopt it, since Fischer had included under this name a whole crowd of different species. N. gratiosella, *Stt. and H.-S.*, is larger than N. latifasciella ($2\frac{1}{3}$ lin.); the frontal tuft is deep black;

the white eye-caps are larger; the cervical tuft dark; all the legs blackish gray; the anterior wings narrow, more of a pure golden, inclining somewhat to olive-green, beyond the fascia bright violet or violet-blue; the fascia is likewise placed very posteriorly, is narrow above, distinctly margined, straight and vertical, of silvery white colour, sometimes with a very faint golden tinge; the entire surface is smooth, as though polished, and very glossy. The cilia, as also the posterior wings and their cilia, are more of a blackish gray. I have found the larva of N. gratiosella only on whitethorn hedges, but those of the other whitethorn Nepticulæ (N. regiella and N. atricollis) only in shady places in woods.

Group IV.

9. N. PRETIOSA.

Capillis ochraceis, antennarum conchula albida; alis anterioribus atro-violaceis, fascia pone basin dilute aurea, fascia post medium argentea nitida. Exp. al. 3—3¼ lin.

Distinguished by its size and beauty. The frontal tuft is brownish ochreous-yellow. The cervical tuft dark; the eye-caps silvery yellowish; the antennæ long; the legs blackish gray; the middle tibiæ with a faint pale ring. The anterior wings are deep violet-blue, almost black; near the base is a pale golden fascia, not sharply margined, whereas the base itself is dark for a slight distance; beyond the middle is a second fascia, distinctly margined, moderately broad, vertical, very shining, and silvery with a golden gloss; the cilia are blackish brown, with their tips blackish gray, shot with bluish. The posterior wings and their cilia are blackish gray.

N. æneofasciella differs in its markings in the fact that the metallic tint of the basal half of the anterior wings has a much greater extent, so that the dark colour beyond it is confined to a narrow fascia in the middle, whereas in N. pretiosa it is not the anterior fascia, but the dark space between it and the posterior fascia, which is much broader than the latter.

Herr Glitz found the larva near Hanover in the old leaves of Geum urbanum at the end of March and beginning of April. The mine is long and narrow, deeply and irregularly tortuous; the excrement forms a loose greenish stripe and leaves the edges free. The cocoon is oval, flat and slightly arched in the middle; its colour is brownish green. The imago appears at the end of April.

10. N. ÆNEOFASCIELLA, *H.-S.* (*Fr.*)

Capillis atris, antennarum conchula argentea; alis anterioribus nitidissimis aureis, basi, ante fasciam argenteam et apice purpureis aut purpureo-cyaneis, ciliis apice griseis. Exp. al. $2\frac{1}{2}$—$2\frac{3}{4}$ lin.

Herrich-Schæffer, v. 353, 110. *Frey, Tin.* 376, 9. *Linn. Ent.* xi. 388, 13.

Unquestionably one of the most beautiful species, recognisable by the purple or blue colour of the base and of the anterior margin of the silver fascia. The frontal tuft is deep velvety black; the rather large eye-caps are shining yellowish silvery; the antennæ in both sexes have more than half the length of the anterior wings; they are blackish, above with a yellowish white tinge; the palpi are silvery white; there is no pale cervical tuft. The thorax is shining brassy; the abdomen and the belly silvery gray; the legs externally blackish; the extreme tip of the anus is yellowish gray in the male, brownish yellow in the female. The anterior wings are long and little expanded posteriorly; the base is purple violet, often with a more or less decided blue gloss ["kornblumeblau," the blue of the corn bluebottle (*Centaurea Cyanus*)]; exactly in the middle is a vertical fascia of the same colour, but sometimes of a much brighter blue, so that the purple-brown or violet ground colour is often almost entirely covered with the blue scales, and is only visible at the inner margin; it borders the silver fascia, which it scarcely equals in width, and is sharply defined towards the base; the space between it and the base is bronzy golden, and as broad as the width of the wing in that part. The silver fascia is nearly at three-fourths of the length of the wing; it is vertical, very broad, not sharply bordered externally, and changes here gradually into brassy golden and then into the purple-violet tip of the wing, so that the commencement of the latter, according to the light in which we view it, appears either entirely brassy golden or violet. The entire disk has a metallic splendour, which is very decided on the golden ground, and on the silvery fascia. The cilia are purple violet at their bases, brownish in the middle, with faint golden gloss; at the tips they are pale blackish gray. The latter colour is also that of the posterior wings and their cilia, as also of the under side of all the wings, though with rather a darker shade.

This species, which we at first took for new, since it did not agree with Frey's description, is, according to a written communication of

the latter, the correct N. æneofasciella, since his description was made from a pale captured specimen. The larva lives in October in the leaves of Agrimonia Eupatoria, and makes strongly contorted mines with slender excremental tracks, which can hardly be distinguished from the mines of N. Agrimoniella, but it changes to pupa outside the mine in an almost circular yellowish brown cocoon.

Near Frankfort-on-the-Maine, Zurich and Wolfenbuttel.

11. N. FRAGARIELLA, *Heyd.*

Capillis fuscis, antennarum conchula argentea; alis anterioribus basi late viridi-æneis, ante et post fasciam latam dilute auream purpureo-fuscis, ciliis fuscis, apice griseis. Exp. al. 2—2⅓ lin. *Von Heyden in litt.*

Frontal tuft brown, blackish in the middle, passing into gray at the sides and in front; the eye-caps small, rather larger in the male, greenish white with metallic gloss; the antennæ are in both sexes more than half the length of the anterior wings, blackish; the palpi white. I do not perceive that the cervical tuft is pale. The entire body is shining greenish bronze, likewise the legs, only they are darker; the anus of the male has two small pale gray tufts. The anterior wings are narrow and elongate, of nearly uniform width, very shining greenish brassy to beyond the first third of the wing; the remainder to the apex is of a rather pale brown, inclining somewhat to purple or violet-brown, more rarely to violet-blue, which before the metallic fascia appears as an equally broad fascia, distinct towards the base, though not sharply bordered. The metallic fascia is vertical at two-thirds of the length of the wing; it is rather broad, pale golden and very shining. The cilia have, at their bases, brown, somewhat violet scales, but these are not sharply defined; at their tips they are pale gray, and this is also the colour of the posterior wings and their cilia. Beneath all the wings are pale fuscous.

This species has perhaps some resemblance with N. splendidissima, but can easily be distinguished from it. The latter has the frontal tuft deep black, the eye-caps larger, and the colour of the broader anterior wings beyond the brassy basal portion is quite different, golden brown with a strong violet tint, often almost entirely deep violet-blue, and not distinctly margined towards the pale base, but shading gradually into it; besides the metallic fascia is nearer the base on the costa and perceptibly oblique.

The larva feeds in July, and again at the end of September and

beginning of October on strawberry leaves; it is pale amber-yellow with the head brownish, and makes long, narrow, tortuous mines, with a rather slender excremental line. The cocoon is rather broad and flat, of a brownish yellow colour.

Found at Frankfort-on-the-Maine by Herr von Heyden, and last year it was also noticed at Wolfenbuttel.

Group V.

12. N. Ulmivora, *Fr.*

Capillis atris, antennarum conchula alba; alis anterioribus nitidis, viridi-aureis, in margine anteriore cupreis, apice violaceo-fuscis, fascia postica late argentea, nitidissima, ciliis apice cinereis. Exp. al. $1\frac{3}{4}$ lin.

This species, named by Frey, who forwarded me a specimen, is very like N. gratiosella, but is distinguished by the bright coppery colour of the costa of the anterior wings, by the pale gray cilia and hind wings, and by the whitish gray middle tibiæ, and from the remaining black-headed species of this group it is further distinguished in the silver fascia not being bordered with dark towards the base. The frontal tuft is black; the eye-caps pure white. I cannot perceive a pale cervical tuft. The legs are blackish gray; the middle tibiæ are whitish gray; the middle tarsi and the tips of the posterior tarsi are white. The anterior wings are narrow, of nearly uniform breadth, in colour similar to N. gratiosella, but paler greenish bronze with reddish golden tinge and considerable glossiness; on the costa they are purple-violet, especially before the fascia, beyond which pale brown to the base of the cilia, with a faint violet tinge. The fascia is rather posteriorly placed, somewhat oblique; it is broad, silvery, with faint golden gloss and highly metallic. The cilia are gray, with their tips and at the anal angle more whitish. Posterior wings pale gray. Frey writes me that the specimen sent was paler, and on the costa of a less brilliant coppery red than his other specimens.

According to Frey's communication the larva is green, and mines circular and visceriform tracks in Ulmus campestris at Frankfort-on-the-Maine.

13. N. speciosa.

Capillis nigris, antennarum conchula magna albida; alis anterioribus nitidis, rufo-aureis, medio purpureo-tinctis, apice atro-cæru-

leis, fascia post medium aurea, nitida, ciliis apice fuscis; tibiis mediis æneo-griseis. Exp. al. $2\frac{1}{2}$ lin.
Frey, Intellig. iv. 27.

Extremely like N. marginicolella, ♂; of the same size and form, and of quite similar colours and markings, with only this difference, that the cilia of the anterior wings, as well as the posterior wings and their cilia, are not blackish but more brownish, the eye-caps are larger and of a purer white; besides, the middle tibiæ are not whitish as in N. marginicolella, but gray with a bronzy gloss like the other legs. On the hind margin of the posterior wings in the male of N. speciosa there is a row of shorter cilia on the other cilia, but these are finer than in N. marginicolella, and only noticeable in that the basal half of the cilia appears thicker. I have not been able to find out other differences. The ground colour of the anterior wings is of a shining reddish golden with faint violet gloss, which becomes violet-blue before the fascia. The fascia is placed just beyond the middle; it is vertical, pale golden, very glossy, the space beyond it is dark brown with violet-blue gloss. If one looks obliquely along the wings towards the base, and towards the light, the golden gloss on the ground colour and on the fascia disappears, and the ground colour from the base to the distinctly and sharply-defined dark portion before the fascia appears of a shining greenish brassy, and the fascia itself appears pure silvery; the same thing also occurs in N. marginicolella. Whether the female has, like N. marginicolella, a reddish yellow frontal tuft I know not, since I only possess a male.

The larva feeds in a large mine at the end of September and beginning of October, in the leaves of Acer pseudo-platanus. Frey bred it at Zurich, and sent me the specimen described. I have also found the empty mines at Brunswick.

I am still doubtful whether two specimens which Buchheister took the beginning of May at Wolfenbuttel, on Acer pseudo-platanus, should be referred here. They are much less shining, especially the base of the anterior wings is rather dull, since violet or purple-blue scales, though only faint, go to near the base, and the latter lightens up somewhat metallic; the ground colour is more bronzy green, with violet tint; the fascia broader, with fainter glossiness, and the entire insect is more like N. splendidissimella than N. marginicolella.

Group VI.

14. N. ALNETELLA, *Stt.*

Capillis ferrugineis, antennarum conchula flavida; alis anterioribus subnitidis, violaceo-aureis, apice nigro-cæruleis, fascia post medium recta, lata, dilute aurea, nitida, ciliis apice obscure griseis. Exp. al. 2—2⅓ lin.

Stainton, Ann. 1856, 43; *Man.* ii. 437. *Frey, Linn. Ent.* xi. 457, 52.

This and the two following species follow after the last species of the preceding group, but are distinguished by the less shining and not polished ground of the anterior wings. These in all are rather broad, perceptibly dilated and rounded posteriorly; the fascia is nearly vertical, rather beyond the middle of the wing, has straight margins and is highly metallic; the ground colour is darkened before it for a greater or less extent, but only very slightly and scarcely perceptibly in N. alnetella; the apex of the wing is likewise dark to the fascia. The frontal tuft is bright ferruginous; the small cervical tuft ochreous-yellow; the eye-caps yellowish white; the antennæ short.

The anterior wings of N. alnetella are pale golden brown, not very glossy, darkened with a violet tinge, which is rather more intense towards the fascia, and to which it sometimes forms a narrow dark margin. The fascia is broad, sometimes as broad as the thorax, sometimes about one-half narrower; its colour is pale golden; it is scarcely so glossy as in the following species; beyond it the ground colour is blue-black or blackish with blue, not violet glitter, not shining; the base of the cilia is also clothed with blue-black scales, which are rather regularly edged; beyond them the cilia are darker gray. The posterior wings and their cilia are rather paler gray. Beneath all the wings are fuscous; the anterior darker; the abdomen has somewhat of a greenish bronzy tint; the legs are blackish; the middle tibiæ scarcely paler.

Of the species of the preceding group only N. aurella and the male of N. marginicolella can be confused with N. alnetella, from the ferruginous colour of the frontal tuft. But in both these the anterior wings before the fascia are much more shining, smooth, and without a violet tinge; beyond the fascia they are dark purple-brown and not blue; besides, N. aurella has narrower and longer anterior wings, and in N. marginicolella the fascia is pure silvery. N. dulcella and N. continuella have still less glossiness on the surface of the wings, and the fascia is narrower, purer silver and more shining, and with a distinct and

broader fascia before it, and the space beyond it violet-black; the middle tibiæ are also whitish. In N. ignobilella the anterior wings are narrower and longer, paler, the fascia stands further beyond the middle, and is less golden; the apex is violet. With the other species of this group any confusion is not so easy, since in them the apex of the anterior wings differs less in colour and glossiness from the basal half.

Stainton's statements do not agree with the two specimens which I possess, in that he says "fascia extremely brilliant," and calls the colour of the tip of the wing "dark purple, almost black." According to the account of the larva I can have no doubt but that my species is identical with his.

The pale amber-yellow larva feeds at the beginning of July and end of September on the leaves of Alnus glutinosa; the mine is long and narrow, tortuous, entirely filled up with dark excrement.

Found in England, also near Brunswick and near Zurich.

15. N. DULCELLA.

Capillis ferrugineis, antennarum conchula luteo-alba; alis anterioribus dimidio basali olivaceo-æneis, subnitidis, postice atro-purpureis, fascia post medium recta, argentea nitidissima, ciliis apice griseis. Exp. al. $2\frac{1}{3}$ lin.

Very like N. continuella. I can only find a difference in the paler colour of the anterior wings, and in the narrower dark fascia which precedes the silvery fascia being more obsolete towards the base. The anterior wings are pale olive-bronze from the base, rather glossy; they become gradually darker towards the silvery fascia, and before it become for an undecided extent dark brown, with faint purple-violet gloss; this is also the colour of the space between the fascia and the apex. The protruding scales in the cilia are dark violet; they lie in two rather regular rows, of which the outer one is the paler; the tips of the cilia are gray. The posterior wings are rather paler than in N. continuella.

I have a pair bred from mines in strawberry leaves, which I could not distinguish from the mines of N. fragariella. The male I sent to Frey, who refers it to N. fragariella, remarking that the two sexes of that species differ considerably. I have myself received N. fragariella from Heyden. It is the species already described, and of which I and Buchheister have bred both sexes of quite similar specimens; likewise of N. dulcella I have bred both sexes, which also agreed precisely, only that the male, as far as I remember, had more the colour of N.

marginicolella, ♀. Moreover all the specimens of N. fragariella appeared in the warm room in January, whereas those of N. dulcella do not appear till March, simultaneously with N. augulifasciella; hence I believe I must decidedly recognise in this a new species.

16. N. CONTINUELLA, *Stt.*

Capillis ferrugineis, antennarum conchula luteo-alba; alis anterioribus violaceo-atris, basi obscure æneis, vix nitidis, fascia post medium recta, argentea, nitidissima, ciliis apice obscure griseis. Exp. al. $2\frac{1}{3}$—$2\frac{1}{2}$ lin.

Stainton, Ann. 1856, 42; *Man.* ii. 437. *Frey, Linn. Ent.* xi. 436, 51.

The frontal tuft is rusty yellow or ochreous-yellow; the cervical tuft paler; the eye-caps, which are larger in the male, white, inclining rather to ochreous-yellow; the abdomen and legs blackish; the middle tibiæ and tarsi whitish. The anterior wings are dull olive-bronze at the base, sometimes with a faint violet tinge on the costa, but very slightly shining; before and beyond the silver fascia they are black-brown, inclining to purple-violet, not glossy; thereby is formed before the fascia a more or less broad dark band, not sharply edged, but yet rather distinctly defined. The silver fascia is just beyond the middle, vertical, rather narrow and very glossy; frequently it has a faint golden tinge. Violet-black scales project at the base of the cilia, which at the anal angle are more defined; between them the cilia are fuscous, with the tips purer and paler gray. The posterior wings and their cilia are darker gray.

A female bred along with N. continuella differs in some respects. The anterior wings are narrower, of more uniform width, the fascia is placed more posteriorly and is perceptibly broader; the basal half of the wing is dull golden brown, with a violet tinge, only a little darker towards the fascia; the cilia have their bases darkened for a greater extent; the middle tibiæ are scarcely paler than the other legs; the antennæ also seem to be longer, and the eye-caps of a darker yellowish. Whether this indicates a new species will be seen hereafter.

The larva is green, and feeds in birch leaves; the mine is long and narrow, tortuous, entirely filled up with dark green excrement. The cocoon is oval, flat, of a yellowish brown or pale olive-green.

In England and near Brunswick; the larva at the end of September and beginning of October.

17. N. INÆQUALIS.

Capillis atris, antennarum conchula nivea; alis anterioribus angustis, fusco-nigris, parum cæruleo-micantibus, fascia valde post medium dilute aurea, nitida, ciliis obscure violaceis, apice griseis. Exp. al. 2 lin.

This species is easily recognised by the black head, the narrow, elongate anterior wings, throughout uniformly dark, and the pale golden fascia placed unusually posteriorly. The frontal tuft is black; the cervical tuft and eye-caps white; the antennæ blackish gray; in the female shorter than the half of the anterior wings; the abdomen metallic blackish gray; the legs black, with the tips of the tarsi whitish. The anterior wings are extraordinarily long and narrow, scarcely dilated posteriorly, of a uniform dark brown, with a faint bluish tinge, scarcely shining; the fascia is placed at three-fourths of the length of the anterior wings; it is vertical, rather broad, pale golden, very glossy. The violet-brown base of the cilia is well defined; the tips, as well as the posterior wings are fuscous. The under side is fuscous; the fascia of the anterior wings is indicated by the paler colour, especially on the inner margin.

The larva feeds in strawberry leaves, and was collected along with that of N. fragariella in October, without any difference being observed in it or its mine. The cocoon is also similar, rather broad and flat, of a brownish yellow colour. Buchheister bred two females of the species from larvæ found in chalky places near Wolfenbuttel.

18. N. BETULICOLA, *Stt.*

Capillis luteis (♂), aut ochraceis (♀), antennis brevioribus, conchula flavida; alis anterioribus, apice rotundatis, æneo-nigris, postice violaceis, subnitidis, fascia valde postica, subrecta, albida, dilute aureo-nitida, ciliis apice cinereis. Exp. al. $1\frac{1}{2}$—$2\frac{1}{4}$ lin.

Stainton, *Ann.* 1856, 42; *Man.* ii. 436; *Nat. Hist.* i. 26, under Betula alba, No. 2 (larva and mine). *Frey*, *Tin.* 387, 24; *Linn. Ent.* xi. 424, 42.

Frey had only one female before him, and an additional description seems the less superfluous, since the male differs in some specimens, and Frey's statements do not perfectly accord with those of Stainton. In the male the frontal tuft is pale luteous-yellow, sometimes almost dirty white, the small cervical tuft still paler, the eye-caps small and silvery white; in the female the frontal tuft is bright ochreous-yellow,

the cervical tuft luteous, the larger eye-caps are pale yellow, with a silvery gloss. The antennæ in both sexes have less than half the length of the anterior wings; they are blackish; the abdomen is black-gray, with metallic lustre; the legs are blackish, in certain directions with a silvery gray lustre; the middle tibiæ and tarsi, as also the ends of the posterior tarsi, are whitish. The anterior wings are proportionally broad, rounded at the tip, though this form is rather variable; the ground colour is not, as Frey says, black with a violet gloss, but a mixture of bronze and blackish gray, rather smooth, with tolerably decided metallic lustre; beyond the fascia it is violet, more rarely blue. The fascia itself is very posteriorly placed, at more than two-thirds of the length of the wing, scarcely oblique; it is rather narrow, of uniform width, distinctly but not sharply outlined, white with a silvery gloss, sometimes inclining to golden, especially in the female. The cilia are violet-gray at their bases, with the tips whitish gray; at the anal angle they are rather darker. The posterior wings and their cilia are gray. Beneath all the wings are fuscous, the anterior rather the darker.

This species is most nearly allied to N. plagicolella, and is sometimes very difficult to distinguish from it, but the latter has the frontal tuft much brighter ferruginous and the antennæ are longer, reaching in the female to the middle of the anterior wings, and in the male perceptibly beyond the middle; besides, in N. plagicolella the ground colour of the anterior wings is more bronze, paler and more glossy, and not so inclined to black-gray; before the fascia there is a more decided violet tinge; the base, on the other hand, is always rather paler dull bronze-colour; the fascia is close beyond the middle of the wing, rarely as narrow as in N. betulicola, and has a more decided metallic lustre; the cilia are decidedly of a darker gray. Moreover in N. plagicolella the middle tibiæ are not paler than the other legs. N. microtheriella may be distinguished by the narrower anterior wings suffused with violet, and before the tip almost of a pure blue, by the narrow rather oblique fascia, and by the darker gray cilia. N. luteella has the disk of the anterior wings less smooth and dull, the fascia is not placed so posteriorly, and perceptibly expands on the inner margin, inclining to yellowish with very slight glossiness.

The amber-yellow larva with green dorsal vessel feeds in July, as also at the end of September and beginning of October, in the leaves of Betula alba; I counted twenty-five specimens in one leaf. The mine is rather broad, tortuous, with a loose excremental track in the

middle. The cocoon is yellowish brown, flat, generally rather broader at one end.

Besides occurring in England this has been observed at Zurich, Brunswick and Hanover.

Group VII.

19. N. POTERII, *Stt.*

Capillis sordide ochraceis, antennarum conchula parva, flavido-alba; alis anterioribus subnitidis, aureo-olivaceis, apice violaceis, fascia postica lata, dilute aurea, nitida, ciliis apice griseis. Exp. al. $1\frac{1}{2}$ lin.

Stainton, Ann. 1858; *Man.* ii. 435.

Allied to N. ignobilella, but smaller; the frontal tuft dirtier yellow; the eye-caps very small, yellowish white; the middle tibiæ scarcely paler than the remaining legs, which are of a rather pale gray. The anterior wings are narrow, pale olive-coloured as far as the fascia, with golden gloss; the tip of the wing is pale violet-blue. The vertical fascia is placed very posteriorly; it is broad, pale golden, with something of a greenish tinge, and less brilliantly metallic. The tips of the cilia and the posterior wings are pale gray. From the other species of this group this may be known by the golden fascia.

The larva (according to Stainton) is yellow, and feeds in June on the leaves of Poterium sanguisorba in mines, at first slender and then blotch-like. The imago in July.

Hitherto only observed in England.

20. N. DISTINGUENDA.

Capillis ochraceis, antennis maris longioribus, conchula flavida; alis anterioribus angustis, olivaceo-fuscis, apice vix violaceis subopacis, fascia postica suberecta, albida, subnitida, ciliis apice griseis. Exp. al. (♂) $2\frac{1}{2}$ lin., (♀) $1\frac{1}{2}$ lin.

Although I only possess a pair of this species I do not hesitate to describe it as new, since it differs decidedly from all the other species. It is closely allied to N. betulicola and also to N. glutinosæ; it is larger than the former. The frontal tuft, eye-cap and cervical tuft, and also the legs, are as in N. betulicola, but the blackish antennæ are longer in the male, since they reach perceptibly beyond the middle of the anterior wings to the fascia, but yet they are shorter than in N. glutinosæ, in which species they have full two-thirds of the length of the anterior wings and reach to beyond the fascia. The abdomen is

blackish. The anterior wings are elongate, narrower and not so rounded as in N. betulicola, more of the same form as in N. glutinosæ, which they also resemble in their slight glossiness. The surface is not so smooth; indeed the individual scales may be distinctly perceived with a lens; their bases are olive-bronze; their tips dark brown, with quite a faint bluish tinge, and to the naked eye the surface appears of a unicolorous olive-brown. The fascia does not appear to be quite so posteriorly placed as in N. betulicola, and is vertical; it is at the same time rather narrow, of uniform width, inclining to yellowish, but perceptibly less glossy. Beyond it the surface is darker, with a very faint violet-blue tint, which also prevails at the base of the cilia, whereas their tips are rather dark gray. The posterior wings and their cilia are gray, slightly inclining to brownish. In the much smaller female which I refer here the antennæ are short, the anterior wings a little more bronze-coloured, and the fascia is broader, hence appears to be nearer the base.

This species is further distinguished from N. glutinosæ and N. microtheriella by the ground colour not being so blue, especially at the tip of the wing, and by the paler, more brownish colour of the posterior wings and their cilia. From the former it also differs by the broader and more glossy fascia, from the latter by the longer antennæ of the male, by the rather duller fascia being throughout of uniform width. N. luteella has the antennæ and anterior wings shorter, the tip of the latter of a bright violet-blue; the fascia is nearer the base, close beyond the middle, more inclining to luteous, and is ill defined, especially towards the costa, and not metallic. N. turicella has the ground colour of the anterior wings more of an olive-gray, with a dull white, distinctly oblique fascia, edged with dark towards the base, and posteriorly rather concave; it has also paler cilia and shorter whitish antennæ. There are specimens of N. malella in which the anterior wings are of the same colour as in N. distinguenda, but that species is readily distinguished by the more brilliant fascia being placed nearer the base, and by the distinct cilial line.

I once bred both sexes from birch leaves at the same time, before I was acquainted with N. betulicola and N. luteella, and at that time had not examined the larva and mine sufficiently. Last autumn I found a single larva in a birch leaf, which appeared to me distinct from the larvæ of the remaining birch Nepticulæ, but hitherto it has not produced an imago. It may belong to N. distinguenda. This larva was wax-yellow, the mine tortuous, quite filled up with dark excrement.

Brunswick.

21. N. GLUTINOSÆ, *Stt.*

Capillis ochraceis, antennis maris longis, conchula flavida; alis anterioribus angustis, olivaceis, violaceo-tinctis, apice violaceo, aut totis nigro-cæruleis, fascia postica angusta, luteo-alba, parum nitida, ciliis apice griseis. Exp. al. 2—2⅓ lin.

Stainton, Man. ii. 436.

This species is closely allied to N. distinguenda and to N. microtheriella. The differences between it and the first-named species have been already given: the points of difference between it and N. microtheriella consist in the rather larger size, the less smooth surface of the anterior wings, and their being tinged more with violet and not with so pure a blue; also by the very narrow fascia, not so purely silvery and less shining; and finally by the longer antennæ. Those specimens of N. glutinosæ which have little of the violet tinge are still more closely allied with N. turicella, but the latter has the frontal tuft paler, the antennæ white or silvery gray to the tips, the surface of the anterior wings is rather smoother, their tip is not so blue, more of a violet-brown, the fascia is whitish with a faint silky lustre; it is placed rather obliquely, and generally expands on the inner margin towards the base, or this expansion is at least indicated from the fascia near the inner margin being rather broken towards the base; the dark margin on the basal side of it is more pronounced. Besides, the legs in N. turicella are paler, especially the anterior legs and femora are whitish gray, whereas in N. glutinosæ these are blackish. The frontal tuft is of a more or less bright ochreous, sometimes almost luteous; the cervical tuft and the eye-caps are whitish, with a slight inclination to yellow; the blackish antennæ in the male reach beyond the fascia, in the female beyond the middle of the costa; their basal half is sometimes whitish. The abdomen and legs are blackish, the former whitish gray beneath; the middle tibiæ and the ends of the posterior tarsi are whitish. The ground of the rather elongate, finely-scaled anterior wings is dull silky olivaceous, as in N. turicella, suffused more or less with violet or blue, sometimes so slightly that the ground colour remains almost quite unsullied as far as the fascia, or at most there is only a faint and ill-defined violet-brown border before the fascia; but sometimes, and especially in the females, the surface is uniformly suffused with blue up to the fascia, either in such a way that the ground colour still remains distinctly visible or so that the entire surface is dark blue, indeed even black-blue, but without this blue colouring being very

bright. The fascia is placed rather posteriorly, vertical or only slightly oblique; it is narrow, sometimes very narrow, throughout of uniform width, not very sharply defined; its colour is whitish, with a faint yellowish silvery gloss; in all specimens the tip of the wing is dark violet-blue or black-blue, likewise the bases of the cilia, which then become dark gray, with their tips paler. The posterior wings and their cilia are pale blackish gray.

The wax-yellow larva feeds in July, and again at the end of September and beginning of October, in the leaves of Alnus glutinosa; the mine is serpentine, with a loose excremental track in the middle; the cocoon is of a broad oval form, rather arched, with flat margins; the colour is rusty brown.

In England, and at Brunswick and Wolfenbuttel.

Group VIII.

22. N. LUTEELLA, *Stt.*

Capillis luteis aut fuscis, antennis brevioribus, conchula albida; alis anterioribus obscure olivaceis, apice violaceo-tinctis, fascia post medium luteo-albida, parum nitida, antice evanescente, ciliis apice pallide griseis. Exp. al. $1\frac{3}{4}$—2 lin.

Stainton, Ann. 1857; *Man.* ii. 434.

This species may be known by the ill-defined yellowish fascia, which is less distinct towards the costa, or at least attenuated there. The frontal tuft is generally pale ochreous or luteous, often mixed with gray, more rarely entirely black-brown; the cervical tuft and the large eye-caps whitish; the antennæ of the male have half the length of the anterior wings; those of the female are rather shorter, they are blackish gray; the abdomen and legs are of the same colour, only the tarsi and middle tibiæ are whitish. The anterior wings are rather short; their ground colour is similar to that of N. turicella, but from the coarser scaling they appear uniformly darker up to the pale fascia, which has no dark border on its basal side; beyond the fascia the wings are dark brown, with more or less of violet, rarely with a bright violet-blue gloss. The fascia is placed rather beyond the middle of the wing; it is not sharply defined, broad on the inner margin, it becomes attenuated and often obsolete towards the costa; its colour is whitish, with a dash of olive-yellow; it is rather more shining than the adjoining surface, but the glossiness is ill defined and varies according to the light; it varies in breadth and distinctness, so that sometimes it only appears as a pale, rather more shining part of the

ground colour. Beyond the violet scales the cilia are fuscous, with the tips paler. The posterior wings and their cilia are gray. The under side of all the wings is fuscous; the anterior have a feeble bluish gloss, with the apex darker.

N. luteella differs from N. glutinosæ, as also from N. turicella, by the shorter antennæ and wings, the larger and whiter eye-caps, the forms of the fascia, partly also by the want of the dark bordering of the fascia towards the base. Besides N. glutinosæ has more blue on the disk, especially beyond the fascia, and the fascia is narrow, more defined and not expanded on the inner margin, and before the fascia the anterior wings are irrorated with dark violet. The differences between this species and N. betulicola and N. distinguenda are mentioned under these latter.

The larva is pale green, with darker dorsal line, and feeds in July and October in birch leaves. The mine is long, slightly tortuous, generally abruptly angulated; the excremental line is slender. The cocoon is small and flat, buff-coloured.

Besides occurring in England, this has been observed at Brunswick, Wolfenbüttel and Hanover.

Group IX.

23. N. TURICELLA.

Capillis pallide ochraceis, antennis maris longioribus, conchula albida; alis anterioribus griseo-olivaceis, medio et apice fuscis, violaceo tinctis, fascia obliqua, albida, sericeo micante, ciliis apice griseis. Exp. al. 2—2⅓ lin.

Herrich-Schäffer, v. 355, 1118.

N. turicensis, *Frey*, *Tin.* 391, 30. *L. E.* 413, 34.

N. lemniscella, *Zeller*, *L. E.* iii. 313, 4. (The two specimens from Zeller's collection).

Since both Herrich-Schæffer's and Frey's descriptions were made from captured specimens, I amplify them from a series of bred specimens. The frontal tuft is pale ochraceous, the cervical tuft whitish; the small eye-caps and antennæ whitish; in the male the latter have nearly two-thirds of the length of the anterior wings, in the female nearly the half. The abdomen and the hind legs are blackish gray, only the middle legs and tarsi are whitish; the anterior legs are pale gray. The ground colour of the anterior wings is olivaceous, rather inclining to gray, sometimes nearly olive-black, not brownish yellow, as Frey says, and not pale brassy yellow, as Herrich-Schæffer says;

the surface is certainly finely scaled, but not polished and very little shining; the fascia, which is not broad, stands perceptibly beyond the middle and is rather oblique; its posterior edge is generally somewhat concave, whence on the margins it appears rather broader, especially on the inner margin; its colour is whitish, and it has a dull silky gloss; towards the base it is bordered by a dark brown stripe, with a faint violet gloss, and the entire tip of the wing, as well as the base of the cilia, is of the same colour. The cilia are darker gray in the middle, paler gray at the tips. The posterior wings and their cilia are gray.

The larva is very like that of N. tityrella, and feeds in beech leaves simultaneously with it. The mine is also similar, but long, and its tortuosities are not so close to one another. The cocoon is longish, much arched, and of an ochreous-yellow.

Zeller has (*l. c.*) mixed N. turicella with N. tityrella, and described them under the name of N. lemniscella. The two specimens from Metzner belong to N. tityrella, as is manifest from the distinct cilial line; the two specimens from Glogau are N. turicella. That this is so is also evident from the fact that Zeller formerly named for me as N. lemniscella dark specimens of N. turicella as well as specimens of N. tityrella. Paler specimens of N. turicella he pronounced to be N. hemargyrella. But, on the other hand, I consider this latter to be a good species, which I formerly often took on the trunks of beech trees, but which I have never bred along with N. turicella, and I refer to it Herrich-Schæffer's fig. 816. I describe it as follows:—

24. N. HEMARGYRELLA, *Zell.*

Capillis dilute ochraceis, antennis maris longioribus, conchula alba; alis anterioribus flavido-albis, nitidis, apice fuscis, fascia post medium lata, subrecta, subargentea, basin versus linea subfusca terminata, ciliis apice late albidis. Exp. al. 2—2¼ lin.

Zeller, L. E. iii. 323, 9.

N. ignobiliella, *Herrich-Schæffer*, fig. 816.

Of the form of N. turicella, but altogether paler and more glossy. The frontal tuft is pale ochreous-yellow, the cervical tuft and the small eye-caps white; the antennæ of the male have two-thirds of the length of the anterior wings; those of the female are shorter; they are silvery gray. The anterior wings are white, slightly inclining to yellow, with the base sometimes clouded with olivaceous; they are smooth, with considerably silky gloss, with a narrow brownish line at

the fascia, not sharply expressed and sometimes slightly interrupted. The fascia, placed a little beyond the middle of the wing, is rather oblique, broad, only distinguished from the ground colour by the intermediate dark line, its purer white colour and greater glossiness; the space beyond it is paler or darker brown, with a faint yellowish gloss. The cilia are at their bases narrowly pale fuscous, then broadly whitish; they are also whitish on the costa before the apex, whereas here in N. turicella they are dark. The posterior wings and their cilia are whitish gray, rather inclining to yellowish; the abdomen is pale yellowish gray, with the legs whitish.

Herrich-Schæffer's fig. 816 agrees thoroughly, only the basal half of the anterior wings, as well as the tip, is too dark.

Near Brunswick; scarce on the trunks of beech trees in May.

Group XI.

The five species with coarsely-scaled anterior wings, and, with a distinct divisional line in the cilia, and with a metallic fascia in the middle of the anterior wings, are extremely difficult to distinguish. They are N. Agrimoniella, N. atricollis, N. angulifasciella, N. Rubivora and N. arcuatella: we have bred them all, and, excepting the last named, in numbers, and we have found that in the form of the fascia, on which authors have laid special stress, they are more or less variable, and that therefore this character is only of secondary importance in distinguishing the species. All have the anterior wings, which are more or less coarsely-scaled, similar in form, dilating considerably towards the hind margin, blackish, sometimes inclining a little to gray (N. Agrimoniella, male, and N. arcuata). The fascia is moderately broad or narrow, and has considerable silvery lustre; in general it runs from the middle of the costa rather obliquely towards the inner margin, is refracted above the inner margin, which it reaches in, or a little beyond, the middle; in N. Agrimoniella, and often also in the other species, it is refracted in the middle of the wing, or only slightly curved; at other times it goes in rather an oblique direction to the inner margin. Apparently this fascia consists of two spots, one in the middle of the costa, the other rather posterior on the inner margin; both have a rather oblique direction posteriorly, and generally meet at an angle, yet often they remain distinctly separated; the longer the costal spot is in proportion to the dorsal spot, the nearer to the inner margin is the angulation of the fascia, and then the dorsal spot is generally the more posteriorly placed. If the fascia be angulated or curved in the middle, as in N. Agrimoniella, both spots are

then generally placed precisely in the middle of the margins, and this form then passes into that in which the fascia is vertical on the inner margin; on the other hand, if the costal spot stretches to the inner margin, the dorsal spot is then almost entirely dropped, and forms only a slight extension of the oblique fascia towards the base. The cilia beyond the divisional line are pale, only of a darker gray at the anal angle. The posterior wings are pale gray, with darker gray cilia. The under side is of a paler or darker black-gray, rather paler on the posterior wings. The colour of the frontal tuft appears constant in N. angulifasciella, N. Rubivora and N. atricollis; in N. Agrimoniella it varies from rusty yellow to dark brown, and in N. arcuata from luteous or rusty yellow to blackish gray, and certainly the males have generally the pale yellow colouring, and the females the dark brown or gray tint. The cervical tuft is dark. The antennæ are rather short (longer in N. Agrimoniella and N. arcuatella), blackish, more rarely pale gray; the abdomen and the legs are blackish, the femora and middle tarsi often paler, but not the middle tarsi; the hind tarsi at the extreme tip pale (in N. arcuata this pale colour extends to the first joint). The cocoons are oval, flat and black; that of N. Agrimoniella is lilac. The larvæ all live in the leaves of Rosaceæ at the end of September and beginning of October, appearing probably only once a year in the imago state in June. N. atricollis alone is double-brooded.

25. N. Agrimoniella, *H.-S.*

Capillis ferrugineis aut fuscis, antennarum conchula flavida; alis anterioribus postice valde dilatatis, grosse squamatis, nigris fascia media argentea, nitida; ciliis post lineam nigram albidis; tarsis posticis nigris, apice lutescentibus. Exp. al. 2—2½ lin.

Herrich-Schæffer, Corresp. Blatt. 1860, p. 60, No. 3. *Neue Schmett.* 169.

This species is distinguished from the rest by the peculiar form of the anterior wings, which are extraordinarily dilated by the longer cilia at the anal angle, being directed more posteriorly; this is especially conspicuous in the male, where the anterior wings gradually increase in breadth from the base; generally in the female this form is not so decided, but the wings are more suddenly dilated beyond the middle. The frontal tuft in the male is generally rusty yellow, at the neck brownish; in the female generally dark brown, yet males do occur with brown heads and females with ferruginous heads. The eye-caps

are small, whitish, more or less inclining to yellow; the antennæ long. The anterior wings are more coarsely scaled than in the other species, the male has the scales black-gray, with black tips; in the female they are pure black; the fascia is equidistant from the base on the costa and inner margin, obtusely angulated or curved in the middle, sometimes almost straight and vertical, rarely with a slight interruption in the middle, and then composed of two silvery spots of equal size. In the male it has a dull slightly golden metallic lustre; in the female this is more decided. The cilial line forms a large (in the female often depressed) curve round the apex of the wing, running to the anal angle; before it the cilia are gray, with black tips to the scales, which form a second divisional line, sometimes only perceptible at the anal angle, but sometimes extending distinctly to the costa.

The male may be distinguished from the other species, independently of the form of the wings, by the paler, grayer colour of the anterior wings, and from N. arcuata, which is also gray, by the darker hind tarsi; the female may be generally recognised by the brown frontal tuft. Besides, in the other species the fascia goes rather obliquely from the costa to beyond the middle, is generally refracted below the middle, and is further from the base on the inner margin than on the costa. From N. atricollis, which sometimes has the fascia almost of the same form, the longer antennæ will distinguish it.

The larva is greenish yellow, with brownish head and brownish spots on the second segment. It feeds in the leaves of Agrimonia Eupatoria, sometimes very abundantly, in a long tortuous mine, with slender excremental track, and changes to a pupa *inside the leaf*, in a violet-coloured cocoon.

At Ratisbon, Frankfort-on-the-Maine, and at Wolfenbuttel; not scarce in the last-named locality.

26. N. ATRICOLLIS, *Stt.*

Capillis læte ferrugineis, alis anterioribus postice latioribus, grossiuscule squamatis, nigris, fascia media subobliqua interdum interrupta argentea, nitida, ciliis post lineam nigram albidis; tarsis posticis nigris, apice pallidis. Exp. al. 2 lin.

Stainton, Ann. 1857; *Man.* ii. 435.

? N. argyrostigma, *Frey, Tin. d. Schweiz*, 379, 13. *Lin. Ent.* xi. 394, 18. (The specimen from Baumgarten.)

In the form of the anterior wings this approximates to the preceding species, since they are dilated in the same way, though not nearly to the same extent. The frontal tuft is bright rusty yellow; the eye-caps

are rather large silvery white; the antennæ rather short; the middle legs pale. The anterior wings are deep black, not quite so coarsely scaled as in N. Agrimoniella; the fascia is silvery white, with considerable metallic lustre; it is angulated on the fold, but often the costal portion is abbreviated, and thus it is split into two small oblique spots, one of which is on the middle of the costa, the other a little beyond the middle of the inner margin. The cilial line also runs in a curve round the apex of the wing, but is rather more oblique above the anal angle; before it the cilia are blackish gray, with dark tips to the scales (not, however, forming a second divisional line); beyond it they are shining whitish.

From N. angulifasciella and N. Rubivora this is distinguished by the rusty yellow frontal tuft; from N. arcuatella the purer white tips of the cilia and the distinct cilial line, as also the darker hinder tarsi, serve to distinguish it.

Here, it appears to me, should be referred the red-headed specimen of Frey's N. argyrostigma, whilst I would refer the two specimens with black-brown frontal tuft to N. Rubivora.

The larva is double-brooded, occurring in the leaves of wild apple trees and whitethorn, in shady parts of woods; it forms a blotch-like expanded mine, very similar to those of N. gratiosella and N. regiella. It is yellow, with the head and spot on the second segment blackish.

England, and in Germany at Wolfenbuttel.

27. N. ANGULIFASCIELLA, *Stt.*

Capillis luteis, antennarum conchula albida; alis anterioribus angustioribus, grossiuscule squamatis, nigris, fascia media subobliqua, in plica fracta, interdum interrupta argentea, nitida, ciliis post lineam nigram albidis; tarsis posticis nigris, apice pallidis. Exp. al. 2—2½ lin.

Stainton, List, 171; *Ins. Brit.* 304; *Nat. Hist.* i. 88, Tf. 1, f. 3; *Man.* ii. 435. *Herrich-Schæffer*, v. 350, 1096. *Frey, Linn. Ent.* xi. 417, 37.

The anterior wings are narrower than in the preceding species, and not so extraordinarily dilated posteriorly; the colour is pure black, with a faint bluish gray tinge, especially towards the apex; the fascia is silvery, very glossy, sometimes with a slight golden gloss; it runs rather obliquely to the fold, where it is angulated, sometimes rather indistinctly. I never saw it divided into two opposite spots,

as it does occur, according to Stainton, but have, indeed, specimens where the angulation is in the middle. The cilia have two dark divisional lines placed more obliquely than in N. Agrimoniella and N. atricollis; moreover the frontal tuft is paler yellow than in those species. N. angulifasciella is distinguished from N. Rubivora by the yellow frontal tuft, from N. arcuatella by the whiter tips of the cilia of the anterior wings and the darker cilial line. The antennæ are short, the eye-caps white, sometimes rather yellowish.

The larva is greenish white, with green dorsal line and brownish head. It occurs in the leaves of wild roses, in shady borders of woods.

The mine is very tortuous, with slender excremental line, and generally forms large blotches.

Widely distributed.

28. N. Rubivora, *Wck.*

Capillis nigris, antennarum conchula albida; alis anterioribus angustioribus, grossiuscule squamatis, nigris, fascia media subobliqua, in plica fracta, argentea, ciliis post lineam nigram albidis; tarsis posticis nigris, apice albidis. Exp. al. 2—2¼ lin.

Wocke, Vaterl. Berichte, 1860.

? N. argyrostigma, *Frey, Tin.* 379, 13. *Linn. Ent.* xi. 394, 18. (The specimens with blackish frontal tuft).

All the specimens very closely resemble the preceding species, yet it is easily distinguished by the black frontal tuft. Besides, it is smaller, and the anterior wings appear rather narrower and of a more uniform width, and their colour a deeper black. The antennæ are short; the eye-caps small, pure white.

The larva and mine are quite similar to those of N. angulifasciella; the larva feeds in the leaves of Rubus cæsius in moist and shady places.

At Breslau, Brunswick, Wolfenbuttel, &c.

29. N. arcuatella, *H.-S.* (*Fr.*)

Capillis ochraceis aut fusco-griseis, antennarum conchula nivea; alis anterioribus grossiuscule squamatis, nigro-cinereis, fascia media tenui subobliqua, argentea, nitida, ciliis pallide griseis, basi nigro squamatis, tarsis posticis albidis, basi grisescentibus. Exp. al. 2—2½ lin.; (Frey, 3 lin.)

Herrich-Schæffer, v. 354, 1114.

N. arcuata, *Frey, Tin.* 384, 21. *Linn. Ent.* xi. 415, 36. *Stt. Man.* ii. 434.

This species may be recognised by the tips of the cilia of the anterior wings being grayer, not so white, and by the paler legs; the hinder tarsi are yellowish white, and only pale gray at the first joint. The fascia has the same direction as in N. angulifasciella, but is very narrow and less conspicuous. The frontal tuft in the male is generally pale luteous or ochreous, in the female is more or less of a brownish fuscous, especially at the hinder part, yet some males occur with brownish and females with yellowish frontal tuft. The antennæ are long, yellowish gray, the eye-caps large, pure white; the colour of the slightly dilated anterior wings is more black-gray than black. The cilial line is more undefined than in the other species.

The larva is yellowish green, with the head brownish, and it feeds in the leaves of Fragaria vesca and Potentilla fragaria.

The mine is long and tortuous, with a slender excremental line. I have only noticed the autumnal brood; according to Frey there is also a summer brood.

In Switzerland, and at Brunswick, Wolfenbuttel, &c.

Group XII.

30. N. OBLIQUELLA.

Capillis ochraceis, antennarum conchula parva flavida; alis anterioribus fuscis, post medium grosse squamatis, nigris, fascia media obliqua in plica fracta albida, vix sericeo-nitente; ciliis post lineam nigram albis. Exp. al. $2\frac{1}{2}$ lin.

This species agrees with those of the preceding section in the fascia being quite similarly placed, of similar form, but differs in the colour of the fascia and its want of metallic lustre; in N. tityrella and its allies the fascia is placed beyond the middle of the wing and the cilia have no divisional line; in the group of N. Salicis the anterior wings are also more coarsely scaled before the fascia, which is placed more posteriorly. The frontal tuft is ochreous; the cervical tuft and eye-caps are rather paler; the legs are pale blackish gray. The anterior wings are narrow, of uniform width, rather finely scaled before the fascia, of a gray-brown; beyond the fascia they are thickly clothed with coarse black scales. The fascia is narrow, and runs from a little before the middle of the costa obliquely to the fold, where it unites with a small spot, which lying on the inner margin beyond the middle has also an oblique direction towards the hind margin, and with it it forms nearly a right angle; sometimes instead of this it expands below the fold, forming a triangle. Its colour is whitish, very slightly

inclining to yellow, with feeble silky lustre. The cilia up to the divisional line are uniformly dark, beyond it whitish and at the anal angle gray. The posterior wings and their cilia are pale fuscous.

I took some specimens in May on the edges of woods.

Group XIII.

31. N. Myrtillella, *Stt.*

Capillis rufo-ferrugineis, antennarum conchula flavido-alba; alis anterioribus fusco-nigris, cæruleo tinctis, grossiuscule squamatis, fascia subobliqua tenui albida, pone medium, ciliis griseis, basi squamis fusco-cæruleis regularibus; tarsis postice griseis. Exp. al. $2\frac{1}{4}$ lin.; ($1\frac{1}{2}$ lin.)

Stainton, Ann. 1858; *Man.* ii. 434.

?N. fagella, *H.-S.* v. 354, 1115.

N. Fagi, *Frey, Tin.* 384. *Linn. Ent.* xi. 412, 33.

This species is extremely closely allied to N. Salicis and its allies, and can scarcely be distinguished by constant characters. On the whole it is rather smaller than N. Salicis (I have some specimens only one line and a half in expanse); the anterior wings have the same ground colour and the same blue gloss, but are not so inclined to yellowish as is generally the case in N. Salicis, since the individual scales have not their bases yellowish, as in that species, but are more uniformly dark. The fascia is not composed of two opposite spots; it is narrow, of nearly uniform width, evidently less oblique, not so yellow, but purer white, with a faint silky lustre. The dark scales at the base of the cilia lie more regularly than those in N. Salicis and N. floslactella, and form by their ends a regular, more strongly curved divisional line, whereas in N. Salicis the scales are more irregularly placed, being rather abruptly truncate posteriorly, and some project into the outer half of the cilia. Beyond this line the cilia are of a purer pale gray, without the yellowish colouring round the apex of the wing, as in N. Salicis; at the anal angle and at the inner margin they are gray. The frontal tuft is bright rusty yellow; in N. Salicis it is more of a brownish ochreous; otherwise in both species the eye-caps and cervical tuft are yellowish white, the longer antennæ are blackish, the legs gray, the hinder tibiæ spotted with pale in the middle and at the end, the posterior tarsi are pale gray.

Since, moreover, N. Salicis and N. Myrtillella both vary to some extent in the above-given distinctive characters, the certain recognition of specimens which have not been bred is extremely difficult; indeed,

I must admit that, although I have bred great numbers of both species, yet I should have referred individual specimens of one species to the other had I not been guided by the information furnished by the larvæ.

The amber-yellow larva feeds, in July and at the end of September, in the leaves of Vaccinium Myrtillus; the mine is serpentine, unless the confined space compels a blotch-like formation. The cocoon is broad and flat, rather longish, brown.

I do not doubt that N. Fagella, *H.-S.*, and N. Fagi, *Frey*, belong here. In the descriptions there is nothing opposed to this. Before I had bred N. Myrtillella I had taken it singly on the trunks of beech trees amongst N. turicella. Herrich-Schæffer, to whom I sent some, and mentioned my conjecture that the species was distinct from N. turicella, enumerated in a subsequent letter N. Fagella amongst the species which he had received from me, which could only have been N. Myrtillella. Were N. Fagella another species which mines in beech leaves, I should certainly have bred it in these latter years, but from the mined beech leaves I constantly obtained only N. turicella and N. tityrella.

Probably Von Heyden formerly took N. turicella and N. Myrtillella for one species, especially as they occur in company, and, after he had bred N. turicella from beech leaves, has through error labelled specimens of N. Myrtillella with the indication mentioned by Frey, "bred from beech leaves," or the latter has probably taken the bred specimens of N. turicella seen only hastily at Von Heyden's for a different species than the captured specimens. Frey suspects in N. Fagella the summer brood of N. Floslactella, which, from the similarity of this species with N. Salicis and N. Myrtillella, likewise confirms my notion.

According to this, N. Fagella would be the oldest name for our species; but, as it might cause confusion, it would be best to retain the name derived from the food-plant given by Stainton.

Group XV.

32. N. Weaveri, *Stt.*

Capillis læte ferrugineis, antennarum conchula flavido-alba; alis anterioribus grosse squamatis nigris, fascia abbreviata in costa ante medium et macula in angulo anteriore argenteis, ciliis post lineam nigram albidis. Exp. al. $3\frac{1}{4}$—$3\frac{3}{4}$ lin.

Stainton, Annual 1855, 49, Tf. 1, f. 5; *Man.* ii. 432. *Herrich-Schæffer*, v. p. 346.

Frontal tuft ferruginous; the very long antennæ blackish; the eye-caps yellowish white. The anterior wings shining black-gray, from the coarse black scales appearing darker and almost entirely black; at the base they are generally a little paler; an oblique costal spot before the middle reaches to the fold, and just before the anal angle is a dorsal spot almost reaching to the middle of the wing; these spots are shining silvery white, sometimes rather inclining to yellow. The cilia have gray scales at the base, which with their black tips form a rather distinct divisional line; beyond this they are whitish, at the anal angle gray. The posterior wings and their cilia are fuscous. The abdomen and the legs are blackish gray; the belly and the tarsi yellowish gray.

The larva is amber-yellow, and feeds on the leaves of Vaccinium Vitis-Idæa. The mine finally becomes bladdery and inflated: the change to the pupa state takes place in an oval ochreous cocoon inside the mine: the imago makes its escape through a slight silken tube which leads from the cocoon to the skin of the leaf. I found the full-grown larva and pupa on the Upper Hartz, in the middle of June; in the lower country it occurs in May.

Also near Hanover and Glogau.

Group XVI.

33. N. SIMPLICELLA.

Capillis albis, luteo mixtis, antennarum conchula alba; alis anterioribus pallide ochraceis, post medium dilutioribus, nitidis, ciliis basi flavescentibus, apice albidis.

Exp. al. 3 lin.

This species joins on to the species of Group I., since the anterior wings are less roughly scaled and rather glossy, and the divisional line of the cilia is not so distinct. The latter is, however, still present, and only appears rather ill-defined because the colour of the cilia at their bases is also very pale.

The insect is of a very pale colour. The frontal tuft is whitish, mixed with pale ochreous-yellow; the short antennæ, the abdomen and the legs are whitish, with somewhat of a yellowish tint. The ground colour of the anterior wings is shining whitish, but thickly clothed with pale ochreous-yellow scales, which are more scanty at the base, more plentiful at the apex, but beyond the middle leave the whitish ground almost entirely uncovered. These scales are continued to the cilia, and their tips form the divisional

line, which is near the margin of the wing; beyond the cilia are hair-like, but at first still yellowish, before the tips whitish, but both colours are quite distinctly separated. The posterior wings are whitish; the cilia have a faint yellowish gloss.

Very similar to Trifurcula pallidella in the colouring, but the frontal tuft is paler, and the antennæ are shorter and more slender.

Buchheister, in May, 1860, took five specimens, quite similar, on the stems of beech trees. On the Asse, near Wolfenbuttel.

Studies on the Genus Lithosia. By Achille Guenée. Translated from the 'Annales de la Société Entomologique de France,' Vol. 1861, p. 39, by Edward Newman: and additional Notes by Henry Doubleday: these last are invariably followed by the initials H. D.

During the last five-and-twenty years Lepidopterology, at least so far as regards the study and determination of European species, has made very considerable progress: we may now say that well-named collections, which at that period, in France, were the rare exceptions, have now become the rule: nevertheless, certain families and genera still resist this onward movement, and make blots, so to speak, in the midst of even the best-named collections. The Entomological Society of France has very properly called attention to the genera Syrichtus and Eupithecia, and to the family Zygænidæ: I am now about to introduce to its notice a genus no less difficult, and much more treacherous than either: supposing it to be thoroughly known, entomologists have neglected to study it as it ought to be studied. The consequence has been that the genus Lithosia is not only one of those in which the determination of species has been peculiarly careless, but the synonymy equally inaccurate,—two defects which proceed from the same cause, the great similarity of the species to each other.

On these grounds I have concluded that I may be rendering some service to my colleagues in offering them a monographic notice of the genus; first, however, eliminating those species which present no difficulty whatever; such, for instance, as Lithosia quadra, L. rubricollis, L. muscerda, &c. In order to avoid those long descriptions which are but little read amongst ourselves, and are scarcely ever translated by our foreign colleagues, I have written Latin diagnoses, in which I have endeavoured to sum up the characters of each, as exactly as the

gradations, often very difficult of definition between nearly-allied species, would permit me.

It would be quite superfluous for me to write a detailed history of the genus Lithosia, since every lepidopterist is acquainted with these long-bodied and depressed moths, with their hind wings folded like those of Crambus, — a character which misled Latreille himself, who, in his arrangement, placed them next after his Tineites, their approach to which family is purely superficial. There is no collector, even though a novice, who has not seen them flying in the twilight, both in the woods and around the lights, which attract them in great numbers; and, observing them falling suddenly into his net, and at first supposing he had struck at a large Geometer, has many a time concluded he had missed his aim, until he has examined very carefully the folds of his net, in which the insect has secreted itself.

It is also known that all their larvæ feed on lichens; but this similarity of food seems not to exercise much influence on the habits of the perfect insect. Thus we find the larvæ of L. complana and L. plumbeola in the full sunshine, upon the dry leaves which have accumulated at the foot of oak-trees, and in the warmest and most sheltered situations, in company with those of L. mesomella and L. rosea; while that of L. griseola prefers moist and shady situations. The larvæ of L. rubricollis and L. unita—so extremely alike, notwithstanding the difference of the perfect insects—are found on the branches of oak trees; while those of L. palleola and L. arideola sit during the day on rocks, and climb, morning and evening, on blades of grass; and that of L. caniola spends its life on the tiles of roofs. It is difficult, as will be seen, to reconcile habits so different with food so uniform.

Exotic species of Lithosia have an extreme resemblance to our own, of which they exhibit almost all the characters; so that they might readily be mistaken for indigenous species. I might have described several new species, but, not possessing good series of specimens, I have preferred leaving the ground entirely unexamined, thus rendering its exploration more easy to any entomologist who may hereafter address himself to the task.

I have been compelled to change several names, although well established in our French collections. I trust I shall be pardoned this act of justice, when it is seen that the prior names I have restored are often more appropriate than those which had been substituted: this good result is not always obtained from a strict adherence to the otherwise indisputable law of priority.

Sp. 1. Lithosia cereola. [No British example].
Sp. 2. Lithosia unita.

Le manteau jaune, *Geoff.* ii. p. 192 (1762); *Engr.* 219, *a*, *b*, *c* = Unita, *Wien. Verz.* C. 2; *Esp.* pl. 93, fig. 6, 7; *Bork.* 80; *Fuess. Neu. Mag.* ii. p. 212; *Schr.* 1505 = Aureola, *Hb.* 98; *God.* p. 395, pl. 40, fig. 5; *Ochs.* iii. p. 140; *Bdv. Icon.* p. 107, pl. 58, f. 2; *Steph.* p. 94, pl. 18; *Wood*, 96; *Frey*, pl. 380, fig. 3.; *Herr.-Sch.* p. 158 = Luteola, *View.* No. 4 = Aurantia, *Haw.* p. 147, No. 5.

Alæ anticæ vivide ochraceæ, unicolores, costa valde convexa; subtus atro-griseæ, margine luteo, vittaque costali usque ad medium (in mare) lutea. Alæ posticæ dilutiores utrinque immaculatæ. Thorax vivide ochraceus; abdomen griseum, ano luteo; corpore subtus pedibusque nigris. Fœmina paullo minor.

This is one of the most widely distributed of our species, and inhabits almost every country of Europe. It is found in May, in warm and elevated woods, under the leaves of trees, whence it may be obtained by beating.

The larva has some similarity to those of L. quadra and L. rubricollis; it is, moreover, slightly depressed above, and has shorter hairs than those species, but more than either L. complana or L. caniola, especially on the sides: it is of a yellow-gray colour marbled with dull green, with the usual warts, the hinder ones being larger and of an orange-yellow colour: the dorsal stripe is black; the subdorsal stripes waved, and formed by the aggregation of black marblings: on the 2nd, 3rd, 7th and 11th segments the trapezoid markings are obscured with black, and adorned posteriorly with a white dorsal spot. It feeds in August, on the lichens of different trees.

This Lithosia is clearly L. unita of all the older writers,—a very appropriate name, and one which instantly reminds us of a character which, together with the shape of the superior wings, enables us to recognize the species at the first glance. It has therefore been a great mistake to transfer the name "unita" to another species, and I think it nothing more than just to restore the name as originally employed, without expressing any annoyance at the trouble of making this alteration in our collections. We may also observe that the name "unita," taken from this species, has not been subsequently employed with any uniformity.

Sp. 3. Lithosia pallifrons.

Zell. Entom. Zeit.

Parva. Alæ anticæ vivide ochraceæ, unicolores, costa post medium convexa; subtus atro-griseæ, vittis costali et marginali, fimbria vix latioribus, luteis costa basi nigricante. Alæ posticæ margine interiori late nigricante, nervis concoloribus, costa subtus tenuissime lutea. Corpus luteum, pectore segmentisque 5 abdominis griseis.

I have received this new species from Silesia, and it has been identified by Zeller himself. Since then I have taken it at Bourg-d'Oisans in July. It seems to frequent our mountains and lower eminences: near La Grave and Lautaret it is replaced by L. luteola.

It may be distinguished from L. luteola by its yellow head, and by the nervures of the hind wings being concolorous, &c.; and from L. pygmæola by the colour of the thorax, which is entirely yellow; by the colour of the wings, almost as bright as in L. luteola; and by the shape of the hind wings, which appear a little less triangular in the male. Nevertheless, some of these varieties approach so near to L. pygmæola that we cannot be certain of the validity of L. pallifrons as a species until we know the prior states.

Sp. 4. Lithosia marcida. [No British example].

Sp. 5. Lithosia luteola. [No British example].

Sp. 6. Lithosia pygmæola.

Doubleday, Zool. 1914; *Wood, Suppl.* 1691; *Bdv. Icon.* p. 105, pl. 57, fig. 9 (non 10), 1834; *Dup. Suppl.* p. 30, pl. 2, fig. 5=Luteola, *Frey*, 380, fig. 4?

Parva. Pallide straminea. Alæ anticæ unicolores, basi paulo angustiores, costa vix convexa; subtus griseo-nigræ, fimbria, vitta terminali fimbriæ latitudine costæque dimidia parte luteis. Alæ posticæ, subtrigonæ, primoribus concolores, dimidio anteriori nigro-griseæ. Caput luteum. Thorax abdomenque luteo-grisea, ano stramineo. Fœmina minor, alis brevioribus plus minusve griseo lotis, costa tunc mere straminea.

France and the South of England, in dry and sandy woods, in June and July. Never very abundant. I take it in the neighbourhood of Châteaudun and about Paris, at Hublay (Seine-et-Oise).

The male varies little, but it is different with the female, which is

sometimes of the same hue as the male, and sometimes tinged with gray over the whole of the upper wings. I have seen some specimens of L. arideola of the same hue, but then the costa always remains a pale yellow. It also varies much in size. Very small specimens are occasionally met with, especially in England.

I see no difference between English specimens (I have eighteen before me) and our own: however, in some of the English specimens the dark tint of the lower wings extends further than in continental ones.

I believe I have found the larva of this little Lithosia: they are of a gray earthy colour, almost without markings; but I cannot obtain the perfect insect from them. These larvæ are found under stones, and in dry and stony or sandy woods. The imago seldom quits these localities, and remains almost always on the ground. Mr. Doubleday tells me that it is taken on the sea-coast of the county of Kent, in a locality where he believes the lichen fusco-ater abounds, and probably serves as food for the larva.

It is not easy to decide by M. Boisduval's figure and description whether his male L. vitellina belongs to the present species or to L. pallifrons; and although the name of "vitellina" may be a little anterior to that of "pygmæola," I have thought it right to adopt the latter, which leaves no confusion. (Concerning the female of M. Boisduval's L. vitellina, it is very certain that it belongs to neither).

Finally, I observe that, notwithstanding the differences that I have pointed out under my remarks on L. pallifrons, and notwithstanding also the shape of the fore wings, and the colour of the thorax, entirely pale in L. pallifrons, whilst it is always more or less stained with gray in L. pygmæola, these two species seem sometimes to be united by the occurrence of intermediate individuals. It will be wise, then, to await the discovery of the larva state before defining with certainty the distinctions between the two.

Sp. 7. Lithosia palleola. [No British example].
Sp. 8. Lithosia Beckeri. [No British example.]
Sp. 9. Lithosia arideola. [No British example].
Sp. 10. Lithosia caniola.

Hb. 220; *Och.* iv. p. 196; *Godart*, v. p. 18 (in not.); *Bdv. Icon.* p. 99, pl. 57, f. 6; *Dup. Suppl.* p. 22, pl. 2, fig. 1, *a*, *b.*; *Herr.-Sch.* p. 160.

Alæ anticæ albo-griseæ, sericeæ, fimbria concolori, vitta costali albidiore, costa tenuissime fulva, versus medium convexa; subtus

griseæ, margine terminali late albo. Alæ posticæ albæ, vix luteo tinctæ, margine interno lævissime griseo, diluto. Caput collareque fulva. Thorax abdomenque murina, ano in mare luteo, in fœmina concolori.

Common in central and southern France, in June. It may be met with in the interior of towns, of houses and of public buildings. I have found it even in the highest galleries of the cathedral at Chartres.

The larva lives principally, perhaps exclusively, on the lichens which grow on the walls, and especially on the tiles, of the roofs. It is of a brownish earthy colour, with a black dorsal line, and with subdorsal lines of a pale orange colour, continuous, although concealed at the incisions, and slightly bordered with black. The spiracular line is also orange-coloured and continuous. The head and feet are black. It may be found in April and May. It is figured in Duponchel's 'Iconography of Larvæ.'

It is scarcely possible that L. albeola of Hübner (No. 284) can be referred to this species. Even in making allowance for the coarseness of this figure, there still exists too great a difference for us to recognize it as that of L. caniola.

[The first British specimens of this species which I saw were taken at Torquay, by Mr. King. Mr. Barrett met with it near Dublin, where it has also been taken by Mr. Birchall. It has not, so far as I am aware, been met with in any other locality in Britain.—*H. D.*]

Sp. 11. Lithosia costalis. [No British example].

Sp. 12. Lithosia complana.

Linn. S. N. 115, *F. S.* 1153; *Réaum.* i. p. 313, pl. 17, fig. 13, 14? *Geoff.* ii. p. 191 (le manteau jaune); *Wien. Verz. C.* 4.; *Fab.* 53; *Esp.* pl. 92, fig. 8 (non 7) et pl. 185, fig. 9—11; *Bork.* 77; *Engr.* 301, *a*, *c* (le manteau à tête jaune); *View.* No. 2; *Schr.* 1507 (le ♂ seul); *Schw.*; *Kléem.* p. 13, pl. 2, fig. 10—14; *Ochs.* p. 129; *God.* v. p. 17, pl. 41; *Frey*, pl. 380, fig. 1 et pl. 687, fig. 1; *Dup. Suppl.* pl. 1, fig. 5; *Fisch. v. Rosl.* p. 55, 104, pl. 42; *Herr.-Sch.* p. 158 = Depressa, *Wood*, 101.

Alæ anticæ angustæ, fere æquilatæ, costa vix media convexa, pallidæ plumbeo-griseæ, sericeæ, nitentes, vitta costali lata, lutea, usque ad apicem æquilata, costa ipsa tenuissime fulva; subtus obscuriores, vitta costali integra margineque lato luteis, fasciculo versus medium costæ squamoso, plicato. Alæ posticæ utrinque pallide ochraceæ, immaculatæ. Caput collareque

fulva. Thorax plumbeus. Abdomen semi-griseum semi-luteum. Pedes lutei. ♀ major, alis paulo latioribus.

This is the most generally distributed of the genus Lithosia, and the most common in our country. It flies abundantly, in July, around the flowers of the clematis.

The larva is very common, in early spring, among dry leaves, under which it secretes itself during the day. It is of a brownish earthy colour, with the dorsal and subdorsal lines black, and having two dorsal series of ferruginous oval spots; these are distinct anteriorly, and separated from each other by a small dot of grayish white. The lateral region is paler, varied with black lines, in the place of spiracles, each accompanied by a very delicate distinct yellow dot. The head is black. It lives on the lichens of trees, and especially those of oaks.

A character that surely ought to be noticed in this species, but which nobody has yet spoken of, is a band of large scales situated below the middle of the costa of the fore wings, which forms a kind of fold. This character only exists in the male, and occurs only in this and the following species.

The synonymy presents several difficulties. The short description given by Réaumur applies but indifferently, although, according to him, the head and thorax are of the yellow of a dead leaf: Geoffroy, who refers to Réaumur, says it is grayish white above and below: Linnæus cites Clerck's figure, which certainly represents Abrostola triplasia: lastly, Hübner, who has well represented the caterpillar, gives, under the same name, a figure which evidently represents the imago of L. plumbeola, and does not figure the present species at all, — an omission very remarkable in a species so common. These errors must be attributed, as regards the older authors, to the want of precision which prevailed in the descriptions of their time, and, as regards the last-mentioned instance, to authors having confounded two nearly-allied species.

Sp. 13. Lithosia molybdeola.

Alæ anticæ angustæ, fere æquilatæ, costa vix convexa, plumbeo-sericeæ, vitta costali angustiori, vivide fulva, ad apicem decrescente; subtus nigriores, fascicula costali squamoso, plicato dimidioque costæ fulvis. Alæ posticæ pallide plumbeæ, margine (plus minusve lato) ochracea. Caput et collare vivide fulva. Thorax abdomenque plumbeo, ano ochraceo. Fœmina vix minor, obscurior, ano vix ochraceo.

My excellent friend, Mr. Henry Doubleday, having sent me, for the present work, a series of Lithosia from Great Britain, I found, among his specimens of L. complana, two which appeared to me specifically different; these had been found in a bog near Warrington, in Cheshire. At my request Mr. Doubleday pressed his correspondent to search for the caterpillar, and for additional specimens of the perfect insect. On the first point the search was fruitless; but a large number of the perfect insect were obtained, and I have now before me a score of specimens, all of which present the same characters, and confirm me in the opinion that this species is probably distinct from L. complana. Nevertheless, the question cannot be finally decided until the discovery of the prior states.

L. molybdeola is intermediate between L. complana and L. plumbeola; it has the figure of the former, the colour of the latter, and is rather more shining than either. It may be distinguished from L. complana by its darker hue, and in having the yellow costal stripe straighter, and terminating in a point before arriving at the apex as in L. plumbeola. The hind wings are always strongly tinged with gray along the inner margin, this colour even extending, in some specimens, over the whole surface, and leaving none of the usual ochreous colour visible, except a tolerably broad border, which forms a notch between the median and internal nervures. The head and neck are of a very bright yellow; the thorax and abdomen lead-coloured, this last not exhibiting any yellow except at the extremity, and the yellow even here is generally mixed with gray. The female especially has scarcely any yellow at the anus; it is of the size of the male, or smaller.

This species may be still more readily distinguished from L. plumbeola by the form of the wings, which altogether resemble those of L. complana; the gray is equally shining, the costal band straighter and more distinct, the cilia tinged with gray, the neck unicolorous, the hind wings lead-coloured, but especially by the presence of the scaly fold of the costa of the fore wings.

L. molybdeola varies much more than L. complana. It inhabits low and marshy places, and its larva in all probability feeds on the lichens which grow on the stems of the heath, or which carpet the stones that are scattered over the surface of the ground. There is no doubt that, if sought in similar situations to those in which it occurs in the North of England, it would be found in France and other countries of Europe.

[When my kind friend M. Guenée applied to me for specimens of our British Lithosiæ, I sent him two which I had received from Mr. Greening some time previously, which differed considerably from the specimens of L. complana found at Epping. Soon afterwards I received a letter from M. Guenée, in which he said that he believed they were distinct, and proposed the name "molybdeola" for the northern insect, with a request that I would not publish it before his Monograph appeared. At this time I believe no one in this country was aware that there was any difference between the northern and southern specimens.—*H. D.*]

Sp. 14. Lithosia plumbeola.

Albin, pl. 70, *e*, *h*. (1749); *Hb*. 100; *Herr.-Sch*. p. 158 = Lurideola, *Zinc*.; *Somm. Allg. Litterz*. 1817, p. 68; *Treits. Sup*. x. p. 162; *Frey*. pl. 637; *Dup. Gn. Chenilles* = Complanula, *Bdv. Ic*. p. 97; *Dup. Sup*. p. 15, pl. 1, fig. 4 = Complana ♂, *Esper*. pl. 92, fig. 7 (non 8); *Haw*. p. 147, No. 3; *Wood*, 100.

Alæ anticæ latiusculæ, costa post medium convexa, margine rotundato, saturate murinæ, vitta costali lutea versus apicem acutissima, fimbria strigaque basali luteis. Alæ posticæ ochraceæ. Caput fulvum. Collare griseo maculatum. Thorax abdomenque murina, segmento anali apud marem, apice ani apud fœminem, luteis.

This Lithosia, the most common except L. complana, and in many countries even more abundant than that species, is without doubt nearly allied to it; but it is going much too far to say that the larvæ alone will distinguish them. The form of the wings is very different, and, above all, the absence of the fascicle of subcostal scales is sufficient to separate the two species with certainty.

The larva is black, with a spiracular stripe of reddish yellow extending from the 3rd to the 10th segment. It associates with L. complana, and has the same habits.

Sp. 15. Lithosia griseola.

Le manteau bordé, *Engr*. 303, *a*, *b*, *c*, *d* (1788) = Griseola, *Hb*. 97; *Och*. p. 128; *Haw*. p. 147, No. 2; *Sepp*. iv. pl. 16; *Frey*, pl. 380, fig. 2; *Steph*. p. 96; *Bdv. Ic*. p. 95, pl. 57, fig. 5; *Dup. Sup*. p. 24, pl. 1, fig. 3; *Wood*, 102; *Herr.-Sch*. p. 160.

Magna. Alæ anticæ latæ, costa valdè convexa, suprà plumbeæ, sericeæ, fimbria pallidiore, vitta costali luteo-diluta, ante apicem

desinente; subtus plumbeæ, margine latissime griseo-lutescente, vitta costali lutea, costa basi nigra, fasciculum squamosum luteum superante. Alæ posticæ griseæ, plus minusve ochraceo tinctæ, subtus ochraceæ, margine interno griseo. Corpus plumbeum, capite anoque luteis.

Of frequent occurrence over almost the whole of Europe, in small woods, July; it delights in cool, shady, and even moist situations.

It varies much, especially in the colour of the hind wings; I possess a male which has them of a pure ochre. In those specimens in which the hind wings are gray, the disk is almost invariably more yellow, even to the disco-cellular, which then forms a long distinct stripe; I possess another specimen in which the thorax is pure yellow without any trace of gray. It should also be observed that the thorax is sometimes entirely yellow, and sometimes stained with grayish lead-colour.

The larva is black, with two yellow dorsal lines composed of irregular spots: on its anterior segments these two lines become confluent; the hairs are much longer than in the larva of L. complana; the head is shining black. It feeds on the lichens growing on trees, and is much more difficult to find, at least with us, than that of the last-named species.

Var. A. STRAMINEOLA.

Stramineola, *Doubleday, Zool.* 1914 = Flava, *Haw.* p. 147, No. 4; *Steph.* p. 95; *Wood*, 99 = Plumbeolata, *Wood*, 103?

The whole insect is of a dingy straw-yellow colour all over, without any mixture of gray, except a slight shade on the abdomen and sometimes on the thorax.

This beautiful variety has hitherto been found only in England, and generally in marshy places. It is much more rare than the type, from which, at first sight, it appears very different; but if we study attentively its organic characters, the form of its wings, the scaly fascicle which covers the receptacle of the bristle, the shape of the body, &c., we shall find no difference between the two.

English authors have sought to identify this variety with Lithosia flava of Fabricius (Suppl. 9), which appears to me rather to be one of the varieties of L. palleola: but it is impossible to decide from so short a description; moreover, Fabricius tells us that L. flava inhabits Italy,—an additional reason for doubting the identity of the two, L. griseola being rather a northern species.

[My friend Mr. Buckler found a larva in the summer which produced my Lithosia stramineola. He kindly sent me a beautiful drawing of it, which I forwarded to M. Guenée, with reference to which he says, in a letter recently received from him, as follows: — "The first sight of this drawing caused me to think that I was right in considering L. stramineola as a variety of L. griseola. A comparison with the preserved larvæ of this species which I possess confirmed me in my opinion.

"The two caterpillars do not differ at all, either in form, hairiness or colour, except that in the drawing which you have sent me the dorsal spots are redder than in the specimens, and rather larger and more distinct. In the larvæ of L. griseola, of which I have three specimens, one has spots only on the first and last segments; the two others have the spots upon all the segments, but those upon the intermediate ones are small and almost linear. You will perceive from this that the spots vary in different individuals; and should Mr. Buckler rear a considerable number, he will probably find some amongst them with the intermediate spots smaller than in the one which he has figured.

"I have now given you my opinion of your drawing; however, if I had seen the larva in nature, I could have given a more decided opinion, as certain slight, but important, characteristics may have escaped the notice of your friend, which would either L. show stramineola to be a distinct species, or positively prove that my first opinion was correct."—*H. D.*]

Sp. 16. Lithosia deplana.

Esper. p. 97, pl. 93, fig. 1, 2 (1786); non *Lin.* nec *Fab.* Le manteau livide, *Engr.* 302, *a*, *b*, *c.* = Complana, var., *Schr.* p. 313; *Bork.* 78 = Helvola, *Hb.* 95 (non *Clerck*) = Helveola, *Och.* p. 133; *Steph.* p. 94; *Wood*, 98; *Frey*, pl. 380, fig. 5; *Bdv. Icon.* p. 102, [pl. 57, fig. 8; *Dup. Sup.* p. 24, pl. 2, fig. 2; *Herr.-Sch.* p. 159 = ♀ Depressa, *Esp.* pl. 93, fig. 3; *Bork.* 79; *Och.* p. 132; *Treits. Sup.* x. p. 164; *Frey*, pl. 380, fig. 6; *Bdv. Ic.* p. 101, pl. 57, fig. 7; *Dup. Sup.* p. 18, pl. 1, fig. 6; *Herr.-Sch.* p. 159 = Ochreola, *Hb.* 96 = Gilveola, *Wood*, 97?

Mas. Alæ anticæ æquilatæ, margine rotundato, farinosæ, pallide ochraceo-griseæ, vitta terminali grisea, sericea, fimbria costæque initio luteis; fasciculo subcostali squamoso prope basim. Alæ posticæ primoribus concolores, vitta latiori grisea. Caput thoraxque vivide fulva, humeris pallide terminatis. Antennæ valde

ciliatæ. Fœmina valde differt, alis anticis ubique sericeis, saturate griseis, vitta costali lutea, costa convexa; alis posticis vix pallidioribus vitta terminali deficiente.

It is but lately that we recognized, as the sexes of one species, Lithosia deplana (helveola) and L. depressa. They are indeed so different that it is difficult to suppose this to be the case. The male is distinguished clearly from others of the genus by its upper wings, of which three-fourths are clothed with elevated scales, which give them a powdered or velvety appearance; they have, moreover, under the subcostal nervure, near the base, a little fascicle of scales still more developed. Finally, the antennæ are furnished with very long and strongly curved pectinations. The female, on the contrary, does not differ from other species of Lithosia in any of these respects.

L. deplana inhabits Switzerland, Germany, England, and even France; but it is very local in all these countries. The neighbourhood of Norwich, in England,* and of La Touraine, in France, are, I believe, the only localities where it has been found in these two countries.

It is needless to say that this species must not be confounded with the L. deplana of Linneus and Fabricius, which is nothing more than the male of L. quadra, and therefore ought to be struck out of the entomological vocabulary.

Var. A. UNICOLORA.

This is a beautiful variety of the female, of which the fore wings are entirely of a bright ochreous-yellow, exactly resembling L. unita (aureola). The hind wings are likewise ochreous-yellow, but somewhat paler. This variety has been communicated to me by Mr. Doubleday, together with other specimens connecting it with those of the ordinary colour. It stands exactly in the same relationship to L. deplana, as the variety stramineola to L. griseola, and furnishes me with a new reason for uniting the two insects I have last named.

Var. B. FŒMINEA.

This is a variety of the male absolute, of the same colour as the female, and which resembles it on the upper side. The wings are uniformly gray, and without any appearance of a terminal band. This

* [This is evidently a mistake of M. Guenée's, probably from misunderstanding my letter.—*H. D.*]

curious variety, had it been more generally known, would have prolonged the illusion which induced a belief in the existence of two species.

ACHILLE GUENÉE.

Entomologizing in Madagascar.—I have collected about 800, chiefly Lepidoptera, in the neighbourhood of Tamatave; but there is not any collecting-ground near. It is my intention to go up to Alamazaotra, a village on this side of the large forest. I shall start on Wednesday next, September 3rd. I hope there to have a consignment ready to forward you, if all is well. I have made an arrangement with Mr. Canonville, at Port Louis, to ship the boxes by the first vessel leaving Mauritius for England. M. Soumaque will superintend the shipping of them from Tamatave. It takes ten days to go from Tamatave to Mauritius, but should they commence running steamers it will only take three days each way. I have no doubt they will do so in a few months. The people, "natives," here are more civilized than I expected to find them; they have a great respect for, and a wholesome dread of all Europeans; I go about with them without the least fear; they are always ready to do anything for you. The Betsimisarakas are the hard-working class: the Hovahs are the moneyed men. One would take the "lamba," after reading Mr. Ellis's book, to be an elegant garment that the Hovahs wear, when you see them in reality, they remind you of dirty English table-cloths.—*Frederick Plant, in a letter to S. Stevens, dated August* 29, 1862.

Insects taken at Haslemere, Surrey, in 1862.—Ever since my arrival here, in the beginning of April last, I have worked pretty hard to see what I could make of this almost unexplored locality; unexplored, I mean, as far as Lepidoptera are concerned. The results are not unsatisfactory, as the subjoined list will show; but I am not aware that a single species has turned up that is not known to occur in other parts of the South of England. The following is a list of the more important things that have occurred:—

Satyrus Ægeria. I merely mention this species because I have observed three evidently distinct broods—one in April, a second at the end of May, and a third at the end of July. I expected a fourth in September, but the third brood lasted a long time, and larvæ from eggs laid by a female of that brood are only now full fed.

Nemeobius Lucina. I found this species worn in a wood in June.

Chœrocampa Elpenor. June; hovering at sugar.

Zeuzera Æsculi. A chance specimen occurred in August.

Hepialus sylvinus. August. Common among fern.

Anthrocera Trifolii. July. In some damp meadows, not common.

Nola cristulalis. May. Common on tree-trunks.

Epione advenaria. May and June. Common in woods, among Vaccinium Myrtillus.

Eurymene dolobraria. June, scarce.

Pericallia syringaria. July. I took a specimen on a hedge-bank, just emerged. The pupa-skin was suspended by the tail to a blade of grass.

Selenia lunaria. May, scarce.

Ennomos erosaria. October. I obtained some eggs from a female I found on a furze-bush. Their shape may be well-known, but was new to me: they were like bricks in miniature.

Boarmia consortaria. May, June. Not scarce on tree-trunks.

Tephrosia consonaria. End of April and May. Abundant on fir-trunks, but very local.

Tephrosia extersaria. End of May and beginning of June. Scarce on tree-trunks; commoner at sugar.

Geometra papilionaria. August. At rest on Pteris aquilina, late at night.

Phorodesma bajularia. July. Beaten from oak.

Ephyra orbicularia. May. Beaten from a hedge.

Asthena sylvata. May, June. In woods and hedges, not common.

Eupisteria heparata. June, July. Scarce.

Corycia taminata. May. Flying at dusk.

Minoa euphorbiata. May, June. Common in woods.

Pachycnemia hippocastanaria. April. Excessively abundant on heaths. The swarms of this species were absolutely bewildering. When I had swept up half a dozen into my net at once, and was boxing them, others would perch on the heath-tops just by, as though watching the process.

Emmelesia alchemillata. June—August. Very abundant in hedges and woods.

Eupithecia pulchellata. May, June. A few specimens occurred in different localities.

E. tripunctata. Larva on Umbelliferæ in October, not common.

E. irriguata. A specimen occurred on a larch-trunk early in May.

E. tenuiata. July, August. Beaten from oak-bushes.

Lobophora sexalata. End of May, June. On tree-trunks and in hedges, not common.

L. viretata. May, June. On birch and fir-trunks, not common.

Melanippe hastata. June. Flying wildly over a wood-path in the sunshine.

Coremia quadrifasciata. June, July. Common in lanes at one or two places.

Scotosia undulata. July. Beaten from a hedge.

Cidaria psittacata. September, October. At sugar and ivy-bloom.

C. picata. June, July. Beaten from hedges, common.

C. silaceata. May, June. Mothing, scarce.

Drepana Hamula. Apparently common in June, flying round the tops of oak trees, but quite out of reach. Odd specimens of the second brood occurred in August and September.

Notodonta carmelita. April. On birch-trunks, scarce.

N. dodonæa. May. Flew into the room, attracted by the light.

Ceropacha Or. July. At sugar, scarce.

Acronycta leporina. May. On a fir-trunk high up.

A. Aceris. July. On an oak-trunk.

Agrotis saucia. October. At sugar.

A. agathina. August, September. At heath-bloom, but very scarce.

Noctua ditrapezium. July, August. At sugar and rush-bloom, and one specimen bred.

Tæniocampa leucographa. April. At sallow-bloom. A fine set.

Dasycampa rubiginea. October. Has occurred at ivy-bloom.

Dianthœcia Cucubali. June. At blossoms of Silene inflata.

Epunda nigra. October. At sugar.

E. viminalis. July. At sugar and rush-bloom, common.

Aplecta tincta. June. At sugar, and blossoms of Silene inflata.

Hadena contigua. June. At sugar.

Xylina rhizolitha. April, October. Not scarce at sugar and ivy-bloom, and on tree-trunks.

X. petrificata. October. At sugar and ivy-bloom, not common.

Cucullia Asteris. July. Flying at night.

Stilbia anomala. August. A specimen occurred when looking for A. agathina.

Madopa salicalis. June. I beat several specimens out of oak and beech-bushes in a wood where sallow abounded.

Hypenodes albistrigalis. July. At sugar, and common at rush-bloom. Second brood in October.

H. costæstrigalis. July, common at sugar; October, scarce.

Hypena crassalis. May, June. In woods, among Vaccinium Myrtillus, not scarce.

Scopula ferrugalis. October. At sugar and ragwort-bloom, and beaten from hedges, common.

Eudorea cratægalis. July, August. Common in hedges.

E. resinalis. Mr. M'Lachlan took a specimen when visiting here in July. I have not met with the species.

E. coarctalis. September. Abundant on mossy walls.

E. pallidulalis. June. In a damp meadow.

Crambus hamellus. August. In grassy places among heath, not common.

Halias quercana. July. At sugar.

Sarrothripa Revayana. October. By beating hedges.

Tortrix cratægana. July. In woods, not common.

Dichelia Grotiana. July. Beaten from hedges.

Peronea Schalleriana. July to October. Very abundant in hedges,—a nuisance, in fact.

P. cristana. April; August to October. Beaten from hedges. Some good varieties.

P. hastiana. April, July, October. Beaten from sallow hedges.

Teras caudana. July to October. Abundant in hedges.

Ditula semifasciana. Beaten from sallow hedges.

Sericoris conchana. June, July. On some marshy meadows, not very common.

S. micana. In the same place and at the same time as the last, but very abundant.

Phoxopteryx siculana. May, June. Common.

P. uncana. May, June. Not common.

P. biarcuana. June. Beaten from sallow, scarce.

P. diminutana. June. Beaten from sallow, scarce.

P. derasana. May, June. Not common.

Grapholita obtusana. May, June. Not common.

Oliudia ulmana. June, July. Common in hedges.

Carpocapsa grossana. Beaten from a hedge.

Eupicælia ambiguana. May, June. I took a fine series of this species among Rhamnus Frangula. I do not think it is attached to the birch.

Argyrolepia cnicana. June, not common.

Diplodoma marginepunctella. June. Beaten from hedges.

Tinea arcella. June to September. Beaten from hedges, not common.

T. fulvimetrella. May. Not common.

T. albipunctella. June, July. Beaten from hedges, not common.

T. nigripunctella. June. Two specimens occurred in a saddler's shop.

Lampronia quadripunctella. June. Scarce.

L. luzella. May, June. Common among brambles.

L. prælatella. June. In damp woods, flying at dusk; pretty common.

Incurvaria Zinckenella. April, May. Common among beach, flying in the sunshine.

I. Œhlmanniella. May, June. Common, flying along hedges in the sunshine.

Micropteryx calthella. May. Excessively abundant in flowers of Caltha palustris and buttercup.

M. Seppella. May, June. Common in flowers of Veronica Chamædrys.

M. mansuetella. May. One specimen occurred in a wood.

M. Allionella. May. Among Vaccinium Myrtillus, scarce.

M. Thunbergella. April, May. Flying in abundance in the sunshine round alder and sallow bushes.

Nemophora metaxella. July. By beating.

Adela fibulella. May, June. Abundant in the flowers of Veronica Chamædrys.

A. rufimitrella. May. Abundant on flowers and seeds of Cardamine pratensis; a few also on those of the common daisy.

Harpipteryx nemorella. July. Among honeysuckle, scarce.

Depressaria angelicella. July. At rush-bloom.

D. hypericella. July. At rush-bloom.

Chelaria conscriptella. August. Common in hedges. Appeared again at the end of September, but scarce.

Œcophora minutella. June. Common in a saddler's store-rooms.

Œ. tinctella. June. Beaten from hedges, not common.

Acrolepia autumnitella. May, by beating. Bred in August, from Solanum Dulcamara.

Roslerstammia erxlebella. May. Beaten from hedges.

Glyphipteryx oculatella. June. Among rushes.

G. Fischeriella. May, June. This species was abundant in flowers of Veronica Chamædrys. This habit may be well known, but was new to me.

Perittia obscurepunctella. April, May. Flying in the sunshine, common.

Tinagma sericeella. April, May. Also flying commonly in the sunshine.

Ocnerostoma pinariella. June. Beaten from fir trees.

Gracillaria phasianipennella. April. In hedges.

Coriscium cuculipennella. April, June, October. Beaten from hedges.

C. citrinella. July. By beating, and flying at dusk.

Ornix guttella. May. Beaten from a hedge.

Bedellia somnulentella. April, October. Beaten from hedges, not common.

Chrysoclista Schrankella. May. I took a few specimens sunning themselves on leaves in a marshy wood.

Lithocolletis irradiella. May. Bred from oak.

L. lantella. May. Beaten from oak.

L. Nicelliella. May. Flying along hedges.

Opostega saliciella. Beaten from a hedge.

Bucculatrix ulmella. June. Among oak.

B. frangulella. May to July. Among Rhamnus Frangula.

Pterophorus acanthodactylus. August, October. In woods and hedges, scarce.

P. punctidactylus. July. Mr. M'Lachlan first took a specimen, and some days afterwards I met with others.

From this list it is evident that I cannot echo the complaint of many other entomologists, that there have been no insects this year; indeed, the common butterflies, which seem to have failed in some places, have most of them been very abundant here. Still some things have disappeared in a most extraordinary manner. I have not seen a single specimen of either of the following: — Argynnis Paphia, A. Aglaia, A. Adippe, Thymele Alveolus, Smerinthus Populi, Sesia Tipuliformis, Hepialus Humuli, Anthrocera Filipendulæ, Nola cucullalis, Lithosia complanula, Euchelia Jacobææ, Miana furuncula, Caradrina Morpheus, C. cubicularis, Hadena oleracea, Cucullia umbratica, or Mania maura, and only one Lycæna Ægon, one Acronycta Psi, four Agrotis exclamationis, two or three Hadena dentina, one Amphpiyra Tragopogonis, and one Mania typica; and even Apamea oculea, Agrotis Segetum, Xylophasia lithoxylea and X. polyodon, Noctua xanthographa, and Cosmia trapezina were comparatively uncommon, and I am inclined to say long may they continue so, or to hope that it may be the rule in this neighbourhood. On the other hand, many things were excessively abundant, and in June and October Noctuæ came to the sugar in swarms.—*Charles G. Barrett; Haslemere, November* 15, 1862.

Description of the Larva of Nemeobius Lucina. — Ground colour dingy olive. Central dorsal line blackish or very dark olive, much darker at the centre of each segment. Subdorsal lines slanting, dark olive, dotted posteriorly on each segment by a dull yellow spot. On each segment between dorsal and subdorsal lines a largish orange tubercular spot, surmounted by a tuft of reddish orange hair. Between subdorsal and spiracular lines a similar row of smaller spots and tufts. Spiracular line indistinct, anteriorly olive, posteriorly dull yellow. Spiracles black. Head reddish yellow. Belly dirty greenish olive, destitute of markings. Feeds on the under side of the leaves of cowslip. Full-fed middle of July. Eggs white, conical, laid singly or in small clusters at the end of May and beginning of June, at the back of the leaves of cowslip. Pupa pale straw-colour. Along the centre of both thorax and abdomen a double row of largish black spots; on each side three similar rows, the intermediate row much smaller than the other two. Upper border of wing-cases black. On the head or extreme end of thorax two transverse black bands. Suspended by a thread across the junction of thorax and abdomen. In form, colour and general appearance closely resembles the pupa of M. Artemis.—*H. Harpur Crewe; the Rectory, Breadsall, near Derby, February* 8, 1862.

Lycæna Dorylas, S. V., *in England.*—In Lewin's 'Papilios of Great Britain,' published in 1795, figures are given of a Lycæna under the name of "Hyacinthus," which Lewin states he took in two successive years by the side of a chalk-hill near Dartford, in Kent. Ochsenheimer refers these figures to L. Dorylas, *S. V.* The late J. F. Stephens, in his 'Illustrations,' doubtingly gives Lewin's insect as distinct from Adonis, and in his latest publication, the Museum Catalogue, it stands as "variety *a*" of that species. I do not know whether any of Lewin's specimens are now in existence, but his figures most certainly represent the sexes of Lycæna Dorylas, which is distinguished from Adonis by its paler blue colour slightly tinged with green, immaculate cilia, and the absence of the two transverse ocelli at the base of the superior wings beneath. Mr. Cooke, of Oxford Street, recently detected two specimens of this species

among a number of Adonis taken in England which he had purchased. One of these I have seen and it is certainly L. Dorylas, and now that attention has been called to it, the insect will probably be met with in the coming summer.—*Henry Doubleday ; Epping, January* 12, 1863.

Occurrence of Ino Geryon in England.—Three years ago when the question was mooted whether we had not a third species of Ino in this country, and whether that species was not Ino tenuicornis of Zeller, I paid considerable attention to the subject, and obtained the loan of specimens from several of my entomological friends. The result however was unsatisfactory, and I failed in my attempts to identify our small species in which the sexes are so similar in size with Ino tenuicornis. More recently this little species has been identified by Mr. Doubleday with Ino Geryon of Hübner, and although many entomologists still doubt its distinctness from Ino Statices, still I feel no hesitation in accepting it as a species. The subject has been recently afresh brought before me by Mr. M'Lachlan, who has kindly placed in my hands Dr. Staudinger's little monograph of the genus Ino, published in the Stettin 'Entomologische Zeitung' for 1862, p. 341. I append a translation of that learned entomologist's observations on Ino Geryon :—"This species is altogether less than Ino Statices, and measures only from 8.5 to 9. inch in the expansion of the wings : in this respect there is scarcely any difference between the two sexes, the male being scarcely inferior to the female in size, and being very much smaller than that of Ino Statices. Compared with those of that species, the antennæ of I. Geryon are shorter and stouter in the male. The colour of the fore wings is green more or less glossed with gold ; I have never observed any approach to blue. The hind wings are more transparent than those of I. Statices, and consequently appear somewhat blacker. I am the more inclined to consider I. Geryon a good species since the typical I. Statices is common near Vienna, which is almost the only locality where the real I. Geryon is found, and I am assured by an experienced collector residing there that there must certainly be two species. In the 'Transactions' of the Zoological-Botanical Society for 1852, p. 103, H. Lederer says of Ino Geryon, that Ochsenheimer is wrong when he pronounces it to be a small variety of I. Statices, from which it can be distinguished at a single glance ; it is true that H. Lederer has since abandoned this opinion, although without assigning reasons for doing so, and has treated them as constituting a single species. The important fact, however, that for many consecutive years the two races have been found unchanged in character at a short distance from each other (I am not aware whether they have been found on exactly the same spot), is a certain proof that they are distinct as species. The opinion expressed by Ochsenheimer (Bd. iv. p. 63), that I. Geryon might be a generation of I. Statices insufficiently fed, must, on careful consideration, be pronounced erroneous. Half-starved broods can certainly occur (more frequently when raised in confinement), especially if the food-plant be dried up by the heat, or other casualties of weather induce an earlier emergence from the pupa. But if I. Geryon is only to be found near Vienna in dry places, how comes it that the larvæ, led by the well-known and instinctive sense of smell (they frequently know where to find their food-plant even when miles distant), do not seek the food (which is the well-known food-plant of Ino Statices) lying so near them? Or, on the other hand, is it to be supposed that these larvæ (having no propensity for roving) do not know where to obtain their natural food, by feeding on which they might attain their natural size ; if so, how did these unfortunate insects get to a place where they must be half-starved, notwithstanding which calamity they have managed to maintain an

existence for so many years? It is, at any rate, a bold assertion to make that they constitute but a single species, and one that the young naturalist should if possible avoid; it is more consistent with probability, and much more simple, to accept them as two species, admitting their distinctive characters to be still imperfectly determined, or perhaps imperfectly known. Ino Geryon has been found on the 'Gahns'* of Lower Austria, and I believe also near Digne." So far Dr. Staudinger. I may add my own opinion that Ino Statices and I. Geryon are perfectly distinct species. I believe that all the three British species of Ino occur in company in Sussex, more especially on the south coast, and I shall feel extremely obliged for a series of specimens in order that my Friday visitors may have ample means of examining and comparing them. If some of our Sussex entomologists would endeavour to obtain and describe the larvæ, and rear the perfect insect, that would add a valuable page to the Life-histories of British Lepidoptera. Since the above was written, the Rev. E. Horton, of Wick, near Worcester, has looked over my collection, and informs me that the insect I have called Ino Geryon is abundant on the Malvern Hills, and that he has always regarded it as a small or starved variety of Ino Statices.—*Edward Newman.*

Description of the Larva of Amphydasis prodromaria.—Having had a large brood of Amphydasis prodromaria to bring up this year, I have made a few observations on that species which may be interesting to some of your readers. My breeding-cages are kept out of doors, so that the times will be those of nature. I had two impregnated females. The first left the male March 14th, and I looked in vain for eggs till March 25th, when I chloroformed her in fine condition, and afterwards held a *post-mortem*, the result of which was the discovery of a tolerable quantity of eggs in her abdomen. The second parted from her spouse March 28th, but I saw no eggs till April 3rd, when, on a minute examination of the breeding-cage, I found a great number between the wire and some leno which I had gummed on outside. There were evidently two batches, so that the first female had done her duty, and they were so cleverly concealed that it required the closest inspection to detect them. I should conclude from this that, in a state of nature, the female, by means of her ovipositor, inserts her eggs in the crevices of the bark, or under the lichen with which it is covered. I had put several budded twigs of oak in the cage, but not an egg was laid on them, probably because they were too smooth. The eggs (small for the size of the moth) are greenish, with a hyaline appearance after a few days, oval, not flattened, appearing under a moderate glass to be very finely chased. Before hatching, which they began to do May 2nd, they turn of a purplish hue. The larva is at first olive with lighter spiracular line. Head light brown. After the first moult smoky; head brown mottled. Anal claspers brown. After the second moult reddish brown (some much redder than others); dorsal line a chain of dark brown markings, with ashy dashes on each side at intersections; suffused with ashy on the 8th and 9th segments. Head rather bifid. Two lateral tubercles on the 8th segment; two larger lateral tubercles on the 9th; a slightly-raised ridge on the 12th; slight ventral projections on the 8th, 9th and 10th segments. After the last moult, more suffused with ashy. Head reddish brown. Two small lateral tubercles on the 5th segment; two ventral tubercles on the 7th; two small dorsal tubercles instead of ridge on the 12th. The rest as before. I divided my brood into two parts, feeding one on oak, the other on birch, on which they thrived

* Will some German scholar kindly give me the meaning of this word.—*E. N.*

equally. They would also eat plum freely, and elm. They began to go under about July 6th. I turned out a number of larvæ on two birches and an elm in my field, but failed to find any pupæ at their roots afterwards, perhaps from the trees not being sufficiently isolated. With regard to the time of emerging from pupa, I observed that all the eight specimens which I had this spring came out about noon or soon after, when the temperature was highest; never in the night or in the forenoon; while Himera pennaria, which I have been breeding lately, invariably emerges during the night. I hope to make some more observations next March, and to try some experiments which I omitted to do this year.—*E. Horton; Wick, near Worcester, November* 21, 1862.

Occurrence of Hybernia boreata near York.—I had the pleasure of taking a very fine specimen of this insect about the middle of November, in the same locality where Mr. Birks took his two years since. It very rarely occurs near York, but that may perhaps be attributed to its being passed for H. brumata. I took it along with H. aurantiaria, which has been remarkably fine this year.—*S. J. Carrington; Clifton, York, December* 15, 1862.

Descriptions of the Imago and Larva of Eupithecia fraxinata, an English species new to Science, and also of those of E. innotata, with which it has hitherto been confounded.—I have for some time suspected that our British ash-feeding Eupithecia innotata was distinct from the typical continental species bearing that name; the habits of the respective larvæ, their colour and food-plants being so different, that it seemed to me impossible that they could belong to the same species. During the past spring, Professor Zeller kindly sent me some pupæ and perfect insects of the continental species. The former all emerged, and I hoped to have obtained impregnated eggs, but could not get any of the moths to pair. They so closely resembled our English E. innotata, that I could scarcely bring myself to think that they were distinct; at any rate I determined to wait till I could compare the respective larvæ. In the course of the summer my friend Mr. Greene obtained a small batch of impregnated eggs of our British species, from a pair of moths bred in confinement, from larvæ taken in the autumn of 1861, on ash, in Derbyshire. He sent me four; from these I reared two larvæ, and as soon as they were full-fed, despatched them to Professor Zeller, at Messnitz. He at once wrote to say that they were in every way so totally different from the larvæ of the true continental E. innotata that there could be no question whatever as to our British insect being a distinct species. A short time since, M. Zeller obligingly sent me four full-fed larvæ of the continental species, taken by himself on Artemisia campestris, their typical food-plant, at Messnitz. I at once came to the same conclusion with himself as to the specific distinction of the two insects. It is scarcely possible for two larvæ to be more dissimilar. Mr. Buckler has, with his usual kindness, drawn for me the most wondrously life-like figures of each larva, and I have myself taken accurate descriptions. I forwarded the drawings to Mr. Doubleday as soon as I received them from Mr. Buckler. He says that there can be no question whatever about the distinctness of our British insect from the continental E. innotata. With his entire concurrence, I have therefore ventured to name the former Eupithecia fraxinata, *Crewe*. It is, as far as my own experience and that of my friend Mr. Greene goes, exclusively an ash-feeder, and it is entirely impossible to give it a more appropriate title. The perfect insects are wondrously alike, almost as much so as Acronycta Psi and A. tridens; Eupithecia fraxinata is, however, invariably a darker and more dingy-looking insect. Mr. Westwood has kindly written out for

me a very elaborate description of E. innotata, and has pointed out the few distinguishing characteristics of E. fraxinata. These I subjoin, together with my own descriptions of the respective larvæ. These latter are much more dissimilar than the larvæ of A. Psi and A. tridens.

EUPITHECIA INNOTATA, *Hübner.*

Expanse of anterior wings in a full-sized specimen, 10—10½ lines. Fore wings gray, with a slight brownish tinge, mottled with brown and black scales. Disk somewhat paler than margins. Along the anterior margin a series of about twelve irregular-sized black spots arranged generally in pairs, and forming the anterior outlines of the paler undulated strigæ which run across the wings. From the base to the middle of the anterior margin these spots have an outward direction, but from the middle to the tip they are directed obliquely towards the base of the wing. In the middle of the wing closing the discoidal cell is a small transverse black spot; the median vein between the base and the first branch is marked with one roundish and three oblong minute black spots. The branches of the median vein, as well as the two disco-cellular and the subanal veins, are also faintly marked with blackish spots, those on the first branch of the median vein being the most strongly marked. All these spots indicate the direction of the pale obliquely undulated strigæ. Of these one near the base, two running across the middle of the discoidal cell (strongly elbowed near the middle of the cell), two beyond the middle of the wing (strongly elbowed towards the fore margin), and one subapical (strongly elbowed near the anal angle, and forming a well-marked W opposite the apical angle) are the most conspicuous. Other strigæ are faintly and indistinctly indicated. The outer portion of the wing has also a series of small dark lines running from the margin towards the disk between the veins. The outer margin itself is formed by a dark line. Fringe pale, outer portion dark, near the base a dark line. Hind wings paler than fore ones, especially on the disk. Anal portion darker, varied with short transversely undulating strigæ. At the beginning of the disco-cellular vein a very minute dark dot. Beyond the middle of the wing a denticulated dusky striga, followed by a whitish one commencing at the anal angle, beyond which the outer portion of the wing is dusky. Fringe pale at the base, darker on its outer portion, with a dark line near the base dilated into dark dots opposite the extremities of the longitudinal veins. Body griseous, slightly varied with darker scales. On each abdominal segment a small dark dot. Antennæ slightly luteous.

EUPITHECIA FRAXINATA, *Crewe.*

Expanse of anterior wings in full-sized specimen, 10⅞ lines. Fore wings of a much more uniformly brownish gray. Black markings and pale undulating strigæ similar in number and position to preceding species, but always very faint and indistinct. The white subapical strigular W barely visible, or very indistinct. Fringe much more uniform in colour than in E. innotata. Posterior wings much darker on the disk; anal portion much less strongly marked, especially towards the body; the dark and pale subapical strigæ can in fact only be traced with the greatest difficulty, though their place is indicated by the somewhat more decided markings at the anal angle.

LARVA OF EUPITHECIA INNOTATA, *Hübner.*

Ground colour pinkish gray. Central dorsal line rusty, or dull purplish brown, connecting a series of well-defined top-shaped blotches of the same colour. Dorsal

blotches margined by a number of lateral white stripes. Each lateral segment ornamented with a large orange-red and dusky purple spot. Spiracular line white. Head dusky purple. Back and sides more or less suffused with orange. Whole body rugose, studded with minute tubercles. Tapers considerably towards the head. Belly purplish gray, with a central dusky purple line margined with white. Resembles in appearance the first variety of the larva of Eupithecia nanata; the lateral stripes also recall to mind the larva of Eupithecia virgaureata. Feeds on Artemisia campestris, (Zeller), and according to Knoch and Schwaz, on A. vulgaris and A. Absinthium. It most probably occurs in this country, and any entomologist in whose locality Artemisia campestris occurs will do well to search for it. It is full-fed at the end of September and beginning of October; at least it was at the beginning of the latter month that Professor Zeller forwarded the larvæ to me. Pupa enclosed in a slight earthen cocoon. Thorax and wing-cases yellowish green, base of latter almost yellow. Abdomen pale yellowish red. Altogether paler than E. fraxinata.

Larva of Eupithecia fraxinata, *Crewe.*

Long, smooth, rather slender, tapering towards the head. Ground colour uniform dark green. Central dorsal line faint purplish, enlarged into a very distinct purple spot on the anal appendage. Segmental divisions yellow. Spiracular line waved, yellowish. Belly wrinkled, whitish. Central ventral line dark green. A variety occurs in which the central dorsal line is supplied by a series of dusky triangular blotches, very faint or altogether evanescent on the anterior and posterior segments. On each side is a row of slanting, faint yellow stripes, tinged with pink. Feeds upon ash. Full-fed at the end of August and beginning of September. The larva of Eupithecia tamarisciata, *Frey*, as described by Guenée, p. 332, seems in some degree to resemble this larva. Pupa enclosed in a slight cocoon, under moss on the trunks of ash. Long, slender and tapering. Thorax and wing-cases dark olive; abdomen still darker, almost black, tinged posteriorly with red. Perfect insect appears in June and July. The larvæ will feed upon flowers of laurustinus if reared frem the egg in confinement. I have described this larva as Eupithecia innotata in the 'Entomologist's Annual' for 1861, p. 136, and in the 'Zoologist' (Zool. 6610, 6770.)—*H. Harpur Crewe; The Rectory, Drayton Beauchamp, Tring, November* 12, 1862.

Leucania Loreyi (Duponchel), *at Brighton.*—On the 14th of last October, Mr. Thorncroft captured two specimens of this species in Sussex, a few miles from Brighton; they are both females, and rather wasted. On the Continent of Europe it is found in the South of France and in Spain, but appears to be rather a scarce species. M. Guenée says of it, "I have not found any essential difference between the L. Loreyi of Europe and those I received from Dr. Horsfield, which were reared from the larvæ in Java. I have also a female given to me as coming from Brazil, which is only rather smaller and a little paler in colour. It is therefore probable that this Leucania, like Heliothis armigera, inhabits a large portion of the globe. It varies in colour." Mr. Thorncroft has kindly presented one of the specimens to me. The fact that nearly all the species of Lepidoptera recently discovered in the South of England are natives of the southern portion of Europe, and are never found on the northern coast, renders it very improbable that these specimens are of continental origin. In a letter recently received from Dr. Staudinger, he remarks upon the singularity of our country, which produces so many southern forms.—*Henry Doubleday; Epping, January* 12, 1863.

Heliothis armigera in the Isle of Wight. — In looking over a collection of Lepidoptera which I made, during the summer and autumn months, at the Isle of Wight, I see in my journal that I came across a very good specimen of Heliothis armigera in the latter part of September, at Sandown, Isle of Wight.—*R. L. Lovelace; 57, Pembridge Villas, Bayswater, January* 7, 1863.

Fore Wings of Phlogophora meticulosa.—I wonder if it has ever been observed that the hind margins of the fore wings of this moth, in repose, form an elegant double-feathered head for a light in a gothic window. Any one acquainted with architecture would at once recognize the resemblance.—*E. Horton; Wick, Worcester, November* 21, 1862.

Xylomiges conspicillaris in Worcestershire.—I have bred several fine specimens of this rare species during the past five years. The pupæ were all obtained by digging in the ordinary manner, and could not be distinguished from the Tæniocampa family. I could never be certain that I had one until the moth actually appeared, which was always between 7 and 8 o'clock in the morning. My impression is that I dug them all from under elm trees; but I do not mean to say that the larvæ fed upon elm, but more probably upon "low plants," and had crawled to the base of the trees for better security in undergoing their transformation. The perfect insects emerged on the undermentioned days: — 1858: March 13th, 1. 1859: March 13th, 1. 1860: April 23rd, 1. 1861: March 27th, 1; April 10th, 1. 1862: April 3rd, 1. I must remark that the whole of the pupæ were kept in a room where there was a fire occasionally, but they were tolerably remote from its influence. The present season, for pupa digging, is certainly the worst I ever remember. There are scarcely any to be obtained in this neighbourhood; and, besides, the earth has been, and is still, so saturated with rain, that although I have often gone poking, routing and digging upon my bended knees nearly the whole day through, I have returned with but little hope of adding to my series of X. conspicillaris in 1863. — *Abraham Edmunds; The Tything, Worcester, December* 17, 1862.

Dasypolia Templi in the Isle of Wight.—On the 6th of October last I bred a specimen of Dasypolia Templi. I cannot give a description of the larva, as I took no note of it at the time I found it. In July or August I found a handsome green larva, but, thinking it to be only one of the Hadenas, I placed it with several other larvæ in a breeding-cage: I took it in a wood, at rest on broom, close to some oak underwood, and I believe it fed on the latter. When Dasypolia Templi appeared, of course my suspicion was aroused that it was produced from this said larva. I wish it to be understood that this is all conjecture. One thing only is certain, and that is I bred the insect. A few days ago I took it to Mr. Rogers, of Freshwater, who pronounced it to be a genuine D. Templi. As I have always understood the larva was unknown, I thought it might be worth noting. — *J. Pristo; Alverstone, Whippingham, December* 15, 1862.

Economy of Depressaria applana.—The sluggish habit of this little creature, when in its summer bloom, is in remarkable contrast with its liveliness in the early spring. I saw a specimen on the wall of an out-house on the 20th of August, which I can answer for having been on the same spot, and in the same position, for four days and nights, although the weather was fine and the thermometer at 60° Fahr. Mr. Stainton says that Depressariæ do not lay their eggs till spring, and probably therefore do not pair till then; and the same rule, though not without exception, is supposed to hold with all hybernating Lepidoptera. If so, Dame Nature seems more rigorous towards

hybernating Lepidoptera than modern society, with artificial requirements, to bachelors of limited means; for she counsels them to defer the happy event, in many cases (particularly in that of the active butterfly) till they are quite faded and worn. Hence probably what appears to us a sluggish habit in Depressaria is in fact a wise economy, whereby that crafty tribe accommodate themselves to circumstances, and save themselves and their wardrobes for more propitious days.—*E. Horton.*

Life-Histories of Sawflies. Translated from the Dutch of M. Snellen van Vollenhoven, by J. W. May, Esq.

(Continued from p. 8307.)

Emphytus tibialis, *Panz.*

Imago, *Panzer, Fauna Germ.* 62, 11, and 147, 12. *Hartig, Aderflügler Deutschl.* i. p. 251, No. 17.

The larva is yet undescribed.

Emphytus niger, nitidus, antennarum cingulo et tibiarum basi albis, femoribus rubris.

This is the first species of Emphytus we have found occasion to describe. It appears that the larvæ of Emphytus are not very readily detected, or that they are difficult to rear; at all events, few authors have taken any note of their metamorphoses. Bouché, and subsequently Hartig, have made known to us the metamorphoses of E. cinctus, *L.*, and of E. perla, *Klug.* In addition, De Geer and Dahlbom mention the larvæ of E. rufocinctus, *Klug.*, and E. succinctus, *Klug.*; lastly, Brischke has given a figure of E. viennensis, *Schr.*; and this is the extent of our knowledge of the metamorphoses of a genus of which nearly forty species occur in Europe.

The larva of the present species was taken by me during a walk in company with Dr. Wttewaal at de Beele, near Voorst, in Gelderland. It was found for the most part coiled up in a spiral form on the upper surface of oak-leaves. We took some home for the purpose of rearing and figuring them.

These larvæ are dark olive on the back and pale gray underneath. They have twenty-two legs in all. Head anteriorly and on the upper surface clear shining black, with some minute projecting hairs; from an imaginary line running below the antennæ the face is brown, with dark brown trophi. The segments are all much wrinkled. A paler longitudinal line runs along the back; the ground colour above the legs at the side of the body was somewhat darker in ill-defined spots. The thoracic legs were obscure glassy gray, with a broad spot, which

is somewhat curved in shape and prolonged downwards at the ends; the claws were brown, and on the under side at their base a cushion-like eminence was visible. The fourteen middle legs and the two hind legs were of the same colour as the belly and the side, as also the anus, but upon the outer side of each leg there was an olive-coloured spot.

These larvæ were generally rolled up spirally, so that the head was lower than the tail; when walking they were very sluggish and slow in their movements. We subsequently found that they attached themselves to the under side of the leaf as much as to the upper.

They had undergone the last moult but one. After the last moult the colouring was much paler; the head was then obscure brown instead of black; the back brownish green, but the under side had assumed a somewhat browner tint.

On the 6th of June and following days these larvæ buried themselves in the earth which was given them in their cage; they made a cocoon stuck together with grains of earth.

I was not fortunate enough to observe the pupa, but on the 5th of November of the same year I received from my friend Wttewaal two imagos, which, although probably some time previous, had emerged from the cocoon. From the colour of the antennæ and the beautiful red colour of the femora I immediately recognised the species which Panzer, in his 'Faunæ Insectorum Germaniæ Initia,' has named Tenthredo tibialis, and which had previously been taken by me at Heemstede in August, and by M. van Bemmelen at Brummen and Oosterbeek. According to Hartig it occurs in Sweden and Austria, where, however, it is scarce.

It is uncertain whether this is the same species as the T. tibialis of Le Peletier de Saint-Fargeau (Monog. Tenthred. No. 348), and which was taken near Paris, for the legs are described as somewhat differing in colour; it must, however, be the same as Gmelin's species, No. 114, which he calls T. braccata.

This pretty sawfly has the head broad, depressed, black, studded with some very short hairs; eyes also black, of moderate size, elliptic, protruding. Upper jaws rather sharp-pointed, the base and apex black, intermediate portion ferruginous; palpi black at the base, the colour inclining to gray, and becoming much paler at the terminal joints. Antennæ as long as the head and thorax together, moderately thick, more or less hairy; the first five joints dull black, the sixth, seventh and eighth clear white, the ninth smaller and black. I may here mention that in one of my examples the right antenna shows a

singular variation; the fourth joint is obscure brown at the apex, the following joints are all fuscous, gradually approaching to a yellow tinge towards the extremity.

The thorax is shining black both above and below, cenchri clear white, tegulæ pale brown. Wings long and somewhat narrow, with a yellowish tinge at the base, the remainder being transparent and but slightly iridescent. The costal nervure is brownish, and the nervures bounding the anterior portion of the anal cell are orange, all the others black. The anterior portion of the anal cell is divided by an oblique transverse vein; the posterior wings have no middle cell.

Both the dorsal and ventral surfaces of the abdomen are shining black, but beset with extremely fine hairs; the seventh and eighth segments have a rather broad brown band on the dorsum.

The coxæ and apophyses are shining black, femora bright red, only that those of the fore pair of legs are blackish at the base, the extremities of the femora of the hind pair being also somewhat blackish. The tibiæ of the first pair are entirely rufous, those of the second white at the knee, rufous at the extremities, and in the last pair the tibiæ are clear white for half their length from the knee, thence to the end black with a rufous tinge, more especially on the inner side. Tarsi black, the first joint, and in some individuals the second, being white at the base. In order to give an idea of the brightness of the colouring in newly-taken examples, I have given a separate figure of a hind leg, at 3 A, somewhat more highly magnified than the enlarged representation of the female of this species in the same plate. The length of the sawfly ranges between 8 and 9 mm., the expansion being nearly 16 mm.

The saw and ovipositor of the female are very simple and of a clear brownish yellow. They are represented at fig. 4.

I do not know where the eggs are laid, nor am I acquainted with their appearance. It is not unreasonable to suppose that the female deposits her eggs in apertures made by her in the young branches, and that they remain concealed there during the winter. This being so there would be but one brood.

Anthomyia Betæ, Curtis, *and the Wurzel Crop.* — The female lays her eggs in a group on the under side of a wurzel-leaf. They are generally three in number, sometimes four, but rarely five or more. They are oblong and of a pure white. When the eggs are hatched the grub begins his work of devastation, by mining into the leaf and feasting on the inner rind. The leaf thus attacked quickly assumes a withered appearance, and looks as if blighted. When the grub arrives at maturity it drops from

the leaf, and buries itself in the ground. The pupa is of a reddish brown colour. Five or six hundred roots of wurzel, which I had growing in my garden this year, were more or less injured by these grubs. Root-crops, like the wurzel, draw much of their support from the air, by means of their large fleshy leaves; and if these are injured the root of necessity suffers also by the withdrawal of such support. To show the extent of the injury inflicted by these insects, it will be only necessary to say that many leaves this year had five or six grubs in them, and that a constant succession is kept up from June to September. I never observed the leaves of the wurzel to be attacked before 1861, when they suffered severely, but not so much as this year. Before 1861 the wurzel was supposed to be safe from the attacks of all insects, and therefore a safe crop. Unlike your correspondent (Zool. 7885), I had no difficulty in procuring the pupa, and I have had as many as twenty at a time in a breeding-glass. I purpose next near to devote some time to the study of the economy of this insect, and shall be glad to furnish either eggs or pupæ, or both, to any of your correspondents that may desire them, and not be able otherwise to procure them.—*John Ransom; York.*

A Day's Beetle-Collecting on Schehallion.—During a tour in Scotland in September last, I stayed a few days at Rannoch, a small village on the Loch of that name; but more of my time there was devoted to trout-fishing than to Entomology. One very good day's sport, however, was afforded me while making the ascent of Schehallion, which is in the immediate neighbourhood. The slopes at the foot of this mountain, as well as the sides of the mountain itself, were thickly strewn with stones of various dimensions, beneath which the whole of my captures were, with few exceptions, made. The first beetle transferred to my collecting-bottle was a specimen of Pterostichus orinomus, a species then new to me. Cychrus rostratus soon followed, and beneath heath occurred Bradycellus cognatus and B. similis, the former in limited numbers, the latter in profusion. Patrobus clavipes, a late addition to our list of British species, now made its appearance, and was apparently of a very solitary character; for though I found upwards of a dozen specimens, in no case did I observe more than one specimen beneath each stone. On ascending higher Nebria Gyllenhalii was plentiful, all the examples being of a uniformly small size, having black elytra and red legs, and are most probably referrible to the variety described by Mr. Dawson in his excellent Monograph, p. 49. The only Staphylinus of any rarity was an immature specimen of Arpedium brachypterum, which I dug out from its stony habitation. On reaching the summit, where the temperature in some places was not much above freezing point, and the elevation 3600 feet, the rare Otiorhynchus maurus, a species peculiar to the northern mountains, occurred beneath moss, in company with a Homalota which I have not yet determined. On descending I turned up more P. clavipes, and a single specimen of its comparatively rare congener, P. septentrionis, another O. maurus, and a great many fragments of deceased examples of the same species. My exertions were finally rewarded by the capture of a fine pair of Aphodius fœtidus, *Fab.* (alpinus, *Wat. Cat.*) The day selected for this expedition was gloomy and the weather unfavourable, and under these circumstances my success was the more remarkable.—*H. Montague; Boxley House, Stockwell, January 6.*

Captures in the North.—Among these are several rarities (other than those detailed in the note above), a list of which will, I think, prove interesting to the Coleopterist.

Carabus arvensis. Two. Rannoch.

Calathus micropterus. Eight. In a decayed fir-stump, Blair Atholl.

Bembidium pallipes. Loch Tay.

Bolitochara lucida. Two. Kenmore.
Quedius xanthopus. Four. Under stones near birch trees, Kenmore.
Philonthus lucens. Rannoch.
Tachinus collaris. Blair Atholl.
T. laticollis. Kenmore.
Baptolinus alternans. Four. Under bark, Blair Atholl.
Geodromicus nigrita.
Cryptohypnus dermestoides. Eight. Rannoch.
Otiorhynchus monticola. Twelve. Rannoch.
O. pabulinus.
Barynotus obscurus. Blair Atholl.

I must also record the capture, at Rannoch, of Adimonia Tanaceti, its occurrence so far North having been quite unexpected.—*H. Montague; Boxley House.*

Calosoma sycophanta in Devonshire.—On the 21st of July, this year (1862), I accompanied a botanical friend to the Devonshire Moors. In a pathway at the foot of Ugborough Beacon (a hill belonging to the Dartmoor range) there lay on the ground portions of this grand geodephagous coleopteron, consisting of both elytra, a leg, and some lesser fragments. These parts were all fresh, showing that the insect had very recently been slain and the softer portions carried off. The elytra were very brilliant, appearing as though the insect had just assumed the perfect state. Some coleopterists do not consider this insect a British species,—an opinion I concurred in until I met with it in the way just mentioned, but now feel certain it is truly an indigenous species. The woods and small forests in and about the Devonshire Moors will by-and-bye be proved to be habitats for this fine beetle. Mr. Dawson, in his 'Geodephaga Britannica,' considers Calosoma sycophanta "not truly indigenous." This opinion is arrived at because specimens of the insect have more frequently been found on the coast than inland, and because no one has testified to its being a regular inhatant of some well-known locality. I think, however, now that it has occurred in such a district as the one alluded to, and although but one specimen was observed, there must be established, in the minds of the sceptical on the point in dispute, a belief favourable to the view that this insect is truly indigenous.—*J. J. Reading; Plymouth.*

Cryptocephalus Wasastjernæ Discovered in Britain.—I have long thought that our Cryptocephalus labiatus must include some other of the many little black species recorded by Suffrian, and I was pleased to find the other day among my specimens of that insect four or five of the C. Wasastjernæ, *Gyll.*, easily recognised by the roughly punctured thorax and different colouring of the head.—*G. R. Crotch; Uphill House, Weston-super-Mare, November* 25, 1862.

Occurrence of Xantholinus sapphirina near Croydon.—Among some Coleoptera taken at Croydon, in the summer of 1861, and which, owing to my absence from England for a year, have not been examined till lately, is one belonging to the family Staphylinidæ, which has been ascertained to be Xantholinus sapphirina, a Brazilian insect of great beauty. It has been suggested to me (and is, I think, probably near the truth), that the insect may have been imported to Sydenham in a larva state in mould with some Brazilian plant.—*W. S. Rooke; Pilstone House, Coleford, Gloucestershire.*

Notes on Phryganidæ, &c.—I have much pleasure in recording the capture, on May 21st, at Dunsford, of a Trichopterous insect new to Britain—Mormonia basalis, *Kolenati.* I have given a pair to the British Museum, so that other British collectors

may be able to consult the same. I have also had the pleasure of breeding Leptocerus filosus, *Linn.*, this season. The larva lives in running water, and feeds on aquatic plants, and when full-fed seals up its nearly straight case, which is made of a horny-like substance, mixed with fine grains of sand, and covered with a coarser sand outside. When the imago is about to emerge it cuts itself a little trap-door, which opens on a hinge, the door itself being perforated in the centre, corresponding to a hole at the opposite end of the cocoon, to allow for the free circulation of water. The pupa-cases are attached to bits of sticks, &c., at the bottoms of the straws. The insect emerged on June 1st. This insect fades from nearly black to rusty brown, even in the cabinet, where it is not exposed to the light.

Limnephilus vitratus. I have bred this species this year. The larva-case is comparatively fragile, composed of silk and small bits of stick laid longitudinally, and weighted at the posterior end with small stones.

Leptocerus bimaculatus of Stephens. This rare species was given me by the Rev. J. Hellins, who captured it in his garden, in August.

Perla marginata. This rather uncommon species I took at Dunsford this season.

Psocus vittatus. I took a pair of this local species near Exeter, October 18th. — *Edward Parfitt ; November* 23, 1862.

Preserving Ephemeræ. — The author of the useful "Synopsis of British Ephemeridæ," in the 'Entomologist's Annual' for 1863, complains of the difficulty of preserving specimens of that order of insects. Did it ever occur to him that they may be pressed and dried in blotting-paper, like flowers? I have before me a May-fly, which I caught in the summer, as a model for an artificial fly, and placed between two pieces of flannel in my fly-book. It has undergone no alteration, either in form or colour, since the day of its capture, and may be handled without fear of injuring it.— *C. A. Johns ; Callipers, Rickmansworth.*

Correction of Errors. — There are two errata in the description of the larva of E. arceuthata (Zool. 8343). In line 10, page 8343, "annoying distinctive differences" should be "unvarying distinctive differences;" and at line 24 of the same page, "and tip of central dorsal line" should be "anal tip of central dorsal line." — *H. Harpur Crewe.*

Proceedings of Societies.

Entomological Society.

January 5, 1863.—Frederick Smith, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the respective donors:—'Proceedings of the Royal Society.' vol. xii. No. 52; presented by the Society. 'Naturhistorisk Tidsskrift Stiftet af Henrik Kroyer,' udgivet af Prof. J. C. Schiödte, Fredie Raekhes asidet Hefte; by the Editor. 'Exotic Butterflies,' part 45; by W. Wilson Saunders, Esq. 'A Manual of European Butterflies; by the Author, W. F. Kirby, Esq. 'The Intellectual Observer,' Nos. 11 and 12; by the publishers, Messrs. Groombridge and Sons. 'The Zoologist' for January; by the Editor. 'The Athenæum' for November and December; by the Editor. 'The

Journal of the Society of Arts' for December; by the Society. 'The Entomologist's Annual' for 1863; by the Editor, H. T. Stainton, Esq. 'Sitzungsberichte der k. bayer. Akad. der Wissenschaften zu München,' 1862, I. Heft 4, II. Heft. 1; by the Society.

Exhibitions.

Mr. W. W. Saunders, after making some remarks on the importance, from a commercial point of view, of a more intimate acquaintance with the various kinds of galls and their fabricators, exhibited specimens of a gall found at Reigate on the roots of the oak, and of another similar but larger root-gall recently brought from the Zulu country by Mr. Cooper: they appeared to be the production of several successive years, and formed in fact an assemblage of galls upon galls, leading to the hypothesis that the perfect insect laid its eggs within the galls of one year, and the produce of those eggs produced the galls of the following year. Mr. Saunders also exhibited another gall from South Africa which was rather soft to the touch, and was found in clusters upon a species of Cissus; it was doubtless the production of a Cynips, though the insect had not been discovered.

Mr. Saunders also exhibited living specimens of a species of Bruchus from the seeds of Erythrina Saundersonii.

Professor Westwood exhibited a large tough pouch-like larva-nest from Africa, which had been cut off from the branch of a tree to which it had been attached. The tough interior material had several holes in it, which were covered exteriorly with cone-shaped masses of woolly matter; there were evidently door-ways for the exit of the larvæ, but it was difficult to imagine that a larva which had once emerged could again effect an entrance through the same passage. The nest was doubtless that of some gregarious Lepidopterous larva, and was somewhat analogous to that of Eucheira socialis described many years ago by the Professor in the 'Transactions' of the Society. Professor Westwood also exhibited the leaves of various plants which had been mined by the larvæ of Micro-Lepidoptera, mounted on glass, with the larvæ inside their mines. This novel method of exhibiting the miners, and the shape and peculiarities of their workings, was due to Mr. S. Stone, of Brighthampton.

Mr. S. Stevens exhibited a fine Psalidognathus from Quito, and a remarkable instance of arrested development in one of the hind wings of a specimen of Papilio Pammon, brought by Mr. A. R. Wallace from the Sulu Islands.

Mr. Fenn exhibited an unusual variety of Ellopia fasciaria.

Mr. Stainton exhibited several remarkable varieties of well-known species of Lepidoptera from the collection of Mr. W. H. Bibbs, of Worcester, including Vanessa Urticæ, V. Atalanta, Arge Galathea, Arctia Caja, Eriogaster lanestris, &c.

Mr. Percy Wormald exhibited a specimen of Limnephilus nobilis of Kolenati, a trichopterous insect new to Britain, which had been captured at Ruislip, Middlesex, on the 29th of September, 1862.

Sir John Hearsey exhibited a collection of thirty-two species of Sphingidæ from India.

Papers read.

Mr. W. W. Saunders read a further paper on the genus Catascopus, and gave descriptions of seven new species, from Mr. A. R. Wallace's collection, under the names of C. Wallacei, C. versicolor, C. ruficollis, C. lævipennis, C. elongatus, C. punctipennis and C. æneus. Specimens of these, with other species of the genus, were exhibited to the Meeting.

Mr. Waterhouse read some "Notes on Omalium riparium, *Thoms.*, Homalota lævana, *Muls.*, *Kr.*, H. dilaticornis, *Kraatz*, and H. nigritula." Specimens of these species were exhibited to the Meeting.

Mr. Walker communicated a paper entitled "Characters of Undescribed South-African Lepidoptera-Heterocera, in the collection of W. S. M. D'Urban, Esq."

Major Parry communicated a paper entitled "A few Observations upon Lucanus Lama, *Oliv.*, and its Synonyma."

The President read some "Observations on Ants of Equatorial Africa," containing a criticism of some of the statements of M. Du Chaillu with respect to the ants of that region.

Mr. W. F. Kirby read a paper "On the Geographical Distribution of European Rhopalocera, in which the author expressed himself as an adherent to the Darwinian theory of the origin and development of species.—*J. W. D.*

Vitality of Sabella.—I have been noting lately with much interest the extreme vitality shown by a Sabella in a mutilated condition. The annelid was found at Ryde on the 5th of December, and came into my possession on the following day, when it appeared in health, judging by its rapid retreat into its tube on any alarm. On the 7th it seemed languid, and on the 8th was found lolling half out of its tube, and but little inclined to notice any disturbance. On the morning of the 9th the head and gills, separated from the body, were lying at the bottom of the aquarium, and the rest of the creature, which I at first thought had been devoured by a fish confined with it, was discovered at a little distance under some sea-weed. Knowing the habit of these annelids is to quit their tubes to die, I transferred both the defunct portions, as I thought them to be, into a separate vessel of sea-water, and after awhile, proceeded to put the body portion into liquor potassæ to prepare the foot-bristles for the microscope. This part was apparently dead, but on attempting to do the same with the head portion it was noticed to be still living, the one or two pairs of feet attached moving spontaneously, but they ceased to do so in the evening. During the afternoon the gills moved occasionally, and some of their pectinations were observed to curl about, but as all seemed motionless at night death was supposed to have taken place. On the following day (the 10th) similar movements were observed, and continued in the evening. From this time the appearances were regularly noted three or four times a day. The movements of expanding the gills and bending the pectinations were remarked throughout the 11th, but the feet on the body portion attached were extended and motionless, nor did they after this show any sign of life. On the 12th the gills expanded and contracted as strongly as ever, but the attached fragment of the body showed symptoms of decomposition by getting rather flocculent. 13th. Motion the same, but some of the gills had become curled at the end, and I thought they were paler; they expanded and closed, however, like the others, and their pectinations moved the same. The motion continued on the 14th, though rather languidly, and the gills were inclined to curl. 15th. The gills curled; occasionally some of them moved by slightly bending or straightening, never, however, becoming straight. They ceased to expand and contract in unison, and seemed more flaccid, obeying any movement of the water. Individual pectinations gave a decided movement now and then, bending and returning. The gills continued curled on the 16th, moving slightly at times. The pectinations

exhibited the same marked actions, individual ones bending quite back and returning with some quickness; in the evening only these latter moved, the gills being quiescent. On the 17th the gills were more curled, and most of them pale; they showed scarcely any movement, but the pectinations, especially of those gills which retained their colour, moved now and then as before. . The small piece of body in connection with the gills had become shapeless and flocculent, and part of it had fallen away. I found the gills on the 18th more curled up and somewhat entangled or confused-looking, all but one or two bleached; only after very patient watching (as usual with a pocket lens) fancied I detected a trifling movement among some of the pectinations, but it was not repeated and the observation was uncertain. 19th. Failed to observe any motion of the pectinations, and on slightly shaking the bottle to excite movement if any life remained the two groups of gills fell quite apart, from the advance of decomposition in the basal portion. It is not perhaps certain whether the division of the annelid's body was spontaneous, or whether it should be charged on the fish which shared its captivity, but as neither portion was devoured I should be inclined to think the injury was self-inflicted, as it is an acknowledged habit of some of its tribe. I do not know if the power of reproducing lost portions is as strong in Sabella as it is in some of the Annelida, but the great tenacity of life indicated in surviving such severe injury for more than a week, and the vigour which the movements of this specimen showed for some days, impressed me with the notion that had it been placed in more favourable circumstances, as in the pure water of the ocean, it might possibly have restored the missing portions of its frame, and, secreting a new tube, made a fresh start in life with literally an old head upon young shoulders. Annelids, however, seem to differ much in their reproductive powers; in some species separation of the body into two portions and the production of a second set of organs for the unprovided moiety appears to be the appointed means of increasing the species. Though this action has been denied it has been reasserted by Mr. Gosse from eye-witness; the subjects of his observations, however, Nais and Syllis, are neither of them tube-worms, and it seems a new head is grown before self-division occurs. Dr. T. Williams, as quoted by Dr. Carpenter, states in reference to Nais that the separated portions henceforth take no food and seem merely to exist in order to develope their eggs. Mr. Wood observes that the common notion of an earthworm cut in two becoming two complete worms is erroneous, and asserts that the injury unless inflicted near the tail end is fatal, the head portion surviving longer than the other. Mortification, he says, spreads from the wound, ring after ring withering and dropping off, each half in the same manner dying by degrees, but he does not state for what period life continues. The case of the Sabella was somewhat similar: the posterior portion, it seemed, soon died; in the anterior mortification commenced at the wound, vitality retreated forward and found a last refuge in the breathing organs, where it made a considerable stand. As these singular creatures wear their lungs on the top of their head it was the most anterior part of the frame in which the vital spark at length died out.—*George Guyon; Ventnor, Isle of Wight, November* 24, 1862.

Notes on Sea Anemones, Observations on the Tank, &c.—The following incident of a battle between two anemones of the Sagartia family fully bears out the traditional reputation of these ancient warriors. It also seems to indicate the possession by these humble yet beautiful creatures of an instinct not often surpassed in animals of higher organization. I received a consignment of anemones from Tenby a few weeks ago, and among them were two or three of the beautiful Sagartia miniata, *var.* venustoides.

One of these seemed to be ailing, and with the view to give it the best chance of recovery, I placed it in what I call my Ilfracombe tank, which has been established some time, and vegetation well developed. The anemone in question was located on the end of a small piece of mica, about the size of one's three fingers, and of a tolerably flat and even surface. In the tank were several of the S. Sphyrodeta species, some of which have not shifted their position for months. Within an inch of the opposite end of the stone on which the S. miniata was fixed, was one of the S. Sphyrodeta above-named. The new comer was placed in his new home on the 18th of October, at six o'clock in the evening. About an hour afterwards, on casually looking at the tank, it seemed to me that the S. Sphyrodeta was moving his position towards the stone. Subsequent examination confirmed the impression, for in a couple of hours more he began the ascent of the stone. Fancying that his intentions were felonious towards my new pet, and for the purpose of interrupting his advance, I placed a bit of oyster-shell, of the size of an old penny, between the two. Half an hour elapsed, and exhibited the S. Sphyrodeta in the act of crossing the barrier, still advancing in a straight line towards the apparently unconscious opponent. As an additional obstacle to its progress I put a Trochus shell on the oyster-shell, and so left the combatants for the night, under the firm impression that no quarrel would take place. My reasons for these precautions were the result of my observations that the S. Sphyrodeta is, of all the anemones with which I am acquainted, the most spiteful. On the slightest irritation it emits the *acontia* most freely, and other anemones so irritating or coming in contact with it have been stung severely. In more than one instance which I remember, a Gemmacea has been killed by S. Sphyrodeta, and I am therefore the more careful to keep them isolated in the aquarium. The morning inspection showed that a severe battle had been fought, for both the anemones were detached, lying within half an inch of each other, and literally covered with *acontia*, and S. Sphyrodeta, from his flabby and lacerated appearance, indicated that he had come off second-best in the fight. But the most remarkable part of the story is that the two shells were in the exact position in which they were left: the inference therefore is that S. Sphyrodeta must have gone round the bit of stone (a distance of three or four inches) so as to attack his adversary. I at once removed S. miniata (which soon got better) to prevent further "family jars," but it was quite a week before the angry little S. Sphyrodeta (which is not half the size of the former) adhered, and seemed "himself again." Can any of the readers of the 'Zoologist' give information respecting the reproduction of Serpulæ? In an aquarium which has never been tenanted by a single specimen, two specimens of S. triqueta have recently appeared, one on the slate side of the tank and another on a bit of rock-work contiguous. They are each about half an inch in length, and from the constant expansion of their little feathery plumes I conclude that they are in perfect health. In another tank, where are some fine specimens of S. contortuplicata from Weymouth, I observe that they occasionally cast the little valve which closes their tube, and that it is renewed by Nature. What can be the reason for this? To my great delight, a sample of sea-water procured from Rhyl, in the early part of October last, contained the Noctiluca in great abundance. They continued visible for about ten days whenever the water was agitated, but gradually disappeared during the period. This is the first time I have ever witnessed this beautiful phenomenon away from the sea coast. To do so in an aquarium in this "city of smoke" is a treat of no ordinary kind. On opening a large mussel (*Mytilus edulis*), a few days ago (which, by the way, I find by experience to be the best food for all anemones), I

found, to my astonishment, a small shore crab (*Carcinus mænas*), about the size of a silver fourpence, cosily ensconced near the folds of the gills. Neither the mollusk nor the crustacean appeared the better for this abnormal close connection, the former being greatly emaciated and its shell full of water, while the latter, although plump, seemed feeble and incapable of motion: its shell was leathery, and lacked the usually calcareous nature,—caused in all probability by its living entombment. The crab survived its release several days.—*W. R. Hughes; the General Hospital, Birmingham, November* 10, 1862.

Occurrence of the Sand Pintlet (Halicampa chrysanthellum) *at Banff.*—In Mr. Gosse's beautiful work on a beautiful tribe, the British sea-anemones, the only locality mentioned for the above worm-like species is Cornwall. I beg to say that they are to be found here. Two were procured a short time since, and although sickly and evidently dying,—having been dislodged from their homes and dashed on shore by the waves of a tempestuous sea,—still I managed to keep them alive the greater part of three days. During this period I had the pleasure of seeing them frequently expand their little star-like disks. Of course I have them preserved; but alas! their beauty is gone for ever.—*Thomas Edward; Banff, January* 5, 1863.

Trans-Atlantic Sketches.—No. 1. *On the Little Miami River, Waynesville, Warren County, Ohio.*

By J. F. Whiteaves, Esq., F.G.S., &c., &c.

It is a sultry afternoon in the latter end of July, as we leisurely stroll from our little village hotel in the "buck-eye" State, the thermometer at from 90° to 95° in the shade. We have been watching the ruby-throated humming bird hovering over the flowers of the trumpet-creeper at the end of the verandah. Into the village street, shaded by "trees of heaven," locust trees and the beautiful Indian bean, with its pods fully a foot long. Along a dusty turnpike road, running parallel or nearly so, with the little Miami river, our main object being to collect the Unionidæ of that stream. On one side of the road, fields of Indian corn stretch down to the river; opposite to these are hills, partly cultivated, partly woodland, crowned with large peach orchards. The commonest road-side weeds here are Mentha viridis, the cosmopolite Anthemis cotula, Scrophularia nodosa, Vernonia noveboracensis, Datura stramonium, Phytolacca decandra, Verbena hastata, V. urticifolia, Ambrosia artemisiæfolia, and Cynoglossum Morisoni. When just outside the town, we strike a short distance up the hill into a friend's garden to examine a nest of the American goldfinch (*Chrysomitris tristis*). It is built in a fork of a peach tree, and in its construction closely resembles that of the European species, the lining of the nest in each

case being of thistle-down, but the eggs of the American species are white, with a very faint bluish tinge, and generally unspotted; the birds themselves are very distinct. Peach trees in Ohio, it should perhaps be observed, are not trained against a wall, as in England, but grow free, like apple trees. Speaking of birds' nests, not far from here I found a nest of the Virginian colin (*Ortyx virginianus*): it was placed in a field of Indian corn, between the rows, where two small decayed logs were lying at right angles, surrounded by a patch of weeds, principally Rumex and Chenopodium, with a little grass. The nest itself was a shallow hole scratched in the ground, in the angle formed by the aforesaid logs, and possessed hardly any lining, a very little dirty straw and a feather or two. The scantiness of lining and its want of cleanliness may account for the stains so often seen on these eggs, the original colour being probably pure white. The old bird was sitting as we approached, partly concealed by the logs and grass. The eggs in this particular case were six, the full complement being from about fifteen to twenty.

But to return to our stroll. On the hill-side, in grass fields, we observe Silene stellata and Tradescantia pilosa. A little further on we come to some woods with little or no undergrowth. Here the black walnut is frequent, also the fœtid or Ohio "buck-eye" (*Æsculus glabra*), the abundance of which in this part of the world has suggested the popular name of the State. Under their shade are flocks of the American goldfinch, occasionally a robin (*Turdus migratorius*), also blue birds (*Sialia sialis*), "chipping sparrows" (*Spizella socialis*), and now and then a purple grackle (*Quiscalus versicolor*). We get into the road again, and, clambering over the fences, cross through the tall Indian corn to the river. In among the corn grow the beautiful wild potato vine (*Ipomæa pandurata*), the ground cherry (*Physalis viscosa*), Sicyos angulatus, Phaseolus diversifolius and Portulaca oleracea. Shells of snails of three species (Helix clausa, H. profunda and H. elevata) occur in myriads strewn over the fields, in a kind of semi-fossil state. Cultivation has had the effect of making these, especially the last-named, comparatively rare, at least in the immediate neighbourhood. Between us and the river a dense weedy thicket intervenes, conspicuous among which, both in size and relative number, is the tall coarse Ambrosia trifida, reaching here to the height of from twelve to fifteen feet. Other plants composing it are the tall nettle (*Urtica gracilis*), the horse mint (*Monarda punctata*), Actinomeris helianthoides, Teucrium canadense, with occasionally bushes of the American elder (*Sambucus canadensis*) and other trees.

We push through this tangled thicket towards the river, and hearing a heavy splash are just in time to see a large snapping turtle take the water. The leather-backed and the musk turtle (*Trionyx ferox* and *Sternothærus odoratus*) are abundant in this river, also many of the more critical forms, but having no books with us we are compelled, rather unwillingly, to ignore their existence. A little further on a narrow creek runs into the river, and here we propose to commence active operations. Where the small stream and river meet is a shady grove. The trees are principally planes (*Platanus occidentalis*), often festooned with the graceful winter grape (*Vitis cordifolia*), sugar maples, red and white oaks, and, rather more rarely, the red mulberry (*Morus rubra*) and the hackberry (*Celtis occidentalis*). We pause here and botanize for a short time. The plants of most general interest are Mimulus ringens, Impatiens fulva, Scutellaria lateriflora, Lobelia syphilitica, the Indian plantain (*Cacalia suaveolens*), the American blue bell (*Campanula americana*), the bunch berry (*Cephalanthus occidentalis*) and the cup plant (*Silphium perfoliatum*). At the point where the two streams meet is a small island covered exclusively with Dianthera americana. The bottom is gravelly and somewhat pebbly. The shore is strewn with dead valves of Unio, principally U. costatus, indications of the mania for hunting pearls which has existed, and yet does exist, in this village. Having examined many Unionidæ, I am led to infer—*first*, that although pearls are most abundant in the animals of the genus Alasmodon, they are not *peculiar* to that group of shells; I have found them in the Unio phaseolus, U. gibbosus, U. costatus and U. multiradiatus: *secondly*, that they may be found in almost any part of the animal *except the foot;* I have found a tolerably large pearl thoroughly enveloped in the cardinal muscle of an Alasmodon.

We proceed to wade into the water, but cautiously, lest we should get our feet badly cut by dead shells. As soon as we are fairly out in the stream, we lift up and examine these defunct mollusks. In them we find Cyclas solidula, Melania depygis, Paludina integra and an Ancylus—alive, also dead shells of Pisidium virginicum and Amnicola Sayana. The Amnicola Sayana is a terrestrial species, living in damp places with Helix, Succinea and Pupa, and occurs alive near the banks of the river, about a mile above the spot we are exploring. Occasionally with these we get the American crayfish (*Astacus Bartoni?*) and the curious larva of a Phryganea (?), whose case looks so much like the turbinated shell of a mollusk that Mr. Lea described it as a new species, under the name of Valvata arenifera. The living

Unionidæ are abundant further out, where the current is most rapid, and the water about knee-deep, two-thirds of the shell being buried in the gravel. We wade slowly for some time, feeling with our hands along the bottom for the points of the shells.

During a month's stay at Waynesville, in the most favourable part of the year, we found the following fresh-water shells in the Little Miami River, within a mile or two of the town:—

Anodonta plana, *Lea*
„ edentula, *Say*
„ imbecilis, *Say*
Margaritana (Alasmodon) rugosa, *Barnes*
* „ „ truncata, *Say*
* „ „ calceola, *Lea*
*Unio costatus, *Rafinesque*
(U. undulatus, *Barnes*)
* „ flavus, *Raf.*
(U. rubiginosus, *Lea*)
„ cardium, *Raf.*
(U. ventricosus, *Barnes*
U. subovatus, *Lea*
U. occidens, *Lea, female var.?*)
* „ triqueter, *Raf.*
(U. triangularis, *Say*)
* „ clavus, *Lamarck*
„ rectus, *Lamarck*
* „ lapillus, *Say*
„ dilatatus, *Raf.*
(U. gibbosus, *Barnes*)
Unio siliquoidens, *Barnes*
„ alasmodontinus, *Barnes*
(U. pressus, *Lea*)
* „ fasciolus, *Raf.*
(U. multiradiatus, *Lea*)
* „ fasciolaris, *Raf.*
(U. phaseolus, *Hildreth*)
* „ parvus, *Barnes*
* „ subrotundatus, *Raf.*
(U. circulus, *Lea*)
* „ tuberculatus, *Raf.*
(U. verrucosus, *Barnes*)
Sphærium (Cyclas) solidulum, *Prime*
Pisidium virginicum, *Bgt.*
(Cyclas dubia, *Say*)
Paludina integra, *Say* (and reversed variety)
*Melania depygis, *Say*
Planorbis trivolvis, *Say*
Physa heterostropha, *Say*
Ancylus (undetermined)

Of these twenty-seven shells about half are purely western species, and do not extend far north (say not so far as the 43rd or 44th degree of N. latitude) or east of the Alleghany Mountains; to these an asterisk is prefixed. All the rest (save Anodonta imbecilis and Paludina integra) occur as far north and east as Lower Canada, for example, and, the two species excepted, have been found so far north in the state of New York, that it is not unlikely they may exist in the "Eastern townships" of Lower Canada.

But we are again digressing. During the wading we have been silently watching the proceedings of two musk rats, as they leisurely swim across the stream. Three red-headed woodpeckers (*Melanerpes erythrocephalus*), two males and one female, are investigating some rotten plane trees on the opposite side of the river. A belted kingfisher (*Ceryle Alcyon*) perches on a dead tree: suddenly we hear a

splash, and looking towards the spot whence the sound proceeded, we observe the kingfisher jubilantly return to the tree crunching one of the river crayfish with evident satisfaction. "From the woods came voices of the well-contented doves,"* the dove in this case being the American turtle (*Zenaidura caroliniensis*). A little lower down several green herons (*Butorides virescens*) and some "kill deer" plovers (*Ægialites vociferus*) are wading about seeking what they may devour.

But, tired of wading, we cross the river to the railway, and walk some distance along the line. Passing by the station we observe some shady woods, towards which we turn. The trees are mostly the American beech (*Fagus ferruginea*), with little undergrowth save papaw bushes (*Asimina*). The May apples (*Podophyllum peltatum*) are beginning to ripen, and about the roots of the trees we notice the delicate green fronds of Adiantum pedatum. Some rotten logs are lying about, which we turn over and hunt for land shells. After about half an hour's search, we have obtained living specimens of Helix albilabris, H. thyroidus, H. clausa, H. palliata, H. tridentata, H. inflecta, H. alternata, H. striatella and H. perspectiva. After a short rest we turn towards the river again. Just below a dam, on one bank a section exposes alternations of the shales and clays of the Hudson river group, which are Lower Silurian. Its most abundant fossils here are† Strophomena alternata and S. planumbona of Hall, Orthis Lynx, O. subquadrata, O. testudinaria and O. occidentalis, Rhynchonella capax and R. modesta, Ambonychia radiata, Ciclonema bilix, Orthoceras crebriseptum; the delicate bryozoon Stenophora fibrosa, and the trilobite so common in Ohio, the Calymene senaria of Conrad,—probably identical with the well-known British species Calymene Blumenbachii. Living under small pieces of timber lying about on the damp grass, &c., we find Helix ligera, Bulimus marginatus, Pupa armifera, P. contracta, P. ovata, and Carychium exiguum, one of the smallest of the American land shells.

But it has taken some time to collect these, it is getting dusk, and the fireflies, called "lightning bugs" in the elegant phraseology of the district, are beginning to appear; so we stroll gently homewards. Many interesting Coleoptera, Lepidoptera, &c., were observed, but these I have not enumerated, fearing lest I should overburden this sketch with mere lists of species.

* Tennyson's 'Gardener's Daughter.'

† These fossils were kindly determined for me by my friend Mr. Billings, the palæontologist of the Canadian Geological Survey.

It has been urged in favour of Natural History studies that they are eminently conducive to health. This appears to me to be a great fallacy. Three years practical out-of-doors work in Oolitic Geology has helped considerably, in my case, to induce severe asthma. On leaving England I found similar results awaited me. Not more than two months spent in collecting the fresh-water mollusks of the interior of the state of Ohio resulted in an attack of fever and ague; and I was told that collecting Unios in this very river cost Mr. Lea, the brother of the well-known author of so many papers on American Unionidæ, his life. The botanist and the ornithologist have to investigate swamps, &c., at the risk not only of malaria, but of bronchial complaints, &c., to which so many of our fellow-countrymen are already predisposed. That these evils may, to some extent, be guarded against is true, but the cause of Natural History can never have anything to gain either by the suppression of facts or the distortion of truth.

J. F. Whiteaves.

Anecdote of a Dog and a Hen.—A friend, who is an accurate observer of Nature, has recently given me the particulars of a very curious attachment between a dog and a hen, and kindly allows me to publish it. What he describes, took place at his own residence near Shaftesbury, in Dorsetshire, and has been going on for the last twelve months. The dog, which is a black and tan terrier, named "Figaro," is an old acquaintance of my own, and lives (generally tied up) in a little yard where no other animals are kept except a solitary hen, "Polly," and a cat. My friend writes, "It is certainly amusing to see the confiding way in which our dog and hen carry things on. When the dog is tied up, Polly sits half the day, at times, by his side, on one of the logs upon which the kennel is put to keep it off the ground, and in rainy weather she gets inside, and you see their two heads peering out of the box together. Also when she wants to lay, unless she is closely watched to prevent it, she gets in quite behind him, and he draws a little forward. Indeed whenever Figaro is seen with his two fore paws hanging out of the door-way it is pretty certain that Polly has an egg within. The eggs are, however, always perfectly safe under the dog's care; he has never been known to touch one of them, as some dogs will do." "I told you," he continues, "of their feeding amicably together, but I did not mention that when it is a case of barley meal or scraps and potatoes, if Figaro is getting on ahead too quickly, Polly pecks him a gentle reminder on the nose that "ladies first" is good politeness—a hint which he does not fail to regard. Our new cat, "Tom," was getting upon first-rate terms with both when I left home, three weeks ago, and could already feed with them, though somewhat upon sufferance, his approaches to the platter being dashed with a touch of creepiness and tail-drooping. When I return I shall no doubt find him in full enjoyment of recognition by the other Powers."—*A. Rikey Hogan; 13, Westbourne Square, London, W., December* 26, 1862.

Notices of New Books.

'*An Introduction to the Trochilidæ or Family of Humming Birds.*' By John Gould, F.R.S., &c. London: 1861.

In inviting the attention of my readers to Mr. Gould's 'Monograph of the Trochilidæ' I am perfectly aware that I address myself to many who are well acquainted with that gorgeous work, and who desire no incentive to study its beauties. But there is a far larger class who, totally unable to possess themselves of that expensive luxury, may yet enjoy the minor volume, which, with the exception of omitting the history of the species, is nearly a literal reprint of the folio work, written to accompany the life-like illustrations; and may even be pleased to find, in the inexpensive pages of the 'Zoologist,' extracts which give a faithful idea of the author's power of observation, and aptitude in laying his conclusions clearly before his readers.

In dealing with a subject so seductive as a history of humming birds it is difficult indeed to resist the temptation to launch into a series of grandiloquent paragraphs that would ill become the staid and sober character of the 'Zoologist, which is not, and I trust never will be, a "Romance of Natural History." It is difficult, indeed, to emancipate oneself entirely from the influence of that enthusiastic admiration which the author lavishes so lovingly on his "living gems," and it is only by restricting myself most rigidly to the bibliographical aspect of my theme that I can hope to escape the charge of sacrificing Science to a love of display. The first mention of humming birds occurs in a work intituled 'Les singularités de la France Antarctique,' in which the names of André Thevet and Jean De Lery figure as the companions of a Monsieur la Villegaignon, who, in 1555, appears to have made an unsuccessful search for gold and an equally unsuccessful attempt to found a colony in America, a new world to which our neighbours modestly assigned the name of "Antarctic France." After this both incidental and detailed notices of humming birds are numerous and frequent; Piso, Ximenez, Acosta, Gomara, Marcgrave, Garcilasso, Dutertre, Sloane, Catesby, Edwards, Brown, Labat, Plumier, Feuillée, Rochefort, Humboldt, D'Orbigny, Schomburgk, Tschudi, Castelnau, Burmeister, Gosse, and many others, have contributed to the general stock of knowledge. But the works in which there is a more systematic account of these birds are by Linneus, Latham, Audebert, Vieillot, Lesson, Bonaparte, Gray, Illiger, De Blainville, Reichenbach,

&c., all of whom have contributed more or less to pave the way for the complete monograph now offered to the public from the pen and pencil of Mr. Gould.

The comprehensive question of natural affinities may be said to pervade every part of Mr. Gould's 'Introduction,' since it embraces every character, whether structural, economical or physiological, of any group of animals, and therefore, without following the exact order in which Mr. Gould has arranged the different branches of his subject, I shall extract most of his preliminary observations, arranging them after my own fashion. Let me, then, recommend my readers carefully to peruse what Mr. Gould has written on these several subjects, and I will endeavour to extract from this source reasons for not agreeing with those views of the affinities of humming birds which have latterly become prevalent, and which Mr. Gould seems rather to favour without giving in his unqualified adhesion.

The subject of bird affinities is fraught with no small difficulty, and the difficulty is increased by the apparently ineradicable antipathy that all ornithologists evince to anything approaching a natural or physiological classification of birds. Nothing can be more unnatural than what is called the Vigorsian or quinarian arrangement, and yet this artificial and fanciful system has now been in vogue in Great Britain for more than twenty years; and on the Continent, where our quinary and ternary systems are matters of great mirth, naturalists are agreed in adopting the scarcely less objectionable method of admeasurement. When Cuvier pronounced in favour of structure as the guide to be employed in classification, he enunciated a theory which has fettered the lucubrations of all subsequent systematists; even the quinarians and ternarians have never made the slightest attempt to emancipate Science from the thraldom of admeasurements, but have added thereto the additional thraldom of numbers. Mr. Gould takes a somewhat more liberal view of system than either the counters or the measurers, and is willing to consult habit and economy; but I cannot feel quite certain at what conclusions he has arrived farther than these; *first*, that the humming birds most nearly resemble the swifts; *secondly*, that they are nevertheless sufficiently different to constitute a distinct order. I will, however, proceed at once to Mr. Gould's general observations on the natural affinities of humming birds, only premising that the whole of his remarks are made in the true spirit of philosophical research, and are scarcely susceptible of improvement, except inasmuch as he has studied the views of others somewhat more seriously than they deserve.

"Ornithologists of the present day consider the humming birds to be more intimately allied to the true swifts than to any other group of birds. This view of the subject is supported by the fact of the humming birds, like the swifts, having most ample wings, vast powers of flight, and a bony structure very closely assimilating; and this alliance is still further exemplified in some parts of their nidification, the number and colour of the eggs, &c. It is not to be expected that, with this subject before me for so many years, I should have been inattentive to the consideration of the place these birds should occupy in our attempts at a natural arrangement; and while I admit that they are somewhat allied to the swifts, they are so essentially distinct from these and all other birds, that they might be separated into a distinct order with quite as much, if not greater, propriety as the pigeons, when considered in relation to the gallinaceous birds. They have certain characters, dispositions and modes of life which are not to be noticed in any other group of birds: their cylindrical bills, double-tubed tongues, enormously developed sternums and corresponding pectoral muscles, rigid primaries, the first of which is the longest, and their diminutive feet, separate them from all the others. In the swifts and fissirostral birds generally the sexes are alike in outward appearance; in the humming birds they are in nearly every instance totally different in their colouring; in the former the young assume the livery of the adult before they leave the nest, while the contrary is the case with the humming birds. How different, too, is the texture of the luminous feathers with which they are clothed; and vastly diversified in form as the tail is in the various genera, the number of feathers in the whole of them is invariably ten. In their disposition they are unlike birds, and approach more nearly to insects. Many of the species fearlessly approach almost within reach of the hand; and if they enter an open window, as curiosity may lead them to do, they may be chased and battled with round the apartment until they fall exhausted; and if then taken up by the hand they almost immediately feed upon any sweet or pump up any fluid that may be offered them, without betraying either fear or resentment at their previous treatment. A Trochilus colubris, captured for me by some friends at Washington, immediately afterwards partook of some saccharine food that was presented to it, and in two hours it pumped the fluid out of a little bottle whenever I offered it, and in this way it lived with me a constant companion for several days, travelling in a little thin gauzy bag distended by a slender piece of whalebone, and suspended to a button of my coat. It was only necessary for me to take the little bottle from my pocket to induce it to thrust its spiny

bill through the gauze, protrude its lengthened tongue down the neck of the bottle and pump up the fluid until it was satiated; it would then retire to the bottom of its little home, preen its wings and tail-feathers, and seem quite content."

In continuation of, and connection with, this subject the following note is too interesting to be omitted.

"The specimens I brought alive to this country were as docile and fearless as a great moth or any other insect would be under similar treatment. The little cage in which they lived was twelve inches long by seven inches wide, and eight inches high. In this was placed a diminutive branch of a tree, and suspended to the side a glass phial, which I daily supplied with saccharine matter, in the form of sugar or honey and water, with the addition of the yelk of an unboiled egg. Upon this food they appeared to thrive and be happy during the voyage along the sea-bord of America and across the Atlantic, until they arrived within the influence of the climate of Europe. Off the western part of Ireland symptoms of drooping unmistakeably exhibited themselves, but although they never fully rallied, I succeeded in bringing one of them alive to London, where it died on the second day after its arrival at my house. The vessel in which I made the passage took a northerly course, which carried us over the banks of Newfoundland, and although the cold was rather severe during part of the time, the only effect it appeared to have on my little pets was to induce a kind of torpidity, from which, however, they were readily aroused by placing them in the sunshine or in some warm situation, such as before a fire, in the bosom, &c. I do assure my readers that I have seen these birds cold and stiff and to all appearance dead, and that from this state they were readily restored with a little attention and removal into light and heat, when they would perk up, flutter their little wings, and feast away upon their usual food as if in the best state of health."

Truly a beautiful picture! Shall we ever see these little creatures introduced into our English or even European conservatories? The temperature presents no difficulty, neither does the food; transit seems to have been overcome in Mr. Gould's instance, and certainly it may be again. It would indeed be delightful to see these lovely creatures homed in the Crystal Palace or the palm house at Kew; but perish the thought of caging them, and denying them full scope for the exercise of their restless wings.

The Humming Bird's Food and Beak.—"We find the humming bird's bill greatly diversified in form, and that each of these variations

appears to be specially adapted for some given purpose; indeed I have never seen the law of adaptation more beautifully exemplified than in the multiplied forms exhibited in the bills of the members of the various genera of this family of birds. A certain generic character runs through the whole of them; the gape in all cases is very small, and whether the bill be curved or straight the upper mandible overlaps the under one on both sides, and thus forms an admirable protection for the delicate double-tubed tongue. If we examine the extraordinarily lengthened bill of Docimastes ensifer and the short feeble bill of the Lesbia Gouldi we see the extremes as regards the length of this organ, and we are not less astonished at the functions they are both intended to perform. The bill of the D. ensifer, which is nearly six inches long, and which contains a tongue capable of being protruded nearly as far beyond its tip, is most admirably fitted for the exploration of the lengthened and pendent corollas of the Brugmansiæ, while the short-billed Lesbiæ cling to the upper portion of those flowers, pierce their bases, and with the delicate feelers at the extremities of the tongue, readily secure the insects which there abound. I have been assured by M. Bourcier that this is really a practice of the bird, and that it frequently resorts to this device for the purpose of gaining its insect food, but I suspect that, besides exploring the stalwart Brugmansiæ, a more delicate flora is the object for which its bill is especially formed. In no part of America are so many tubular-flowered plants as among the Andes, and the greater number of the humming birds found there have straight and lengthened bills, such as the members of the genera Helianthea, Bourcieria, Cœligena, &c. The arched bills of the Phäethornithes are admirably adapted for securing the insects which resort to the leaves of trees, and upon which these birds are said to exist. But how much are we astonished when we examine the bill of Eutoxeres, and find this organ curved downwards beyond the extent of a semicircle, a form beautifully adapted for exploring the scale-covered stems of the larger palms."

"Let us turn to another genus of this group—Grypus. Here the bill is not only armed with a strong hook at the end of the mandibles, but with a row of numerous and thickly-set teeth. The G. nævius is said to frequent the borders of the great forests, and to gain its food from among the interstices of the bark of the palm trees. Both this bird and the Eutoxeres, as well as the Phäethornithes, are said (and I believe with truth) to feed principally upon spiders, and we know that these are the food of the Grypus. All the members of the genus Ramphomicron are said to feed on insects which inhabit the alpine

Floræ, and their bill is well suited to the capture of the minute insects found in those elevated regions. In some instances the bill is perfectly wedge-shaped, as in Heliothrix, while in others it suddenly turns upwards, as in Avocettula. These forms are also adapted for some special purpose, of which, however, at present we are ignorant. Besides these there are others whose bills approach somewhat to the form of the flycatchers, as the Aithurus. This bird we know frequently seizes insects on the wing, and so doubtless do many of the others. It will have been seen that all these forms of bill are well suited for the capture of insects, and, as might be supposed, insects constitute the principal food of the humming bird, but that liquid honey, the pollen and other saccharine parts of flowers are also partaken of is evident from the double tubular tongue with which all the species are provided. Besides this they readily and greedily accept this kind of food when offered to them in a state of captivity, or when the corollas of a bouquet of flowers placed in a window are filled with sugar to entice them to approach; and from my own experience I know that they have been kept in captivity for several months upon this kind of food."

Here then we have all that Mr. Gould has to say on the important subject of food, and it must be admitted by all true naturalists that the very diversity of food, and in the manner of feeding, are important characteristics of the tribe. Among other groups of birds we find constancy of food an excellent guide in classification; thus the swallow tribe may be associated and distinguished by their propensity to capture exosteate animals on the wing; the hawk tribe have a like *penchant* for living endosteates; the vulture tribe for dead and putrefying endosteate carcasses; the herons for fish, and so on; but when we examine such a heterogeneous tribe as that called the passerine birds we find it contains consumers of every different kind of food; thus we have bird-eaters, insect-eaters, grain-eaters, fruit-eaters, &c., and indeed many groups which seem absolutely omnivorous. Mr. Gould finds amongst the humming birds, muscivorous, arachnivorous, mellivorous and pollenivorous species, thus making out a *primâ facie* case for considering the group of diversified food and economy, and leading to a conclusion, also *primâ facie* but inevitable, that a group thus diversified is of greater extent than hitherto ascertained, and of proportionate importance in a natural system. I will revert to this subject almost immediately, and will suggest another possible cause for the diversity in question; but I must first pause for a moment to consider Mr. Gould's mention of pollen and other saccharine parts of flowers. The slight obscurity of these words induces me to pen the following queries.

First, Is the pollen really a food of the humming bird? *Secondly*, Can it, in the precise language of Natural History, be properly called "saccharine"? *Thirdly*, What are the "other saccharine parts of flowers," the "liquid honey" having been already carefully elimina ted? I leave these queries unanswered: let the reader take them for what they are worth.

To take any exception to Mr. Gould's conclusions that the food of humming birds is very various, but that insects really do "constitute their principal food" may seem somewhat captious, but certainly drawing my conclusions from Mr. Gould's own observations, and without travelling the least tittle beyond his own record, I should be ready to conclude from the wonderful structure of their double tubular tongue, so similar to that of a Papilio or Sphinx, from their known preference for long tubular corollas, from their propensity to pierce those corollas with instinctive certainty at the exact point where the nectary is situated, and, finally, from the interesting fact here recorded of the mode of feeding and kind of food so complacently taken in confinement: from all these I say I should be ready to conclude that the liquid honey of flowers was the normal food of the humming bird. But, then, how numerous the exceptions! and here I will not take shelter under the trite and really paradoxical adage that exceptions prove the rule, but will grant at once that the exceptions are, for anything I know to the contrary, as constant, as prevalent, and as clearly established as the rule itself. But what is the teaching of these exceptions? In the first place how very frequently do we find a phytophagous bird, whether it be a fruit-feeder, as the whitethroat, a seed-feeder, as the goldfinch, a corn-feeder, as the sparrow, or a feeder on the wheat plumule, as the skylark certainly is in the autumn, seeming to abandon its normal and natural food during the whole of the breeding season, and spending its time and its energies in searching for caterpillars to feed its young. Is not the humming bird thus employed when she visits the wondrous web of the spider, and plucks the unsuspecting geometrician from its centre, while her wings vibrate so swiftly as to be invisible, and so gently that the delicate fabric is scarcely moved by the artificial breeze? And does she not carry away the minute spiders thus captured to feed her young ones? Certain it is that where this habit was observed the spider-catchers were actually engaged in rearing a brood of little ones. I would not, however, restrict the insect food of the humming birds exclusively to spiders; there is no reason to doubt that they eat winged insects also. But taking this for granted, and taking it also as exceptional, a similar exception exists

with the birds I have mentioned, all of which freely eat insects throughout the breeding season. Taking still another view of the subject nothing is more likely, I might almost say more a matter of course, than that in a group so diversified as the humming birds there should be a division feeding on flies and another on spiders, and that neither of these facts should in any way interfere with the normal mellivorous propensity of the tribe implied in the extraordinary structure of the tubular tongue.

I am well aware how common it is for the man of straw in the critic's chair to assume a knowledge superior to that of the author he is reviewing. I will not fall into that error. Knowing how perfectly Mr. Gould has informed himself on all these points, I take it for granted he is scarcely open to contradiction on matters of fact; neither do I know from what other source I could obtain reliable statements opposed to anything he has advanced had I desired to do so. The suggestions I make have a wider scope and more general bearing than the pleasure of detecting an error of fact or of pointing out an inconsequent inference.

Flight of Humming Birds.—"How wonderful must be the mechanism which sets in motion and sustains for so lengthened a time the vibratory movements of a humming bird's wing! To me their action appeared unlike any thing of the kind I had ever seen before, and strongly reminded me of a piece of machinery acted upon by a powerful spring. I was particularly struck by this peculiarity in the flight, as it was exactly the opposite of what I expected. The bird does not usually glide through the air with the quick darting flight of a swallow or swift, but continues tremulously moving its wings while passing from flower to flower, or when taking a more distant flight over a high tree or across a river. When poised before any object this action is so rapidly performed that it is impossible for the eye to follow each stroke, and a hazy semicircle of indistinctness on each side of the bird is all that is perceptible. Although many short intermissions of rest are taken during the day the bird may be said to live in air, an element in which it performs every kind of evolution with the utmost ease, frequently rising perpendicularly, flying backward, pirouetting or dancing off as it were from place to place, or from one part of a tree to another, sometimes descending, at others ascending; it often mounts up above the towering trees, and then shoots off like a little meteor at a right angle; at other times it quietly buzzes away among the little flowers near the ground; at one moment it is poised over a diminutive weed, at the next it is seen at a distance of forty yards, whither it has vanished

with the quickness of thought. During the heat of the day the shady retreats beneath the trees are very frequently visited; in the morning and evening the sunny banks, the verandahs and other exposed situations are more frequently resorted to. In the intervals of flight I believe that they not only rest in the ordinary way, but even pass some time in sleep; at least I found that this was the case with my living birds, and that from this state of partial torpor they were not easily aroused. In the morning and evening they were far more animated than at any other period of the day; and they would even perform their buzzing evolutions round their cage and sip from their little bottle in the night time if a light was brought into the room. They usually sat in a moping position, with the bill in a line with the body, or slightly elevated, after the manner of the kingfishers. I never saw them hang by their feet and sleep with their heads downwards, a position which I have been informed is sometimes assumed by humming birds."

Such being our author's description of the flight of humming birds it follows as a matter of course that the organs of flight should be next presented to our notice, and it seems desirable in this place again to invite the zoologist to contrast the insect-like flight of the humming bird, here so truthfully pourtrayed, and the smooth hawk-like flight of the swift, which differs in every character. It is curious, and for my purpose most opportune, that Mr. Gould in his admirable remarks has no idea whatever of giving any prominence to this difference; on the contrary his previously-quoted remarks on affinities indicate a leaning towards the strange hypothesis that the humming birds have tolerably near affinities with the swifts.

The Humming Bird's Wings.—"When we have compared the wings of Calliphlox amethystinus with those of Patagonia Gigas we have noticed the two extremes of development in those organs, but many intermediate forms exist, and each modification has doubtless an influence on the mode and power of flight. I cannot leave the subject of the wings without alluding to the extraordinary development of the shafts of the primaries in the Campylopteri. The great dilatation of these feathers would lead one to suppose that they have an influence on the aërial movements of the birds, but, strange to say, this remarkable feature only occurs in the males; the females are entirely destitute of it. It might naturally be supposed that such a modification of so important an organ must be formed with an especial object. What, then, can be the particular use of the broad dilated shafts of these

singularly and apparently awkwardly-shaped wings? Generally the primaries and secondaries are of a sombre and uniform hue, while the shoulders or wing-coverts in most instances are of the same colour as the other parts of the body. There are, however, a few, but a very few, exceptions to the rule, and I may mention the Eulampis jugularis and Pterophanes Temminckii as instances in point; both these birds have luminous wings, and must form very striking objects during flight, and, as I believe colour is seldom given without the intention of its being exhibited, there is doubtless something peculiar in the economy of these birds. The primaries and secondaries are in some instances stiff and rigid, while in others they are soft and yielding; some are broad, others narrow; they are always the same in number, and the first quill is constantly the longest, except in Polytmus cephalater, where the second exceeds the first in length."

The tail, so often called the "bird's rudder," must necessarily be considered in connection with its wings the undoubted propellers of the bird's course through the air.

The Humming Bird's Tail.—"Connected intimately with the mode of flight is the form and structure of the tail, and in no group of birds is this organ more varied; in some species it is four times the length of the body, in others it is so extremely short as to be entirely hidden by the coverts. Every humming bird, however, has ten tail-feathers and no more. I am aware that this number is not apparent in some of the smaller fork-tailed species, the two centre feathers being so exceedingly minute as to be almost obsolete; but if a careful examination be made that number will be found. The tail appears to be, and doubtless is, a very important organ in all the aërial movements of the Trochilidæ, and accordingly we find very great variations in its form among the many different genera of which the family is composed. In Cometes and Lesbia the forked character is carried to its maximum, while its minimum is seen in Calothorax, Acestrura and the allied groups. The tails of all the members of the two former and many other genera are of this form, while in others it is only seen in a single species of a group, all the other members of which have rounded, square or cuneate tails. Next to this we may notice the species with feathers terminating in spatules, such as Loddigesia, Spathura, &c. I was informed by the late Mr. Dyson that the flight of these birds presents a marked difference from that of other humming birds, and that their appearance in the air is most singular, the tail being not only constantly opened and shut, but the spatules always in motion, particularly when the bird is poising over a flower; and if this be

really true what an extraordinary appearance must the Loddigesia mirabilis present during its evolutions!"

The last structural peculiarities to be noticed are those of the feet.

The Humming Bird's Legs and Feet.—"Nothing has yet been said respecting the legs and feet. Diminutive as they are they will be found to be very diversified. In some instances the tarsi are bare, in others they are thickly clothed, as in the Eriocnemides; in some the toes are very diminutive, and are furnished with equally small rounded nails; in others all the toes, particularly the hinder one, are greatly developed and armed with long, curved and extremely sharp spine-like claws. This latter form is admirably adapted for clinging to the petals of flowers, a habit common to many members of the family, which not only settle upon but thrust their spiny bills through the bell-shaped flowers. The power these little birds possess of clinging to the branches is very remarkable; they hang on with their little feet and hooked claws like bats with such pertinacity that I was often fearful of dislocating the legs of my living birds when attempting to remove them from their perch."

I do not wish to conceal the fact that these copious extracts are made because they are delicious and instructive, and will I am sure be welcomed by my readers. It is a matter of course that I should append to them certain commentaries just to show that I have not quoted at random, but have had a method and aim, to which the extracts are used as contributions. That object is classification. Mr. Gould's views on this subject are now before us. "While I admit," says he, "that humming birds are somewhat allied to the swifts, they are so essentially distinct from these and all other birds that they might be separated into a distinct order," &c. (see *ante*). The admission that they are somewhat allied to the swifts seems an act of courtesy rather than of judgment, since Cabanis and all the later writers unite them with the swifts and goatsuckers, and since the writer of the admission proceeds immediately to point out what he considers the most striking points of dissimilarity. Now when we consider the *prestige* attached to the name of Gould as an ornithologist and the very humble claims which the editor of the 'Zoologist' possesses to be called an ornithologist at all,—his weaknesses having taken very different forms, as of fern culture, reptile study, caterpillar describing, &c.,—it cannot be expected that his editorial opinions will have much weight, still I venture very explicitly to state that I dissent *in toto* from Mr. Gould's first conclusion that the humming birds are "somewhat allied to the swifts," and equally so that humming birds can possibly "constitute a separate order of birds." And were it

necessary to go farther I cannot see that Mr. Gould has brought out the strongest points of difference between humming birds and swifts, although he very evidently desires to do so. Let us investigate these matters.

The "most ample wings and vast powers of flight" Mr. Gould considers as supporting the view that the humming birds and swifts are closely allied. I cannot regard these characters of the slightest value, otherwise the affinity will extend with equal force to the vultures, the terns, the albatross and the frigate bird. The *experimentum crucis* is this, How are the wings used? What says Mr. Gould on the subject? The motion of the wings of humming birds is so "rapidly performed that it is impossible for the eye to follow each stroke, and a hazy semicircle of indistinctness on each side of the bird is all that is perceptible." Now I cannot describe in language so graphic as Mr. Gould's the mode in which the swallow tribes use their wings; if I could the contrast would be more striking perhaps than any to be found throughout the feathered world. Indeed there is no similarity between the wings of humming birds and swifts, except such as is common to other birds, and in the use of the wings the contrast is the most violent that can be imagined.

Coming to Mr. Gould's second suggestion, that of constituting the humming birds a separate order, in what do these nectar-drinkers, honey-imbibers, sun-loving, Sphinx-like fairy birds of the New World differ from those of the Old World; I mean the Nectarinidæ. There is a difference, indeed there are differences, but incomparably less important than those which separate the humming birds from the swifts; the nectar-drinkers of the New World, regarded collectively, have the feet small and the tarsi short, while those of the Old World have feet and tarsi and toes of moderate size, much as in the Sylviadæ; and the mode of flight differs in the two groups, that in the Nectarinidæ being much after the weak and ill-sustained manner of the other passerine groups; and in no instance with which I am acquainted does the sun-bird of the Old World quaff the nectar of flowers while hovering on the wing. Many years ago I could have ridiculed, as Mr. Gould does now, the idea of making the humming bird an inhabitant of both worlds, but now that these nectar-drinkers have gradually become less unfamiliar I have learned to regard with far greater leniency the frequently-repeated assertions of travellers that they have seen humming birds on the coast of Africa and among the delightful spurs of the Himalayas. These assertions, though not rigidly in accordance with scientific fact, are nevertheless so nearly true that they establish beyond

a question that the nectar-drinkers of all countries are closely allied, so closely indeed as to deceive the instructed eye of many an accomplished and observant traveller.

Let us now examine the humming bird's mouth and compare it with that of the nectar-drinkers on one side, and those of the goat-sucker, the swift and the swallow on the other; and here let me observe that if we once adopt a division, such for instance as that called fissirostral, let it comprise *all* those birds which clearly possess the character in question, but let us exclude *all* others which have been annexed simply because they are difficult to dispose of in any other way, such for instance as the kingfishers. The true fissirostral birds are the Caprimulgidæ nocturnal, and the Hirundinidæ diurnal; and whether we call them fissirostres or swifts we must regard them as a united and most natural group, and must compare or contrast their most strongly pronounced characters with those of the humming birds. First the gape is an important element in the beak of every bird; in the Nectarinia and Trochilus the gape is extremely small; it does not extend into the cheek, it is scarcely perceptible when the mandibles are separated, it is invisible when the mandibles are closed. Compare this with the gape in Podargus, which is simply a nocturnal swift. I select the Podargus because it exhibits the swift character in excess. When the mandibles are separated for the purpose of gulping the enormous nocturnal insects which constitute their food the bird looks as though the upper portion of the head must inevitably fall off, so widely does the gape extend below and beyond the eye. Even when closed it often curves upwards almost behind the eye: the reader unacquainted with this extraordinary structure will do well to trace it through the genera Batrachostomus, Podargus, Caprimulgus, Scotornis, Cypselus, Acanthylis and Hirundo. There is no halting-place between either two of these genera. From the gape we pass easily to the external development of the beak. I use the word external for want of a better; I mean that portion projecting in advance of the face. In the seven genera I have mentioned above the united mandibles, forming two sides of an equilateral triangle, scarcely project beyond the face, and present a strange contrast to the excessive gape. In Nectarinia and Trochilus the beak is extended in a slender form and with parallel sides far in advance of the face, and however the species (erroneously called genera) either may vary in the curvature or length of their beaks, these characters of slenderness, parallelism and deficiency of gape obtain throughout these groups, as regularly as the triangular form, absence of extreme development and excess of gape in the true fissirostres.

One glimpse at the tongue and I have done. In humming birds this organ assumes an extraordinary form and character, which I regret to say I have never had the opportunity of examining, but which from the description would appear to differ from that of all other birds. It is long, slender and extensile, or capable of protrusion far beyond the beak; but its distinguishing character is that nearly throughout its length it is bitubular, the tubes uniting almost in the throat, where the tongue is continued in the excessively-developed forks of the hyoid bones, and united to muscles which pass under the throat, and then returning over the head are attached to the fore part of the skull, not far from the base of the upper mandible. This wondrous structure is partially observable in the woodpeckers, the extensile character and the apparatus for protrusion and retractation being much the same; but the tongue of the woodpecker is not tubular, the extremity being converted into a kind of harpoon, with which the insect prey of the bird is transfixed. The goatsuckers and swifts have small and short tongues, quite incapable of protrusion; and this brevity of tongue may be said to culminate in the kingfisher, where it is reduced to an insignificant triangular process lying at the base of the lower mandible. The tongue of the sun-bird is long and slender, but I find no sufficient authority for stating that it is either extensile or tubular, and therefore this organ affords me no corroborative evidence of the affinity I have desired to establish between the humming birds and the sun-birds.

And now it is time that I bring this protracted notice to a close. It has extended to a far greater length than I intended, and its very length has for several months delayed its appearance; but worse than this, and more to be lamented, the subject is yet incomplete; the nests of humming birds remain untouched and unexamined, and these alone might fill a number of the 'Zoologist.' I might explain from personal observation, not in "Antarctic France" but in smoky London, how these beautiful little structures are sometimes glued to the surface of a palm leaf, sometimes stuck in the fork of a branch, sometimes suspended by a rope of straw, swinging lightly and in safety amid the uproar of equatorial storms. I might tell how that they always contain two snow-white eggs reposing side by side, and looking like twin sugar-plums; but I forbear: I leave the subject with no promise, indeed with no intention, of returning to it. I can do nothing further than refer my readers to the works of that indefatigable and most accomplished naturalist, who has made the subject his own, and whilst shedding a flood of light on the history of the humming bird has earned for himself a name that will not die. Of such a naturalist as

Gould it is possible that George Herbert was thinking when he sang,

> "Of all thy creatures, both by sea and land,
> Only to man hast thou made known thy ways;
> And put the pen alone into his hand,
> And made him secretary of thy praise."

EDWARD NEWMAN.

The Norwegian Jer-Falcon (Falco Jer-falco norvegicus of Wooley, "rip-spenning," *Lap.*, "jagt falk," *Sw.*)—Of this dark jer-falcon I only succeeded in obtaining one nest with three eggs, which was taken by a Lap on the 8th of June, from a high cliff on the shores of Lake Wihrigaur, on the Norwegian frontier, about fifty miles west of Quickiock. And now allow me to say a few words respecting this northern jer-falcon. And first I will refer the reader to Dr. Bree's 'Birds of Europe,' in which he will find a life-like picture of this bird, be it only a variety of the Iceland falcon or a distinct species. I have not had the luck to examine many specimens of this falcon, but all I have seen have been as dark in plumage as Dr. Bree's figure. They all appeared to be smaller than the Iceland falcon; the colour different from the young Iceland falcons which I have seen, and more resembling the peregrine falcon; and although I am hardly competent to give an opinion, in my mind it is clearly a distinct species, entirely confined to the Scandinavian fell (but not only to Lapland, for it is met with as far south as the Dovre fells in Norway, where it is known by the name of the "bla falk," or the blue falcon). The egg coloured by Dr. Bree is from a specimen in the British Museum, and more resembles a light variety of the egg of Falco islandicus than the eggs of this dark jer-falcon which I obtained. The three eggs which were brought to me with part of the old female were of a uniform dull red colour all over, not speckled or patched, and of a more elongated form. This bird is well-known to the Laps, who distinguish it from the peregrine, the only other large falcon that breeds on these fells; and it appears to be not rare — in fact, from what I could gather, more common in this district than even the peregrine. So much confusion has existed, and so many different opinions have been given respecting the identity of this falcon, that any observations which may tend to throw a light on the matter must be acceptable to the naturalist. Whether or no there be three distinct species of the jer-falcon, one thing appears to be clear, that this dark falcon never becomes perfectly white, as in the Greenland and Iceland forms. And here let me correct a mistake which seems to have gained ground in England, "that in Scandinavia the forms found in Greenland and Iceland never seem to occur." Far from this being the case I never yet heard of this dark variety (unless, indeed, we follow Nilsson, and consider this dark form as nothing more than the Iceland and Greenland bird in a dark state of plumage) being killed off the fells, and certainly all the jer-falcons which are killed in the south and middle of Sweden (and I have seen them very white) appear to belong to the Greenland and Iceland forms. Nay, more than this, I bought at Quickiock a skin of a very fine white old Iceland falcon, which was killed up there in 1861. The man who shot it considered it a great rarity, as he had never seen one so white before, but I do believe that the only bird which breeds on these fells is the dark Falco Jer-falco norvegicus. I very much doubt, however, whether we are correct in applying the Linnean synonym of Falco

lanarius to this bird, and in this opinion I am borne out by Nilsson, for in the last edition of his ' Birds of Scandinavia ' (1858) he describes the Falco lanarius, *Lin.*, as quite a different bird, under the Swedish name of " slag falk." And although Linneus, in his ' Systema Naturæ ' (at least in my translation by Turton, of 1800), in describing the F. lanarius does not say anything regarding the colour of the head, Nilsson in describing the " slag falk " (*F. lanarius*, Lin.), distinctly says, " head white, tinged with rusty yellow," and, except that he gives the length of the old female twenty inches, his general description agrees with Dr. Bree's description of the lanner falcon (*F. lanarius*, Schleg.), ' Birds of Europe,' p. 37. Linneus's description of the lanner was from a younger bird killed in Sweden. In Nilsson's description of the Falco Jer-falco he does not use Linneus's synonym of F. lanarius, but he gives to it the synonym of F. rusticolus, *Lin. Faun.* p. 19 (older female), and also F. Jerfalco, *Lin. Faun.* p. 22 (young bird). Neither Nilsson nor Sundewal will allow that there is more than one species of jer-falcon in Sweden, in describing which Nilsson uses all these synonyms :—" Falco Gyrfalco, F. islandicus, F. candicans, F. grœnlandicus, F. rusticolus, F. fuscus, F. umbrinus," and he gives it the Swedish names of jagt falk, hort falk, bla falk (the name by which this dark F. Gyrfalco norvegicus is known on the Norwegian fells), and he also gives to the same bird the Lapland name of reifsakfalle—thus clearly identifying it with our Lap " rip-spenning," which word has precisely the same meaning as the riefsakfalle, only used in another district. He then gives us descriptions and measurements taken by himself from fourteen different specimens, varying in length from 21 inches to 25 inches, and presenting every shade of plumage, from the dark young to the old white mature bird. Nilsson's experience in Swedish Ornithology is very great, and has extended over many years, and his opinion, with me at least, always carries weight. I may remark that he divides his specimens into two series—the first with oblong, the latter with transverse spots. He winds up his remarks with the following pertinent note, which I translate freely and fully :—" To this latter series probably belongs Schlegel's F. candicans islandicus, as he has described it in his ' Révue Critique,' p. 4. It is also undeniable that Linné's F. rusticolus and F. Gyrfalco belong to this group, but by referring to the above measurement it does not appear that the F. Gyrfalco is so much smaller than F. candicans islandicus. Herr Schlegel (' Révue,' p. 57) expresses his surprise that the true Norwegian F. Gyrfalco, which he (Schlegel) nevertheless supposes to be identical with Linné's F. lanarius, *Faun. Suec.*, should have been altogether unknown to the Scandinavian naturalist until he (Schlegel) described it. And Degland, in his ' European Ornithology,' reiterates the same. Yet it would indeed have been very surprising had such been the case; but not only has this F. Gyrfalco been known to us even from Linné's time, but we also know the transitions from this to the F. candicans islandicus of authors; therefore we do not consider ourselves justified in dividing them into two or more species." So much for Nilsson. He clearly considers this F. Jerfalco norvegicus of Wooley, the F. grœnlandicus of Hancock and F. islandicus of Hancock as all varieties of one bird—F. Gyrfalco, *Lin.*, and not three distinct species; and presumptuous as it may appear for me to differ with a naturalist of such standing, I cannot help it. Without going into the question as to whether F. islandicus of Hancock and F. grœnlandicus of Hancock are anything more than local varieties of the same bird, I consider the dark Norwegian jer-falcon a clearly distinct species from either; and although, perhaps, the young of this may be easily confounded with the young of the F. islandicus of Hancock there is too marked a difference in my eye between the old bird to admit of their being considered as nothing

more than the same bird in a different stage of plumage. Kjærholling, the Danish naturalist, distinctly says that this Norwegian jer-falcon, which he calls Falco Gyrfalco, is distinct from both the Iceland and Greenland forms. In his description, he says of this Norwegian bird :—"It never becomes white. From the young Iceland and Greenland falcon it differs in its smaller size (in the same sex), by the dark spot on the cheek (as in the peregrine), by its yellow-green legs; and, further, in that the spots on the under part of the body and sides have the form of 'transverse bands.'"—*H. Wheelwright, in 'The Field.'*

Kite (Falco Milvus) *near Leeds.*—We have had a specimen of the kite (Falco Milvus) in the woods here for the last eighteen months. I gave orders that it should not be molested, in the hope that it would find a mate, and so breed here; but though it is still about, it has not yet met with a help meet.—*W. Christy Horsfall; Horsforth Low Hall, near Leeds, January* 2, 1863.

Common Buzzard (Buteo vulgaris) *at Battle.*—A fine old female of the common buzzard was trapped upon the Battle Abbey grounds, Sussex, on the 23rd of December last, and sent to me for preservation; the entire plumage is a dark chocolate-colour.—*Robert Kent; St. Leonards-on-Sea, Sussex, January* 8, 1863.

Roughlegged Buzzard (Falco lagopus) *in Cambridgeshire.*—The land-steward of General Hall has informed me that his master, while cover-shooting near the Six-mile Bottom Station, was agreeably surprised to flush a truly magnificent specimen of this hawk. Through the kindness of the steward I have been favoured by a sight of this bird, which is nearly in full adult plumage, a dark variety of the species. This bird had been seen and known to frequent the locality (a famous one for its habits, being the best stocked with game of any in the county) for some time previous to its accidental capture by the gun of General Hall. Numerous farmers and sporting men in the immediate vicinity had even followed it for a day at a time, but with no success, owing to its being extremely vigilant and wary, never allowing of a near approach. At the time of its unlucky appearance and the deadly aim of General Hall, I have no doubt that its appetite had for once stilled its instinctive warning of approaching danger. The capture was made on the 7th December, 1862.—*S. P. Saville; Dover House, Cambridge, January* 5, 1863.

The Roughlegged Buzzard (Falco lagopus) *in Yorkshire.*—On Friday last, the 16th instant, a fine male specimen of the roughlegged buzzard (*Buteo lagopus*) was shot in this neighbourhood. It is at present in the hands of Mr. Richard Richardson, birdstuffer, Beverley, at whose house I saw it in the flesh, and proved its sex by dissection.—*W. W. Boulton; Beverley, Yorkshire, January* 19, 1863.

The Roughlegged Buzzard.—The roughlegged buzzard (*Falco lagopus*, Brunn; "*fjösbent wrak*," Sw.), was by far the commonest of all the birds of prey in the Quickiock district during the summer, probably owing to the quantity of lemming which swarmed on these fells. Of all the falcons, I think that this buzzard varies most in the shading of its colouring, and I have remarked that the female is generally lightest, becoming nearly gray-white with age. But if the birds themselves vary, I am sure we may say the same of the eggs, for I have taken them of every shade, from pure white to a dark brown blotched egg. It is almost impossible to distinguish these eggs from dark varieties of the common buzzard's, except that in general the egg of the roughlegged buzzard is a little larger (but I have seen the egg of the common buzzard as large), and it has a rather finer and bolder character, if I may be allowed the term. These buzzards appeared on these fells as spring migrants. The first I

observed was early in May, and the first nest I obtained was on May 21st, with three eggs; and although I have obtained the nest with five, and once even with six eggs, I observed that three was the most usual number, and most often sat on. The nest, a coarse edifice of sticks, moss and grass, loosely put together, was often on a fell-ridge, often in a tree, but never down in the forest; always on the sides of the fells, but always below the snow-region. I have occasionally seen them beating over the lower meadows in the end of July, after the young ducks, but I never by any chance saw a roughlegged buzzard in the forests. The fells appear to be their peculiar summer home (for they breed in no other part of Sweden); and on August 18th, the last day that I was on the fells, I counted seventeen on the wing, soaring very high over one fell tract; and the reader may further fancy that they were very common here, from the fact that more than fifty nests were destroyed in this district during the spring of 1862. In habits, flight and appearance, the roughlegged buzzard much resembles its congener, the common buzzard, from which it may be always distinguished when in the air by the white root of the tail. Its cry is a loud "ka haa," not unlike the melancholy call of the common buzzard, and is in perfect harmony with the wild, lonely fell-tracts which it frequents. The period of breeding must extend over a very long space of time, for I observed downy young ones in a nest on August 6th. I do not think this bird is so sluggish in its habits as the common buzzard; and, although doubtless lemming and fell mice form their principal food, I am certain that they destroy many ptarmigan, for I have seen the ground surrounding the nest thickly strewed with the feathers of the ptarmigan.—*H. Wheelwright, in 'The Field.'*

The Roughlegged Buzzard (Falco lagopus), *and Hen Harrier* (Falco cyaneus) *at Ashburnham Park.*—A noble specimen of the roughlegged buzzard, a female, was trapped as above, on the 13th of January; the hen harrier, a very beautiful-marked ringtail, was also trapped by the same person, on the 17th of January; they are now in my possession.—*Robert Kent; St. Leonard's-on-Sea, Sussex, February* 8, 1863.

Notes on the Hawk Owl (Strix funerea), *and Tengmalm's Owl* (Strix Tengmalmi) *as observed in Lapland.*—The hawk owl was by far the commonest owl in this district, and although, of course, like the rest of the tribe, the lemming forms its principal food when they are "in season," I don't believe this bird migrates much, but remains stationary in the same district throughout the year. It is true, however, that in winter we occasionally kill an odd example, both old birds and birds of the year, as far south as Wermland, but I do not think, except as stray individuals, they migrate from their native forests. The range of the hawk owl in the north is precisely that of the Siberian jay—the lower fir-forests at the foot and by the sides of the fells. The hawk owl is by no means shy, and in the breeding season is one of the boldest of all birds. Seated on the top of a dead pine, close to the nest where his mate is sitting, the old male bird keeps a constant watch, and as soon as any one appears to be approaching the nest, he raises his tail and head (just after the manner of the cuckoo), and uttering a shrill cry, not unlike that of the kestrel hawk, down he comes full on the head of the intruder; dashing by with the speed of lightning, he returns to the charge again and again, till he has either cleared the coast, or has paid the penalty of his rashness with his life. My lad was really frightened at this bird, and always hated to go up to a nest; and well he might, for on one occasion, when taking the eggs out of a dead pine, without a branch to help him, holding on, as the sailors say, "by his eyelids," forty feet from the ground, the old bird made a swoop down on his head, struck off his cap (through the top of which a large slit was cut), and in a moment returned to the charge, tearing

off a very fair-sized handful of his hair. I was standing below, and knocked the old bird over with his claws full of hair. Had I not been at the bottom of the tree with my gun, the lad might easily have been beaten off his hazardous perch. There is no trouble in shooting the hawk owl if you have only a close-ranging dog in the forest; for, whatever time of year it may be, as soon as ever the bird spies a dog below him, he always descends to give battle. In flight, manners and appearance, the hawk owl is closely allied to the hawks. It is strictly diurnal in its habits, and to the stealthy quiet flight of the owl adds the spirit and courage of the falcon. No forest bird is safe from the attacks of these owls. I have seen them strike down the Siberian jay, their closest neighbour, on the wing; and more than once have I disturbed them feeding on the old willow-grouse, a bird half as large again as themselves. Their principal food appears to be birds, lemming and wood mice, but I have often taken insects out of their stomachs. There is little difference in the plumage of the male and female, but the latter is rather the larger; and in the breeding season I have observed that the breast and belly of the female is strongly tinged with reddish brown. The male takes his turn at sitting, for I have shot both as they flew out of the hole from the eggs. The hawk owl moults very early, as do many of the northern birds. Like the Siberian jay, the old birds may be seen in deep moult, without tails, even before the young are flyers; and in both the autumnal moult is complete as soon as the young birds are full-feathered. The hawk owl is then in its best plumage, and its clean, pure, shining dress at that season is very different from the dingy colouring of spring. The nest is always in a hole in a rotten pine or fir, sometimes at considerable height from the ground. On June 30th I took a clutch of the hawk owl with eight eggs—probably a second clutch from a bird whose first nest had been robbed, for we seldom found fresh eggs after the second week in May, and early in June we shot young flyers. I also took, on May 30th, a clutch of Tengmalm's owl, with ten eggs. But these certainly were exceptional cases. As to the nest, I never saw a *nest* of either, the eggs having been always laid, like those of the woodpecker, in a hole with nothing under them but a few dry splinters and chips of the rotten or fresh wood, as the case might be. The eggs of the hawk owl very often so much resemble those of the short-eared owl that one might well pass for the other; but they are in general a little smaller, rather more elongated and pointed at the small end, and of a deep dirty white. Usual size: 1½ inch by 1⅛. Tengmalm's owl was, next to the last, the commonest owl in our forests, but, being much more nocturnal in its habits than the hawk owl, it was not so often seen; not that the light appears much to affect its vision, for here the summer nights are as light as day, and we rarely went into the forest on any night without seeing this pretty little owl hawking after its prey. The eggs of this owl vary much in shape, but not so much in size. In the same nest you will see some eggs as round as musket-balls, others oval and elongated. The usual size, however, is about 1⅜ by 1 inch. This owl has a much more southern range than the last, for we not unfrequently take nests in S. Wermland; but, strange to say, they are met with, like those of the crossbills, only about every third year. This owl goes to nest early; after the end of May you rarely find eggs. It has been remarked that whenever this owl has appeared in autumn, in the very south of Sweden, a severe winter has always followed. We found it to occupy in the Quickiock forest precisely the same range as the hawk owl, and we never, by any chance, saw one on the fell-sides higher than the fir region. It is a bold, voracious little bird. One light night I shot a female in full chase after lemming on a frozen lake. In Wermland, on one occasion, having caught an old female on

the eggs, I took her home in a small fishing creel, and casting in a titmouse which I had shot found it nearly devoured when I arrived home. I had her for a long time in a cage, and a very pretty little pet she was, becoming very tame. The call-note was a very musical soft whistle, which, however, I never heard, except in the evening and night. I could never detect the slightest difference in plumage in the male and female. Till I took the nest in Wermland no Swedish naturalist appeared to be aware of the fact that this owl bred so far south. We took our first nest at Quickiock on the 2nd of May, and the last on the 30th of May.—*H. Wheelwright, in 'The Field' of January* 31, 1863.

[This excellent and very observant naturalist sometimes uses the same word in slightly different senses, thus rendering the context somewhat obscure. It will be noticed in the present most interesting paper that after explicitly stating that these owls make no *nest*, he speaks of their *nests* several times, alluding evidently to the hole in which these eggs are deposited. The assertion that these owls make no nest I believe to be quite correct.—*E. Newman*].

Great Gray Shrike (Lanius excubitor) *near Taunton.*—Last November a specimen of the great gray shrike was shot on the Nynehead estate, and has come into Captain Sanford's possession. The history of this specimen is a little singular, and perhaps may serve to show the fate of many a rare bird which a collector would give almost anything to obtain. The shrike was shot by a labourer who brought it home for his children to play with. After having amused them for a day or two it was thrown out on a dung-heap, as it had become rather stale. It here attracted the notice of Captain Sanford's gamekeeper, who, not knowing what it was, took it away for his master's inspection. It had been in the dung-heap a day or two before this happened, so that the bird-preserver in Taunton had rather a business to make a presentable specimen of it.—*Murray A. Matthews; Taunton, December* 6, 1862.

Great Gray Shrike (Lanius excubitor) *near Newmarket.*—I obtained yesterday a fine male specimen of the great gray shrike, which had been shot a few days previously near Newmarket.—*J. E. Harting, Kingsbury, January* 8, 1863.

Occurrence of the Redbreasted Flycatcher (Muscicapa parva) *in Cornwall.*—The following communication which I received from Mr. Gould enables me to add the above interesting and (to Western Europe) rare species to our Cornish list of birds:—

"Strange to say on the very day I visited Falmouth one of the rarest of European birds was shot for the first time in Great Britain, and it being killed in Cornwall I thought you would like to know something about it. The bird in question is the Muscicapa parva, and you will find figures of it in Part 14 of my 'Birds of Europe,' which you have in the Penzance Museum. The plates will at once give you an idea of this pretty species (a robin among the flycatchers). I certainly never expected this singular bird to have been added to our Fauna. This occasional lateral migration of birds is very singular: the proper home of the species is Western India or the eastern parts of Europe. The specimen was sent in the flesh to Dr. Gray, of the British Museum, and in this state I had it in my hands, so that there is no mistake about it. The bird was in good condition, thanks to your genial climate. The bird was shot on the 24th of January, by Mr. Copeland, of Carwythenack House, in the parish of Constantine, near Falmouth, and is a female. Unfortunately the specimen was placed in some insecure place, and the head was eaten by mice or rats, so that the body alone was sent to the Museum. If you write to Mr. Copeland ask him to look out for the male, which will have a red breast.—John Gould."

I wrote at once to Mr. Copeland, whose attention to Natural History, and whose especial interest in observing the ornithological rarities in our county, I felt sure would ensure an accurate account of the capture of this little wanderer, and I received from him in reply the following interesting remarks on the habits of the bird.

"Carwythenack, Constantine, February 9, 1863.—Your favour has duly reached me. The little flycatcher alluded to we observed some days before it was shot. Its habits were interesting, taking a great deal the character of our summer visitor. We first observed it on a dead holly tree; this tree and the ground around the house were its favourite resort. It was particularly active, skimming the grass to within about a foot, then, perching itself, darted occasionally with a toss, resting either on a shrub or the wire fencing. There is another in the neighbourhood, for which a vigilant watch will be kept. I saw it a few days back in a plantation which is four hundred yards from my house. Should I be fortunate to capture it you shall have due notice. I believe that with due attention many interesting visitors may be found.—G. A. Copeland."

I am unable to offer you any particulars of this valuable fact, except second-hand, but no doubt, upon the two authorities I have quoted, you will feel a pleasure in giving the visit of this new British bird a place in the 'Zoologist.'—*Edward Hearle Rodd; Penzance.*

Black Redstart (Sylvia tithys) *in the County Dublin.*—The black redstart has appeared here this year. On the 4th of January I saw one specimen, a female; on the 11th I saw two more, both also females.—*H. Blake-Knox, Bartragh, Dalkey, Co. Dublin, February* 8, 1863.

Early Nesting of the Hedgesparrow (Sylvia modularis).—A patient of mine (on whose word I can thoroughly rely) informed me a few days ago that he had found the nest of a hedgesparrow in his garden on the 1st of this month, containing four eggs, upon which the old bird was sitting. The nest was built of the usual materials, in a privet hedge, protected on one side by the wall of an out-building. My informant broke one of the eggs accidentally, and found it to be quite fresh. Several persons called to see the nest, the existence of which in this locality is certainly a most unusual circumstance. I was unfortunately prevented calling myself until to-day, when I found that some one had taken the nest, but had nevertheless left behind a sufficient portion to assure me that the materials were undoubtedly freshly gathered, and that the statement I had received was perfectly correct.—*W. W. Boulton; Beverley, January* 10, 1863.

[The notices of early nests are too numerous to mention, including hedgesparrows, robins, thrushes, blackbirds, titmice, sparrows and greenfinches.—*E. Newman*].

Parental Affection of the Willow Wren.—A pair of these little birds built last spring in my garden, in a bed of money-wort, under a branch of rhododendron, by which the nest was partially concealed. When first discovered by my gardener I think it contained three eggs, and, fearing lest the birds should be drowned by the torrents of rain which fell at the time, he placed over it an inclined roof of oilcloth, about a foot square. The bird continued to lay more eggs, until one day my youngest child saw the nest in the rude clutches of a favourite Scotch terrier. Having rescued it and taken it into the house in its dilapitated state, it was reconstructed as well as female hands could do it, and the eggs and nest both replaced. The birds at once returned, and though visited several times a day by various members of my family, succeeded in hatching four young birds, which, however, had the misfortune finally to fall a prey to the same dog. Mr. Yarrell mentions a somewhat similar case with respect to the same bird.—*Thomas Fry; Liverpool, December*, 1862.

Fire-crested Regulus (Regulus ignicapillus) *off St. Leonard's.*—On the 29th of last December a specimen of the fire-crested regulus was captured on board a collier, while laying at anchor off St. Leonard's, about a mile from the shore. It was quite exhausted, and allowed itself to be taken without making any attempt to escape. It is now in my collection.—*Robert Kent; St. Leonard's-on-Sea, January* 8, 1863.

The Shore Lark (Alauda alpestris) *near Lowestoft.*—A specimen of this rare bird, which is now in the possession of Mr. Gurney, of Norwich, was procured by me on the 28th of November, 1862. It was shot whilst running about quite alone on our Denes, on the day previous. Two or three others had also been seen, but not obtained. —*Arthur Wells Roberts; Lowestoft, December* 3, 1862.

Early Sparrow's Egg.—On the 12th inst I picked up, on the pavement in front of my house, a sparrow's egg. It was quite fresh, and must have been laid that morning, as I am sure it was not there the day before. Is not this a very unusual occurrence at this time of the year?—*W. Christy Horsfall; Horsforth Low Hall, near Leeds, December* 15, 1862.

White Variety of the House Sparrow (Fringilla domestica).—Mr. Gunnell, farmer, of Milton, in Cambridgeshire, shot, on the 28th of November last, a nice clean white variety of the house sparrow. This specimen was as white as any I ever saw, having only two small feathers of a dingy colour in its entire plumage. This poor little inoffensive farmer's helpmate had been constantly hunted by every idle boy in the parish, until it became a prey to Mr. Gunnell's fowling-piece, in my idea not over much to his credit, myself loving to see such rarities at large.—*S. P. Saville; Dover House, Cambridge, January* 5, 1863.

The Bittern (Ardea stellaris) *at Eastbourne.*—A very fine bittern was shot here on the 25th of November, which I had the opportunity of seeing and examining in the flesh.—*John Dutton; Eastbourne, December* 18, 1862.

Spotted Crake (Crex porzana) *near Taunton.*—When snipe-shooting, on the 18th of November, in some fens near Taunton, I shot a couple of spotted crakes. I mention this because of the late date, if the birds are to be considered migratory; there would be nothing unusual in the circumstance if this crake is only a partial migrant, as I am inclined to fancy it to be. My brother shot a specimen of the same species, on the 1st of March last, on the Braunton Burrows. This bird did not appear to have recently made a long flight, and might have been on the Braunton Marshes all the winter. The more it is considered the more difficult the migration question becomes to solve. I cannot help thinking that a careful collection and investigation of facts relating to the migration of birds, animals and fishes (and even insects), with a view to solving this problem, would be a more worthy object of labour than one or two questions which have been engaging the attention of our leading naturalists of late.—*Murray A. Matthews, Taunton, December* 6, 1862.

American Snipe.—In reply to the editorial query (Zool. 8287), I beg to say that I consider Scolopax Gallinago, S. americanus and S. Wilsoni constitute one species only, and that species distinct from the common snipe of Europe. We also find it named Scolopax Brehmi, &c., and Macgillivray says, "A species of snipe, Scolopax Wilsoni, occurs in North America." I would call it Scolopax americanus, seeing that there is but one known species in North America, and it has doubtless a better claim to be so designated than our common snipe has to be called the European snipe, seeing that four or more species occur. Though I have described—rather minutely, too—one of the darker specimens I procured, I had no idea of its being distinct.

Wilson says, "The female differs in being more obscure in her colours, the white of the back being less pure, and the black not so deep." Taking this for granted (which, by the bye, no ornithologist should do), I omitted to dissect one, though I skinned several: however, I have no reason to doubt Wilson's assertion, having invariably found both dark and light birds in the same swamps, and flying in company. I met with no other species of snipe during a year's residence in Canada. Why it should ever have been named Scolopax Wilsoni I cannot conceive, seeing that it must have been a well-known species long ere Wilson set foot on that continent.—*Henry Hadfield; Ventnor, Isle of Wight, December* 3, 1862.

[I do not yet quite understand my correspondent: if Scolopax Gallinago is portion of an aggregate species distinct from the common snipe of Europe, what is the common snipe of Europe to be called?—*Edward Newman.*]

The Sandpiper a Diver.— In the 'Zoologist' (Zool. 8196) Mr. Blake-Knox concludes his note with the remark, "Not knowing that these birds dived, I applied to Mr. Newman for information, and finding the fact entirely unknown to him, I insert this." I also observe notes on the diving of the sandpiper in the November and December numbers; but had it not been for Mr. Leven's assertion that he had noticed their diving "on one or two occasions, while the birds were amusing themselves on the shore or bank of the stream," there would, I think, be nothing very remarkable; for that a wounded water bird, though unwebbed, should endeavour to effect its escape by diving is not very wonderful. As to their swimming, I am inclined to believe that most unwebbed water birds would swim on being merely winged. In some unpublished notes I have recorded an instance of an oystercatcher swimming, as noticed at Lossiemouth, N.B., nor shall I readily forget it, on account of the wetting I got on the occasion; having, in mid-winter, waded into the sea after the bird, thinking, as it was in the dusk of the evening, that I had winged a duck. After pursuing it for some time in the shallow water, for it swam faster than I could walk, it took to the shore, where it was captured. As to the diving habits of the sandpiper, I have also a word to say, and will give the substance of the note above referred to. The same winter (that of 1858), and nearly at the precise spot, I shot some sandpipers while resting on a rock, two being merely winged. The rock was an isolated one, and I had some difficulty in getting to it, but the wounded birds remained quietly seated till I set my foot on it; they then plunged into the water, and could be seen diving or swimming beneath, one towards the shore (where it was subsequently caught); the other, making for some rocks covered with sea-weed, was lost sight of, and effected its escape. I had previously observed that, on being wounded, they would swim, but not dive. I have also seen sandpipers playing in shallow water, but never swimming or diving except when wounded.—*Henry Hadfield; December* 1, 1862.

Purple Sandpiper, Iceland Gull and other rare Birds at Dalkey.—The local little purple sandpiper (*Tringa maritima*) is rather a common species on this coast and the adjacent islands: it is generally seen singly or in pairs, though I have seen flocks of ten and fifteen. Unlike other birds of this family, the purple sandpiper evinces no fear of man; though approached within three yards, it will sit as if in a "brown study," with the head crouched upon the neck. Its cry is very similar to that of the snipe, though it also makes the shrill whistle peculiar to the sand birds. Birds shot in October have the purple feathers of the back deeply edged with cream-colour; those in winter plumage a narrow fringe of gray: the white of the abdomen is often suffused with cream-colour or pale pink. On the 2nd of this month, during a severe south-east

gale, I saw an immature specimen of the Iceland gull: it passed under the rock on which I was sitting, and within five or six yards of me: if I had shot it, it would have fallen into the boiling sea beneath. The goosander is not uncommon; I have shot specimens this year. Kingfishers were numerous in the autumn. A gray phalarope was shot lately on the coast of Dublin.—*H. Blake-Knox; Bartragh, Dalkey, County Dublin, December* 2, 1862.

The Glossy Ibis in Shetland.—About the end of October, 1862, immediately after a gale from the S.W., a specimen of the glossy ibis was brought to Dr. Edmonston by a man who had just shot it in his corn-yard, in this neighbourhood. The skin was preserved, and it appears to be that of an immature bird; for, although the whole length (23 inches) is fully equal to that of an adult, the irregular white bars across the throat, the dull rusty hue of the neck and under parts, and the white tips of the feathers of the head, sufficiently indicate its age. Neither the sex nor the contents of the stomach were noted by the man who prepared the skin. The bird appeared to be much exhausted, and would scarcely take wing when disturbed.—*Henry L. Saxby; Baltasound, Shetland, January* 25, 1863.

The Egyptian Goose (Anser ægyptiacus) *in Pevensey Marshes.*—A very fine specimen of this rare goose was shot, on the 4th instant, by a man residing in the above-mentioned place, and purchased by me for my collection. It is in perfect plumage, and never appears to have been in captivity, and what tends to confirm me in this opinion is the presence of an old and perfectly healed gun-shot wound in the foot, and the unsoiled state of its plumage. I am well aware of the frequency of these birds escaping from ornamental waters, but do not think this one has done so.—*John Dutton; Eastbourne, December* 18, 1862.

Rare Birds in Devonshire.—The following birds have been shot, within the last ten days, in the estuaries communicating with Plymouth Sound:—Black guillemot (*Uria grylle*). This species is a rare bird in Devonshire: the specimen that has recently occurred is an old bird in winter plumage. Iceland gull (*Larus leucopterus*). This is an example of a young bird of the year. Glaucous gull (*Larus glaucus*). The specimen just obtained of this gull is a young bird. Both the glaucous and the Iceland gull occur in the district of Plymouth during winter.—*J. J. Reading; Plymouth.*

Buffon's Skua (Lestris parasiticus) *near Wellington.*—I have to record the occurrence of Buffon's skua near Wellington, towards the end of last October. This bird was shot on the property of Mr. E. A. Sanford, of Nynehead Court, and is now in Captain Sanford's collection. Although in perfect adult plumage, the two elongated tail-feathers were missing, seemingly having been but just shed.—*Murray A. Matthews; Taunton, December* 6, 1862.

Sabine's Gull (Larus Sabini) *in Devonshire.*—Among some birds I recently saw, belonging to a gentleman in this neighbourhood, was a very perfect specimen of Sabine's gull, a bird of the year, in the pretty stage of plumage in which the birds of the year of the blackheaded gull (*Larus ridibundus*) are noticed in the autumn. This bird was shot on the south coast of Devon a few years since.—*Id.*

The Fulmar Petrel (Procellaria glacialis) *near Birmingham.*—During the stormy weather that occurred in Birmingham last month a fine specimen of the fulmar petrel was captured in a field situate at Perry Barr, about two miles and a half from this town. This circumstance is the more interesting, as Birmingham is known to be the most centrally situated spot in England.—*Joseph Smith; The Poplars, Acton, Birmingham, January* 9, 1863.

The Forktailed Petrel (Thalassidroma Leachii) *in Norfolk.*—A specimen of this rare petrel was shot at Salthouse, on this coast, on the 17th of November. It proved on dissection to be a female, measuring in length 7¾ inches; wing, from the anterior bend to the end of longest quill-feather, 6 inches; leg 1 inch; middle toe and claw 1 inch. The stomach was filled with some fishy substance not distinguishable. This bird has been killed in Norfolk in several instances, but not, I believe, since 1849. The present example was shot on some brackish waters, which, on Salthouse beach, run parallel with the sea-banks, and, to use the expression of the beachman who sent it me, "appeared to be walking on the water."—*H. Stevenson.*

The Sexes of the Salamanders.—Will you allow me, through the medium of the 'Zoologist,' to put a question interesting to Herpetologists, which some of your readers may possibly be able to answer? How can the sexes of Salamandra maculosa be distinguished, from external signs? I have had for six months two living specimens, from the South of Europe, which I selected from about a dozen which were on sale together. Eleven of these were exactly similar in all respects, except the yellow markings, from which nothing can be inferred as to sex. The remaining individual (which I possess) differed in some of its proportions, the length of the tail especially, which I have found in the English Tritons to be a sexual characteristic. I therefore selected this specimen, in hopes of its proving to be a "help meet" for the other. My object is to institute some observations upon the reproduction, larva state, &c., of this species in the ensuing spring. I believe S. maculosa is the S. terrestris of the older authors, the former name being adopted in the Museum Catalogue. If this is the case, I apprehend that in the early spring my specimens will manifest an inclination to take to the water, under the influence of the reproductive instinct; and if I can succeed in inducing them to breed, the results will be of great interest. The species is ovo-viviparous, and doubtless presents some curious phenomena in its method of reproduction. I am led to believe that if I am fortunately in possession of both male and female little difficulty will be experienced in inducing so stupid and indifferent an animal to follow the dictates of its most important instinct. Both my reptiles have constantly taken food, generally larvæ of T. molitor, but also earth-worms, and other living prey suitable in size. They appear to be guided to their food simply by seeing it in motion, having no other criterion of what is eatable. If a small piece of meat be laid before them they take no notice, but if the same morsel be tied to a thread and made to dance and wriggle as if alive, they soon hunt it down, and, after swallowing it, choke upon the thread. They have been kept in a large fern-case, amongst growing plants and rock-work, and are in very fine condition. Their large black eyes and the brilliant orange-yellow of their spots entirely relieve them from the charge of ugliness. They have refused to hybernate, I presume because they have not been subjected to the requisite degree of cold, and so far they are in an unnatural condition. I observe no indications of the growth of a crest, such as begins at an early period of the winter to adorn the tail of our common Triton cristatus. Hence I infer that the terrestrial salamander probably does not vary in personal appearance throughout the year. Being now upon the subject of salamanders, I may mention that I found a different species concealed in rotten trees in the pine forest of Aitone, in Corsica. This I take to be Euproctus platycephalus of the Museum Catalogue. Having failed in getting these to England alive, I preserved the largest in spirit, and have it now before me. It

differs considerably from my living examples, being much shorter and thicker, and with smaller and fewer yellow spots. The large head and obtuse muzzle well account for the specific name. The Triton alpestris I detected in a mountain stream of great coldness in the region of rhododendrons on the Pic Aubiste, Pyrenees. This animal, I am sorry to say, escaped from the vessel in which it was confined, and I had no opportunity of closely observing it. Our own species are confined to pools of still water, but in the South of Europe, where ponds of fresh water are scarce, the species seem to frequent running streams. Such was the case in Corsica, where I observed the larvæ of a Lissotriton (*Lophinus*) in some numbers in this situation. The perfect animal occurred on the ground in forests. To return to the principal subject of this communication: the organs and tissues concerned in generation are, in the case of the Urodela, concealed in both sexes within the cavity of the abdomen. It is not therefore easy to discriminate the sexes, in the absence of a crest and of differences of colour. The male of Triton cristatus closely resembles the female in winter time, when the dorsal crest has been absorbed. Nevertheless, the relative proportions of the tail and body afford a safe diagnosis. In the smaller newts (*Lophinus*) the persistent differences of colour in adult animals are sufficient to separate them. But I am ignorant of any differentiæ by which to discriminate the sexes of Salamandra. The insertion of this communication in the 'Zoologist' may perhaps elicit some information from those acquainted with Herpetology, and I shall be happy to communicate the results (if any) of my proposed attempt to breed young Salamanders.—*T. A. Marshall; 2, Vittoria Walk, Cheltenham, January* 16, 1863.

Distinctive Character of Reptiles.—It has often struck me as remarkable that neither Linneus, Cuvier, De Blainville, Geoffroy St. Hilaire, nor Agassiz, have noticed the simple and obvious external distinguishing character of reptiles; the epidermis or outer skin of quadrupeds is clothed with hair, of birds with feathers, of fishes with scales, but in reptiles it is uncovered, perfectly naked. It is not extraordinary that our natural-history bookmakers, having no practical knowledge of the subject, should have overlooked so vital an omission, but it is extraordinary that the men whose names I have enumerated above, each one of whom thought for himself, failed to observe so important a diagnostic. When, in 1856, I published my little treatise on the 'Physiological Classification of Animals,' I had no idea that the external or structural peculiarity of reptiles remained unnoticed. This omission is not simply such; it is accompanied by many positive errors; thus, Merrem and others have a reptilian order *squamata*, and Cuvier repeatedly uses the word *écailles* in describing the covering of snakes and lizards. The processes in question, whether described as *squamæ* or *écailles*, are projections, folds, or rugosities of the under-skin; and are not deciduous, like hairs, feathers and scales, but are as permanent and durable as the bones themselves. This may be seen when the slough of a snake is found. This slough is continuous, and contains a faithful mould of each of these processes; it is a very beautiful and very instructive object. The tortoise exhibits the peculiarity of an *articulated skin*, the articulation being clearly discernible in the living animal, but becoming more conspicuous after death, when dehiscence takes place, and the plates fall off, perfectly detached from each other.—*Edward Newman.*

Walking Fish.—A correspondent in Province Wellesley informs us that while passing along, during a shower of rain, the wide sandy plain which bounds the sea

coast in the neighbourhood of Panaga, he witnessed a singular overland migration of Ikan Puyu (a fish much resembling the tench in size, form and colour), from a chain of fresh-water lagoons lying immediately within the sea beach, towards the second chain of lagoons, about a hundred yards distant inland. The fish were in groups of from three to seven, and were pursuing their way in a direct line towards a second chain of lagoons at the rate of nearly a mile an hour. When disturbed they turned round and endeavoured to make their way back to the lagoon they had left, and would very soon have reached it had they not been secured by the Malays who accompanied our correspondent, and who looked upon the migration as an ordinary occurrence at this season of the year. Upwards of twenty were thus taken during a walk of about half a mile, and no doubt many more could have been obtained had the Malays been allowed a little delay. The ground these fish were traversing was nearly level, and only scantily clothed with grass and creeping salsolaceous plants, which offered very slight obstruction to their progress. This singular habit will account for the rapidity with which the paddy fields in Province Wellesley become stocked with fish when they are flooded by the rains. The lagoons from which they came contain water throughout the year, while those towards which they were going are mere hollows, filled by the late rains.—*London and China Telegraph.*

Proceedings of Societies.

Entomological Society.

Annual General Meeting, January 26, 1863.—Frederick Smith, Esq., President, in the chair.

An Abstract of the Treasurer's Accounts for 1862 and the Annual Report of the Council on the general concerns of the Society were read.

The following gentlemen were elected Members of the Council for the ensuing year. Messrs. Dunning, Grut, Sir John Hearsey, M'Lachlan, Pascoe, W. W. Saunders, E. Shepherd, F. Smith, Stainton, S. Stevens, Waterhouse, J. J. Weir, and Professor Westwood.

The following Officers were then elected for the ensuing year. Mr. F. Smith, President; Mr. S. Stevens, Treasurer; Messrs. Shepherd and Dunning, Secretaries; Mr. Janson, Curator.

The President delivered an Address on the present state of the Society, in which he reviewed the *acta entomologica* of the past year.

Mr. Stainton proposed, Professor Westwood seconded, and the Meeting unanimously carried, a vote of thanks to the President for his conduct in the chair during his year of office, and in particular for the Address which he had just delivered. The vote was accompanied by a request that the President would allow the Address to be published in the 'Journal of Proceedings.'

The President returned thanks to the Society for the vote just passed, and also for re-electing him to the Presidential chair.

A vote of thanks to the Treasurer, Secretaries, and the retiring Members of the Council, for their services during the past year, was also carried unanimously, and was acknowledged by Messrs. Stevens, Dunning and Lubbock respectively.

February 2, 1863.—Frederick Smith, Esq., President, in the chair.

The President nominated as Vice-Presidents for the present year Messrs. Pascoe, Waterhouse and Grut.

Donations.

The following donations were announced, and thanks ordered to be given to the respective donors:—'Bulletin de la Société Impériale des Naturalistes de Moscou,' 1861, Parts i. to iv. inclusive; presented by the Society. 'Tijdschrift voor Entomologie,' Ve deel 4e & 5e stuk; by the Entomological Society of the Netherlands. 'The Journal of Entomology,' No. 7; by the Proprietors. 'The Intellectual Observer,' No. 13; by Messrs. Groombridge & Sons. 'The Canadian Naturalist,' Vol. viii. No. 5; by the Natural History Society of Montreal. 'Sitzungsberichte der Königl. bayer. Akademie der Wissenschaften zu München,' 1862, ii. Heft ii.; by the Academy. 'The Zoologist' for February; by the Editor. 'The Journal of the Society of Arts' for January; by the Society. 'The Athenæum' for January; by the Editor. A specimen of Synuchus nivalis, "found under stones" near Reigate; presented by T. E. Hughes, Esq.

New Members.

Frederic Moore, Esq., and Edward Alfred Smith, Esq., were elected Members. A certificate was read in favour of Edward Parfitt, Esq., as an Annual Subscriber.

Exhibitions, &c.

The Secretary exhibited a box of "manna" from Tasmania, which had been anonymously sent to the Society, accompanied by a bottle which contained numerous specimens of a Hemipterous insect of the genus Eurymela, and which was labelled as follows:—"The insect which causes the manna to be formed on the white gum trees, by perforating the delicate young branches, for the purpose of feeding on the sap."

Mr. Bond exhibited a remarkable instance of arrested development in the left fore wing of a specimen of Colias Hyale; also a female specimen of Lycæna Adonis, in which some of the eye-like markings on the under surface were on the left side (*i.e.* right of the under surface) wholly wanting.

Mr. Haward exhibited a miscellaneous collection of Coleoptera, collected by himself three or four years ago in Central Europe, principally in Southern France and Germany, and in Switzerland and North Italy.

Mr. Stainton exhibited two bramble leaves, inside each of which was visible the cast-off skin of a larva of Nepticula aurella, and read the following note by Mr. C. Healy:—

Observations on the Moulting of the Larva of Nepticula aurella.

"On the 18th of January, 1863, I collected several bramble leaves containing young larvæ; in the afternoon of the same day I observed one larva resting in the centre of its mine in an apparently sickly state. On the following morning the old skin had split at the first segment, and the darkish blotch at the back of the head had receded to the second segment. On the 20th the old skin had shrunk to the fifth segment, and at this date the whole of the first four segments had quite a transparent appearance, being devoid of all markings whatever, and contrasting strangely with the remainder of the larva's body; the larva lay quite motionless in its mine. On the 21st the mouth had regained its former brownish colour, and the larva now moved its head about in a languid manner in search of food, of which it partook sparingly. On the 22nd the darkish blotch had reappeared on the back of the larva's head; the old skin

in the meanwhile having shrunk still lower down, the anterior portion of the body had now become much stouter and had a more healthy and fresher appearance; the larva now commenced feeding with great eagerness: at this period the dorsal vessel, which had lately become more distinct at the fore and after part of the larva's body, was quite hidden in the centre. On the 23rd the whole of the dorsal vessel was distinctly visible, the anterior portion being of a much brighter green than the posterior."

Professor Westwood exhibited drawings sent from Australia by Dr. Howitt, of two species of Lucanidæ; one was the species recently described by the Professor as Rys-sonotus? jugularis; the other, the original of which was found in Gipps' Land, was probably the male of Dorcus Pelorides, of which the female was in the British Museum.

Professor Westwood also called attention to a paper in the 'Tijdschrift voor Entomologie,' by Prof. Van der Hoeven, upon Periphyllus Testudo, a Hemipterous insect, which always remained in an apterous state; and to a paper on the Insects of Ceylon, by M. Motschulsky, in the Bull. de la Soc. Imp. des Nat. de Moscou.

Mr. Waterhouse exhibited British specimens of the following species of Homalota which are not included in his 'Catalogue:'—

1. Homalota velox, *Kraatz*. One specimen taken by Mr. Waterhouse at Brocken-hurst, in the New Forest, and a specimen taken by Mr. Hislop in Scotland.

2. Homalota flavipes, *Thomson*. Found on the banks of the Thames and Medway, at Gravesend and near Strood.

3. Homalota gemina, *Erichson*. From the Hammersmith Marshes.

4. Homalota vilis, *Erichson*.

5. Homalota picipes, *Thomson*. Atheta picipes, *Skandinav. Coleopt.* iii. 81, 30. H. fusco-femorata, *Waterh. MSS.*

6. Homalota angusticollis, *Thomson*, *Ofv. af. Vet. ac. Förh.* 1856, 100, 22. Atheta angusticollis, *Thoms. Skandinav. Coleopt.* iii. 87, 38.

The following notes, having reference to some of the above-mentioned species, were communicated to the Meeting:—

"Homalota Vitis, *Erichs.*, and H. picipes, *Thoms.* Of each of these two species I have seen but a single specimen. The insects were captured (by myself, I believe), long since, but their localities were not noted down. Of course with such scanty material I should wish my determinations to be looked upon with some doubt. As there already existed a species of Homalota bearing the name 'picipes' before Thomson applied the name to the insect above noticed, I have substituted the name 'fusco-femorata' for this insect.

"Homalota flavipes = Halobrectha flavipes, *Thoms.* = Homalota maritima, *Waterh. MSS.*, and a nearly allied species H. puncticeps, *Thoms.* More than four years since in examining my specimens of Homalota I distinguished two species as belonging to Dr. Kraatz's third section of this genus, both of which are found under *rejectamenta* on our sea-shores, and both are remarkable for having the head strongly punctured. They have, moreover, the fore parts of the body pretty densely clothed with pubescense. One of these insects is extremely like H. occulta, but has smaller antennæ. It is black, and has the antennæ, palpi and legs more or less piceous; the antennæ without any perceptible paler colouring at the base; the legs, with the tarsi, the knees, and the tips of the tibiæ, usually more or less testaceous. The head is very nearly equal in width (and indeed in total bulk) to the thorax, the sides subparallel, and with the eyes small and not prominent; the upper surface convex, thickly and distinctly punctured,

the crown presenting usually a more or less distinct fovea (perhaps in the male sex only). Thorax subquadrate, very little broader than long, the hinder part distinctly rounded; the sides (which are furnished with two or three setæ) parallel and very indistinctly rounded; the surface thickly and distinctly punctured; in some specimens (males?) with a large oblong shallow fovea on the disk; in others a faint small fovea behind. Elytra depressed, about one-fourth broader than the thorax, and nearly half as long again (as in H. occulta), very densely crowded with punctures, and hence dull. Abdomen glossy, with the basal segments rather sparingly punctured; the fifth segment very sparingly, and the sixth almost impunctate; the apex more or less piceous. Posterior tarsi short.

"This insect is clearly the Homalota puncticeps of Thomson = Halobrectha puncticeps of his 'Skandinaviens Coleoptera,' iii. 49, 1.* It also agrees perfectly with a specimen from the shore of the Baltic, sent by Dr. Kraatz to the British Museum as his H. puncticeps. But it does not agree with the insect named by the same authority in my own collection, nor in that of Mr. Wollaston. The description given by Hardy of his H. Algæ evidently belongs to this species, but he notices a variety ("dilutiora, antennis fusco-ferrugineis, basi, ore, pedibus anoque testaceis") which apparently is the insect next about to be noticed. The specimen alluded to by the same author as having a slight elevation on the sixth abdominal segment must present an abnormal condition of the part. I have seen no such rising in the specimens which have come under my notice.

"The Homalota anthracina of Fairmaire is referred by Dr. Kraatz and by its original describer to the present species, but with doubt; and certainly the description (especially the one published in the 'Faune Francaise') in many respects agrees with the H. puncticeps, but the form of the thorax (which is said to be 'presque aussi large que les élytres,' and 'très arrondis sur les côtes' would appear to be different. H. atricilla of Erichson has been identified with the present species. The description, as far as the colouring is concerned, might have been taken from a very immature specimen of the insect, but, in other respects, is for the most part so utterly at variance with the actual characters of the species that I cannot but believe that there is an error in the identification — that perhaps the so-called type-specimen has been transposed and wrongly labelled.

"The second species is well described by Thomson, under the name Halobrectha flavipes, in his 'Skandinaviens Coleoptera,' iii. 50, 2. I shall content myself with pointing out its distinguishing characters as compared with H. puncticeps. Its general colouring is less dark, being pitchy black; the elytra more inclining to piceous, and the abdomen black. The legs, antennæ, palpi and parts of the mouth testaceous; the terminal joint of the palpi, the apical half of the antennæ, and the femora and tibiæ, however, more or less tinted with fuscous. The antennæ are rather stouter. The head, thorax and elytra are less densely punctured, and hence less dull; the elytra are but little longer than the thorax, and the posterior tarsi are considerably more elongate. The apex of the abdomen is more or less rufescent. This species I formerly regarded as the H. puncticeps of Kraatz, and it stands under that name in my 'Catalogue.'

"Unless entomologists consent to adopt the minor subdivisions of the great genus Homalota proposed by Mr. Thomson it will be necessary to substitute some other spe-

* The original description, published by Thomson in the 'Transactions of the Academy of Sciences at Stockholm' for 1852, I have never been able to consult.

cific name for the present insect, as there already exists one species of the genus bearing the name flavipes. I propose for it the name of maritima.

"H. angusticollis, *Thoms.* In the last edition of Schaum's Catalogue (1862), this insect appears as a distinct species in the third column of p. 24, but further on (first column of p. 25) the name reappears, and in this case is linked with that of H. ravilla, *Erichs.* I have a specimen before me of the last-named insect, sent by Dr. Kraatz to the British Museum, and likewise a specimen of H. angusticollis, received by Mr. Crotch from Thomson. With this material, it would appear that I was in a favourable position for determining whether the insects are identical or not. Both insects appear to me to be males. Thomson's specimen has the penultimate abdominal segment gently (but still evidently) emarginate, as the describer points out to be the case in the male of his species; and further this insect agrees perfectly with the two British specimens which I exhibit to the Society, excepting that in these latter the penultimate abdominal segment is more acuminate at the apex, and is truncated. These two specimens then, as I take it, furnish the opposite sex of A. angusticollis. They have the same structure of antennæ, with the terminal joint of moderate length; that is, as Thomson says, half as long again as the preceding joint. On the other hand, Erichson describes the terminal joint of the antennæ of H. ravilla, 'magno, ovato, precedente triplo fere longiore,' and such is the case in the insect received from Dr. Kraatz. This latter author, however, states that the terminal joint is equal in length to the two preceding joints taken together, so that I am left in uncertainty as to whether the remarkably large terminal joint which I find in the specimen of H. ravilla is constant,—whether, in short, it may not be sexual. In this same specimen the penultimate segment of the abdomen is truncate or most indistinctly emarginate, and the truncated portion is broader than in the English specimens, which I regard as females of H. angusticollis. In other respects, I can discover no differences between the H. angusticollis and the H. ravilla."

Mr. Waterhouse then communicated the following note, and exhibited (on the part of his son, Mr. Charles Waterhouse) a series of specimens of a species of Homalota, which is extremely close to H. analis in its general characters, but which will possibly prove a distinct species:—

"The specimens were collected recently in the Hammersmith Marshes, in company with H. analis, and my attention was first directed to them through the uniform dark (nearly black) colouring of the body and antennæ. Upon examination, I find that the dark insects differ from H. analis in their sexual characters, the male having a very much deeper notch in the upper plate of the penultimate abdominal segment than in the corresponding sex of H. analis, whilst the female has the plate in question truncated at the apex. After the examination of a very large number of specimens of H. analis, I have not been able to detect any decided distinctions in the sexes through the structure of the penultimate abdominal segment; in all it has a largish notch at the extremity in the form of an obtuse-angled triangle; in some the notch is slightly deeper than in others, but there are individuals presenting intermediate conditions. In the penultimate abdominal segment of the darker-coloured insect, the sinus of the upper plate has its depth slightly exceeding its width; the sides are subparallel, diverging but indistinctly, and the innermost half is nearly semicircular, or we may compare the sinus to the outline of a bluntly terminated cone. The edges of the segment bordering the sinus are margined,—*i.e.* there is a delicate impressed line immediately within the margin. In H. analis the triangular notch does not show a corresponding impressed line: here the plate is slightly arched, but in the transverse direction only; whilst in the deeply notched segment of the other

insect the lateral portions are curved downwards. The apex of this segment is tinted with piceous in both sexes, but I have seen no specimens in which the entire segment is testaceous, as is generally the case in H. analis. The antennæ are dusky, often to the base, but sometimes the two basal joints show a dusky testaceous tint in parts, especially on the under side and at the base."

With respect to this communication, Mr. Waterhouse made the following remarks:—

"The Homalota soror of Kraatz (Nat. der Ins. Deutschl. p. 257), we are informed, is very closely allied to H. analis, but is distinguished by the antennæ being darker and a little more incrassated towards the apex; by the palpi being pitchy brown; the thorax and elytra blackish; the abdomen almost as thickly, but much more finely punctured, and uniformly black. The male has, in the upper plate of the penultimate abdominal segment, a still larger triangular notch,* the margins of the plate on either side of the notch falling off more obliquely. In the insect exhibited I do not perceive the differences in the punctuation alluded to, nor those in the structure of the antennæ.

"Again, a species of Homalota is distinguished from H. analis by Thomson (see his 'Skandinaviens Coleoptera,' ii. 294), under the name Amischa platycephala, by having the abdominal plate in the male deeply emarginate, and in the female truncate, so far agreeing with our insect. But A. platycephala is said to be broader than H. analis, less convex, and with the fovea on the thorax obsolete; the antennæ testaceous at the base, and the elytra obscure testaceous,—distinctions which do not exist in the insect before the Society. I still think it possible that it may be identical both with H. soror and A. platycephala. Thomson says of his species that it is scarce in North Scania, and Kraatz simply informs us that the H. soror was taken by him near Bonn, and he makes no mention of the female. It is probable then that neither of these authors had ample material for arriving at the characters of the species, and that, under more favourable circumstances, their descriptions might have been modified. However this may be, this note is communicated to the Society with the view of eliciting further information respecting those species which are certainly most closely allied to H. analis. The last-mentioned species I have collected in great numbers in various localities, but, amongst eighty specimens roughly grouped together in my unexamined collection of species of Homalota, I do not appear to possess a single specimen corresponding with the insect from the Hammersmith Marshes, of which my son found and exhibits two dozen specimens, presenting an equal number of males and females. The species then would appear to be very local."

Paper read.

Mr. M'Lachlan read a paper on Anisocentropus, a new genus of exotic Trichoptera; descriptions were given of five species of that genus, *viz.*, A. illustris, n. sp. (of which specimens were exhibited), A. dilucidus, n. sp., A. immunis, n. sp., A. latifascia, *Walk.*, and A. pyraloides, *Walk.* To these was added the description of a new species of Dipseudopsis, D. collaris, from China.—*J. W. D.*

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* "Noch weiter dreieckig ausgeschnitten." I am not sure that I have rendered this sentence accurately. Both H. analis and H. soror, according to Dr. Kraatz, have a triangular notch or emargination to the abdominal segment in the male, and, as I understand the matter, the segment is still more notched in the latter species than in the former; the term "weiter" cannot be translated simply as "deeper," nor as "wider," but its sense would be conveyed by the two latter terms combined.

By the Banks of the Chu-Kiang. By Arthur Adams, Esq., F.L.S.

It is the season of the green leaf and flower. Close at hand the guava and the orange, their boughs bent down with grateful fruit, are mingled with the dark-leaved banyan, the privet-like Ancistrobolus, Psychotria elliptica with rich purple leaves, and Gardenia florida, always a favourite with the Chinese on account of its fragrant flowers.

Wasps and heavy-winged sawflies, green, black and yellow, haunt these village trees; and lurking among the foliage are spotted golden beetles, Sagra, Clythra and Eumolpus. Poised in mid air, motionless on vibrating wings, are clear-bodied Volucellæ and bird-like Bombylii. I spy the nest of a slender brown Sylvia artfully disposed among the bristling thorns of a Palinurus bush, well defended, snug, bidding defiance to snakes and weasels.

I come out upon the river and I find the banks of the Chu-kiang planted at regular intervals with dark li-chees, Chili bushes, broad-leaved bananas and peach trees, and I observe the fields on the opposite side yellow with heavy-eared rice. The broad river flows calmly by. Here and there, stretched out across the stream, are countless fishing stakes arranged in regular rows, with long black nets drying in festoons on the ropes that stretch from pole to pole. Little sampans are floating like so many waterfowl, drifting with the current, and laying down their lines with a hundred baited hooks; dusky half-clothed figures are seeking for river-mussels and cat-fish on the exposed mud flats; up the little creeks cluster hundreds of brown dome-roofed craft; while conspicuous over the low land are the square tanned sails of the trading junks sailing in the distant windings of the river.

I ascend a neighbouring hill, and from the summit become impressed with the beauty, fertility and dense population of the "Central Flowery Land." The brown sides of the Old World granite hill on which I stand are pitted with the graves of the humbler classes and honey-combed with the tombs of the wealthy. The graves and the moss-grown tombs are overrun and partially concealed by the Rubus parviflorus, the wild rose and yellow Chrysanthemum, while vines cling in graceful festoons about the scattered boulders. Among the showy flowers of Melastoma sanguinea and Osbeckia chinensis, I discover many beetles, including a glittering green Metallites, a small dingy Bruchus, a bristly Strophosoma and a globose Philopedon. Stretched below are green fertile plains, dotted with villages more numerous than

the eye can count, sheltered in groves of evergreen fig trees. The rich alluvial plains are green with garden stuff, or golden with the ripe waving padi, and are watered by canals and intersecting rivulets like the water-meadows of England on a gigantic scale.

On approaching the villages I see the hanging roots and dark foliage of the Ficus nitida, and the hoary limbs of the great Bombax cepa, entirely bare of foliage, but covered with magnificent scarlet blossoms. The bamboos are really grand. Under clumps of this huge grass, which here grows forty feet high, I find both shelter and beetles. A pale yellow Chilocorus, a giant among lady-birds, is found adhering to the under surface of the leaves; a brown glistening lizard, a species of Scincus, rustles among the dry leaves on the ground, and mole crickets run timidly about or are seen scraping the earth with their large fore paws. Everywhere I look I find a beetle. In the grass a spinose Hispa; clinging to the stems a red and black Mylabris; on the wing a bright little Anthicus; on the ground a brown Serica and a glittering Chrysomela; under the oolam trees a dull green Euchlora; on the leaves in the sunny pea-fields Cetonia and Buprestis. My greatest prizes, however, are a large red Horia and a Callistes, a perfect little gem. Perhaps it may seem absurd thus to lavish praise upon creatures not usually regarded with feelings of love or admiration, but I confess I like them. "A beetle is a beauty in the eyes of its mother," says the Arabic proverb, and I may add in the eyes of many an entomologist also.

Before I leave the banks of the Chu-kiang or Pearl River I must beg the reader to visit with me the deserted quarries near the Second Bar Pagoda, and accompany me in a quiet stroll over Danes Island. The quarries form vast gloomy caves and overhanging water-dripping rocks. The walls of old Canton and the river forts have been constructed from granite obtained here, but that must have been long ago. The enormous moss-grown boulders and the heaped-up masses of old lichen-stained granite everywhere surround you, and you seem to be among the work of Titans. In the still dark pools are numbers of harmless water-snakes, swimming gracefully about or diving beneath the surface. The old caverns and ancient shady nooks are also a favourite haunt of the goatsucker and the brown owl, startling the intruder as they suddenly fly out from the deep silent chasms. I am also impressed on this occasion with the harmony of colour between two reptiles and the places they inhabit. One is a slender lizard, of a brownish green colour, hardly distinguishable from the blades of grass among which it lives, and the other is a Gecko, so freckled and

spotted as to resemble very closely the weather-stained granite rocks among which it takes up its abode.

All around these quarries frown barren red-tipped hills, rough with scraggy fir trees, and crested here and there with wind-bent pines. On a brown fissured rounded hill a tall pagoda is conspicuous, and, buried in a sacred grove, at the base is a picturesque jos-house, while in the far distance are indistinct pale gray lofty mountains.

As I return to the ship I observe a water buffalo plodding steadily across a padi-field, the rude wooden plough turning up the soil behind her. Now these unwieldy ruminants appear to think with the Turk that "of all devils the very worst of devils is a Frank in a round hat." No sooner does she scent the "fanqui" than she stops abruptly, snorts, trembles, and is off. Nose in air and horns flat aback she splashes through the watery glebe, the plough at her tail. The vexed China-man gazes helplessly after his unruly charge; but soon, to the great relief of the disconsolate husbandman, steps up a little boy, who whispers soft nonsense in the vagrant's ear, and leads her back, a willing captive, by the rope in the cartilage of her nose.

Danes Island, like all the other islands in the river, rises from the bed as a primary granite mass, with green rounded hills covered with a scanty vegetation, and pitted with the scooped-out graves of many generations of Chinese. A layer, more or less deep, of red and white sandstone rests upon the granite, and, between the hills, are valleys with a rich alluvial bottom, where pumpkins, melons, rice, peas, beans, ground nuts and sweet potatoes form vast vegetable gardens. The terraced sides of the more barren hills are planted with the oolam or olive, the li-chee and the peach. The villagers are harmless, but now and then get into trouble for supposed insults to the British flag, but what then?—"Every day is not a Feast of Lanterns."

Under the shade of the dark-leaved fir trees, where repose the dead of the mild intelligent Parsees, I love to sit upon a gravestone and feast on the cool pink flesh of water melons. Anon comes panting up the hill an urchin—brown, pigtailed, bare-legged, breathless. He bears a home-made bamboo box, a crumpled leaf serving for a cork. This he eagerly withdraws, and reveals the head of a large yellow centipede, whose unpleasant body seems very much inclined to follow. This, offered with a smile of conscious pride, is a present for the "Esung." These village urchins are great allies of mine: they show as much ardour in the chase as any naturalist, nor could a legion of Ariels have served their master Prospero better than these dusky imps do me. Their narrow gleaming eyes see me discard the "disjecta

membra" of the great black Copris. The dung of the buffalo is forthwith scattered to the winds, and dozens of the living beetles are disentombed and brought me. They know the haunts of skink, mouse, bird and beetle. Do I desire an ant lion? They are under the oolam trees, blowing away the sandy soil with their breath till they spy the lurking lion in his den. He hides in a hole on one side of the pit-fall, his long powerful jaws being just visible in the centre. As they scratch him out they sing a little ditty appropriate to the occasion. Do I want a frog? A slight pencil sketch is shown them: off scamper these pig-tailed Ariels, and in ten minutes as many frogs are forthcoming as would feast a dozen Frenchmen. Infants of tender years will join in the sport, and toddling up will bashfully offer a locust struggling in their tiny paws. One little fellow is bitten by a large spider which he has courageously seized, and, as he presents his prize, he points with tearful eye to his swollen finger.

The ants of this island are very interesting. One yellowish species, with very long legs and antennæ, builds large nests in the oolam trees by bending down and joining together the leaves. The jaws of the ants are strong and toothed, and pierce the edges of the leaves, when a viscid sap exudes which soon hardens in the air and cements the leaves together. Another ant, with a roundish body covered with a gray pubescence, forms cylindric holes in the ground with an elevated tubular shaft, an inch or more above the surface, formed of grains of sand. Another solitary ant jumps about the pathways like a Saltica or hunting spider, and is a curious elongated species with a great head and thorax, and with the mandibles produced in front forming a long pair of forceps curving slightly upwards. My friend, Mr. Frederick Smith, to whom I presented a specimen, told me its name, but I have forgotten it.

Although not specifically the same the flowers I meet with in my walks remind me of those in England. The Oxalis is yellow-flowered and not so pleasant an acid as our own wood-sorrel; the shepherd's-purse appears to be the same as ours; the groundsel is represented by Emilia sonchifolia, and the Persicaria is replaced by Polygonum chinense; the woolly Gnaphalium is like ours of waste places; instead of the bluebell we have here Wahlenbergia agrestis; and in place of the bindweed we find the trumpet-like flowers of Evolvulus emarginatus. By the margin of a running stream, springing in numbers from the fresh green sod, I see Spiranthes australis, a delicate little orchid reminding one of S. æstivalis and familiar Hampshire meadows. In the deep damp fissures of the ground the red coral-like corymbs of

Ixora stricta are conspicuous, and on the white dilated calyx-segments of Mussænda erosa I find clustered a pretty Hoplia with a silvery gray pubescence.

The long segments of the crimson-spotted flowers of Strophanthus arrest my attention as I approach the precincts of a village, and I stop to gather the sweet-scented corymbs of Clerodendron fragrans. I also sniff an odour not so pleasing, and peeping over a bamboo fence I observe a piggery! And this fact reminds me of the great difference between the social and physical condition of the pigs of the North and the pigs of the South of China. The pig of the South lies in a clean sty, and is well cared for. She has a short wrinkled face, glutton eyes, swollen cheeks, a sunken back, short legs and a pendulous belly, and she waddles placidly along with a kind of semi-somnolent complacency. The pig of the North, on the contrary, has to take care of himself, and, judging from his *physique*, he is able to do so. He is a black, hirsute, active and irascible pachyderm, with a lean body, long legs, a wedge-like head, a bristling crest, an inquisitive nose, a wicked vigilant eye, a straight tufted tail, and a shrill angry voice. And with this porcine contrast I conclude my observations of what I saw on the banks of the Chu-kiang.

ARTHUR ADAMS.

Artificial Fish Raising.—This most interesting process is now being exhibited in the window of the office of the 'Field' newspaper, No. 346, Strand, under the able superintendence of Mr. Buckland, from whose contributions to that valuable journal I select the following particulars. The ova are those of the salmon and trout. "The apparatus used consists of a series of troughs made of zinc, some 18 inches long, 4 inches deep, and 5½ inches wide; one side has been formed of glass that the good folks outside the window may see the ova resting on the bars, and also the young fish coming out of the ova. The ova are placed upon the glass rods or bars, which are fixed just far enough apart to hold them up. I cannot say for certain how long it is since these ova were taken from the mother fish. The less light the ova have the better; the boxes where they are placed should be covered with boards, or, better still, with coloured glass. The salmon eggs are a bright red colour; those of the trout nearly pure white. As the fish are hatched they fall through the glass rods upon which they are placed as eggs, and when I pay my daily visit I invariably find the eggs decreased in number, but the young ones in the tank below the rods much increased in number. So fast, indeed, have they hatched that I have been obliged to construct a new tank entirely for the young fry, of which (salmon and trout together) I have altogether, in the 'Field' window, nearly two thousand, as active as gnats. It is most interesting to watch the egg at the moment of hatching. If you have luck you may happen to be gazing on a particular egg, when of a sudden you will see it split in twain

at the part corresponding to the back of the fish; you will then see a tiny head with black eyes and a long tail pop out, and the new-born creature gives several convulsive shudders in his attempts to quit himself from the now useless egg-shell. Poor little fellow! he can't manage to get out—the shell is too tight for him. I take, therefore, a soft hair-pencil, press lightly on the egg-shell: he seems to know I am his friend; he gives another vigorous kick or two, and is free: he has commenced life. If we judge from his motions he must enjoy life, for away he swims as fast as his tiny fins and wriggling tail will carry him round and round in a circle, and then plump down he goes to the bottom of the tank and reclines upon his side, breathing with his gills for the first time in his life. As to food, Nature has kindly packed up all the nourishment that it will want for some six or eight weeks, in a neat little bag or parcel which she has affixed to the body of the fish, in such a manner that it shall be gradually absorbed into the general system. This bag or umbilical vesicle is much too heavy for them, and soon brings them to the bottom, like a bullet at the end of a fishing-line. So far so good; but cannot we see and learn more about the young fish? Get out the microscope, and place a young new-born salmon under a low power, and you shall see one of the most beautiful sights ever beheld by human eye. You shall see the tiny heart, which is situate just underneath the lower jaw, going pit-a-pat, pit-a-pat; you shall see the blood at one instant in one cavity of the heart (where it appears like a red speck); at the next instant it is in the other side of the heart: and so it goes on, day and night, never ceasing, never tired—a great forcing-pump, propelling the blood to all parts of the body, and gradually building up the frame of a future king of fishes. I counted the pulse of the salmon when it was under the glass, and ascertained that it averaged about sixty in the minute. Just below the heart can be seen on the umbilical vesicle (when the fish is in the water) a bright red streak. Examine this under the microscope, and you will see that this red streak is in fact a main artery; with a high power you can see plainly the minute blood-disks coursing along between the walls of this elastic tube. The minor red streaks upon the umbilical vesicle can in the same way be made out also to be blood-vessels, containing blood-disks running along at a great pace. Again, down the centre of the transparent body of the fish can be seen, with the unassisted eye, two tiny streaks; the microscope shows that these also are blood-vessels, and that the blood in the one is running towards the head, in the other towards the tail. A more complete and beautiful demonstration of the circulation of the blood never was yet placed under a microscope. The eye is in perfect working order at the moment of birth, though the rest of the body is far from perfection. It is most curious to observe the effect of temperature on the development of the ova. Those at the 'Field' office began to hatch out some five or six days before those in the Zoological Gardens. The reason is obvious: the temperature of the water running over the eggs at the 'Field' office is 52°, at the Zoological Gardens in the open air it is 43° only, and these fellows have not as yet begun to open their egg-cases. Those, however, which I placed in the aquarium house at the Zoological are hatching out fast."

Salmon Ova not the Food of the Water Ouzel.—The notice in your paper of last Saturday (the 'Field') that one of these birds had been sent to Mr. Buckland for examination caused me to look over my notes on the subject, made in the spawning season of 1856-7. Up to that period I, in common with other preservers of salmon and trout, took it for granted that, because this bird is so constant a visitor on the salmon while that fish is spawning, it is solely for the purpose of feeding upon the ova,

and, in consequence, thinking I was getting rid of an enemy, I took great pains to destroy as many as possible. Amongst those I killed twenty fell to my gun just as they emerged from spawning-beds, every one of which I at once opened from bill to gizzard. On examination, both before and after washing, with the naked eye and under the microscope, I could not in one single instance discover a trace of ova, neither of case of ova, nor of the oleaginous matter which forms the contents of the case; instead of this I found the stomach full of the larvæ of flies, whole and in fragments, and always more or less of fine sand. About this date I heard of the destruction of ova in the boxes at Stormontfield by the larvæ of the stone-fly, and it immediately occurred to me that I was destroying a most efficient assistant, and that the water ouzel was one amongst the many exquisite links constantly presenting themselves to the student of the natural history of this valuable fish. During the formation of the spawning-bed the salmon turns over gravel, in the interstices of which lie the larvæ of aquatic flies, to which the water ouzel is debarred access until so turned over by the salmon; and the more frequent the visits of this useful bird to the newly-turned gravel the freer will the spawning-bed be from these hurtful insects. This opinion subsequent experience has confirmed, and preservers of salmon will act wisely to protect, as a most able assistant, the falsely-accused water ouzel.—*J. H. Horsfall, in the 'Field.'*

[A great number of observations on this subject have been published recently, all of them having the same object—to exonerate the water ouzel from the charge of devouring the ova of salmon. I am, however, far from being convinced that the stone-fly (Phryganea) is in its larva state "hurtful" to the salmon ova: having paid considerable attention to this subject I am inclined to think that the phryganidous larvæ are vegetable-feeders like the larvæ of Lepidoptera.—*Edward Newman.*]

Destruction of Trout Spawn by the Parents.—On the 9th of December last, whilst the keepers were netting the river Dunlop for salmon for my use, I examined a small stream on the bog noted for the quantity of trout which breed in it. We took a number of male fish—sea trout and river trout—before we caught a female. Observing a number of ova in the trough in which I deposited them for a temporary purpose, I was led to inspect their throats, and every male fish I examined except one had ova in its maw. What are we to think when the male trout in attendance upon the females in the stream feed upon the ova they help to fertilize? I had a still stranger account from a friend of mine who was getting a stock of breeding trout for the Ribble; and, although I have not his permission to publish it, I think he will pardon the liberty. He had taken seven pairs of trout, and had placed them, with Ramsbottom's sanction, in a small pool for safety until the time for manipulating had arrived. When these fish came to be examined it was found that all the females except one had entirely relieved themselves from their ova, and the seventh partly so, and that every fish, male and female, except the one which had only partially spawned, was absolutely gorged with ova. I never remember to have seen either of these incidents recorded before; and they are both capable of being verified by ample testimony. What wonder that trout should be scarce when both mother and father devour the eggs!—*Samuel Woodcock; Bury, Lancashire, January* 26, 1863. *From the 'Field.*

Note on the Argentine.—Passing along the beach near here the other morning, I came upon one of the most resplendent little fishes which perhaps the British Seas can boast of: so beautiful, in fact, did the little creature appear, that it was some time before I could make myself believe that it really was a thing of life: its back was a little buried in the sand, so that nothing but its glossy and metallic side and its

peculiarly marked belly were exposed to view; these glistening in the rays of the early sun, as it lay on the wet sand, having been but very recently left by the receding tide, made me doubt whether or not I was still in bed and dreaming. Stooping down, however, and taking the elegant little creature gently up in my hand, all doubt on the subject fled, and gave place to a thrill of delight, on discovering that I had found a prize, in the shape of a very fine specimen of an argentine (*Scopelus Humboldtii*). Three other specimens have been obtained on different occasions, but all within a few yards of the same spot: so much alike are these four that the most casual observer would at once pronounce them to be one species. I am not aware what Yarrell says of this species, but in a work since published the account of it is very meagre indeed, and differs, in some instances, from my fish. I am induced to believe, from the same work, that the probability of there being more than one species is a disputed point amongst ichthyologists. A short description of the one captured by myself may not therefore be out of place; the reader must, however, bear in mind that the description is that of a fresh specimen. In length my specimen is nearly two inches; in breadth, where broadest, scarcely half an inch. The back is of a dark glossy brown colour, marked along its whole length with two zigzag lines of a lighter shade, one being on each side the dorsal ridge. The sides are like a piece of the purest and brightest polished silver, and having a most remarkably and bright metallic lustre. The belly is of a slate-blue. The tail, which is very deeply forked, is of a grayish white, having a dark streak crosswise near its base. On the upper jaw, or rather lip, there are two kidney-shaped streaks, one on each side, of a bluish green, similar marks occurring on the lower jaw or lip, but in this case they are round; these, when the lips are closed, give the mouth a darkish appearance. From the under side of the mouth run six rows, three on each side, of little roundish dots or spots of a beautiful light or pea-green; the first, passing along the side of the head, ends beneath, but on a line with the back part of the eye; the second, which is lower down, terminates a little beyond the pectoral; the other (or rather others, for they go side by side) stretches along the belly, with a slight interruption at the vent, to the tail, being smaller and closer set as they proceed backwards. Properly speaking, however, these spots are not plain or simple markings, but are rather a series of minute shallow dimples or impressions, as it were; at least, so they appear to me. With respect to the second dorsal, it is quite visible, and is of a rounded form.—*Thomas Edward; Banff, February* 7, 1862.

Note on Limax marginatus of Müller.—There appears to be a deficiency, in both the English and German books, of any extensive descriptions of the interesting families of the Limacidæ, although I believe there are some excellent monographs, in French, of those inhabiting that land. Some time since Mr. J. F. Heyneman, of Frankfort, informed me that from the lingual dentition he was inclined to separate Limax marginatus and L. Gagates from the other slugs, and place them with L. vitrina. I am unable of my own knowledge to speak of their affinity in this respect, but I notice one habit in which L. marginatus differs from all other English and German slugs with which I am acquainted, and in which it assimilates to L. vitrina and L. zonites, namely in the period of ovipositing. On the 4th of February there had been a sharp white frost in the morning, but after that had passed away the day was mild, and I visited the timber yard of the Commercial Docks, and there found numerous examples

in their usual abodes, and many in the act of depositing their ova. Some which I collected also expelled ova in the vasculum in which they were confined. They appeared only to bury their head in a chamber, like Helix pomatia. The egg is spherical, slightly elongated, transparent, of a golden brown colour, and a coriaceous covering. When placed in spirits of wine they turned to an opaque white.—*John E. Daniel;* 10, *Trigon Terrace, Clapham Road, February* 7, 1863.

Occurrence of Limax Gagates near South Shields.—Two or three years ago I found a small slug infesting some of the gardens in this neighbourhood, which I referred to the Limax Sowerbii, *Fer.* On forwarding some of them, a short time since, to my friend Mr. Alder, he kindly informed me that they were not L. Sowerbii, but the rarer L. Gagates, and that the species had not before been taken in the North of England. Most of the specimens obtained have been procured from a small garden, where it has occurred in very great abundance, as certainly not less than two hundred specimens have been collected during the last three years. Though a very shy and retired species, seldom venturing from its hiding-place in dusk or during dull wet weather, it is a most pernicious and destructive slug to tender transplanted annuals, doing more mischief in a short time than L. agrestis. The eggs of this species appear to be deposited in winter, and in April and May the young show themselves, having attained to the length of half an inch. This species is generally described as dark gray, but the generality of the specimens collected have been of a fulvous or tawny colour on the back, becoming of a paler hue towards the margin of the foot. One specimen has occurred which was nearly black. It attains to the length of more than two inches when in motion; when at rest the strongly carinated back is beautifully arched. It may be asked, how has it happened that this large and very distinct species has been overlooked so long?—has it been introduced recently?—and has it been brought to this neighbourhood in ballast?—*Richard Howse, in 'Transactions of Tyneside Naturalists' Field Club.'*

Entomological Notes. — The opening of the season of 1862 gave a fair promise of a better year for entomologists than the two previous seasons of 1860—1, and hope rose high in the breasts of those who had felt disappointed in having so many blank places still unfilled at the close of last year. Many young collectors then, I fear, gave up all hope of continuing in the pursuit of insects, because they had done so badly, and others thought it was not worth the trouble to go out catching them; but those who did keep trudging on, despite disappointments and the unpropitious fates, were no doubt amply compensated when those few fine, warm and really spring-like days, at the commencement of April, brought out numerous Andrenidæ and early Bombi, and made the hive-bees at the same time remarkably "busy." As the month wore on the little "spring dagger" moth was in profusion, and I picked several very fine specimens of the dark variety from the trunks of the beech trees on the Benton Road, not one specimen of which could I get last year. Towards the end of the month that beautiful "bumbler" fly (*Bombylius major*), which has contracted a habit of always falling on its broad back whenever the wind is a little stronger than usual, and from which position, with its long slender legs, it finds considerable difficulty in righting itself, was more plentiful than I had ever before seen it. How this insect

revels in the hot sun, darting from one primrose blossom to another! — if but a shade passes it, it drops to the ground invisible: and now also the curious "oil beetle" (*Meloë proscarabæus*) was crawling about in all directions. Early in May I made several additions to my collection of bees, and several good beetles fell into my bottle. In June the ruby [?] tiger moth (*Euthemonia russula*) was anything but rare; I found it in the wood above Winlaton once, and it was especially plentiful on the links below Bamburgh Castle. At Gibside I took several good moths, among which may be noticed Xylophasia rurea, *var.* combusta, rare; the specimen was at rest on the fresh-cut portion of an ash-pole, rather a singular place for this insect, as the pale colour of the new wood contrasted greatly with the moth's dark wings. Further on in the same direction I caught another uncommon moth, Acronycta leporina, as it was flying softly across the road near where the oak wood has been cut down, on the right-hand side going to Rowland's Gill; and beyond that turnpike I captured specimens of Rhagium Inquisitor, Clivina collaris, and other beetles of uncommon occurrence, on my way to a small bog on the left-hand side of the road, where grows the sweet-scented willow (*Salix pentandra*), and where the greasy fritillary (*Melitæa Artemis*) was taken by Mr. Dinning; the beautiful daddy-longlegs (*Pedicea rivosa*) I also met with in this bog. From this time to the end of June insects continued to occur in tolerable plenty, and I collected many good specimens; and in July, when on the links beyond South Shields I found great numbers of the coast-chafers (*Anomala Frischii*), of which I could not find a single specimen last year; and I then added the dark purple variety, which is always very rare in England, to my series. The latter portion of the year has not been nearly so favourable for the development of insect life, and the autumn broods have certainly been below the average. Sugar I have found, throughout the summer, next to useless for the night moths. Many evenings which appeared propitious for these excursions I have returned home with empty boxes, or had to depend entirely on my net for captures; and I have heard similar accounts from other entomologists widely separated, and therefore conclude it to be a general complaint.—*V. R. Perkins, in 'Transactions of Tyneside Naturalists' Field Club.'*

On Removing Grease, &c.—I have lately received a letter from my esteemed friend Henry Doubleday, Esq., in acknowledgment of a copy of my little book the 'Insect Hunter's Companion.' With his permission I make an extract or two from that letter. Mr. Doubleday says, "I rather regret that Dr. Wallace's plan for removing grease was introduced, as I think accidents may occur from attempting to carry it out. I cannot understand how benzole can be boiled without incurring great risk of its exploding. A short time since a young man in this place was using some, and left the cork out of the bottle. He happened to move it near the candle, and the evaporation was so rapid that the candle, although some inches above, set fire to it, and it exploded like a gun, and the young man nearly lost his sight." I think it but right that the readers, whoever they may be, of my book should, as soon and as generally as possible, be made acquainted with the danger of an incautious use of this inflammable oil, and as the best means of doing so I have requested the editor of the 'Zoologist' to insert this notice. I should like to take this opportunity of stating that where, as in this and some other instances, I have given two or more methods of doing the same thing, it was to avoid the appearance of dogmatism, and also to give the beginner the opportunity of trying for himself which plan was the best. Mr. Doubleday remarks further, "I am not an advocate for the use of camphor (for keeping off mites; *J. G.*). It unquestionably tends to make moths greasy. If the under sides of the thorax and abdomen and

the antennæ are carefully touched with a camel's-hair pencil dipped in a weak solution of corrosive sublimate (bichloride of mercury) they are for ever proof against mites and mould." Upon my asking for a little further information Mr. Doubleday very obligingly supplied me with the following. "You can easily try the experiment with regard to camphor. Take any moth which is at all liable to turn greasy, and suspend it by a thread attached to the cork of a bottle containing camphor. After letting the moth down into the bottle put the cork in tightly, and in a few days you will find the grease will liquefy and spread all over the insect. I believe that when insects are carefully touched with a weak solution of corrosive sublimate in pure alcohol they will never mould or be destroyed with mites; I mean those parts to which the sublimate has been applied; but if the thorax and abdomen are poisoned mites will very rarely indeed attack the wings, and they never become mouldy. A small piece of sublimate, about the size of a hemp seed, is sufficient for an ounce of alcohol. It should never be strong enough to give visible crystals on a non-absorbing substance (black)—a piece of blackened ivory for instance—when it it is wetted with the solution and allowed to evaporate. The best method of applying it is to take a small camel's-hair pencil and dip it in the solution, pass it along the antennæ, and then apply it to the under side of the thorax and abdomen. It will penetrate these parts in a second or two, and then the alcohol evaporates, leaving the sublimate in the insect." I am sure your readers will feel obliged for these valuable and suggestive remarks.—*Joseph Greene; Cubley Rectory, Doveridge, Derby.*

Habits of various Lepidoptera.—Arctia Mendica always came out of pupa between 10 A.M. and 5 P.M., generally in the afternoon. Odontopera bidentata always in the evening dusk, between 7 and 10 P.M.: as soon as the wings are expanded the insect retreats from the top of the box and fixes itself on one side of it close to the earth, with the head downwards and the tail and hinder extremity of the wings hanging forwards, like a well-hung picture. My Melanthia albicillata almost always came out of pupa either between 6 and 8 A.M. or between 6 and 8 P.M.—*F. Beauchamp.*

Spring Moths.—On the 15th of March, 1862, the Tæniocampas were plentiful on sallows; T. gothica early in the evening; T. stabilis not showing until T. gothica had nearly disappeared. Hybernia rupicapraria was rather common, and H. progemmaria abundant, sitting on the hedges with its wings at an angle of 45° from the twig and 90° from each other. Anticlea badiata, on the contrary (of which I took five males), sets up its wings after the manner of a butterfly; it is much wilder than H. progemmaria; when at rest, as in the day-time, its tail is raised like that of Pyralis farinalis: on the 19th of April I took a female, which laid me about one hundred yellowish white eggs, the larvæ from which fed up well on a garden rose, of which they seemed to prefer the flower-buds to the leaves: they are uncomfortable, round-headed, sawfly-looking creatures,—semi-transparent, too, so that when feeding on roses the anterior portion of the body is tinged with purple.—*Id.*

The late J. F. Stephens' Specimens of Lycæna Dorylas.—Since the publication of my remarks upon this species (Zool. 8402), I have examined the specimens contained in the cabinet of the late J. F. Stephens which were considered by him as identical with the Hyacinthus of Lewin, and given in the Museum 'Catalogue' as Adonis, *var. a.* They are certainly not Lewin's species, but merely ordinary specimens of Adonis; and the same may be said of the specimens marked "Ceronus, *Hub.*," which is a variety, in which the female is of nearly as brilliant a blue as the male. This

variety is found near Bordeaux and other places in the South of France, but has not occurred in England.—*Henry Doubleday; Epping, March* 13, 1863.

Notes on Ino Globulariæ and I. Geryon.—I took these in company on the 19th of June, 1858, I. Geryon being the more abundant of the two. The following notes, made at the time, may prove interesting: —"I think I. Globulariæ is a little bluer in colour than I. Geryon, but the great point of difference is in their respective habits, I. Globulariæ being so much more active, and rarely, if ever, shamming death, as his more sedate brother frequently does. After I had brought them home (in pill-boxes), I always knew which boxes contained I. Globulariæ, because the moment I opened them a little way to drop in chloroform they began to flutter; while I. Geryon sat quietly till the fatal drug was administered. The whole differences were such that I scarcely ever failed to recognize I. Globulariæ flying. I am here speaking of the males only, the females being nearly similar in size." In setting the insects I observed that the body of the male I. Globulariæ was much longer and more tapering than that of I. Geryon. On the question whether I. Geryon be a variety or a species, I will only observe that we get the normal I. Statices in plenty within a mile or two of the hills where I. Geryon abounds, but that I never took them in company; nor did I ever take any form intermediate between them.—*F. Beauchamp.*

Lithosia molybdeola.—The last number of the 'Zoologist' contains a description of several species of the genus Lithosia. Among them there is a new species to which M. Guenée gives the name of molybdeola. My object in noticing it is to ask whether Mr. C. S. Gregson's name of sericea has not the priority. Mr. Doubleday thinks not; I have a strong impression that it *has*. Mr. Gregson, if he cares about it, can soon satisfy us on this head. If sericea be the first name given to this species I for one shall certainly use it, as I think it at least as good as the other, besides being an English insect and named by an English entomologist.—*Joseph Greene, Cubley Rectory, Doveridge, Derby.*

Description of the Larva of Melanthia albicillata.—Some eggs sent me from the North hatched about the end of June, and some that I procured in Sussex hatched about a week later. I had no bramble or raspberry at hand, so I tried them with several other plants, of which they took readily to wild strawberry. I soon, however, transferred them to bramble, on which they fed up very fast, being full-grown by the end of July. I should describe them thus: — Velvety, deep green, with a few short and rather bristly hairs. Head greenish brown, with three pale vertical stripes; interstices of segments yellowish, especially on the sides. On the back, at the posterior part of each of the segments from the 4th to the 10th, there is a triangular rather bright yellowish brown spot (looking red by contrast with the green ground colour), the apex towards the head bordered with dark brown, and having a dark brown tapering streak up the centre; the surface of these spots appears corrugated. Claspers and posterior part of anal segment brown. Spiracular line whitish, edged beneath on the first four and on the 10th and 11th segments with brown. Belly green, with numerous whitish lines and dots. The usual position of the larva is that of a bow, but it has a trick, especially when changing its skin, of hanging down with the body bent backwards almost at a right angle behind the 4th, and again behind the 9th segment, so as to resemble the outline of a very lanky letter E. The back is round, and the belly very flat; the body tapers rapidly from the 5th segment to the head. Its vivid colour and velvety texture render it a beautiful larva; but the perfect insect, when bred, seems to me almost without a rival for purity and exquisite

delicacy of design. I should doubt whether in the range of natural objects a more beautiful line is to be found than that exquisite cool gray streak upon the rich creamy ground of the fore wing. It was the liveliest moth I ever bred, flitting about the moment I came into the room. All the specimens I took were in open places deep in the woods, not on the skirts; when flying they look very small.—*F. Beauchamp.*

Occurrence of Dosithea eburnata at Bangor.—Mr. B. Kendrick sent for exhibition a specimen of Dosithea eburnata, taken by himself on the hills overlooking the town of Bangor, about 8 P. M. on the 5th of July last. Thus a new locality has been discovered for Weaver's lost species. The specimen was fine and well marked, perhaps a little larger than the figure in the 'Annual.' Pterophorus tephradactylus was taken at the same time and place.—*Proceedings of the Northern Entomological Society, October* 4, 1862.

Economy of Scotosia undulata.—I took a female in 1861. She laid me some small oval whitish eggs on the under side of a sallow leaf, generally in the hollow by the side of the midrib or some other rib, often two or more on a leaf, but never adjoining each other. I transferred them to a young tree growing in a pot. As soon as hatched the larvæ spun a web resembling that of the Yponomeutidæ, and sometimes, like them, several together. When a little older they bent and fastened leaves together, and ate through the walls of their dwelling until they left only a skeleton, when they went on to another place, to behave in a similar manner. They were very sluggish, not taking the trouble to push their tails outside, so that when they had eaten the walls of their tent the lower part formed a bag full of "coprolites." They usually lay curled up in their tent, and all mine continued to dwell under cover until they went down. I think I never saw them outside, except when they were "removing," and once when they had eaten their plant down to the stumps; then they crawled about uneasily till fresh food was introduced. When full grown they were scarcely an inch long, and reminded me somewhat of the larvæ of Eupithecia venosata in their general appearance. I proceed to give a description of them. Short and stumpy, with a few very short hairs. Head small, shining, brown, the two upper lobes round and conspicuous. Dorsal line brown, bordered with a very slender much broken whitish line. Subdorsal line brown, broad, bordered on the upper side by a slender broken whitish line (perhaps *this* is the true subdorsal). Spiracular line broad, dirty white, puckered. Ground colour above the spiracular line varies from pale flesh-colour to dark brown; belly from pale gray to dark gray. In the dark specimens the dorsal line is scarcely perceptible, but the subdorsal (?) is perceptibly darker. On the upper side of each of the anal claspers there is a large blackish spot, in addition to which light specimens have a blackish spot on the centre piece of the anal segment. The pupa is in a rather slight earthy cocoon. I kept mine in a fireless attic. They began to emerge early in May, and the last made its appearance about the end of that month. I took great pains to continue the brood, but ineffectually, though I sacrificed a dozen specimens for that purpose, keeping them till they died in a large leno bag over a growing tree (which I stood out in the garden one night), and feeding them with syrup; some of them lived over a fortnight, but I had only a score of eggs laid, and they proved infertile. I should add that the perfect insect was very lively, so as to make it no easy matter to catch and box, without injury, three or four out of a small flower-pot.—*F. Beauchamp.*

Description of the Larva of Phibalapteryx tersata.—During the last week of August and the first fortnight of September, 1861, I beat a number of these larvæ, in company

with those of Melanippe procellata, from Clematis, after dark. They are long, slender and tapering towards the head, which is small, flat and rounded. Ground colour very pale grayish brown. Dorsal line dark brown, very conspicuous and broad on the head, thence tapering to the end of the 4th segment, where it generally becomes invisible, reappearing, however, as a gray spot just behind the intersections of the segments, and on the 10th segment broadening into a conspicuous black spot, which tapers to a point forwards. Similar spots, but much fainter, can be traced on the 9th and 8th segments, and sometimes on the 7th. On the hinder part of each of the middle segments is a pair of spots of the same colour as the gray spots before mentioned, with which they form a triangle. Spiracular line slender, pale, edged each side with dark. Sides below the spiracles paler and rather ochreous. Spots and spiracles conspicuous, black, ringed with pale. Ventral line pale, rather broad, edged with a dark line of considerable but variable breadth. There are numerous longitudinal lines, and on many specimens transverse dorsal shades, especially on the middle segments. In some examples all the above markings are very indistinct, except the conspicuous black spot on the 10th segment. These larvæ come out at dusk to feed, usually holding on the edge of a leaf, and at the slightest touch dropping off, without leaving any silken thread to return by; when on the ground they curl into a regular St. Catherine's wheel. They are very lively at night, but quite the reverse by day. In habits they closely resemble the larvæ of M. procellata. The cocoon is rather slight and subterranean. The imago began to appear early in May, and continued till the middle of June. I had no difficulty in pairing them off, but what I may term their inveterate habit of "child-dropping," gave me great trouble; though nice Clematis sprigs were prepared, they persisted in scattering their eggs in the earth at the foot of the glass cylinder in which I kept the food, and as the eggs are brown it was difficult to collect them. In this habit the insect differs altogether from M. procellata, which lays its large white eggs upon the edges of the Clematis leaves. The imago is not very lively. —*F. Beauchamp.*

Ichneumoned Eggs of Pygæra bucephala.—On the 3rd of July, 1858, I found a batch of fifty-eight eggs of Pygæra bucephala on the under side of a birch leaf. I did not then know what they were, so I made the following description of them:—Size intermediate between those of Lubricipeda and vinula, hemisperical, prolonged into a very short cylinder at the base; the cylindrical part brown (just the colour of glue), the remainder, and by far the greater part of the egg, bluish white, with the top, however, conspicuously black; the whole surface shining, and (examined through a lens) appearing as if enamelled. On the 2nd of August small black ichneumons made their appearance in the winged state, having gone through all their changes in the egg-shell. I preserved the egg-shells with a number of the flies, which I shall be happy to present to you or to any of your readers.—*Id.*

Divorce and re-union of Platypteryx falcula.—About two in the afternoon I found a pair of these insects *in copulâ*. They separated, owing to my having endeavoured to remove them into another place, at about 5 P. M. About dusk the female laid three or four eggs. Next morning I found them again *in copulâ*, and they voluntarily separated about 1 P. M.; after which the rest of the eggs were laid.—*Id.*

Occurrence of Noctua sobrina at Rannoch.—Mr. G. H. Wilkinson exhibited a box containing a specimen of Noctua sobrina, taken by John Stafford at Rannoch, at sugar, in August last.—*Proceedings of the Northern Entomological Society, October* 4, 1862.

Note on Agrotis lucernea.—In the last part of the 'Transactions of the Northern Entomological Society' Dr. Herrich-Schæffer is charged with committing an error in stating that the specimens of A. lucernea found in the South of England are lighter-coloured and larger than those taken in the North. If this is erroneous I am answerable for it, as I sent a series of specimens to Dr. Herrich-Schæffer to show that this was the case, but I have seen nothing to cause me to alter an opinion formed from the examination of at least two hundred specimens, taken in the Isle of Wight, at Deal, in Wales, and near Edinburgh.—*Henry Doubleday; Epping, February* 18, 1863.

Note on the Irish Specimens of Dianthæcia capsophila.—Dr. Staudinger has kindly compared one of the Irish specimens of this insect with authentic specimens of the D. Nisus of Germar, and informs me that it is not identical with Germar's species. Boisduval's name must therefore be adopted for the Irish insect, which is totally distinct from all the varieties of D. carpophaga.—*Id.*

On the Determination of Dianthæcia capsophila.—I received the other day the Report of the December Meeting of the Northern Entomological Society, held at the house of Mr. Gregson. In the Proceedings I find the following entry:—"Mr. Greening brought a specimen of Dianthæcia capsophila of Boisduval, Newman, 'Zoologist,' &c., from Howth Lighthouse, which, on being compared with Mr. Gregson's series of D. carpophaga from North Wales, Cheshire, North Lancashire and Cumberland, was decided to be only a dark variety of D. carpophaga. Mr. Gregson regretted that the Society had not sooner worked out this question, but stated, as a reason for the delay, that the Society did not see the specimens until every one unconnected with it had failed to give a decided opinion, except in favour of Boisduval's name. Although the Irish insect does not agree with the description by Guenée of D. capsophila, yet it does with some of his intermediate varieties, the same as some specimens do with his description of D. Nisus of Germar." With respect to this decision, I wish to say a few words. Did it never occur to the Northern Entomological Society, or to Mr. Gregson, under whose special influence this decision appears to have been arrived at, that there are other entomologists, both in this country and abroad, to whose very high attainments in Science, and superior acquaintance with insects, both British and foreign, some deference is due? In order to show to whom I refer allow me to go back two or three years. I took my first specimens of the insect in question in Ireland, in the summer of 1860. In November of that year I sent specimens to Mr. Birchall, at Liverpool, who showed them to Mr. N. Cooke; and after a careful examination and comparison with Guenée's work, they, particularly Mr. Cooke, came to the conclusion that the specimens were D. capsophila. Mr. Birchall then showed them to Mr. Gregson, who, although Mr. Birchall pointed out the distinguishing characters, insisted that they were only D. capsincola. On being informed of all this I picked out three of my finest specimens, and forwarded them to Mr. Doubleday. He, after a careful examination, informed me that he thought they were D. capsophila, but that, as there was not a specimen of that species in either the British Museum or Mr. Hind's extensive collection of foreign Lepidoptera, he would prefer sending one to M. Guenée before he gave a decided opinion. At the same time other specimens that I had sent to London had been examined by Messrs. Newman, M'Lachlan and others, who were so well satisfied of their identity with Guenée's description that Mr. Newman put a notice of the capture of D. capsophila on the cover of the 'Zoologist' for December, 1860. Mr. Gregson, finding out his mistake, immediately made his celebrated mathematical journey to the Cumberland coast, so graphically

described by himself ('Intelligencer,' No. 225, p. 135), and obtained from Messrs. Tiltman and Nicholson, of Whitehaven, specimens of a Dianthæcia which he lost no time in announcing, at the meeting of the Historic Society, at Liverpool, as Dianthæcia capsophila (see Zool. 7362). Here, however, he rather overshot the mark, for when Mr. Nicholson, a short time afterwards, sent similar specimens to Mr. Doubleday, they turned out to be only dark varieties of D. carpophaga; and subsequently, when Mr. Gregson had collected and bred a number of the larvæ, he discovered and had to admit his error himself (Int. No. 258, p. 186). In July, 1861, Mr. Hind had received D. capsophila from the Continent, which, on being compared by Mr. Doubleday with mine, proved them to be that species; and at the same time M. Guenée returned the specimen Mr. Doubleday had sent him, having ticketed it "Capsophila, *Boisduval*." This alone might be supposed to be sufficient to have settled the matter; but in the autumn of 1861, as Mr. Doubleday was making up a box of rare British Lepidoptera for Dr. Herrich-Schæffer, I sent him a specimen to enclose; and Herrich-Schæffer's description, showing the points of difference between it and D. carpophaga, is fresh in the minds of readers of the 'Zoologist' (Zool. 8292). Besides all this, I have the decided opinion of Mr. Bond in favour of the distinctness of the species. Now, in the face of all this the Northern Entomological Society, or at any rate a certain portion thereof, ventures, from the examination of a single specimen, and that, as I happen to know, not a fine one, to decide that the Irish species is only a variety of D. carpophaga. Certainly Mr. Gregson might with great propriety compliment the Society on having "worked out" a question in which he had so signally failed himself. He says that everybody unconnected with the Northern Entomological Society has failed to give a decided opinion, except in favour of Boisduval's name. That of course is a roundabout way of saying that everybody, with this exception, has agreed to give it that name; and, that being the case, it would seem hardly necessary to say any more about it, only that he deduces from this fact the somewhat remarkable conclusion that it is therefore advisable and proper for that Society to come to a totally opposite decision. He says, moreover, that the Irish insect does not agree with Guenée's description of D. capsophila, but with some intermediate varieties; and that some specimens agree with his description of D. Nisus of Germar. How, then, does it happen that several entomologists of first-rate ability simultaneously come to the conclusion that the Irish insect was D. capsophila, and that only from Guenée's description, since there were no foreign specimens to be procured for comparison? And how can Mr. Gregson undertake to give an opinion of Guenée's description, when it is well known that he professed to name specimens from that description which afterwards turned out to be D. carpophaga? With regard to D. Nisus, my kind frend Mr. Doubleday, to whom I am greatly indebted for the trouble he has taken in the determination of this and other species, has, I believe, communicated with Dr. Staudinger upon the subject, and the result will doubtless appear in an early number of the 'Zoologist.'— *Charles G. Barrett; Haslemere, Surrey, February* 27, 1863.

[I think that the Secretary of the Society would do well not to give any decision as that of the Society collectively; but assign each opinion to the member who expressed it.—*E. Newman*].

Note on Brephos Parthenias.—I succeeded in overcoming the reluctance of these lively insects to lay eggs, by enclosing several in a large glass cylinder over birch twigs in wet sand, feeding them with syrup: they were a week, however, before they

gave in. The eggs are small, oblong, wrinkled and of a dirty grayish green, soon turning brownish; they are laid singly, or two or three together, just below a projecting bud or twig. The perfect insect is excessively wary. In collecting it we took our station close to a magnificent male sallow in full bloom, around which they had been sporting in some numbers before we approached. We frequently saw them coming up towards the tree, but when they came within a few yards they wheeled off, and would not settle till we moved.—*F. Beauchamp.*

Note on Tinea granella.—This very destructive little moth swarms in the granaries of Newcastle in myriads, and is quite as injurious to the corn-dealers as Calandra granaria or Cucujus monilicornis, the ravages of which have been most ably delineated by Mr. Bold. The larva feeds within the grain, and as soon as the weather begins to turn rather chilly these little white creatures, having fed themselves up, come forth and crawl all over the premises in search of some cracks or crevices wherein to undergo their transformations. If you go into any warehouse or even counting-house where grain is, in the beginning of autumn, you will not fail to see hosts of these larvæ making their way over sacks, counters, walls, windows, in fact over everything fixed or moveable on which the eye can settle.—*V. R. Perkins, in 'Transactions of Tyneside Naturalists' Field Club.'*

Life-Histories of Sawflies. Translated from the Dutch of M. Snellen van Vollenhoven, by J. W. May, Esq.

(Continued from p. 8411.)

Nematus viminalis, *L.*

Linneus, Fauna Suec. 1529. *Rösel, Ins. Belustigung*, Vol. ii. Wespen, tab. x. p. 4—7. *DeGeer, Mémoires* (German translation), Vol. ii. 2, p. 274, pl. 38, fig. 26—31. *Hartig, Aderfl. Deutschlands*, i. p. 220, No. 55, N. Gallarum. *Dahlbom, in Stett. Ent. Zeit.*, Jahrg. 9, p. 182.

Nematus niger, ore coxis, femoribus, tibiisque luteis, feminæ ventre rufo-flavo, alarum stigmate magno, nigro.

Although I have placed the above references at the head of this description, I by no means undertake to say that they all apply to the synonymy of this insect. I give the reference to Linneus on the authority of Dahlbom: this I am willing to accept, as I believe we are bound to retain, with a certain degree of reverence, the nomenclature of Linneus and Fabricius, in case no cause to the contrary can be shown; but, on the other hand, I am so convinced of the great difficulty, not to say impossibility, of distinguishing closely-allied species of insects by means of the short diagnoses or insufficient descriptions of these high-priests of our Science, that it is seldom worth while entering upon any controversy for the purpose of showing

one's adherence to or dissent from the opinions of others in such a matter.

I have given all the other references, as they apply either to this species—of which two races or varieties appear to exist—or else to a second species, which is only to be distinguished from the present by the most minute characteristics. It even appears to me to be very probable that there are two species having the same habits, but living on two distinct species of willow. Although I have lately taken great pains to get both these species, I have not hitherto succeeded. If eventually, upon rearing the other species, it should be ascertained that it is actually distinct, the references will probably be found to apply solely to this latter, which must then take the name of Nematus Gallarum, *Hartig.*

In order to explain my meaning more clearly, I must remind my readers that De Geer speaks of galls on Sahlweiden (*Salix cinerea*, L.), and that Hartig mentions the same species of tree. My galls, on the other hand, are from the Salix repens. Besides this, the above-mentioned authors speak of gray caterpillars; whereas mine were glassy white when young, and yellow or orange when full-grown. Lastly, I may add that for years, in a certain garden on the banks of the Maas, and the high sea-wall of Schieland, outside Rotterdam, were a number of willows which were every year covered with galls: these galls were at first green, and afterwards turned to yellow, but never became red; and I remember finding them tenanted by gray slate-coloured larvæ. Now, these may have belonged to another species, possibly De Geer's. Last year, when I visited the garden in question, with the intention of investigating this matter, I found the willows had been cleared away; and other willows standing on the same bank, and in the neighbourhood of, although at some distance from, the former plantation, had no galls on them. I had hoped that Dr. Wttewaal would have been able to meet with galls on the willows bordering the Yssel, but this has not hitherto been the case.

In the month of September galls may be found on the dunes in the neighbourhood of the Hague, and near Noordwijk (especially in the last-named place, behind the church-yard), growing on the hard short-leafed dune-willow: these galls look like cherries (see fig. 1). They are always attached to the under side of the leaf, and are very shining and quite destitute of hairs, so that they are very different from those mentioned by Hartig. Some are larger than others; the one represented is one of the largest: they are yellowish green, yellow or red; the surface is studded with several minutely granular

brown elevations (a species of Uredo?). The gall is hollow, having a thickness of from 1 to 2 mm. About the end of September the full-grown larva may be found inside, with a quantity of rather dry excrement of a pale brown-colour. When young the larva is almost translucent glassy white, the head gray; when full-grown it is yellow or orange-yellow, length about 1 centimetre. Head shining, obscure yellow, with two elliptical black spots on the sides, in which are the eyes; the jaws are clear brown. Each segment of the body is divided into three folds, each of these bearing some indistinct slightly projecting wart-like eminences; in some individuals a brown spot was observed on the abdomen close to the anal valve, in all a double black spine above the anus.

These larvæ have twenty legs, all yellow or yellowish white, and more or less translucent. The larva is represented at fig. 2, plate 10. During September and the beginning of October they gnawed round holes in the galls, and made their way out; and after creeping about for some time they buried themselves in the sand which I had placed at the bottom of their bottle.

In the spring I examined the sand, and found some cylindrical cocoons, rounded at both ends, entirely covered externally with grains of sand, as shown at fig. 3. Internally the walls were chestnut-brown, shining, smooth; on holding a piece up to the light it can be seen that the cocoon is made up of transverse and not of longitudinal fibres. The larva remains in the cocoon without change until the month of March, only becoming a little shorter and stouter.

At the end of March I found a pupa in one of the cocoons; of this I made a drawing (see fig. 4). It was of a greenish white colour, with reddish white wing-cases, and singularly attenuated for a tenthredinous pupa. The first imagos made their appearance on the 8th of April; these were a male and a female: during the following twelve days others came out. From general characteristics and the neuration of the wings it is evident that they must be regarded as belonging to the genus Nematus, which is also shown by the antennæ. Both sexes are about the same size, namely, 6 mm. long, including the antennæ 1 centimetre. Expansion 13 mm. Male shining, more or less brownish black; the first three joints of the antennæ are black on the upper surface, reddish brown underneath, all the others being reddish both above and below. Head black, except that from the eyes downwards the colour is pale yellow; jaws black; palpi obscure yellow, black at the base. Legs reddish yellow, only the coxæ and a line on the under side of the femora black; the last two or three joints of the anterior and middle

tarsi, and the entire posterior tarsi, are brown or brown-black. The tegulæ and the nervures at the base of the wing are reddish yellow; the remaining nervures black; the wings themselves strongly iridescent. The stigma is particularly large. The last segment of the abdomen is reddish yellow on both surfaces. This description is illustrated by our fig. 5.

The female differs from the male in the following particulars:—The antennæ are entirely black both above and beneath, or at most have but a tinge of brown on the last two joints. The margins of the collar are obscure yellow, the coxæ and apophyses straw-colour. The tarsi of the first and second pair only bear little brown points, and in the posterior pair the first two joints of the tarsi are yellow, and the last three brown or brownish black (fig. 6). The whole of the under surface is obscure greenish red; for the rest the abdomen, as also the ovipositor, pitchy black.

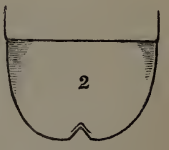
During the first two days after their appearance the movements of these sawflies were very quick; nevertheless I did not see them pair, and the insects soon died. I suppose that in their free state they extract the nectar from the flowers of the catkins of the willow, and so prolong their lives for a few days. I should much have liked to have observed the laying of the eggs, and the commencement and growth of the galls; but this is not practicable, unless one resided in the immediate neighbourhood of the willows on which the animals live; I am consequently unable to give any information as to where the egg is deposited; it is, however, most probable that the female makes an incision in the mid-rib on the under surface of the leaf, and there places her egg. Meanwhile De Geer states that the galls occur on little stalks, which circumstance appears to me improbable. I have not observed stalks to any of the galls in my possession, about fifty in number.

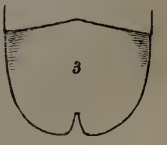
I should much like to be able to compare the present species with the other species or variety living on the willow growing by the waterside.

Oxypoda umbrata.—In January last I captured, at Highgate, an Oxypoda which appeared different from any member of that genus hitherto considered British, and by the kind assistance of Mr. Waterhouse I am enabled to record it as Oxypoda umbrata, *Mann. Brach.* 70, 5; *Erichs. Gen.* 144, 5 (Alcochara umbrata, *Gyll.*, *Sahlb.*), a species new to our lists. It is shorter and much narrower than O. opaca, and not quite so dull as that insect; black, clothed with fine pubescence; the elytra pitchy brown; base of antennæ and legs rufo-testaceous, and having in the abdomen (which is attenuate at

the apex) the entire terminal segment, the greater part of the penultimate and the hinder margins of the remaining segments ferruginous. The antennæ are as long as the head and thorax, not so long or incrassate as in O. opaca, and with the terminal joint shorter and more blunted; the thorax is convex, rather shorter than its breadth, deflexed at the sides, especially in front, where it is slightly narrowed, and with all its angles obtuse. It appears to be the most finely and closely punctured species of the genus, and may be known from O. longiuscula by its more convex form and much shorter antennæ, in which the terminal joint is also much smaller. I took an entirely jet-black variety of O. longiuscula at Boston lately. It seems a very variable species, and when alive resembles a Calodera more than an Oxypoda.—*E. C. Rye;* 284, *King's Road, Chelsea.*

Notes on Philonthus temporalis and allied Species.—When noticing Philonthus punctiventris of Kraatz, in the 'Entomologist's Annual' for the present year, I made some remarks as to the probability of P. temporalis being also a species found in England; and having recently been enabled to compare Mr. Waterhouse's supposed specimens of the latter (and also another example detected by me among Brachelytra belonging to Mr. T. J. Bold, of Newcastle) with the original description given by Mulsant of the insect in question, I can now confirm my former opinion. Philonthus temporalis of Mulsant (Opusc. Ent. 2me Cah. 1853, p. 73) must therefore be added to our lists. It is about the size of P. punctiventris, but not so parallel in shape, the elytra being more ample, decidedly æneous in colour, and with rather less distinct punctuations, which are slightly rugulose transversely; the abdomen is rather more closely punctured, and has the lower surface less thickly punctured than the upper; the antennæ are entirely black and somewhat broader, having the penultimate joints more transverse, but not so wide as in P. æneus or P. carbonarius. The head and thorax are set with long stiff black hairs, and the former has numerous coarse punctures behind the eyes, the basal joints of the anterior tarsi in the male being very slightly dilated; in all which characters it resembles P. punctiventris. The sixth segment of the abdomen, in the male, beneath has a shallow rounded notch in the centre of its hinder margin (fig. 1); whilst the male of P. punctiventris exhibits in the same place a much deeper and wider emargination (fig. 2); in both of these species the edge of the fifth segment is entire and straight, whereas in the males of P. æneus the fifth segment beneath is somewhat emarginate for its entire breadth, and the notch in the sixth segment is more decidedly acute than in P. punctiventris (fig. 3): the females of all these insects appear to present no distinguishing characters in this region, having the apex of the sixth segment beneath obtusely rounded. Mulsant does not notice the above character of the male of P. temporalis, and only refers to the female; I am, however, tolerably confident on the point, having found precisely the same emargination in two of the specimens examined by me, and which are both palpably males, the third example being a female. P. æneus and P. carbonarius may be at once known from their allies by the decidedly transverse penultimate joints of their antennæ, the former also being easily separated by the very fine and close punctuation of the upper surface of the abdomen in both sexes, and by the broad basal joints of the front tarsi in the male: P.





carbonarius is not so metallic in colour, the front tarsi not dilated in the male, and the punctuation of the upper side of the abdomen more distinct and remote. Underneath the sexual characters of these two species are very similar. When looking over the specimens of P. punctiventris in my own collection and in those of my friends, I find certain examples with longer antennæ than the rest; they do not, however, present any structural differences, but nevertheless seem to accord very closely with the description of P. tenuicornis given by Mulsant (*loc. cit.*); and it seems strange that Kraatz (Ins. Deutschl. p. 574, Note) should compare the latter species with P. æneus and P. carbonarius instead of P. punctiventris, which it must certainly resemble more than either of these. I have not as yet been able to see a typical specimen of P. tenuicornis, but probably some of your readers may be in a position to compare P. punctiventris with this species; if so, I should much like to know their points of difference.

I have in my collection a fresh specimen of P. lucens of Mannerheim, taken in Scotland by Mr. H. Montague; and Mr. Bold has also sent to me for comparison another example taken by himself. This species is compared both by Kraatz and Mulsant with certain of the above-mentioned insects, and I mention it in order to dispel any idea that specimens of P. politus (of which it is a near ally), with the under side of the basal joint of the antennæ discoloured or darkened, could possibly be mistaken for it. Its antennæ are much shorter, the joints being more transverse; the legs are not so long, and the punctuation of the elytra is much coarser.—*E. C. Rye; March* 18, 1863.

Proceedings of Societies.

Entomological Society.

March 2, 1863.—Frederick Smith, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be returned to the respective donors:—'Proceedings of the Royal Society,' Vol. xii. No. 53; presented by the Society. 'Annales de la Société Entomologique de France,' 3me Série, Tomes 4, 5, 6, Années 1856, 1857, 1858; by the Entomological Society of France. 'Anatomie, Physiologie, et Histoire Naturelle des Galéodes;' by the Author, M. Léon Dufour. 'Wiener Entomologische Monatschrift,' Band vi.; by Herr Julius Lederer. 'Stettiner Entomologische Zeitung,' Jahrg. 23, Nos. 10—12, and Jahrg. 24, Nos. 1—3, and Beilage; by the Entomological Society of Stettin. 'The Canadian Naturalist and Geologist,' Vol. viii. No. 6; by the Natural History Society of Montreal. 'The Zoologist' for March; by the Editor. 'The Journal of the Society of Arts' for February; by the Editor. 'The Intellectual Observer,' No. 14; by the Publishers. 'Jahrbücher des Vereins für Naturkunde im Herzogthum Nassau,' Bd. 14, 15, 16; by the Society. 'The Reader' for January and February; by the Editor.

Election of Subscriber.

Edward Parfitt, Esq., of the Devon and Exeter Institution, Exeter, was ballotted for and elected an Annual Subscriber to the Society.

Exhibitions, &c.

The Secretary read a letter from Mr. Abraham Edmunds, of the Tything, Worcester, correcting an error in the Report of the Meeting of the Society held on the 5th of January last: of the varieties of Lepidoptera exhibited by Mr. Stainton on that occasion, on behalf of the Rev. E. Horton, part only were the property of Mr. Bibbs; the Vanessa Atalanta, Arge Galathea, Arctia Caja and Eriogaster lanestris, belonged to and were captured by Mr. Edmunds.

Mr. Bond exhibited a specimen of Lycæna Dorylas, believed to have been captured in the West of England in 1862; two specimens had been sent to Mr. Bond as varieties of L. Adonis, having been taken, in ignorance of their specific distinctness, out of a large number of insects belonging to Mr. W. Farren, of Cambridge.

Mr. Waterhouse exhibited certain British species of the genus Mycetoporus, with the view of correcting an error into which he had fallen, that of confounding the M. longulus with M. lepidus. Mr. Waterhouse observed, "When I formerly examined the British Mycetopori, in order to determine and catalogue the species, I possessed only old specimens, not in a favourable condition for displaying their characters; but I have now before me not only a series of fresh and well-preserved British specimens of both species, but likewise continental specimens forwarded to the British Museum by Dr. Kraatz. The M. longulus of Mannerheim, Erichson, Kraatz, &c., appears to be not uncommon in gravel and sand pits in the neighbourhood of London. In some respects it is intermediate in its characters between the M. splendens and the M. lepidus. In size and form, for example, it is intermediate. Its colouring resembles that of M. splendens, being black (if we except the pale legs and basal joint of the antennæ), with bright red elytra, in which the region of the scutellum and the lateral margins are dusky, but in other respects immaculate. It differs from this insect in being rather narrower; in having the antennæ longer and less stout, the four penultimate joints being less strongly transverse; in having two punctures, placed obliquely, on either side of the disk of the thorax; and in having the abdomen more thickly punctured. Most of my specimens of M. splendens have the abdomen entirely black above, but in some the edges of the segments are rufo-piceous. My specimens of M. longulus have the abdomen of a less pure black, being somewhat pitchy; and the edges of the segments, in all, are rufo-piceous.

"This insect differs from M. lepidus in having the sides of the body less parallel, the thorax being broader behind, and followed by broader elytra, and a more attenuated abdomen; the antennæ are rather longer, as are likewise the legs.

"In M. lepidus the colouring of the body is very variable, ranging from nearly uniform rufous to pitchy black; often it is pitchy, with the elytra more or less rufous at the base. Here the general colour of the thorax and elytra is generally the same, or very nearly so. In a long series of M. lepidus now before me, I do not find any specimens having uniformly bright red elytra, accompanied by a black thorax. It has two punctures on each side of the disk of the thorax, and sometimes three or four. On the apical half of each elytron may be seen usually two punctures in a faint stria situated between the sutural stria and the submesial one. In M. longulus these supplemental punctures on the elytra are often wanting.

"The Ischnopoda melanura of Stephens, which is given in my Catalogue as synonymous with Mycetoporus lepidus, should be transferred to the M. longulus, *Mannerh.*"

Mr. Waterhouse also exhibited the insect which stands as "Boletobius castaneus" in Messrs. Hardy and Bold's 'Catalogue of the Insects of Northumberland and Durham,' p. 107; it was regarded by Messrs. Hardy and Bold as identical with Megacronus castaneus of Stephens, but Mr. Waterhouse stated that, upon examination, he found it a perfectly distinct species. M. castaneus of Stephens' collection was certainly an immature specimen either of Boletobius analis or B. cingulatus; formerly he thought it was the latter, but upon re-examination he was inclined to regard it as the B. analis. The B. castaneus of Hardy and Bold, Mr. W. thought, would probably prove a species of Dr. Kraatz's genus Bryoporus, but as he was unable to examine the parts of the mouth, the maxillary palpi only being visible, he was left in doubt. The maxillary palpi were short and moderately stout, and the terminal joint but a trifle shorter than the preceding joint, and of an elongated conical form. This form of palpus was very distinct from the elongated slender maxillary palpi seen in the typical species of Boletobius (such as B. atricapillus, &c.); it approached more nearly, however, to that seen in species of the section Megacronus, *Steph.* (= Bolitobius, Sect. 1 of Kraatz), and could scarcely be said to differ from that of Bryoporus rufus. The insect was smaller and narrower than B. rufus; had shorter and stouter antennæ; and had the elytra impunctate, excepting the punctures in the ordinary discoidal stria, and that of the suture, in each of which there were but about five somewhat indistinct punctures. The head was short and nearly round, as in B. rufus and Mycetoporus splendens, and, indeed, in size, form, and proportions, it greatly resembled the last-mentioned insect, from which it differed chiefly in the greater development of the terminal joint of the maxillary palpi; in the antennæ being rather stouter, the basal joints shorter, more especially the second, fourth and fifth joints; the punctures on the striæ of the elytra fewer and less distinct; the abdomen less thickly punctured (the basal segment nearly impunctate); and, lastly, in the colouring, which was rufo-testaceous, with the head rufo-piceous, the abdomen pale castaneous, and the antennæ black, with the exception of the three basal joints. The above comparisons were made with Mr. Hardy's specimen, which that gentleman had forwarded for inspection.

Mr. Waterhouse also exhibited two specimens of a British species of Homalota, which had not hitherto been recorded in our lists; he regarded it as the H. oblonga of Erichson and Kraatz; one of his specimens was taken in the neighbourhood of London; the locality of the other had not been noted.

Papers read.

Prof. Westwood read "Descriptions of two new Australian Lucanidæ," under the names of Lucanus carbonarius and L. Howittanus.

The President read "Descriptions of Brazilian Honey-Bees belonging to the genera Melipona and Trigona, which were exhibited, with samples of their Honey and Wax, in the Brazilian Court of the International Exhibition of 1862."

New Part of 'Transactions.'

Part 5 of Vol. i. (third series) of the 'Transactions,' being the first Part published in 1863, was on the table.—*J. W. D.*

Additional Remarks concerning a Dormouse.—October 11th. I have observed for some days past that it has been unusually sluggish, seldom leaving the box compartment of the cage; and to-day, for the first time, the nuts are untouched, and, though the weather is unseasonably mild, I think it may be about to hybernate. It rarely creeps forth till towards midnight, when all is still, but on seeing me is not greatly alarmed, or it would retreat at once to its box; however I have occasionally observed a tremulous motion of the whole body, when, fixing its eyes on one, at the slightest noise or motion it will disappear. Sometimes, however, it will frisk about, running up the wires, spinning the cage round; and when in a playful mood the least touch or motion will cause it to renew its gambols, which seemingly it greatly enjoys, though occasionally throwing a summerset. Having managed to escape once, it has not been allowed much liberty. On opening the door of the cage to feed it one night it suddenly sprang out, and, concealing itself, finally managed to effect its escape, but was seen a day or two after running about the garden. Having quite given it up as lost, I was not a little surprised on a subsequent day to hear that it had made its appearance in the kitchen (the only room with a fire), and taken up a position on the mantel-piece, four feet eight inches from the floor, but only two feet from the back of a chair near it, from which doubtless it had sprung up. Having allowed itself to be recaptured it was replaced in its comfortable cage, from which it has made no further attempts to escape, apparently satisfied that it might go farther and fare worse. Its escape, or rather safe return, is somewhat remarkable, seeing that there is a cat in the house and innumerable cats out; however, I have observed on more than one occasion that the cat takes no notice of it, even when placed close to the bars of the cage, turning away unexcited and unconcerned. This may, however, partly arise from her having become familiarised with it, and would account both for its safe escape and return; but the dormouse being perfectly scentless may not be so attractive as the common mouse, which has a peculiarly strong and overpowering scent. It is by no means so voracious as the common mouse, not consuming, on an average, more than a nut or two a-day, but preferring them to most other kinds of food, though partial to apples, the peel of which it is careful in removing. It is a thirsty creature, requiring a daily supply of water. 12th. On looking into the box this morning found the mouse coiled up, and in a sound sleep, but that it had been on the move during the night is proved by the disappearance of the nuts. 17th. Up to this date there has been nothing new to record, but this morning at half past eight I found the mouse completely coiled up in its lair, so that on being handled it but slightly relaxed; however, it had been on the run during the night as usual, and had fed. It remained in a deep slumber up to half past four P. M., when it awoke and began to feed. Having repeatedly observed it up to eleven P. M. it was still awake. Thinking from its sluggishness and drowsiness of late that it might be about to hybernate, I placed wool, slips of cloth and fine paper between the bars. 18th. At eight A. M. found that the greater part of the materials had been carried during the night into the box, which was completely filled up to the lid. On removing some of the superincumbent wool the mouse was found rolled into a complete ball. 19th. It has fed during the night, and more wool and cloth taken to its lair, where it has remained in a state of torpor during the day up to eleven P. M., when last observed. 20th. Though completely imbedded in wool, and asleep, I find it has been in the cage during the night, and fed too, though very slightly. Its bodily functions are apparently on the point of suspension. The weather, though still mild, is cooler, the thermometer having yesterday at one P. M. fallen to 51°, but has during the

greater part of the month been nearer 60°, and occasionally a degree or two higher. 21st. It has in the course of the night eaten a small portion of nut, but has continued in a torpid state up to twelve P. M., when last seen. It is now pretty clear that it is generally near midnight ere the dormouse begins to feed, though it may occasionally be on the move an hour or so earlier. 22nd. Though the nuts have been nibbled there was very little eaten last night. On raising the lid of the box at eleven A. M. I found the mouse wide awake. Thinking it might require water some was placed before it, and, though closely watched, began to drink at once, lapping it up for a minute or two, seemingly much parched, which may partly account for its eating so little during the night. The last days of October and the month of November were passed much in the same manner, the mouse sleeping during the greater part of the day, but invariably sallying forth at night to feed. Fearing it might be kept too warm I removed it to a large spare room, but then finding it chilled of a morning I replaced it at night in a room where there had been a fire during the day, and it seemed improved by it, but showed no further symptoms of hybernating. The extreme mildness of the weather has doubtless been the chief cause of its wakefulness, though noises may have had something to do with it, as I have frequently observed it alarmed at any sound or whistle, however slight. It continued to feed well, and was apparently in its usual health up to about the end of November; it then began to fall off in condition, gradually taking less food, but drinking as freely as ever. I also remarked that it no longer removed the refuse food out of the box as it hitherto had done, or kept its lair clean. Apparently it was not suffering, as it slept on much as usual, and when found dead on the 8th of December was coiled up as if fallen asleep. There is little doubt but that, like the common mouse, it is nocturnal in its habits, though I am satisfied that it is to little purpose endeavouring to carry on observations on any animal kept in confinement, and probably not fed either, on its natural food: as well attempt to study the habits of the Royal Bengal tiger caged in the Zoological Gardens. The dormouse for instance; who knows on what it feeds in its wild state? We have most of us doubtless a vague idea that, like the squirrel, it is a nut-loving animal, and so it is; nevertheless my observations lead me to believe that being fed solely on nuts creates an unnatural degree of thirst, causing it to drink immoderately and injuriously, whereas in a wild state it may have more succulent food, probably seed-grasses and other herbaceous plants, wet too with the evening or morning dew. Though unable to fix the time of hybernating, still there is reason to believe that it is about the middle of October, for it was not until then that the dormouse seemed disposed to set its house in order, though there were always some materials at hand. It would also appear that the nest —at all times a loose and rough fabric—is very expeditiously formed; for the one referred to must have been constructed in a very few hours, but then it was not matted or woven together, and would have fallen to pieces if handled. Fully aware that this is but a slight and imperfect sketch I would point out the desirableness of its being sought out and observed in its native haunts at all seasons; we might then have some reliable information respecting its habits, food, &c., and time of hybernating. With regard to the latter, though it may be determined in some degree by the weather (as in the migration of birds), it is not reasonable to suppose that it can be greatly influenced by it, or it might not of a mild winter—such as this for instance—hybernate at all.—*Henry Hadfield; Ventnor, Isle of Wight, December* 16, 1862. [See Zool. 8025].

Occurrence of the Otter near Bath.—A fine specimen of the otter came into my possession to-day in the flesh. It was killed on the canal bank near this town. It had

most probably wandered from the Avon close by.—*H. Blake-Knox ;* 49, *Pulteney Street, Bath, March* 4, 1863.

Introduction of a new and useful Fauna into Australia.—It seems that an Association called the Victorian Society has been formed at Melbourne with this object. The 'Melbourne Argus' gives us a Report of the last annual meeting, showing the progress already made. After stating the objects of the Society it proceeds as follows. "Having thus reminded our readers of what is the proper aim of the Society, let us see how far this end has been hitherto furthered. In stating this we shall take the list in the order in which Professor M'Coy gives it in his Lecture, although he does not confine himself strictly to animals actually new to the colony, for he begins with the oyster. There can be little doubt that the work of increasing our supply of this first of all purely natural delicacies properly belongs to a Society like this; and this being granted there can be no doubt that it should stand first on the list. The oyster, then, has engaged the attention of the Society during the year; and the Professor tells us that the measures suggested for the preservation of the oyster-beds on our coast have been partially adopted by the Government with beneficial results; 'and in the coming year the experience acquired by the French Government in the formation of artificial oyster-beds, and the preservation of the young, will be applied, as far as is in our power, to the extension and improvement of those on our own coasts.' If only the Society succeed in obtaining for us a good and lasting supply of this delicate morsel it will merit the warmest thanks of the community. Among the *Insecta*, which stand next, we are to have the Arrindy silkworm, which has an additional value to us here, because it thrives on the castor-oil plant, which grows in the colony 'as a perfect weed;' and the Ligurian bee, famed for the quality as well as the quantity of its honey. Of the Crustacea it has been attempted to bring only the English crab and lobster, shipped by Mr. Lachlan Mackinnon. These died on the voyage, but, as with the salmon, the failure itself proved the feasibility of the experiment, because the causes of failure were manifest and are preventible. The Murray lobster, scarcely inferior to the English, has been successfully acclimatised in the Yarra. Of the fish, the first, of course, is the salmon; and as to the failure which has hitherto attended the attempts to introduce it we need only repeat, in Professor M'Coy's words, what has been more than once stated in the columns of the 'Argus,' that 'these failures are only looked upon by all concerned in them as indicative of success, and,' he adds, 'we are trying again.' But English bream, dace, tench, roach and carp have already been imported; the Yan Yean reservoir has been stocked with tench, and the noble Murray cod is now at home in the Yarra. Among birds we have the ostrich, the great crowned pigeon, 'a species of delicate flesh, nearly as large as a guinea-fowl,' the curassow, 'as large as small turkeys, and equally good for the table.' These have already been introduced by the Society in some numbers and distributed. The common pheasant has been introduced in large numbers by the Society, who 'may claim to have already acclimatised it.' The English partridge, too, has now been acclimatised; 'so that, after a few years, we may let, at certain seasons, the sportsmen indulge their bumps of destruction to at least a moderate extent on them.' Besides these Professor M'Coy tells of numbers of other birds already here or on the way to our shores. Of quadrupeds the hare and rabbit have been introduced, 'and the latter so thoroughly acclimatised that it swarms in hundreds in some localities.' Then we have two 'species of the Brahmin bull,' and more are coming; several kinds of deer, including the red and the fallow. Of the llamas we at present possess thirty-eight, and 'five hundred more alpacas are expected

in a few weeks, to be landed by Mr. Duffield, as a portion of fifteen hundred to arrive.' These, as well as many of the deer and goats, are intended for 'some of the highest mountains in Gipps Land.' From South Africa we are to have several of the most valuable of the antelopes, of which the oryx and the koodoo are expected first; and finally, says the lecturer, that finest of all African antelopes the eland, 'a species larger than the largest ox, but with the most delicate and nutritious flesh, is to be the chief object on which our resources will be expended to acclimatise it in the coming year.' These are only a portion of the new and useful animals we owe or are to owe to the Society; and it will be allowed that they constitute a goodly list for one year."

Iceland Falcon (Falco islandicus) *in Shetland.*—On the 18th of the present month a bird of this species, in flying from the persecution of a flock of gulls and hooded crows, passed sufficiently near for me to obtain a long though unsuccessful shot at it. A wounded bird, probably the same individual, has since been seen in this neighbourhood. I also observed another, of much darker colour, dash across the garden a few days ago.—*Henry L. Saxby; Balta Sound, Shetland, February* 28, 1863.

Hen Harrier (Falco cyaneus) *at Eastbourne.*—A fine female hen harrier was shot on Saturday, the 24th of January, on Mr. Boyes' farm, near Old Eastbourne, by a man named George Baulcombe, who has brought it me for examination. Although females are frequently seen, and several have passed through my hands, I never observed or obtained an adult male in this locality.—*John Dutton; South Street, Eastbourne, January* 26, 1863.

Shrike and Yellowhammer.—On the 25th of February one of my boys found a yellowhammer impaled on a long and strong thorn in a quick-set hedge, the work, doubtless, of the gray shrike, which I have seen here at this season on several occasions —and boy-like removed it from the thorn, which was driven right through its breast. But instead of taking it quite away he laid it on the hedge again, at a little distance from the place of suspension. On his mentioning the occurrence to me I made two or three remarks, which had the effect of causing him to look at the place again as he passed. The bird was once more stuck upon the same thorn as before. Yesterday he was there again, and the yellowhammer remained *in statu quo.* This is curious, as seeming to show that the shrike remembered his pantry in the first instance, but has since either forgotten or learnt to despise its contents.—*J. C. Atkinson; Danby-in-Cleveland, March* 4, 1863.

Occurrence of a White Redwing (Turdus iliacus) *in Norfolk.*—When in Lynn this forenoon I called in at the shop of a birdstuffer there, Mr. W. Wilson, who showed me a very fine albino of the common redwing, which was shot lately in Norfolk, and close to Lynn. It was very nearly white, with only here and there faint cream-coloured markings, and in pretty good condition.—*Henry E. Dresser; February* 24, 1863.

The Blackbird (Turdus merula) *Singing in February.*—On the 27th of February the blackbird here was in full song. I do not remember ever having heard it singing here in any former year so soon by two or three weeks.—*J. C. Atkinson; Danby-in-Cleveland, March* 4, 1863.

Note on the Dartford Warbler. On the 16th of February I shot a fine specimen of the Dartford Warbler on Beeston Hill, Sussex, one of the South Down range of

hills. As the author of 'Ornithological Rambles' considers it a scarce bird in that county a record of its capture may be interesting. When first seen the bird rose from some thick furze, and at the height of about five feet above the bush remained dancing and jerking in the air just like a whitethroat, singing noisily all the while. As I was looking on with delight a second, no doubt the mate, appeared suddenly on the top of a bush hard by, but as quickly dived out of sight again. After watching the bird nearest to me for some time,—now creeping like a mouse among the furze stalks, now appearing suddenly on the highest spray of a bush, but only for an instant, when it would either dive in out of sight or fly away with a short jerky flight (not unlike that of the longtailed tit) to another bush,—I began to think of securing the prize for my collection; but it was no easy matter to get a shot, because the furze was so thick, the birds were only seen for a few seconds at a time, and again because the shot I had with me was too heavy except at a long distance, when the birds were of course more difficult to see. I found also that unlike most other birds that will fly out at once on disturbing the bush they are in, these warblers remain hid until all is quiet, when they again creep out, uttering two shrill notes, and make for the highest twig of the bush, from whence to take flight to another. By keeping perfectly still therefore for some time, with my eyes fixed on the spot where I had last seen one of the pair, my patience was at last rewarded, and I got a shot. It proved to be a male in fine plumage, and is now in my birdstuffer's hands for preservation. A friend who was with me tried hard to secure the other bird, pursuing it for a long way through brambles and furze, encountering thorns and scratches innumerable, but all to no purpose; he suddenly lost sight of it, and it never appeared again. I regret that I did not examine the contents of the stomach of my specimen. I forgot to do so until too late. It appears wonderful to think how so delicate a bird as the Dartford warbler can weather our climate during the winter months, and in so exposed a situation too as the top of the South Downs.—*J. E. Harting; Kingsbury, Middlesex, March* 8, 1863.

The Humming Bird's Tongue.—In your review of Mr. Gould's magnificent 'Trochilidæ' your description of the tongue in this family, though correct so far as it goes, is incomplete. You say that you have had no opportunity of examining the organ, and I do not think that the closest examination would be adequate in the dried state. Possibly Mr. Gould himself has made no other, and I therefore beg to supplement your observations with the following notes on the tongue of the recent T. Polytmus, which I extract from my 'Birds of Jamaica,' p. 110, and with the accompanying sketches, carefully made at the time, which have never been published. "The tongue of this species (and doubtless others have a similar conformation) presents, when recent, the appearance of two tubes laid side by side, united for half their length, but separate for the remainder. Their substance is transparent, in the same degree as a good quill, which they much resemble; each tube is formed by a lamina rolled up, yet not so as to bring the edges into actual contact, for there is a longitudinal fissure on the outer side, running up considerably higher than the junction of the tube; into this fissure the point of a pin may be inserted and moved up and down the length. Near the tip the outer edge of each lamina ceases to be convoluted, but is spread out and split at the margin into irregular fimbriæ, which point backward, somewhat like the vane of a feather; these are not barbs, however, but simply soft and flexible points, such as might be produced by snipping diagonally the edge of a strip of paper. I conjecture that the nectar of flowers is pumped up the tubes, and that minute insects are caught, when in flower, in these spoon-like tips, their minute limbs being perhaps entangled in the

fimbriæ, after which the tongue is retracted into the beak, and the insect swallowed by the ordinary process, as doubtless those are which are captured with the beak in flight. I do not thoroughly understand the mode by which liquids are taken up by a humming bird's tongue, though I have carefully watched the process. If syrup be presented to

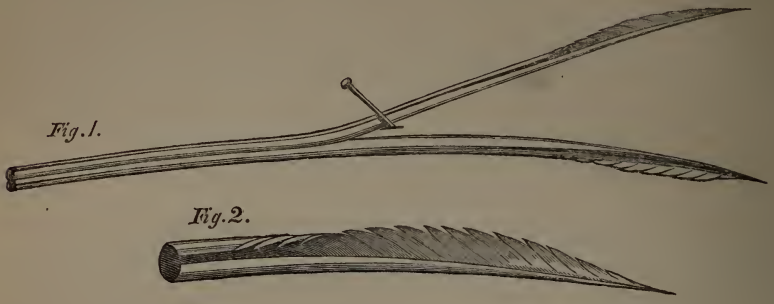


Fig. 1 represents the tongue in Trochilus polytmus, considerably magnified; the terminal filaments kept asunder by means of a pin.
Fig. 2. The extremity of the left filament still more magnified.

one in a quill, the tongue is protruded for about half an inch into the liquor, the beak resting in the pen, as it is held horizontal. There is a slight but rapid and constant projection and retraction of the tubes, and the liquor disappears very fast, perhaps by capillary attraction, perhaps by a sort of pumping, certainly not by licking."—*P. H. Gosse; Sandhurst, Torquay.*

Who are the Humming Bird's Relations? By A. R. Wallace, Esq., F.L.S.

In your last number you have thrown down a gage of battle which I willingly take up. I beg to be allowed to say a few words in favour of the humble swift, who claims a hearing through me, his unworthy champion, to prove his undoubted, though somewhat distant, cousinship to the great and wealthy family of the Hummers; and to show that those Indian sun-birds who have so long held that honoured place in public estimation come of a different stock altogether,—very ancient and highly respectable no doubt, but still quite unworthy of the high position in which their too-partial friends have placed them.

Misled by similarity of dress and by a general resemblance in size and habits, and owing perhaps to the fact that inhabiting respectively the Eastern and Western tropics few naturalists have enjoyed a personal acquaintance with both families, and thus been enabled to detect the real and important differences hidden beneath the jewelled

robes with which Nature has alike decked them, all authors on Ornithology had placed the Trochilidæ near the Nectarinidæ and Meliphagidæ, till Prince Bonaparte, in his ‘ Conspectus Generum Avium,’ published in 1850, separated them widely from these groups, and placed them immediately after the swifts (Cypselidæ). In 1856, in a paper on the “ Natural Arrangement of Birds,” published in the ‘Annals of Natural History ’ (p. 193), I classed them as a very aberrant group of Fissirostres, and believe I was the first writer, at least in England, to give any reasons for so placing them.

Before proceeding to state what these reasons are it is necessary to make a few observations on some important principles of classification. It is now generally admitted that for the purpose of determining obscure and distant affinities we should examine those parts of an animal which have little or no direct influence on its habits and general economy. The classificatory value of an organ is in inverse proportion to its adaptability to special uses. By this means we shall penetrate the disguise of external form as adapted to similarities of food and habits, and arrive at the true and essential differences that underlie them. We thus determine that the Cetacea are not fishes, though judging from external form and habits alone we should certainly so class them, because the essential mammalian characters, which are anatomical and physiological, remain highly developed. So, though there are Marsupials which take upon themselves the exact form, habits and mode of life of Rodents or Carnivora, yet minute details of structure in the skull and skeleton, and their physiological peculiarities are universally held to separate them completely from these orders. Among birds the hornbills and the toucans may be said to have the same general form, to agree strikingly in their enormous bills, in their general habits, their food, and their mode of taking it,—yet peculiarities in the structure of the feet, of the plumage, and more particularly of the skeleton, show that they have no real affinities, the former approaching the kingfishers and the latter the cuckoos.

On the other hand we often find peculiarities of organization, which seem specially adapted to the mode of life, become diminished or altogether lost in certain aberrant species of whose affinities notwithstanding there has never been any doubt. For example, the woodpeckers are most strikingly characterised by the extensile tongue with *os hyoides* prolonged over the head, exactly as in hummers, and also by the rigid and pointed tail; but in one group (Sasia and Picumnus) the tail becomes quite soft, while the tongue remains fully developed; in another (Meiglyptes brunneus) the characteristic tail remains while the

prolonged *os hyoides* has entirely disappeared, and the tongue has consequently lost its peculiar extensile power; yet in both cases the characters of the sternum, the feet and the plumage show that the birds are true woodpeckers, and the food and general habits remain unaltered. In like manner the bill may undergo immense changes from the smallest size in some goatsuckers to the enormous horny mandibles of Podargus, without at all invalidating the affinities of those birds for each other; or the long feathery tongue of the toucan may differ from that of any other bird, and yet not overcome the force of the anatomical and other evidence which shows that the barbets and the cuckoos are their undoubted allies.

The skeleton, therefore, and especially the sternum, offers us an almost infallible guide in doubtful cases, as indicating deeper seated affinities than those shown by organs which are continually modified in accordance with varying conditions of existence. Another guide of this kind is furnished by the egg. This has a characteristic form and colour, and a peculiar texture of surface which runs unchanged through whole genera and families which are really related to each other, however much they may differ in outward form and habits. When, therefore, these two kinds of evidence coincide in indicating an affinity, which is in other respects doubtful, they may be considered as almost infallible. Now, in the case of the humming birds, we have this evidence. Their sternum and eggs resemble those of swifts much more than they do those of any other birds. Nor is this by any means their only likeness, for in many important points of general structure the two closely agree. If any one will take a swift of the genus Collocalia (the constructor of the edible nest) and also one of the eastern tree swifts (*Dendrochelidon cornatus*), he must be struck by the resemblance of these to the larger hummers in everything but the bill. The small size, the immense pectoral muscles, the short and powerful wing-bones and the enormously developed quills, are points of coincidence of great importance. The Dendrochelidon also makes an approach to the brilliant metallic tints of the hummers, and its long white whisker-plumes, erectile crest and immensely forked tail, remind us of some of the eccentricities of that wonderful group of birds. Here, too, we have the first quill-feather longer than all the others, a peculiarity found in no other family of Passeres but the Trochilidæ and the Cypselidæ, which further agree in having each but ten feathers in the tail. The feet also strikingly resemble each other, in both being small, with very short tarsi, short and powerful toes, with short greatly curved claws, a dilated sole, the hind toe and claw always shorter than

the others, and a great grasping power. The bill and tongue offer the sole important points of difference, but, on the principles before alluded to, they are of less importance than the points of agreement, because, being organs directly concerned in maintaining the existence of the birds, they are modified to suit the very different habits of the two families. Moreover, in a very young state, the difference is scarcely perceptible. In a pair of nestling hummers which I kept alive some days by feeding them with minute insects, which they greedily devoured, while they showed repugnance to every kind of syrup, which, therefore, probably only enters into the diet of the adult birds; I observed that the beak was short and triangular, with a very wide gape,—in fact, just the beak of a swift. I am sorry I neglected to examine the tongue of these young birds, but I have little doubt it would have been simple, or only showing a slight approach towards the tubular form. The formation of such a tongue out of one of the ordinary flat horny type is very easily conceivable. It has only to become lengthened and dilated at the margins, which gradually curl in on each side till they meet, forming a double, or rather reniform, tube. The hummer's tongue is really flat, like that of any other bird, the inrolled edges not being united at their line of contact, so that, in their fresh state, it may be flattened out into a long and very delicate ribband. The end of this tongue is fibrous, and the act of suction would no doubt secure minute flower-frequenting insects as well as pump up nectar; and that insects form the most common contents of the stomach I can assert from the examination of scores of specimens of many different species.

We will now consider what are the affinities of the Nectarinidæ, or sun-birds of the East; and at starting I will concede a point, which you, Mr. Editor, were not perhaps prepared for. I can state, from careful observation, that the tongue of the true sun-birds is really tubular, and exactly similar to that organ in the hummers, and the *os hyoides* is also partially extended over the head, so as to give some degree of extensile and retractile power. From this fact, however, I simply draw the conclusion that the structure of the tongue, though useful in confirming the affinities of genera, is not of sufficient importance to determine the relation of families when placed in opposition to other more deeply-seated anatomical and physiological characters. I can imagine how the tongue may become profoundly modified by variation and natural selection, to adapt it to some special purpose in the economy of the bird; but I cannot believe that the sternum (whose characteristic form has no immediate connection

with the habits of the species) should almost exactly resemble that of quite an unconnected family, and differ altogether from that with which it is really allied; still less that the independent evidence of the egg should confirm the same false relationship.

A further examination, too, will show us that the sun-birds are quite as sharply separated by the tubular tongue from their undoubted allies, as the hummers are from the swifts. The little birds of the genus Diceum have always been considered to come in the family of the sun-birds, and are undoubtedly closely allied to them, yet their tongue is short, simple, and merely split at the point. The honey-suckers of Australia and India agree closely with the sun-birds in general structure, in the form of the sternum, the shortness of wing, the length and strength of the leg (in which they both exceed most birds of their size), the large toes, the very long and powerful hind toe and claw, and in having twelve tail-feathers (in all which characters they are totally opposed to the hummers), yet the tongue is flat, of moderate length and terminating in a brush, produced by repeated splittings of the tip.

Now if the one solitary character of the retractile tubular tongue is sufficient to bring together two families so totally distinct in every other respect as the sun-birds and the hummers, it must also be held sufficient to separate them from every other family and to constitute them a distinct order of birds.

But I think I have shown that we have no reason whatever to give such importance to the modifications of the tongue. We have here, it appears to me, a most instructive example of how—when two totally distinct groups of organized beings, with some general resemblances of size and outward form, come to be specialised for a similar mode of life—Nature by means of natural selection may occasionally modify the same organ in each, in the same way, quite independently of each other.

The case of the sun-birds confirms my view of the true function of the tubular extensile tongue being primarily the capture of minute flower-frequenting insects; for those possessed of this organ and the almost equally extensible brush-tipped tongue, make insects a common part of their food, whereas the simple-tongued genera—as Diceum, Phyllornis and the American Careba—feed almost exclusively on soft fruits. The Arachnotheræ, the most highly developed of the true sun-birds, live principally on spiders and nectar, and I have often seen them fluttering in the air at flower-bunches or a sap-exuding palm,

thus imitating the action of the hummer as far as their very different organization will permit.

It is worthy of remark that the true allies of sun-birds in America, the beautiful little Carebidæ, which might naturally be expected to show some sort of transition to the hummers if there were any real connection between the groups, are still farther removed from them, and have never been supposed by any observer or naturalist to have the slightest affinity with them, though obtaining much of their food from flowers in a somewhat similar manner.

The sun-birds, honeysuckers and allied groups are, I believe, related intimately to the Epimachidæ and paradise birds, with which they agree in general internal structure, in the powerful and highly developed grasping leg, in their activity and general high organization and special adaptation to a purely arboreal existence; and this affinity is most beautifully shown in the little tufts of plumes from the breast and flanks which appear in several distinct genera of these birds (Arachnothera, Nectarinia, Moho, Prosthemadera and Ptilotis), and which form a most constant and remarkable character in the Paridiseas. The wonderful Neomorpha Gouldii (undoubtedly allied to this great group of families), in which the bills of the two sexes differ so remarkably in length and curvature that, judging from that organ alone, they might be placed in distinct genera or even different families, tells us most plainly that here the bill has become highly variable, and must be expected to differ among birds otherwise intimately allied. A case in point is that of the Paradiseidæ and Epimachidæ, families which have been placed in distinct orders of birds owing to the difference of their bills, but which, a knowledge of their internal and external structure, their food and habits, enables us to decide are most closely related, so much so that they will probably have to form ultimately a single family.

In conclusion of this somewhat lengthy exposition I would express my firm conviction, which I trust some of your readers will share with me, that the sun-bird and the hummer have not a shadow of true affinity, the former being a specialised form of an extensive group of typical Passeres, the latter essentially a swift, profoundly modified for an aërial and flower-frequenting existence, but still bearing in many important peculiarities of structure the unmistakeable evidences of a common ancestry.

ALFRED R. WALLACE.

Change of Plumage in the Crossbills.—The common crossbills are unusually numerous in our forests this winter, owing to the abundant supply of fir cones; but the parrot crossbills are rare, and I observed very little fruit on the pines. Having worked out the different changes of plumage in the pine grosbeak pretty satisfactorily to myself while at Quickiock [a description of which will be found at Zool. 8001 and 8003], I am now studying the crossbills. I have made but little progress yet. I have, however, proved one fact—that, contrary to the opinion of some naturalists, the young male after the first month does not resemble the female; and I have also (contrary to my own opinion) proved that the young males do not attain the red plumage at the first moult. Four specimens of young males and two females (all bred this year) are now set before me. These were all killed on the 12th of November, and the plumage is this. On the belly, sides and breast are some of the dark-streaked feathers of the nest plumage; rump bright yellow-red; upper plumage dull green, but all the feathers edged with red-yellow, brightest on the head; breast same as the rump, but hardly so bright. The young females dark green, with a faint yellow breast and a faint tinge of bright yellow (not yellow-red) on the rump; head as in the old birds. Now it will be interesting to watch the gradual change of plumage in the young males, which I think (but this is only my own supposition, remaining to be proved) will during the course of the winter gradually become red (in time for next breeding season), by the yellow-red changing to a deeper red, and not by a moult. I hope in the spring to be able to clear up much of the mystery that still envelopes the change of plumage of these birds. We have just now capital hunting weather, rainy and mild, but no winter; and notwithstanding we have plenty of rowan berries the waxwings have not yet come down, although I saw a small flock five weeks ago, when we had one night's snow. We have a few pine grosbeaks.—*Mr. Wheelwright; Gardsjö, Sweden, November* 15, 1862.—*In the 'Field.'*

Greenfinch (Loxia chloris) *in Shetland.*—One was shot from a flock of twites last autumn. Another was obtained in the same manner a few years ago.—*Henry L. Saxby; Balta Sound, Shetland, February* 28, 1863.

Cuckoos Laying in a Greenhouse.—On reading the account of the deposition of the cuckoo's egg in the nests of other birds I am induced to state what has come under my observation during a twenty years' residence in Radnorshire, on the banks of the River Wye. At Garnon's, in Herefordshire, eight miles from Hereford, the seat of the late Sir John Cotterell, his gardener had two or three times seen a cuckoo go out of the green house in the morning when he opened the door, and a day or two afterwards, as he was watering the plants, which were planted in pots and placed on stands in the greenhouse, he discovered a water wagtail's nest built in one of them, with a cuckoo's egg in it along with its own eggs. Now the most singular thing was that the only way the cuckoo could and did come in and out of the greenhouse was by a glass door or opening, to give air and ventilation to the plants, not larger than ten inches by six. The cuckoo's egg was hatched, the bird brought up by the water wagtails, suffered to fly when old enough, and made its escape out of the greenhouse by the same small door or opening at which the old cuckoo came in. On walking across a large common at the back of my house I discovered a young cuckoo just fledged in a woodlark's nest, and which young cuckoo, I am sorry to say, was not suffered to fly, for some unlucky boys stoned it to death. My idea is that the cuckoo very often lays its egg in a ground bird's nest. A friend of mine sent me a titlark's nest with a cuckoo's egg in it besides two of its own. As he was walking across a large hill he trod on a gorse bush, and a titlark

flew out, which induced him to look closely into the bush, when he discovered the nest. I also received from a friend, the Rev. E. Benyon, living at Culford Hall, Suffolk, four miles from Bury St. Edmunds, a reed warbler's nest, containing two of its own eggs and a cuckoo's. The nest was built in some high reeds, and growing on a large piece of water: it was discovered in the reeds by the men when cutting them for the purpose of thatching the ricks, and was built about two feet over the edge of the water. I have mentioned this singular occurrence to many naturalists with whom I am acquainted, and they never heard of an instance of the sort before. This nest was found nine years ago, and my friend gave orders to the men to take particular notice and care of the nest and eggs should they find one with a cuckoo's egg in it, but none have been found since that time, and the reeds are cut every year, at the time when the reed warblers are sitting on their eggs. I have the nest now in my possession, preserved with the reed warbler's and cuckoo's egg in it, and should feel very happy to show it to any naturalist who might wish to see it. I mentioned the circumstance to my old and much-lamented friend, William Yarrell, who said he never heard of an instance before, and had he not had the third edition of his excellent and well got up work on 'British Birds' in the printer's hands at the time, getting ready for publication, it would have been noted in that work.—*J. W. Clutterbuck; 9, Queen's Gate Gardens, South Kensington, March* 17, 1863.

Pheasants in New Zealand.—The increase of the pheasants imported into New Zealand has caused the following remarks in the 'Daily Southern Cross' of the 27th of October:—"We have heard complaints in several quarters that pheasants have increased so much in certain districts as to become a pest; but although they may do some damage, still the good they do by destroying insects far more than counterbalances the evil. Those who attempt to farm in this province know how much they suffer from crickets and caterpillars; and when they learn that in the stomach of a longtail recently killed no fewer than three hundred crickets were found they will look with greater favour on a bird which destroys so many insect enemies at a single meal. At the same time we do not wish for an undue increase of male birds, because as they prevent the hens from sitting they tend to diminish rather than increase the number of young broods."

The Sandpiper Diving.—When I mentioned the sandpiper diving (Zool. 8195), it was not as a *lusus naturæ* but simply as a fact hitherto little known, at least in Ireland. It is, however, curious that out of the three closely allied families Totanus, Scolopax and Tringa, only one species (T. hypoleucos), and that in the family of the three most remote from that of Gallinula, is known, I believe, to have this capability; certainly no other species, to my knowledge, and I have had considerable experience, dive. When other species are proved to dive then the fact will be nothing remarkable, except that habits hitherto generally unknown will be added to the life-histories of these interesting birds. Captain Hadfield says in his paper (Zool. 8447), "But had it not been for Mr. Leven's assertion that he had noticed their diving 'on one or two occasions while the birds were amusing themselves on the shore or bank of the stream,' there would, I think, be nothing very remarkable." This I consider rather inconsistent, for when a bird can dive for safety can it not also dive for other reasons—food or pleasure? My chief object in writing my first paper was to learn from correspondents if the bird was known to dive for food (see my second last sentence, Zool. 8196). My supposition seems to have been satisfactorily confirmed by Mr. Leven's paper (Zool. 8237), and again by the Rev. G. C. Green, who mentions (Zool. 8283), "and saw it occasionally

run on the bottom." As to unwebbed water birds swimming, surely no one doubts this fact when even land birds can propel themselves through water by their feet.—*H. Blake-Knox;* 49, *Pulteney Street, Bath, March* 5, 1863.

Woodcock (Scolopax rusticola) *in Shetland.*—This morning I met with one among the heather upon the side of the hill above Clugan. This is a very rare visitor, only one other instance of its occurrence having been recorded, although it is rather common in Orkney.—*Henry L. Saxby; Balta Sound, Shetland, February* 28, 1863.

Common Snipe (Scolopax gallinago).—The editorial query (Zool. 8447) as to what the common snipe of Europe is to be called if the Scolopax gallinago of America is a distinct species, is more readily asked than answered. It might be easier to say what it ought not to be called. For instance, it should not, according to Macgillivray, be named the bleating snipe; nor should it have been referred to by Wilson as the English snipe. It is called by Buffon and Cuvier *la bécassine*, and by Temminck, Montagu and other authors the common snipe, and so it is both in England and on the continent of Europe; but as species more common and numerous still are found both in Asia and America it might perhaps be better named. I cannot answer for the former being distinct, having, when in India, failed to examine and compare them. Temminck says (ii. 677) that the common European snipe only differs from that of North America by being some shades darker, whereas the reverse of this is the case; see description of the latter (Zool. 8285).—*H. Hadfield; Ventnor, Isle of Wight, March* 8, 1863.

Moorhen (Gallinula chloropus) *in Shetland.*—Several examples have occurred this winter. Early in January I saw one swimming near the shore in Bressay Sound.—*Henry L. Saxby; Balta Sound, Shetland, February* 28, 1863.

Pintail Duck (Anas acuta) *in Shetland.*—A male was shot in this island last July, but whether it was alone or not I have been unable to ascertain.—*Id.*

Pomarine Skua (Lestris pomarinus) *in Shetland.*—One, said to be a male, was shot in the island of Bressay this winter by the Rev. Z. M. Hamilton. I have in my collection a specimen which was shot at Scarv two years ago.—*Id.*

Diary of the Laying of the Emeus at Brockham, in 1863.—

			WEIGHT.
The first,	on January 2, at	4—4¼ P.M.	1 lb. 2½ oz.
„ second,	„ 6, „	4—4¼ „	1 „ 5½ „
„ third,	„ 10, „	3¼ „	1 „ 6¼ „
„ fourth,	„ 14, „	3½ „	1 „ 7 „
„ fifth,	„ 17, about	5 „	1 „ 6 „
„ sixth,	„ 20, „	4½ „	1 „ 6 „
„ seventh,	„ 23, at	4—5 „	1 „ 6¼ „
„ eighth,	„ 26, before	5 „	1 „ 7 „
„ ninth,	„ 29, at	4—5 „	1 „ 7 „
„ tenth,	on February 1, about	4½ „	1 „ 6½ „
„ eleventh,	„ 4, not at home.		1 „ 7 „
„ twelfth,	„ 7, before	5 P.M.	1 „ 6½ „
„ thirteenth,	„ 10, „	5 „	1 „ 7 „
„ fourteenth,	„ 13, at	4¼—½ „	1 „ 7 „
„ fifteenth,	„ 16, about	5 „	1 „ 6¾ „
„ sixteenth,	„ 19, at	4¼—½ „	1 „ 7 „
„ seventeenth,	„ 22, „	4¼ „	1 „ 6¾ „

	WEIGHT.
The eighteenth, on February 25, before $3\frac{1}{2}$ P. M. . .	1 lb. $6\frac{3}{4}$ oz.
„ nineteenth, „ 28, about 4 „ . .	1 „ $6\frac{3}{4}$ „
„ twentieth, on March 3, at $4\frac{3}{4}$ „ . .	1 „ 7 „

My emeu began laying this season on the second day of the year, and continued, the next three being laid at intervals of four days, and then one every third day, with the utmost regularity, even as to the time of day, which never varied more than an hour on either side of four o'clock in the afternoon. The batch has been much larger, and the average heavier than the two preceding seasons. The male bird did not take to the nest this time till after the laying of the twentieth egg, which occurred on the 3rd of the present month. On the 5th the bird was finally settled on thirteen of the eggs. Four other eggs were laid in the nest after the bird began sitting. As usual, the sitting is very close. The first view obtained of the contents of the nest was on the 9th, when two more eggs were found to be added. The bird at large was seen to deposit another on the 12th. No further view was obtained of the nest till the 21st, when there were found to be seventeen eggs in it. Three of these were removed, under the idea that the number was greater than the bird could do justice to. It was intended to take away four, but the male bird was too rapid in resuming possession of them, the female being all the time in a state of considerable excitement.—*William Bennett; Brockham Lodge, March* 23, 1863.

Adder in February. On Saturday, the 21st of February, as I was opening an ancient tumulus or grave-hill on the Skelton Moors, my spade came in contact, at some six or seven inches below the ling on the surface, with a viper of moderate dimensions. The blow of the spade had practically disabled the poor creature, by an injury inflicted at a point about one-third of its whole length from the head. It was still, however, quite lively or wide-awake, and I should not have liked to trust my finger to its forbearance.—*J. C. Atkinson; Danby-in-Cleveland, March* 8, 1863.

Occurrence of Drummond's Echiodon (E. Drummondii) *at Banff.*—No fewer than six specimens of the above curious fish, varying from four to five inches in length, were procured here on Monday last. The teeth, from which the genus derives its name, are most formidable-looking weapons, even in these small specimens. The spine, too, at the back of the head, on the dorsal ridge, is very conspicuous. These two characteristics are sufficient of themselves to distinguish the species. Although my specimens were all fresh, in fact I took most of them alive, still I could discover no scales. If any reader of the 'Zoologist' may wish to see a specimen I shall be very happy to gratify him, but all postal expenses must be paid by him.—*Thomas Edward; Banff, March* 19, 1863.

Hexagonal Cells.—I would also mention a paper by Mr. Edwin Brown (Zool. 8009) "On the Plan upon which Bees and Wasps construct their Cells." The theory here announced is, if I mistake not, that propounded by Mr. Waterhouse in the 'Penny Cyclopædia,' not less, I believe, than twenty-five years ago. I will not trespass on your patience by reiterating my own views of this theory, having done so in various communications to this Society long ago, but I will call attention to one or two points. Mr. Brown says, "Every cell during its progress is impinged upon by six other cells, and, as all progress at the same time, produce inevitably the hexagonal structure." In order to prove that it is not necessary that a cell should be impinged upon by six others, I will refer Mr. Brown to the sixth plate that illustrates my 'Catalogue of the Vespidæ,' in which a faithful representation of a nest of Icaria guttatipennis is figured, showing six hexagonal cells standing in a row on the branch of a shrub. Again it is stated "It is only when another line of cells is in process of erection that the cells in the outer ring assume a hexagonal shape." This is true, but I possess portions of wasps' combs, or rather the beginnings of combs, in which perhaps twenty are completed, others being only just commenced at their base; the rest are carried up to their full height; but had the parent wasp or wasps, as the case might be, not intended to have extended the comb beyond that limit I am fully assured the outer walls would not have been carried up in angular planes of a hexagon, for in that case the form of the outer portion of the cells would be semicircular. But wasps not only build hexagonal cells, but sometimes, as is the case with a South-American species, Apoica pallida, they occasionally construct hexagonal combs. Beautiful examples of this form may be seen in the nest room at the British Museum.—*Frederick Smith in Anniversary Address.*

New Insect at the Friends' Institute.—In our London houses two species of insects may be said to swarm; these are the cockroach and the cricket. Every one knows an infallible cure for these pests, just as every one knows an infallible cure for whooping-cough and lumbago; every one recommends the cure to his afflicted neighbour, but every human body continues subject to the two complaints, and every human habitation shelters the two obnoxious fellow-lodgers. The third fellow-lodger, which I propose to call Lepismodes inquilinus, and to which I can give no English name, is confined, so far as my knowledge extends, to the building known as the Friends' Institute, 12, Bishopsgate Street Without. Its body is half an inch long, and it has antennæ and tails each half an inch long or rather more, so that the entire length is rather more than an inch and a half. Like a judicious epicure it prefers the dining room to every other apartment in the house, and, like an experienced pilferer, its rambles are entirely nocturnal, concealing itself behind the wainscot by day, and wandering about by night in search of provisions, as sugar, crumbs and other comestibles. It seems to find no very secure footing on the varnished surface of the wainscoting, and this physical infirmity led to its detection; for whilst perambulating the treacherous varnish, it frequently lost its hold and was precipitated headlong into cups, saucers, sugar-basins or slop-basins, and once in, its infirmity of "poor" or nonprehensile feet effectually precluded its escape. The various household utensils which I have mentioned are now used as snares, and the numbers of our fellow-lodgers are thus thinned night after night.—*Edward Newman.*

Notices of New Books.

'*British Birds in their Haunts.*' By the Rev. C. A. Johns, B.A., F.L.S. With illustrations on wood, drawn by Wolf, engraved by Whymper. London: Society for Promoting Christian Knowledge. Pp. 626.

I have much satisfaction in believing that my feeble efforts at describing our indigenous ferns have proved a source whence many a respectable family has derived meat, drink and clothing during the last twenty years. Yarrell's 'British Birds' has not been so largely availed of by our bookmakers, and I can only mention a single work that is solely indebted for its being to this respectable parentage. More will follow as a matter of course, and I cannot but feel that this work of Mr. Johns' is in great measure an offspring of the 'History of British Birds;' not such an offspring as proclaims its descent in every feature, but an offspring nevertheless. The most striking of all features in works of this kind is the arrangement: we have no natural arrangement, as I have lately said, and every author who lays claim to any intelligence on this subject believes he possesses a copyright in his system that must not be invaded. Surely to any one capable of reflection there is no great merit in Mr. Yarrell's arrangement; surely, also, the advent of a new work on British Birds afforded an excellent opportunity for effecting some change. What vast improvements have been made on the Continent! and yet Mr. Johns does not take the trouble of remodelling the system, but adopts it exactly as it stands in Mr. Yarrell's second edition, adding only those few species subsequently mentioned either in Mr. Yarrell's Supplement or in the 'Zoologist.' Again in the generic characters given collectively by Mr. Johns, but at the head of each genus by Mr. Yarrell, there is too close a correspondence; the words are not the same, but the purport is the same; and in many instances where Yarrell's were susceptible of considerable improvement that improvement is not to be discerned.

On the other hand I have to mention several excellent characteristics of the new work. The first is that the author places decidedly in the background those birds which have occurred but once or twice, and which have no claim whatever to the name of "British;" a few words are given to each, just enough to show that the author has in no instance overlooked the record, but that he scarcely thinks it worthy of preservation; a view of the case in which I most cordially concur,

indeed I heartily wish that at least a tenth of the names which now uselessly encumber our list were struck out and entirely forgotten.

Another excellent feature of the new work is the unmistakeable evidence that the author is in very many instances familiar with the living bird: this I believe was rarely the case with Mr. Yarrell; everything that could be learned in the library or museum he had learned with the utmost assiduity and patience, had arranged with masterly skill, and had so combined and massed that his history, regarded as a history, left nothing to be desired. Mr. Johns' work is the very reverse of all; of the bibliography of Ornithology he seems to know absolutely nothing, except as contained in 'Yarrell' and the 'Zoologist;' but he makes up for this deficiency of book-knowledge by his evident acquaintance with our familiar birds in a state of Nature. His sketches have all the appearance of being from life, and are in a great many instances as vigorous as they are faithful. I select copious examples to illustrate this remark.

"*The Wagtail.*—The pied wagtail or dishwater is a familiar and favourite bird, best known by its habit of frequenting the banks of ponds and streams, where it runs, not hops, about, picking insects from the herbage, and frequently rising with a short jerking flight to capture some winged insect which its quick eye has detected hovering in the air. Its simple song consists of but few notes, but the tone is sweet and pleasing, and is frequently heard when the bird is cleaving its way through the air with its peculiar flight, in which it describes a series of arcs, as if it were every instant on the point of alighting, but had altered its mind. While hunting for its food it keeps its tail in perpetual motion. It shows little fear of man, and frequently approaches his dwelling. It may often be noticed running rapidly along the tiles or thatch of a country house, and it not unfrequently takes its station at the point of a gable or the ridge of the roof, and rehearses its song again and again. Very frequently, too, it perches in trees, especially such as are in the vicinity of ponds. Next to watery places it delights in newly-ploughed fields, and hunts for insects on the ground, utterly fearless of the ploughman and his implements. A newly-mown garden lawn is another favourite resort; so also is a meadow in which cows are feeding, and to these it is most serviceable, running in and out between their legs, and catching in a short time an incredible number of flies. The country scarcely furnishes a prettier sight than that afforded by a family of wagtails on the short grass of a park in July or August. A party of five or six imperfectly fledged birds may often be seen scattered over a small space of ground, running about with

great activity and picking up insects, while the parent birds perform short aërial journeys above and around them, frequently alighting and transferring from their own mouths to those of their offspring, each in its turn, the insect they have just captured. They are at all times sociably disposed, being seen sometimes in small parties, and sometimes in large flocks. It has been noticed that when one of a party has been wounded by a discharge from a gun, another has flown down as if to aid it or sympathize with it. Advantage is taken of this habit by bird-catchers in France. It is the custom to tie wagtails by their feet to the clap-nets, and make them struggle violently and utter cries of pain when a flight of the same kind of birds is seen approaching; these stop their flight, and alighting are caught in large numbers for the spit, their flesh, it is said, being very delicate. They share too with swallows the praise of being among the first to announce to other birds the approach of a hawk, and join with them in mobbing and driving it away."—(P. 163).

"*The Skylark.*—Early in spring the flocks break up, when the birds pair, and for three or four months, every day and all day long, when the weather is fine (for the lark dislikes rain and high winds), its song may be heard throughout the breadth of the land. Rising as it were from a sudden impulse from its nest or lowly retreat it bursts forth while as yet a few feet from the ground into exuberant song, and with its head turned towards the breeze, now ascending perpendicularly, and now veering to the right or left, but not describing circles, it pours forth an unbroken chain of melody until it has reached an elevation computed to be, at the most, about a thousand feet. To an observer on earth it has dwindled to the size of a mere speck; as far as my experience goes it never rises so high as to defy the search of a keen eye. Having reached its highest elevation its ambition is satisfied without making any permanent stay, and it begins to descend, not with a uniform downward motion, but by a series of droppings with intervals of simple hovering, during which it seems to be resting on its wings. Finally, as it draws near the earth, it ceases its song and descends more rapidly, but before it touches the ground it recovers itself, sweeps away with almost horizontal flight for a short distance and disappears in the herbage. The time consumed in this evolution is at the most from fifteen to twenty minutes, more frequently less; nor have I ever observed it partially descend and soar upwards again. A writer in the 'Magazine of Natural History' maintains that those acquainted with the song of the skylark can tell, without looking at them, whether the

birds be ascending or stationary in the air or on their descent, so different is the style of the song in each case."—(P. 179).

"*The Chaffinch.*—During the open weather of autumn and early winter chaffinches frequent stubble and ploughed fields, where they busily collect grain and the seeds of various weeds, and are not, I fear, very scrupulous whether they are engaged as gleaners of what is lost or robbers of what is sown. In severe weather they resort to farmyards and homesteads, where, along with sparrows, buntings and greenfinches, they equally consider all they can find as provided for their own especial use. On the return of spring they feed upon the young shoots, and for a few weeks show themselves great enemies to horticulture. Their visits to our flower gardens, paid very early in the morning, are attested by scattered buds of polyanthuses, which they attack and pull to pieces as soon as they begin to push from between the leaves. In the kitchen garden they are yet more mischievous, showing a strong inclination for all pungent seeds. Woe to the unthrifty gardener who, while drilling in his mustard or cress or radishes, scatters a few seeds on the surface! The quick eye of some passing chaffinch will surely detect them; so surely will the stray grains serve as a clue to the treasure concealed beneath; and so surely will a hungry band of companions rush to the diggings and leave the luckless proprietor a poor tithe of his expected crop. Yet so large is the number of the seeds of weeds that the chaffinch consumes in the course of a year, more particularly of groundsel, chickweed and buttercups, that he, without doubt, more than compensates for all his misdeeds; and as his summer food partially, and that of his young family exclusively, consists of caterpillars and other noxious insects, he is in reality among the gardener's best friends, who should be scared away at the seasons when his visits are not welcome, and encouraged at all other times. The chaffinch, though a wary bird, does not stand greatly in fear of man, for if disturbed at a meal he is generally satisfied with the protection afforded by the branches of the nearest tree, on which he hops about until the danger is past, uttering his simple but not unpleasing note 'twink' or 'pink,' as it is variously translated. To this cry it adds the syllable 'sweet,' frequently repeated in an anxious tone, and with a peculiar restlessness of manner, which always indicates that its nest is somewhere very near at hand, and by which indeed it is very often betrayed."—(P. 197).

"*The Sparrow.*—Whatever is the staple food of an household, the sparrows that nestle around will be right pleased to share it,—bread, meat, potatoes, rice, pastry, raisins, nuts: if they have these for the

asking they would not trouble themselves to search farther; but obliged as they are to provide for themselves, they must content themselves with humble fare; and so skilful are they as caterers that whatever other birds may chance to die of starvation, a sparrow is always round and plump, while not a few have paid for their voracity by their lives. Much difference of opinion exists as to whether sparrows should be courted by man as allies or exterminated as enemies. The fact that great efforts are at the present time being made to introduce them into New Zealand, where the corn crops suffer great injury from the attacks of insects, which the presence of sparrows would, it is believed, materially check, leads to the conclusion that their mission is one of utility. That sparrows consume a very large quantity of corn in summer there can be no doubt; as soon as the grain has attained its full size, and long before it is ripe, they make descents on the standing corn, and, if undisturbed, will clear so effectually of their contents the ears nearest to the hedges that this portion of the crop is sometimes scarcely worth the threshing. During harvest they transfer their attention to the sheaves, while the reapers and binders are occupied elsewhere. As gleaners they are indefatigable; they participate too in the joys of harvest home, for their food is then brought to their very doors. The most skilful binder leaves at least a few ears exposed at the wrong end of the sheaf, and these are searched for diligently in the rick; and the barns must be well closed indeed into which they cannot find admission. At threshings and winnowings they are constant attendants, feeding among the poultry, and snatching up the scattered grains under the formidable beak of chanticleer himself. At seed time their depredations are still more serious, as they now come in not simply for a share of the produce, but undermine the very foundations of the future crop. I once had the curiosity to examine the crop of a sparrow which had been shot as it flew up from a newly-sown field, and found no less than forty-two grains of wheat. A writer in the 'Zoologist,' who professes himself a deadly enemy of the sparrow, states that he once took one hundred and eighty grains of good wheat from the crops of five birds, giving an average of thirty-six for a meal. Now if sparrows had the opportunity of feeding on grain all the year round they would be unmitigated pests, and a war of extermination against them could not be waged too vigorously: but during the far greater portion of the year they have not the power of doing mischief, and all this time they have to find food for themselves. Against their will, perhaps, they now hunt for the seeds of various weeds, and these being smaller than grains of corn and less nutritive they consume an immense

number of them, varying their repast with myriads of caterpillars, wire-worms, and other noxious grubs. They thus compensate certainly in part, perhaps wholly, for the mischief they do at other seasons; and it is even questionable whether, if a balance were struck between them and the agriculturists, the obligation would not be on the side of the latter.—(P. 202).

An example of sound reasoning on the part of Mr. Johns occurs in his remarks on Mr. Yarrell's proposed alteration in spelling the name yellowhammer: I quote it as it stands.

"*The Yellowhammer.*—Yarrell has suggested that the name 'yellow hammer,' frequently applied to this bird, should be written 'yellow ammer,'—the word ammer being a well-known German term for bunting; but as it is doubtful whether it be possible to alter a mode of spelling which has been in common use for two hundred years at least, I have retained the name applied to the species by our earliest ornithologists, Ray and Willughby."—(P. 193).

Mr. Yarrell is rarely detected tripping in this way; and so great is the influence of his deservedly high reputation, that this trip is sure to be servilely copied by subsequent compilers. Nothing can be more annoying to the English student than to see French or German spellings introduced into Science.

"*The Siskin.*—The siskin or aberdevine is best known as a cage-bird, as it is only a winter visitor in Great Britain, and during the period of its stay is retiring in its habits. Siskins are more frequently met with in the northern than the southern counties of England, but are common in neither. They are generally observed to keep together in small flocks of from twelve to fifteen, and may be heard from a considerable distance, as they rarely intermit uttering their call-note, which, though little more than a soft twittering, is as clear as that of the bullfinch, to which it has been compared. Their flight is rapid and irregular, like that of the linnet. They leave their roosting places early in the morning, and usually alight on the branches of alder trees, where they remain all day. The seeds of the alder, inclosed within scales something like those of the coniferous trees, form the principal food of these pretty little birds, who are obliged to hang at the extremities of the twigs in order to explore the seed-vessels on all sides. Occasionally, but less frequently, they are seen visiting heads of thistles and burdocks, and not unfrequently they descend to the ground for the sake of picking up scattered seeds. During the whole of their feeding time they never cease twittering and fluttering about joyously from twig to twig. Now and then, as if by preconcerted signal given

by a leader, they all take flight to another tree, or after a short evolution return to the same from which they started. Should it happen that while one little band is occupied in despoiling a tree another is heard in the air, the latter is immediately invited by general acclamation to take part in the banquet, and rarely fails to accept the invitation. Owing to this sociability of character they are easily entrapped, provided that one of their own species be employed as a decoy bird."—(P. 214).

"*The Nightjar.*—The bird itself is perfectly inoffensive, singular in form and habits, though rarely seen alive near enough for its peculiarities of form and colour to be observed. Its note, however, is familiar enough to persons who are in the habit of being out late at night in such parts of the country as it frequents. The silence of the evening or midnight walk in June is occasionally broken by a deep whirring noise which seemingly proceeds from the lower bough of a tree, a hedge or a paling. Having in it nothing of a chirp, warble or whistle, it is unlike the note of a bird, or indeed any natural sound, but most resembles the humming of a wheel in rapid revolution. Mr. Bell informs me that it is so like the croak of a natterjack toad that he has more than once doubted from which of the two sound proceeded. It is nearly monotonous, but not quite so, as it occasionally rises or falls about a quarter of a note, and appears to increase and diminish in loudness. Nor does it seem to proceed continuously from exactly the same spot, but to vary its position, as if the performer were either a ventriloquist or were actually shifting its ground. Fortunate observers have been able to creep up close enough to make out that the bird perches with its feet resting lengthwise on a branch, its claws not being adapted for grasping, and turns its head from side to side, thus throwing the sound as it were in various directions, and producing the same effect as if it proceeded from different places. I have repeatedly worked my way close up to the bird, but as I labour under the disadvantage of being short-sighted, and derive little assistance from glasses at night, I have always failed to observe it actually perched and singing. In the summer of 1859 a nightjar frequented the immediate neighbourhood of my own house, and I had many opportunities of listening to its note. One evening especially it perched on a railing within fifty yards of the house, and I made sure of seeing it, but when I had approached within a few yards of the spot from whence the sound proceeded the humming suddenly stopped, but was presently audible at the other end of the railing which ran across my meadow. I cautiously crept on, but with no better success than before. As I

drew near the bird quitted its perch, flew round me, coming within a few feet of my person, and on my remaining still made itself heard from another part of the railing only a few yards behind me. Again and again I dodged it, but always with the same result. I saw it, indeed, several times, but always on the wing."—(P. 289).

"*The Green Woodpecker.*—Commonest among that of the natural sounds of the country is that of the

'Woodpecker tapping the hollow beech tree;'

so at least many people suppose; but, in reality, one may walk through the woods many times and hear no tapping at all, and even if such a sound be detected and traced to its origin it will more probably be found to proceed from the nuthatch, who has wedged a hazel nut into the bark of an oak, than from the hammering of a woodpecker. This bird is far too wise to waste its time and blunt its beak by pecking at wood hard enough to make much resonance. And indeed what motive could it have for so doing? Wood does not enter into its diet, nor does sound wood contain the insects on which it feeds. Often indeed it may be observed ascending by a series of starts the trunk of a tree, inclining now a little to the right, and now to the left, disappearing now and then on the side farthest from the spectator, and again coming into view somewhat higher up. Nor is its beak idle; this is employed sometimes in dislodging the insects which lurk in the rugged bark, and sometimes in tapping the trunk in order to find out whether the wood beneath is sound or otherwise. Just as a carpenter sounds a wall with his hammer in order to discover where the brickwork ends, and where lath and plaster begin, so the woodpecker sounds the wooden pillar to which it is clinging, in order to discover where the wood is impenetrable alike by insects and itself, and where the former have been beforehand with it in seeking food or shelter. Such a canker-spot found, it halts in its course, tears off piecemeal a portion of bark, and excavates the rotten wood beneath, either as far as the fault extends or as long as it can find food. It is, then, by no means a mischievous bird, but the reverse; as it not only destroys a number of noxious insects, but points out to the woodman, if he would only observe aright, which trees are beginning to decay, and consequently require his immediate attention. This aspect of the woodpecker's operations seems far more just than that contained even in modern books, 'it is a great enemy of old trees in consequence of the holes which it digs in their trunks.'"—(P. 292).

"*The Tree Creeper.*—The tree creeper, though a common bird, is less familiarly known than many others of much rarer occurrence, yet, if once observed, can be confounded with no other. In size it ranks with the tits, willow wren, &c., but is less likely to attract notice than any of these, as it never alights on the ground nor perches on the small twig of a tree. Its note, too, is weak, simple and unpretending, amounting to no more than an occasional 'cheep,' which it utters from time to time while hunting for food, and while performing its short flights. Any one, however, who wishes to see the bird, and knows what to search for, can scarcely fail of success if he looks well about him during a stroll through almost any wood of full-grown trees. Half way up the trunk of a rugged elm or oak he will observe a small portion of bark, as it were, in motion; the motion, and not the colour, betrays the presence of a small brown bird, which is working its way by succession of irregular starts up the trunk. Frequently it stops for a few seconds, as it is evidently pecking at some small insect, quite noiselessly however. Its beak is not adapted for hammering; it confines its attention therefore to such insects as live on the surface of the bark. It utters a low 'cheep,' and proceeds, not in a straight line up the tree, but winding in search of its prey; presently it disappears on the other side of the trunk, and again comes in view a few feet higher up. Now it reaches a horizontal branch; along this it proceeds in like manner, being indifferent whether it clings sideways or hangs with its back downwards. Arrived at the smaller divisions of the bough it ceases to hunt; but, without remaining an instant to rest, flies to the base of another bough, or more probably to another tree, alighting a few feet only from the ground, and at once beginning a new ascent. This mode of life it never varies: from morning to night, in winter and in summer, it is always climbing up the boles of trees, and, when it has reached the top, flying to the base of others. On one solitary occasion I observed one retrace its steps for a few inches, and stand for a second or two with its head downwards; but this is a most unusual position, as indeed may be inferred from the structure of its tail, the feathers of which are rigid, and more or less soiled by constant pressure against the bark."—(P. 302).

Of the illustrations I feel little inclined to speak; they are indeed original, but are they equally truthful? Where does Mr. Wolf get the enormous head of the short-eared owl?

EDWARD NEWMAN.

A Memoir on the living Asiatic Species of Rhinoceros.

By Edward Blyth, Esq., F.L.S., &c.

Among the investigations to which I devoted particular attention during my late rambles in Burmá, was the endeavour to corroborate and *confirm* the statement of Helfer and others, that the three known Asiatic species of rhinoceros inhabited that region. In this I succeeded, so far as the two insular species—*i. e.* the one-horned Rhinoceros sondaicus and the two-horned R. sumatranus—are concerned; for these prove to be the ordinary rhinoceroses of the Indo-Chinese region and continuous Malayan peninsula, and I have reason now to believe that they are the only rhinoceroses of that great range of territory, the huge R. indicus, so far as I can discover, appearing to be peculiar to the *tarai* region at the foot of the Himálayas and valley of the Bráhmaputra, or province of Asám; the rhinoceros still common in the eastern Sundarbáns, and also of the Rájmáhal hills in Bengal, where fast verging on extirpation, being identical with that of Jáva and Borneo, in the great oriental archipelago; while the Asiatic two-horned species, R. sumatranus, appears to be more common than the lesser one-horned, R. sondaicus, in the Indo-Chinese territories, this animal extending northwards to the Ya-ma-doung range of mountains which separates Arakan from Pegu, where Colonel Yule observed it as high as the latitude of Ramri island, and I have been assured by Major Ripley that one was killed not long ago in the vicinity of Sandoway. What the particular species may have been that was hunted by the Mogul Emperor Báber on the banks of the Indus cannot now be ascertained, unless, indeed, some bones of it may yet be recovered from the alluvium of that river: it is remarkable that he compares its bowels to those of a horse! A species is also stated by Duhalde to inhabit the province of Quang-si in China, in lat. 15°. This is much more likely to prove either R. sondaicus or R. sumatranus than the large R. indicus.

It is true that the late Dr. Theodore Cantor, in his 'Catalogue of the Mammalia of the Malayan Peninsula,' asserts that both R. indicus and R. sondaicus seem to be numerous there; but he does not mention that he had examined specimens, and he moreover notices that "a two-horned rhinoceros is stated by the Malays to inhabit, but rarely to leave, the densest jungle." As this animal is common in parts of Burmá, as well as in Sumátra, it may be confidently predicated to inhabit the intervening region of the Malayan peninsula;

but the more common and ordinary species of the peninsula would appear to be R. sondaicus; and a friend who has killed as many as nine individuals in the southern half of that region, to whom I showed several skulls of R. indicus and of R. sondaicus, is positive that all which he saw there were of the lesser one-horned species, as distinguished from the larger. The former, as before remarked, inhabits the islands of Jáva and Borneo in the archipelago, but not Sumátra;* whereas the two-horned species, as an insular animal, appears to be peculiar to Sumátra.† In the volume on elephants, &c., in Sir W. Jardine's 'Naturalist's Library,' the lesser one-horned rhinoceros is erroneously styled "the one-horned Sumátran rhinoceros," a mistake which might have been rectified by reference to Sir T. Stamford Raffles's paper in the thirteenth volume of the 'Transactions of the Linnean Society,' which indeed is cited by the compiler.‡

The vernacular tropical names of *Jávan* and *Sumátran* rhinoceroses had now better be disused, seeing that both species have an extensive range of distribution on the mainland of south-eastern Asia; the latter should rather be denominated "the Asiatic two-horned rhinoceros," and the two others "the great one-horned" and "the lesser one-horned," unless, indeed, the alleged discovery should be confirmed of the existence of a one-horned species in inter-tropical Africa, in addition to the four two-horned species which are now recognised upon that continent, in which case "the great Indian" and "the lesser Indian" might be deemed sufficiently appropriate, as the range of the "Asiatic two-horned" does not extend to India proper, which of course comprises Bengal but not Burmá. The existence of an African one-horned rhinoceros was long ago confirmed by James Bruce, of

* The range of Bos sondaicus is similar, excepting that this animal does not extend to Bengal, like Rhinoceros sondaicus.

† As also the Malayan tapir, the continental range of which extends northwards to the Tenesserim provinces of Tavoy and Mergui.

‡ The adult male rhinoceros which lived for many years in the Gardens of the Zoological Society, Regent's Park, London, and for which the considerable sum of £1000 was paid, is stated to have been captured in Arakan; but he was not nearly so large as several that I have since seen in India, and therefore I entertain an exceedingly strong suspicion that he was no other than R. sondaicus. His bones have doubtless been preserved. The two Asiatic one-horned species, indeed, resemble each other a great deal more nearly, in external appearance, than the published figures of them would lead us to suppose. Certainly no sportsman or ordinary observer would distinguish them apart, unless his attention had been specially called to the subject. The best figure I know of adult R. indicus is that published by Cuvier and Geoffroy, in the 'Menagérie du Museum d'Histoire Naturelle.'

Kinnaird, in addition to the two-horned species which he pretended to figure;* and Sir Andrew Smith assured me that he had been repeatedly told by natives that such an animal occurred in the regions northward of the tropic of Capricorn. In the 'Comptes Rendus,' tome xxvi. (1848), p. 281, an elaborate letter is published, "Sur l'Existence d'une espèce Unicorne de Rhinocéros dans la partie tropicale de l'Afrique," from M. F. Fresnel, then consul of France at Jidda (Djedda), to which the reader, curious on the subject, is referred.

Professor Schinz, in his 'Synopsis Mammalium,' makes out as many as eight living species of rhinoceros. The two Asiatic one-horned species, of course; and R. sondaicus only from Jáva; R. sumatranus from Sumátra only, and of this he remarks, "Cornu anterius mediocre, posterius minutum." His R. niger and his R. Camperi must alike be

* Bruce's figure of the Abyssinian rhinoceros, it is well known, is a reversed copy of Buffon's representation of true R. indicus, with a second horn added; Dr. Rüppell ascertained the species to be R. africanus, the ordinary black rhinoceros of South Africa. The earliest published *genuine* figure of this animal is that in the Supplement to Buffon's work; but certainly the most spirited as well as correct pictorial representations, alike of the rhinoceroses and of various other animals of Africa, are given by modern sporting travellers, as Cornwallis Harris, and especially C. J. Andersson. By a slip of the pen, the latter writer alludes to rhinoceroses in the island of Ceylon! As even Humboldt referred to the tiger of Ceylon in his 'Asie Centrale'! There are capital figures of some of the arctic animals, also, in Mr. J. Lamont's 'Seasons with the Sea Horses' (1861), among the rest, of the Spitzbergen deer, represented with well-developed vertical brow-plates to their horns. The question about the development of these deer, as compared with those of Lapland, is elucidated by Mr. Lamont, who states that "They do not grow to such a large size as the tame rein-deer of Lapland, nor are their horns quite so fine, but they attain to a most extraordinary degree of condition." For further details, see his extremely interesting volume. However, I may remark that in all his figures of rein-deer the brow-plate is represented as being well developed upon each horn, whereas I suspect that it is, generally, only rudimentary upon one of the pair; this, however, is probably a mistake on the part of the lithographer. In further reference to the article alluded to, in which I commented upon the late Professor Isidore St. Hilaire's remarks upon domestic animals, and contended that we do not owe the domestication of the turkey to the Spanish invaders of America, a most unlikely people to have accomplished anything of the kind, I may remark, that so completely familiar had this fowl become in Shakspeare's time that its then almost recent introduction into Europe had already been forgotten, for the great bard of Avon considerably ante-dates the existence of turkeys in England, making it prior to the Spanish discovery of the New World! In the first part of the drama of King Henry IV., Act ii. Scene 1, one of the carriers introduced exclaims, "'Odsbody! the turkeys in my pannniers are quite starved." But it is not impossible that Shakspeare meant the guinea-fowl, albeit not very probable, though, in either case, he had ante-dated the appearance of the domestic bird in European countries.

referred to R. africanus. Next, R. simus and R. keitloa, but, of course, neither R. Oswellii nor R. Crossii. But what is his R. cucullatus, *Wagler*, unless an ill-stuffed R. sumatranus? "R. cornubus duobus, capite sensim elevato, plicis cutis profundis [!], clypeo scapulari indiviso, supra latiori, epidermide verrucis parvis obsita. Capite elongato, auriculis subcylindricis, labro elongato prehensili, cauda mediocri. Hospitatur in museo Monacensi."

From examination of an extensive series of skulls of Asiatic rhinoceroses it is impossible not to discern that there are three well-marked species, each of which varies considerably in the shape of the cranium. Of each there is a shorter and broader type, higher at the occiput, wider anterior to the orbits; and also a type the opposite of this, with every intermediate gradation. This amount of variation in the existing Asiatic species of the genus should induce caution in the acceptance of *all* of the very numerous fossil forms that have been named by palæontologists.

R. sondaicus and R. sumatranus are very inadequately represented by the figures of skulls published by Cuvier and De Blainville. Those of both authors represent the narrow type, as distinguished from the broad type; whereas their figures of the skull of R. indicus, the R. unicornis of Linnæus, represent an unusually fine broad example of the species, doubtless the skull of the individual figured from life in the 'Menagérie du Museum d'Histoire Naturelle,' which gives a far greater amount of contrast of appearance to the skulls of R. indicus and R. sondaicus than exists in average specimens of those of the two species.

The skulls of R. indicus and R. sondaicus appear to differ only, *constantly*, in the former being considerably larger, and having the condyle of the lower jaw proportionally much more elevated, imparting a conspicuously greater altitude to the vertex when the lower jaw is *in situ*. Both species would appear to exhibit precisely the same amount of variation. On present evidence, which, however, I suspect to be fallacious, it would seem that the broader type of R. sondaicus prevails in Bengal, and perhaps the narrower far southward; but we have both from the Tenesserim provinces, and they completely shade into each other, as equally in the analogous instances of R. indicus and R. sumatranus.

In illustration of the skulls, I cite the figures of Cuvier and De Blainville as exemplifying the broad-faced type of R. indicus, and a very similar skull is that upon the skeleton of a *female* in the Museum of the Calcutta Medical College. This female is one of a pair that

lived about forty-five years in captivity in Barrackpore Park. I have repeatedly seen the pair when alive, many years ago, and remarked that they showed no *secondary* sexual diversity, being exactly of the same size and general appearance. They never bred; and I have been informed that a pair of tapirs similarly kept for many years, in Batavia, showed no disposition to propagate their species. They should, of course, have been separated for a time now and then, and again put together. We learn from this Calcutta Medical College specimen and others, that the two forms of skull presented by the Asiatic species of rhinoceros are not indicative of sex, as might probably have been suspected.

So far as I can learn, the R. sumatranus is the only existing species of rhinoceros which presents secondary sexual distinctions; inasmuch as the horns of the male are very considerably more developed than those of the female. It further differs from the four existing African species of two-horned rhinoceros, not only by possessing slight skin-folds, but also by having the bases of the horns separated by a considerable interval: Bell's figure, in the 'Philosophical Transactions' for 1793, represents, as I believe, their full development in an adult female, as shown likewise in a Tenesserim stuffed head in the Society's Museum, already referred to; and over Bell's figure of the skull of a male are represented in outline the horns of an ordinary male, not quite so fine, however, as those upon Col. Fytche's specimen, and that officer informs me that he has possessed a head with still finer horns, some five or six inches longer. Unfortunately, fine horns of R. sumatranus are exceedingly difficult to procure, as they are eagerly bought up at high prices by the China men, who not only value them as medicines, but carve them into very elegant ornaments.* Still the horns which Dr. Salomon Müller figures, upon what he calls an adult male, are small; and when I was at Pahpoon, amid the forests of the Yunzalin district of Upper Martaban, in November last, an animal of this species was killed within five miles of me; but I did not learn of this in time, and was only able to procure the facial bones with the two horns. From their size and appearance I took them to be the horns of rather a juvenile male, but, on cleaning the bone, the

* The anterior horn of Colonel Fytche's specimen is worth, I was told, about fifty rupees, or £5. I have seen a pair beautifully carved and polished, and set with the bases upwards, in a black wooden frame similar to the stands on which Chinese metallic mirrors are mounted, and am sure *now* that they were the two horns of one individual of R. sumatranus, of about the same development as those upon Colonel Fytche's specimen.

nasals were found to be most completely and solidly anchylosed and united, and of the usual width in the male sex. The Karens obtained the animal by means of a heavy falling-stake, such as they set for tigers and other large game, and the carcase was completely hacked to pieces by them, and every edible portion of it devoured.

The Rev. Dr. Mason, in his work on 'The Natural Productions of Burmah,' remarks that the hide of the two-horned rhinoceros of that region is smooth like a buffalo's. This expression might mislead into the suspicion that the species is not exactly the same as that of Sumátra. Col. Fytche writes word, on this subject, "I have myself shot three rhinoceroses; one single-horned, on the borders of Asám,* and the other two not far from Bassein, in the Yomatoung range separating Pegu from Arakan. I saw the skin of the one whose skull you have got,† and it was exactly, in every respect, like the one I shot in Asám. The two-horned fellows I shot had smooth skins, as stated by Mason; they were, however, very thick, and there were slight rumples or folds about the neck and shoulders, I remember, but nothing to be compared in size to the mailed armour of the single-horned species." In Burmá, people distinguish only a one-horned kind and a two-horned kind; and though the skull from Tavoy Point referred to is very nearly adult and of fair size, Col. Fytche thought it to be that of a small and immature animal, as compared with the huge R. indicus that he killed in Asám. I must frankly confess that I have only quite recently discriminated the two one-horned species, fancying, as a matter of course, that the numerous skulls of single-horned rhinoceroses in the Society's Museum, from the Bengal Sundarbáns, &c., especially of the broad-faced type, were necessarily of the hitherto-reputed sole Indian species. F. Cuvier's figure of R. sondaicus is that of a very young animal, and, with those of Horsfield and S. Müller, conveys the appearance of a more evenly *tessellated* hide than I remember to have seen in any living continental example. I have, however, been comparing our stuffed Sundarbán example (less than half-grown) with the figure of adult R. indicus in the 'Menagérie du Museum d'Histoire Naturelle,' and with the figures of R. sondaicus by S. Müller and others, and perceive that it must be referred to the latter and not to the former. The tubercles of the hide *are* much smaller than in R. indicus; and a marked difference between the two

* R. indicus, of course.

† That of R. sondaicus, of the narrow type, shot by my friend Dr. Hook, of Tavoy, near Tavoy Point, where there is a small isolated colony of the species.

species, as represented, consists in the great skin-fold *at the setting on of the head* of R. indicus, which is at most but indicated in R. sondaicus. In skulls of adults, however those of both species may vary in width, and especially in breadth anterior to the orbits, the following distinctions are trenchant:—Length of skull, from middle of occiput to tip of united nasals, measured by callipers, in R. indicus 2 ft. (half an inch more or less); in R. sondaicus, $1\frac{3}{4}$ ft. at most. Height of condyle of lower jaw, in R. indicus 1 ft., or even a trifle more; in R. sondaicus 9 in. Breadth of bony interspace between the tusks of the lower jaw, in R. indicus $1\frac{1}{2}$ in. to $1\frac{3}{4}$ in.; in R. sondaicus $\frac{3}{4}$ in. to 1 in. These measurements are taken from exceedingly fine examples of both species.

Sir T. Stamford Raffles asserts, of R. sumatranus, that "the female has a larger and heavier head than the male, but is similar in other respects." (!) This decidedly does not apply to the two-horned species inhabiting Burmá, nor even to Bell's figures of *Sumatran* individuals! Raffles further remarks that, "Dr. Bell's description and representation of this animal are extremely correct. The skin of the Sumatran rhinoceros," he adds, "is much softer and more flexible than that of the Indian one, and is not, like it, corrugated into plates of mail. It has, however, some doublings or folds, particularly about the neck, shoulders and haunches, rather more distinct and defined than in Dr. Bell's drawing. The natives assert that a third horn is sometimes met with, and in one of the young specimens procured an indication of the kind was observed." In Mr. C. J. Andersson's 'Lake Ngami' the same is remarked of one or more of the ordinarily two-horned rhinoceroses of Africa. This traveller writes, "I have met with two persons who told me that they had killed rhinoceroses with three horns; but in all such cases, and they have been but few, the third or hindmost horn is so small as to be scarcely perceptible." This seems a not unlikely character to have been developed more frequently in the great fossil R. tichorhinus of North Europe and Asia.

Bell further mentions, of R. sumatranus, that "The whole skin of the animal is rough, and covered very thinly with short black hair." The latter is conspicuously represented in F. Cuvier's portrait of the species in the 'Planches des Mammiféres,' less so in Bell's figure in the 'Philosophical Transactions,' and in that by Dr. Salomon Müller, and it is well shown about the *jowl* and base of the lower jaw of our stuffed skin of the head of an adult female. In Dr. S. Müller's figure of what he styles an adult male, but the horns of which are

quite small, as in the adult Martaban example before noticed,* the shoulder-plait is rather more strongly developed, especially towards the elbow, than in the figures published by Bell and F. Cuvier,—F. Cuvier's figure representing a young male, and that by Bell a mature female, while the skull represented by Bell is that of a male with finer horns than appear to have been hitherto represented elsewhere.

Sir T. Stamford Raffles further remarks of the Asiatic two-horned rhinoceros, in Sumátra, that "They are not bold, and one of the largest size has been seen to run away from a single wild dog." We hear, however, of a "fire-eating rhinoceros" in Burmá, from its habit of attacking the night-fires of travellers, and scattering the burning embers and doing other mischief, being attracted by unusual noises, instead of fleeing from them as most wild animals do. Professor Oldham's camp was attacked in this way, in Tavoy province, and the animal being mortally wounded by a two-ounce ball, its skull was recovered three days afterwards, and proved to be that of R. sumatranus. The same propensity is ascribed to the ordinary black rhinoceros of South Africa (R. africanus): thus Dr. Mason cites, "This animal appears to be excited by the glow of a fire, towards which it rushes with fury, overcoming every obstacle. It has been known to rush with such rapidity upon a military party lodged among the bush covering the banks of the Great Fish River, that, before the men could be aroused, it had severely injured two of them, tossed about and broken several guns, and completely scattered the burning wood." I am not aware that the same ferocity has been remarked of either of the mailed one-horned species.

In Jáva R. sondaicus is reputed to be rather a mild animal, though I could cite a rumour of one attacking a sailor's watering party (Zool. 7328). According to Professor Reinhardt, this animal is, in Jáva, "found everywhere in the most elevated regions, and ascending, with an astonishing swiftness, even to the highest tops of the mountains." Dr. Horsfield also notices that "it prefers high situations, but is not limited to a particular region or climate, its range extending from the level of the ocean to the summits of mountains of considerable elevation. Its retreats are discovered by deeply-excavated passages, which it forms along the declivities of mountains and hills. I found these occasionally of great depth and extent." In Bengal, I believe that

* Can these animals, under any circumstances, occasionally shed and renew their horns, which consist only of a mass of agglutinated hair? There is certainly no physiological objection to the possibility of their doing so.—*E. B.*

the identical species is found in the Sundarbáns and also (formerly, at least) in the Rajmáhal Hills at all elevations; but it has hitherto been universally mistaken for R. indicus, a species which may inhabit the same localities,—only that now remains to be ascertained, as also if R. sondaicus extends its range to the region tenanted by the other. All evidence at present attainable points to the opposite conclusion.

So long ago as in 1838 the late Dr. Helfer remarked, that "The Tenesserim provinces seem to be a convenient place for this genus; for I dare to pronounce almost positively," he then wrote, "that the three known Asiatic species occur within their range; R. indicus being found in the northern part of these provinces, in that high range bordering on Zimmay called the Elephant Tail Mountain; R. sondaicus, on the contrary, occupies the southernmost parts; while the two-horned R. sumatranus is to be found throughout the extent of the territories from the 17th to the 10th degree of latitude. In character R. sondaicus seems to be the mildest and can be easily domesticated, the powerful Indian rhinoceros is the shyest, and the double-horned is the wildest." Mason remarked that "the common single-horned rhinoceros is very abundant. The double-horned is not uncommon in the southern provinces;" and then he alludes to the alleged "fire-eater" of the Burmans, supposing that to be R. sondaicus as distinguished from the common single-horned kind, which he thought was R. indicus. Very decidedly I consider that the alleged existence of the great sub-Himalayan R. indicus in Bengal, the Indo-Chinese region, and Malayan peninsula, remains to be proved; the broad and narrow types of skull of R. sondaicus having, I suspect, been mistaken for R. indicus and R. sondaicus respectively. That the real species denoted by these names was so early discriminated, I opine, is mainly due to the accident of R. sondaicus having been first obtained in Jáva, which induced the suspicion of its being probably different from the only then recognised continental species inhabiting Upper India; likewise to the accident of the Paris Museum containing a particularly fine skull of the true R. indicus, which, as before remarked, is probably that of the individual figured in the 'Menagérie du Museum d'Histoire Naturelle.'

The Museum of the Calcutta Medical College contains, as we have seen, three noble skulls of R. indicus, besides that with the entire skeleton of an old female, both the broad and narrow types of skull being represented, but it has neither R. sondaicus nor R. sumatranus. The Society's Museum still wants the first species, but is tolerably well supplied with the two others. Sir T. H. Maddock, in 1842, pre-

sented us with two skulls of R. sondaicus, of the broad and the narrow types, and also with two of R. sumatranus, one wanting the lower jaw, all from the Tenesserim provinces ; and the skulls of an old male and of an adult female of R. sumatranus,—the skin of the head of the latter, its axis vertebra, the long bones of the limbs (*minus* the right fore limb and scapula), and the two scapulæ and long bones of the four limbs of the male,—were presented to the Society by Mr. E. O'Reilly, then of Amherst, in 1847. In the 'Asiatic Researches' part of the head of a two-horned rhinoceros is recorded to have been presented, and also the horn of a rhinoceros from Sumátra. The latter was not in the Museum when I took charge of it in 1841, but the former I think I recognise in a pair of united nasal bones, certainly belonging to this species, and in this case the specimen would probably be from a Sumatran individual. Of R. sondaicus we have also a fine series of skulls, one of them from Jáva, presented by the Batavian Society ; the almost complete skeleton of a very nearly full-grown female, being considerably smaller than that of the female R. indicus in the Medical College Museum, and the small stuffed specimen to which I have before referred, the limb-bones of the skeleton being considerably more robust than those of R. sumatranus. For this skeleton, and those of elephant and camel, we are indebted to a former Náwâb Názim of Bengal, and it is doubtless either from Rajmáhal or the Sundarbáns, the skull being of the broad type, though less strongly marked than some others,—in fact intermediate, though scarcely quite midway intermediate.

The following notice, by Sir T. Stamford Raffles, may be advantageously introduced here :—" The one-horned rhinoceros of India is not known to the natives of this part of Sumátra ; and the single horns, which are occasionally procured, appear to be merely the longer horns of the two-horned species separated from the smaller one. There is, however, another animal in the forests of Sumátra never yet noticed, which, in size and character, nearly resembles the rhinoceros, and which is said to bear a single horn. This animal is distinguished by having a narrow whitish belt encircling the body, and is known to the natives of the interior by the name of Tenu. It has been seen at several places, and the descriptions given of it by people, quite unconnected with each other, coincide so nearly, that no doubt can be entertained of the existence of such an animal. It is said to resemble in some particulars the buffalo, and in others the badak or rhinoceros. A specimen has not yet been procured, but I have several persons on

the look out, and have little doubt of soon being able to forward a more accurate description from actual examination.

"It should be remarked," continues Raffles, "that the native name, Tenu, has until lately been understood to belong to the tapir. It is so applied at Malacca, and by some of the people of Bencoolen. In the interior, however, where the animals are best known, the white-banded rhinoceros is called 'Tenu,' and the tapir 'Gindol,' and by some 'Babi Alu.' It is not impossible that, as both animals have white bands, the names may have been confounded by people little in the habit of seeing either, and deriving their information solely from report. In a country like Sumátra, where the inhabitants, in a great measure shut out from general communication, are divided into an infinity of tribes, speaking different dialects, a perfect consistency or uniformity of nomenclature cannot be expected, and it is not always easy to reconcile the synonymy."

It naturally occurs to the mind that if the tenu really exists it would long ere this have been discovered, in all probability, in the neighbouring Malayan peninsula; but how little is even now known of the great animals inhabiting that peninsula! The late Dr. Cantor, when he wrote his 'Catalogue of the Vertebrated Animals of the Malayan Peninsula,' was unaware of the existence there of Bos sondaicus in addition to B. gaurus, only includes a two-horned rhinoceros on the testimony of the Malays; and whether Elephas sumatranus occurs on the mainland of Asia, like the tapir and the two insular species of rhinoceros, the Bos sondaicus and others, is still undetermined. It is possible enough, though doubtless rather improbable, that such an animal as the tenu may have escaped observation there even to this time. But it might not extend its range into the peninsula (as in the instance of the large Siamang gibbon, which is peculiar to Sumátra); and not very much has been accomplished in the investigation of the Zoology of the great island of Sumátra since the time of Raffles. At all events, I think the present opportunity a meet one to recall the subject to notice.

Baron Cuvier long ago remarked, I think in his 'Leçons dans l'Anatomie Comparée,' that even then it was not probable that any more existing large quadrupeds remained to be discovered; and it is worthy of notice that no remarkable genus of large quadruped has been since brought to light, though additional species have been discriminated of several of the old genera. The small Hippopotamus liberiensis of the late Dr. Morton is scarcely an exception, although since raised to generic rank by Dr. Leidy, by the name of Chœropsis.

Of the three genera containing the most bulky of existing land quadrupeds additional species have been distinguished, though, for the most part, they may not yet be universally accepted. Of Elephas, the E. sumatranus of Temminck and Schlegel, to which Sir J. Emerson Tennent refers the Ceylon elephant;* of Rhinoceros, a second black African species, the R. keitloa of A. Smith, long previously indicated by Sir J. Barrow by the name "Jekloa," and a second white African rhinoceros, the R. Oswellii of Elliot, besides the R. Crossii of Gray (founded on the horn only, and the habitat of which is unknown); and of Hippopotamus, the species of North and South Africa respectively are distinguished by Dr. Leidy and others (sinking H. senegalensis of authors, as a synonym of the former), and there is also the Hippopotamus or Chœropsis liberiensis, which is a most undoubted species, considered, as we have seen, entitled to generic rank by Dr. Leidy. Whether external differences exist between the great Hippopotami of North and South Africa remains to be shown; as also in the case of the European and American beavers, which Owen separated on account of differences in the configuration of the skull: in another animal first so discriminated, the Phascolomys latifrons of Owen, good external distinctions have since been discovered, which characterize it well apart from P. wombat. Of other Pachydermata of

* The grinders of Elephas sumatranus are said to be intermediate in form to those of the Indian and African species; and I have just purchased a pair of table-weights, formed each of a thick horizontal section of an elephant's molar tooth, which seems to me to be of this species. The little boxes formed of sections of elephant's molars, which are commonly brought from Galle, are, so far as I have seen, of the Indian species; but these are not necessarily from Cinghalese individuals. It is worthy of remark, however, that whilst among the elephants of Sumátra and Borneo fine *tuskers* would appear to be common, and the ivory is an article of export from both islands, as I am assured by a gentleman who has collected the article in Borneo, they are exceedingly rare among the elephants of Ceylon, where, nevertheless, it has been suggested that tuskers are so much sought after that they are seldom permitted to develope their ivories. With reference to Sir J. E. Tennent's speculation regarding the former continuity of land between Sumátra and Ceylon and Africa, of which the intermediate character of Elephas sumatranus is one of his presumptive proofs, it may be remarked that the *two-horned* Rhinoceros sumatranus, with its only slight skin-folds, interposes a link between the two-horned and smooth-skinned African and the single-horned and mail-clad Asian species; but, not to allude further to the alleged existence of a single-horned African species, the presence of the second horn in R. sumatranus is much less remarkable when we bear in mind the several fossil two-horned species of Europe and Asia, to which, moreover, the existing two-horned Asiatic rhinoceros is much more nearly akin than it is to the different African two-horned species, as before remarked.

Cuvier, more Equi, of the asinine type, have been added to the list, and several species of swine. Among the bovine ruminants the three species of flat-horned taurine cattle proper to south-eastern Asia have only recently been properly distinguished; also the Bubalus brachyceros of intertropical Africa; and there are others, as I believe, not yet sufficiently established, and more species also of large deer and antelopes. Among the Carnivora, no animal worthy of much note, unless Phocidæ (as might have been expected), and the like with Cetacea, my Balænoptera indica, for example, which is perhaps the largest of existing animals, but these latter are not four-limbed. Among the Quadrumana, the grandest of all, the huge gorilla, has been recently re-discovered, for its reputed existence was regarded as fabulous by Baron Cuvier. Lastly, in the bird class, it is most remarkable that the number of brevipennate species has quite recently been more than quadrupled;* still, however, no remarkable new genus, excepting the New Zealand moa, and of this at least two species have just been discovered to maintain a lingering existence, as I have learned from a letter recently received from Mr. E. L. Layard, who is at present in New Zealand as private secretary to Governor Sir G. Grey. One of these, of comparatively small size (about $3\frac{1}{2}$ feet high), has actually been killed and eaten by a famishing party of explorers, and fifteen others seen. Of the other, one of the large moas, only the fresh footsteps, fifteen inches long, have been traced, as Mr. Layard states, by a party who had lost themselves; and therefore the instance does not appear to be the same as that lately recorded in the 'Zoologist' (Zool. 7847). Both of these living species inhabit the little-explored Middle Island.

Edward Blyth.

Calcutta, March 1, 1862.

A further Note on Elephants and Rhinoceroses.—There is a notice of the wild elephants of Borneo in Mr. Spencer St. John's 'Life in the Forests of the far East' (1862), vol. i. p. 95. This author writes, "Among our Malays was one who had frequently traded with the north-east coast of Borneo, and the mention of 'gading' (ivory) brought to his recollection that elephants exist in the districts about the river Kina Batangan. I have seen many tusks brought to Labuan for sale,

* Even a *sixth* cassowary has since been added by the Baron von Rosenberg, of Amboyna. It is from the island of Salawatti, and has *no wattles*, as in all the others. He terms it Casuarius Kaupi. The Balæniceps Rex must be considered as a remarkable discovery among large birds; and this is quite a new genus.

but never measured one longer than six feet two inches, including the part set in the head. I have met dozens of men who have seen the elephant there, but my own experience has been limited to finding their traces near the sea-beach. It is generally believed that about a hundred years ago the East India Company sent to the Sultan of Sulu a present of these animals; that the Sultan said these great creatures would certainly eat up the whole produce of his little island, and asked the donors to land them at Cape Unsang, on the north-east coast of Borneo, where his people would take care of them. But it is contrary to their nature to take care of any animal that requires much trouble, so the elephants sought their own food in the woods, and soon became wild. Hundreds now wander about, and constantly break into the plantations, doing much damage; but the natives sally out with huge flaming torches, and drive the startled beasts back to the woods. The ivory of Bornean commerce is generally produced from the dead bodies found in the forests, but there is now living one man who derives a profitable trade in fresh ivory. He sallies out on dark nights, with simply a waist-cloth and a short sharp spear: he crawls up to a herd of elephants, and, selecting a large one, drives his spear into the animal's belly. In a moment the whole herd is on the move, frightened by the bellowing of their wounded companion, who rushes to and fro, until the panic spreads, and they tear headlong through the jungle, crushing before them all the smaller vegetation. The hunter's peril at this moment is great, but fortune has favoured him yet, as he has escaped being trampled to death. In the morning he follows the traces of the herd, and, carefully examining the soil, detects the spots of blood that have fallen from the wounded elephant. He often finds him, so weakened by loss of blood as to be unable to keep up with the rest of the herd, and a new wound is soon inflicted. Patiently pursuing this practice, the hunter has secured many of these princes of the forest." In another place (vol. i. p. 396), but again with reference to the valley of the Kina Batangan river, Mr. St. John remarks, "As this is the only country in Borneo where the elephants are numerous, it is the only one where ivory forms an important article of trade in the eyes of the natives." Now, I am well aware of Mr. Darwin's calculation as to what the accumulated progeny of one pair of slow-breeding elephants might amount to in the course of five centuries, supposing that nought happened to check their increase in the geometrical ratio; but I doubt exceedingly that, in the instance under consideration, the existing great herds of elephants in the north-eastern peninsula of Borneo have descended from some two or three

individuals put ashore by the order of the Sultan of Sulu, a little more than a century ago, continually decimated, too, as these elephants would seem to have been and are at this time; and I doubt it all the more because it appears that herds of wild elephants existed until recently in Sulu! Why, therefore, should the few tame elephants presented to the Sultan of Sulu be landed in Borneo? The remnant of the wild race existed in Sulu within the memory of people now living. On this subject, Mr. St. John fortunately helps us with information. In his notice of Sulu, he remarks, "Remembering Forest's statement that elephants were found in his time in the forests which clothed so much of the soil of the island, I asked Dater Daniel about it; his answer was, that even within the remembrance of the oldest men then alive, there were still a few elephants left in the woods, but that, finding they committed so much damage to the plantations, the villagers had combined and hunted the beasts till they were all killed: I was pleased to find the old traveller's account confirmed."—Vol. ii. p. 243. Why should the elephant of Borneo have been introduced by human agency any more than the Rhinoceros sondaicus or the Bos sondaicus, which latter would appear to be remarkably numerous on the vast island?—*E. B.*

Enormous and deformed Horns of Red Deer and Roe.—I have been trying to find out the history of the big head, and have at last succeeded. It appears that it was the head of a stag shot several hundred years ago in Wallachia, whence it was sent down the Danube to Constantinople, and thence found its way to Sheffield for cutlery purposes; but a Viennese, seeing it in a cutler's store, bought it and brought it back to Vienna for his collection. He died, and it was then sold, with the rest of his collection, to a Mr. Exinger, a large game-dealer here, who also deals in deers' horns, skins, &c. It was then exposed for sale in the game market, where Julian Fane bought it for me. This story is told me by Mr. Vynes, a Queen's messenger, whom I met at dinner at the Embassy here, and he says he has known the head for years here in Vienna; it was celebrated as a wonder in Hungary and Wallachia, and was said to be one of the largest specimens of red-deer horns in the world. He says it has been examined here and found to be real, though much broken and repaired; the skull, however, was adapted to the horns, which were fastened on to it. I can now tell you what I have hitherto been a little in the dark about myself, that since I have been in Germany I have seen heads in old collections (not for sale) not only as large and with as many points, but larger and with more points. The most remarkable collection in Germany, I believe, is that of the King of Saxony, at the Castle of Moritzburg, about five miles from Dresden; there are there 120 red deers' heads, seventy gigantic ones in one room, and the rest, being deformed and singular specimens, are in another room by themselves. The heads in the large room vary from twenty-four points to fifty, of which latter number there are two, but they are by no means the largest

heads,—in fact, they are nearly the smallest, though themselves gigantic,—and the points are crowded on these two heads like thorns on a bush, and not much larger. But there are heads in that room which take one's breath away. The largest head has only twenty-four points, but is 7 feet wide in the spread, and the points are all 18 inches and upwards! There are many heads with thirty, thirty-two, thirty-six, forty-two and forty-five points, all gigantic; and I assure you that that big specimen of mine would look like nothing by them. As the measurement stands, it is 5 feet 5 inches from outside to outside. The big head at Moritzburg is 7 feet inside, and each horn over 4 feet long. There is nothing like them that I ever saw, and I believe nothing in the world like them; but when I tell you that an Irish elk's head, which is in the next room to them (it is a fair specimen, but I have seen much larger), looks quite small by them, you may imagine what they are. Not only the number of points is wonderful, but the strength and thickness of horn. Many of the points are over 2 feet long, and I am sure, if some of the heads were put on the ground, they would stand 6 feet high, or more. I have set an artist to work to sketch me the whole collection, each head on a separate page; it will make a curious and valuable book. I bought a head at Berlin, which would look small by these, but still measures 4 feet 7 inches wide between the horns, has nineteen long points, and the horn is so thick that I cannot grasp it with two hands. Another, with sixteen points, 3 feet 7 inches wide, is also a splendid head. I have picked up some wonderful roe-deer heads at Prague and Berlin, four or five of them having horns each 18 inches long, with ten points, five on each horn, besides many deformed ones. I will show you all these curiosities when I return. I hope to pick up more in Austria. I bought a fine deformed head here to-day, with thirteen points, very curiously formed and very large; and I am about another, which is most wonderful: it is a deformity, but I have so many large heads now that I value deformities more than monsters, unless the latter are something quite above the common. I bought, at Prague, a roe head, which I do not think the man knew the value of: I never saw one quite like it; it is all grown together in a mass like a honeycomb: the animal was found dead, so probably it was the result of some disease. There are some other curious ones, and one or two much larger than any roe heads of Scotland: I believe they are mostly of great age, killed two or three hundred years ago. I saw a collection belonging to the Prince Augustus, of Wurtemburg, at Berlin, and there were some marvellous heads, both of red deer and roe, in it. He had two roe heads grown in a mass, and I believe he paid nearly £150 for one of them! I saw one at Ratisbon of the same kind, belonging to a brewer, who asked £100 for it, but then he had shot the beast himself. I mean to go down to Pesth and Belgrade, in Hungary, and I hope to find something wonderful there, as that is the country for these things: they are all bought up from there by the dealers in these towns, and therefore, if there is anything curious, it is as well to get them first hand. There are deer here, in the Prater, or Park of Vienna, which I have often seen, with eighteen, twenty, twenty-two and twenty-four points.—*Lord Powerscourt, in a letter to F. T. Buckland, published in the 'Field' of April* 11, 1863.

[The particular pair of horns to which Lord Powerscourt refers, in the beginning of this communication, was exhibited for some weeks in the window of the 'Field' office, and was a very attractive object.—*Edward Newman.*]

A Visit to Mew Island.—In June, 1858, I spent a day in exploring Mew Island, a little coral islet near the entrance of the Sunda Strait. It is densely wooded to the water's edge, and is partly encircled by a barrier reef. As I step from the boat upon the reef I am struck at once with the extreme beauty of a species of Amphitrite which lives in holes of the great solid madrepores which compose the reef. The gills of these lovely Annelids are in the form of spiral laminæ, of a brilliant orange-green and blue. These resplendent gaudy plumes are alternately extruded and withdrawn, and, seen through the pellucid water, present a very singular and beautiful appearance. On the moist sand within the reef are numbers of pale gray crickets, veritable maritime Orthoptera, which share the strand with horsemen crabs, and perforate the soil in every direction. It was calm as well as hot, and the still water under the dark shadow of the overhanging trees abounds with long-spined purple sea eggs, and glancing here and there among them are black and yellow Chætodons, strikingly handsome fishes on account of the contrast of colour. Jumping from stone to stone, like so many tiny seals, are numbers of Periophthalmi, fish as singular in form as the Chætodons are vivid in colour. Sea slugs or Holothuriæ are lying quiescent in the shallow pools or "dragging their slow lengths along" the coral *débris*. Some crabs with bright scarlet eyes, hiding beneath the madrepores, and Ophiuri, with slender snake-like rays, wriggling their way among the dead shells and seaweed, also struck me as very curious during my sojourn on this tropical barrier reef. On penetrating the jungle I admire the great gutta percha trees firmly anchored in the loose coral, and supported by broad buttresses, which extend beyond the base of the trunks. One giant tree has fallen, and his prostrate form is already clothed with a drooping pall of Epiphytes, and nearly screened from view by the pinnate fronds of Lomariæ, and the cylindric branches of enormous Lycopodiums. A species of solitary wasp and legions of indefatigable ants are engaged on the work of demolition, which in the Tropics is soon effected, while in the tree-tops overhead the Cicadæ are chanting a monotonous dirge over the decaying form of the vegetable giant. This is the first time I have seen the Cycas in fruit, and I obtain some fine specimens of the size and shape of large pine apples. A species of Nepenthes, with very pretty pitchers, is growing also in great luxuriance in one part of the island. And now I come upon a deserted village which offers a picture of mingled plenty and desolation. The ruined huts are encircled by verdurous broad-leaved bananas and the blackened stems of burnt palms, while some are overgrown with ferns or half buried beneath dense masses of parasitic creepers. The capsicum and cotton plants around are choked by the rank growth of trailing Convolvuli, and the village paths are green with weeds, and obstructed by rotting trees swarming with centipedes and scorpions. Absorbed in the contemplation of this strange scene, I am startled by the sound of heavy flapping wings, and looking up see two large birds with outstretched necks winging their way to a tall bare tree adjacent. They perch side by side, and I recognise the great black and white hornbill. In the perfect solitude of the jungle sudden sounds of mystery, like the vibration of these birds' wings, recal visions of tigers and other jungle horrors, and the hand instinctively moves towards the faithful revolver. The Malays had come over here to avoid the tigers which had devastated their village on the mainland, but these man-slayers, having tasted human blood, swam over to the island, and so molested them that they were forced to quit the neighbourhood altogether.—*Arthur Adams.*

Ornithological Notes between Bristol and Dublin.—On the 20th of March, while off the Bishop and Clerks, near Milford, a flock of shearwaters accompanied us for about six miles. Their flight is most beautiful, and resembles that of the martin more than any bird I know. There was a gale blowing from the westward, and though the bird is nearly the size of the razorbill, they flew against it at an astonishing rate, occasionally cleaving the water with their breasts. While in the Liffey, an Iceland gull was feeding with a flock of herring gulls. On the 8th of April, when returning, I saw a flock of six shearwaters off the Wexford Coast. During a squall accompanied with sleet, and in about mid channel, a meadow pipit accompanied us for some time, endeavouring to settle on the rigging. At last it flew as if in despair before the squall north-east.—*H. Blake-Knox ; 49, Pulteney Street, Bath, April* 10, 1863.

Marsh Harrier, Peregrine Falcon, Iceland Falcon, &c., in Ireland.—The marsh harrier (*Falco æruginosus*) is plentiful this year in the Queen's County, &c. Several specimens have been sent to Dublin. The peregrine falcon (*Falco peregrinus*), too, is not uncommon. An Iceland falcon (*F. islandicus*) came into the possession of the Natural History Society. The Merlin (*F. Æsalon*) is also common. The little auk (*Alca alle*) is numerous on the west coast.—*Id. ; Bartragh, Dalkey, County Dublin, April* 5, 1863.

Peregrine Falcon (Falco peregrinus) *at Haverfordwest.*—I obtained on the 29th of last month a fine specimen of the peregrine falcon while still fresh and unskinned. It was captured near Haverfordwest by means of a bait poisoned with strychnine. The plumage in consequence is perfect, and is that of an old bird. I dissected the body, which is that of a female, and found the ovary in a very forward state, the largest egg being about half an inch in diameter. The stomach contained nothing but a few pieces of the poisoned meat. What a pity it is that so noble a bird is gradually becoming so scarce. I did not know until a few weeks ago that a peregrine was shot in this parish in January, 1862. I have recently seen the bird, which is stuffed and in the possession of a neighbour of mine, and I fancy from the size it is a female.—*J. E. Harting ; Kingsbury, Middlesex, April* 4, 1863.

Correction of an Error.—In my communication respecting the Dartford warbler (Zool. 8484), there is a misprint: the locality where I obtained the bird should be Bepton, not Beeston.—*Id.*

Blackbird Singing in February.—At Zool. 8484 the Rev. J. C. Atkinson mentions as a remarkable circumstance a blackbird singing in Yorkshire in February. Having noted for many years the first song of the blackbird, it is by no means uncommon in very mild winter for the blackbird to sing a few days in February, and once now and then at the end of January, but rarely. In my neighbourhood the first heard was about the 24th of February. In cold weather this bird is frequently silent until even the first or second week in March. The blackbird is also much later in nidification than his congener the song thrush, seldom commencing his nest before young thrushes are hatched. Many persons who have not correct ears for the song of birds, mistake the missel thrush for the blackbird. The missel thrush is a much hardier bird, and sings in colder and more tempestuous weather. The latter seems the only bird which delights to sing during a heavy gale of wind, when the other songsters of the grove are silent. The blackbird delights most to sing in a calm gleamy day, between warm showers.—*H. W. Newman ; Hillside, Cheltenham, April* 9, 1863.

The Query respecting the Robin.—I observe in the January number of the 'Zoologist' (Zool. 8326) that Mr. Whatt corroborates Mr. Ransom's statement as to the

popular notion current in Yorkshire respecting the destruction of the old robins by their young, though he does not answer the query, "Are there any grounds for it?" but says, "Considering the advantages they enjoy they ought to be very common, and yet they cannot be said to be so." "There must be some cause or causes at work to keep down their numbers." "The question is what are those causes?" I would in the first place suggest, in reply to Mr. Ransom's remark, that it is unreasonable to suppose that the stronger birds should be killed by the weaker; even if attacked by numbers, having greater power of wing they would readily escape, and so unnatural too that the young should destroy the parent birds. As to the "young birds being common in June and July, and the old ones rare," I think it is readily accounted for. Allowing only four to a brood that would make two to one. And then we must recollect that the parent birds have to rebuild and rear another progeny before reappearing in our gardens, another reason for redbreasts being very rare indeed in June and July. Though Mr. Whatt seems at a loss to account for its not being a more numerous species, the reasons I think are obvious. First, their greater tameness and familiarity render them an easy prey to cats; secondly, being a tender and sparsely-feathered species many perish of a severe winter, particularly in the Northern Counties. That the robin should be less numerous than the hedgesparrow in the North is not surprising. During a year's residence in Morayshire I do not remember seeing one in the garden, though sheltered and well stocked with trees, but I occasionally met with it in my rambles. In most parts of France the robin is scarce, though the climate is more favourable, but there it is preyed on both by man and beast. In the south of France I have seen strings of them exposed for sale in the markets.—*Henry Hadfield; Ventnor, Isle of Wight, January* 17, 1863.

Early Occurrence of the Swallow.—In a letter from a near relative, residing a few miles from Boston, in Lincolnshire, dated April 1, 1863, the occurrence of a swallow is thus mentioned:—"A swallow was found one day a week ago in the swill-pail set at the back-kitchen door. A piece of beef had been boiled, and the liquor had been poured out into the pail. The swallow appeared to have fallen into the hot liquor. It was alive when found, though it died shortly afterwards. Where did it come from? Was it an early and exhausted arrival which fell from weakness after reaching the house?"—*J. C. Atkinson; Danby-in-Cleveland, April* 7, 1863.

The Sandpiper a Diver.—Mr. Blake-Knox says (Zool. 8493) that in mentioning the diving of the sandpiper it was "simply as a fact hitherto little known." The mere fact of the wounded bird endeavouring to effect its escape by diving may be interesting and worthy of note, but in itself proves nothing as to the habits of birds of that species in a natural and healthy condition, though your correspondent seems to think otherwise, for he refers to "habits hitherto generally unknown being added to the life-histories of these interesting birds;" then remarks, to prove my observations "rather inconsistent," "When a bird can dive for safety, can it not also dive for other reasons—food or pleasure?" Undoubtedly it could, but whether it would, or, rather, has occasion to do so, is the question. That it is not the sandpiper's usual habit to seek for food at the bottom of streams or pools there can be little reason to doubt; and as to its taking pleasure in it, I am inclined to believe that it only dives when winged and pursued, having no other way of escape. And if proof were wanting of its diving not being habitual or natural it might be found in the fact that a man of Mr. Blake-Knox's experience of the species never yet saw a sandpiper dive except when wounded. He says, "My chief object in writing my first paper was to learn from correspondents

if the bird was known to dive for food. My supposition seems to have been satisfactorily confirmed by Mr. Leven's paper, and again by the Rev. G. C. Green." By a reference to their notes, however, it would appear that Mr. Blake-Knox is easily satisfied. As to Mr. Green's statement (Zool. 8283) it merely amounts to this: that he, too, has seen a wounded sandpiper dive; but this your correspondent seemingly considers "satisfactorily confirming his supposition," though his "chief object was to learn if the bird was known to dive for food." The fact is, that the Rev. G. C. Green, Mr. Blake-Knox and myself can merely certify to having seen wounded sandpipers swim and dive,—not for food, but to escape capture; consequently it can hardly be said that we have "added much to the life-histories of these interesting birds." No; the credit—if credit there be—belongs of right to Mr. Leven, as he alone has observed the diving of the unwounded bird. Let us then see what facts are to be gleaned from his short note. On a careful reperusal of it, all I can gather is this. That he once, as he seems sure of no more, saw a sandpiper dive when amusing itself on the shore or bank of a stream. But it may be as well to quote his own words (Zool. 8237):—"I have noticed it often dive when wounded, and on one or two occasions while the birds were amusing themselves on the shore or bank of a stream. Whether they were after food or not I cannot say." I would likewise call attention to the following sentences:—"I have seen them dive four or five feet deep, and that not by plunging in, but from the surface;" and he adds, "I never saw one swimming on the surface unless wounded." Opportunities seldom offer for a close inspection of birds of this species, except during the breeding season. I have then seen them perch on a rail or fence within a few yards of me, and have had to drive them away to prevent their seeing me approach their nest. But on one occasion, when residing on the north-east coast of Scotland, on rowing out to the beacon rock, about two miles from the harbour of Lossiemouth, I found, about noon, on a calm winter's day, an innumerable flock, or rather assemblage or combination of flocks, of sandpipers awaiting the receding of the tide. There they sat, apparently unconscious of danger, allowing us to row within a few yards of them without one taking wing. By far the greater part were sleeping or reposing on the shelving rock, but many with outstretched wings were preening their feathers; others were standing or reclining on the outer edge or margin of the rock, basking in the sun; and numbers were to be seen playing or sporting about in the shallow water or pools, but none diving, though they may have ducked or dipped for a second or two without my attaching much importance to it. We had a gun with us, but they were not shot at or otherwise disturbed. Unless by some such chance Mr. Leven could hardly have got within thirty or forty yards of a flock, and at that distance it would be difficult to see or make out whether the birds might be dipping or diving, but as they were on the "shore or bank of the stream," *i. e.* in shallow water, the former is the most likely. What we want is to hear something of the habits or life-history of the unwounded birds. As to the swimming of land birds I am aware that even a barn-door fowl, when scared, will fly into or take refuge in a horse-pond, and float. In that way, doubtless, land birds swim, but I have yet to learn that they can generally "propel themselves through the water by their feet," though they may flutter on for a time, but their plumage—unlike that of the waterfowls—being unanointed would soon be saturated, when they would drown of course. Wounded or hunted animals it is well known often take to the water. The cat, though by no means amphibious, will do so. I have seen one swim across a large pond. However, in a wild state it is not unlikely that it may occasionally prey upon fish, seeing how partial the domestic cat is to that food.

In describing the sheep I should not say, for instance, that its habit is to throw itself headlong down a precipice, after the manner of the ibex, though I have seen one do so when pursued, and strangely enough it was none the worse for it.—*Henry Hadfield; Ventnor, Isle of Wight, April* 7, 1863.

Bite of a Poisonous Snake cured by Ammonia.—As I was riding on the morning of the 14th of January from Kopeigaur to Yeola (two villages in the Ahmedungger Districts, Bombay Presidency), I saw a man carrying a load on his back, and on seeing a woman who was passing at the time seize hold of it I perceived that it was a boy about eighteen years of age, and on asking him what was the matter he replied that the boy had been bitten by a snake early in the morning (this was about half-past nine), and that he believed the boy to be dead. I got off my horse and felt the boy's pulse, but could not feel it beat. The man at my direction put the boy down; then the body was quite motionless and the limbs deathly cold. I applied a bottle of carbonate of ammonia (that I have always carried about in my pocket since my dog was bitten by a cobra about two months before, and died in seven minutes after being bitten) to his nose; in about two or three moments I saw his head shake. We then forced open his teeth, which were clenched tight together, and I put a piece of this ammonia into his mouth. He very soon began spitting it out, when I put in a second, third and fourth piece. In a quarter of an hour he was so far recovered that with the assistance of two men he walked some three hundred yards. This occurred near Yeola, where I met a native official. On my asking him whether he had any spirits of ammonia, which is supplied by Government to these native officials in cases of snake bites, he sent to his office to see, when a man brought me a bottle. I then administered a dose or two of it in water to the boy, and after an hour he was so convalescent that he opened his eyes and looked about; though he remained speechless, still he appeared to notice what was said to him. I may mention that at first, on forcing up the eyelids, the whites of his eyes were perfectly yellow. The natives could not tell me what sort of snake it was that had bitten him, and though no doubt a venomous one it could not have been a cobra, otherwise all remedies so long after the boy had been bitten would have been inefficacious.—*Julian Hobson; Ahmedungger Districts, Bombay, February* 12, 1863.

On the Breeding of Salamandra maculosa in Captivity.—Seeing a paragraph in the March number of the 'Zoologist' (Zool. 8449), relative to the above reptile I send a few notes concerning the breeding of this wonderful creature. Not knowing any external difference between the male and female Salamandra I cannot answer the question of sex referred to by your correspondent. I have had two of these curious reptiles, but both were females which I purchased two years ago. For four months or more they both refused food, and I was afraid they would soon die, but not so, for after this time had elapsed, they began to feed upon the common garden worm, taking two or three large sized ones at a meal, and they have fed on them ever since, and are remarkably fat and well. The man from whom I purchased these told me they would have young very soon, for which I eagerly looked forward for two or three months, after which I gave up all hopes, but at the end of eleven months one of them gave birth to five or six little ones, thus showing that the reptile is viviparous and not oviparous as many people fancy. As she was neglected, of course these died. She

had in all twenty-eight or twenty-nine young ones, but as I did not know how to manage them I lost them all. My second salamander had twenty-eight young ones about a fortnight after the *accouchement* of the first. The salamander takes to the water to bring forth her young, and after producing six or seven leaves it. During this period the young ones must be removed, or the mother will very likely eat them. They must be fed as soon as possible after their birth, or they will attack one another. The young, when removed from the mother, should be placed in a shallow pan, with some shingle arranged on one side, so that they may get upon it for air, and the depth of water should not exceed an inch or an inch and a half. The food I brought up my young upon was either raw mutton or beef, which they ate most ravenously; pieces the size of a pin's head only should be given to them at first, but after a fortnight they will take pieces cut lengthwise, thin and about the size of a small worm. Their form is like the mother, excepting that they have flat tails and fluffy gills, which disappear when they are about to leave the water. They change their skins constantly, and at about four months old they change and become the colour of the mother; before their change, however, they are almost transparent, excepting where the dark spots are visible. Out of the twenty-eight young, unfortunately only fourteen were born alive, the reason I fancy being in consequence of my having moved the mother from a large fern case with a tank in it to a smaller one with only a small quantity of water, for the whole time she was in the small case, which was about a week, she never had any more young ones, but after I put her back into the large case, the very next day I found four dead and two or three living; the remainder were born (some living and some dead) on the next day. I forgot to say that she had six or seven in the large tank before I removed her: my reason for moving her was that I was afraid the frogs, toads, triton or water tortoise which I keep in the case might attack and eat the young ones as they were born. These fourteen that were born alive I managed to rear in a milk-pan, giving them fresh water every day and washing the shingle. They were fed every day. Six of them I lost by their crawling up the side of the pan when ready to leave the water, and, although search was made all over the room, nothing could be found of them; one died, and the rest I have still alive. They are very healthy, and are fed upon small common garden worms, for they reject the meat after they leave the water. Their growth is very slow, for mine are now more than twelve months old, and they only measure two and a half inches from the nose to the tip of the tail. Their colour is like that of the mother, as I said before, but brighter, and the spots are different in all but two; one is striped with four stripes, two yellow and two black, the others are spotted in different ways. A curious fact concerning my salamanders is that they were very large when I bought them, and have kept about the same size ever since, and even after they had had their young did not appear any smaller; they have refused food all the winter and yet are about the same size.—*Thomas Lendon Merriman; 27, Sutherland Place, Bayswater.*

A Viviparous Fish.—The 2nd of May, 1859, finds us at anchor in the safe and pretty port of Mah-lu-san. In the afternoon I accompany the seining party. The day is lovely; the whole face of the country is bright and smiling; the barley is ripe in the fields, the hills are covered with a varied green, and the little rippling waves of the clear water of the bay are dancing in the sun. Stretching far away to the north

and to the south are groups of dark blue islets rising mistily from the surface of the sea,—glimpses of that mysterious archipelago, among the unknown islands of which I cruised in bye-gone years. Large picturesque boats crowded with Koreans, in their white fluttering robes, are putting off from the adjacent villages and skulling across the pellucid water to visit the stranger ship. And now we choose a sheltered bay, and commence paying out the seine. Koreans seated in groups, bare-headed or wearing their broad-brimmed hats, smoke their pipes in silence. The rooks, in the tall and glorious trees that fringe the bay, caw loudly with indignant remonstrance at the unwonted intrusion upon their quiet haunts, while the sailors, to the tune of their popular songs, haul in the great net. Upwards of 170 pounds of bream and other fish are taken. There are also toad-fishes and devil-fishes, sea-horses and swimming-crabs, and among these I notice a great many individuals of a singular oviparous fish, most of which have three or four living young ones in their bellies. I believe the fish belongs to a genus described by Temminck under the name of Ditrema. As I stroll away from the seining party, I meet with a singular species of Arum, with long curling horns extending from its lurid spathes. I find the natives just as friendly as when I visited the group in 1845. An old man, with a basket of sea-weed on his back, stops and would fain persuade me to taste of his Laminarian dainty; a little further on, a young lad makes a friendly advance by biting off a portion of lily-root, offering me the remainder; while a little boy brings me wild raspberries strung upon a straw.—*Arthur Adams.*

On the Supposed New British Mygale (Zool. 8172 and 8202).—I had expected that Mr. Robertson would have before this corrected the error into which he fell in his notice of Dysdera erythrina as new to Britain (Zool. 8172). After some correspondence with Mr. Robertson on the subject (during which he had the opportunity of comparing his specimen with specimens of D. erythrina captured by myself), he seemed to have no doubt that his specimen was of that species, and consequently was a well-known British spider for years before his discovery of it at Brighton.—*O. Pickard-Cambridge; Bloxworth, Dorset, March* 31, 1863.

Species of Micropteryx Bred.—During the present month I have had the pleasure of breeding the following species of this genus:—

Micropteryx purpurella. Bred freely from whitish larvæ with brown heads and green dorsal vessels, mining the leaves of birch, in May last.

M. salopiella. I have bred several of this species from whitish larvæ with dark brown heads and darkish dorsal vessels, feeding in birch leaves during May.

M. semipurpurella. I bred a single example of this species along with M. purpurella.

M. subpurpurella. This I have also bred from whitish larvæ with dark brown heads, the second segments being dusted with darkish; these larvæ fed on oak leaves in May last.

I have tenanted cocoons of two other kinds of Micropteryx larvæ, the imagos of which I am expecting every day to make their appearance. It is fatal to the larvæ to

allow them to spin their cocoons and remain for any length of time in sand, as they are almost sure to dry up; the quantity of cocoons containing dried-up larvæ in my possession fully convinced me of the impolicy of such a course. The plan I adopted last May was, having first carefully separated the various larvæ, I put a mixture of one part of sand to two of mould at the bottom of each jar, into which, when full fed, the larvæ retired and spun their cocoons. When they had all constructed their cocoons I placed them along with the mould and sand in small flower-pots, on the outsides of which I painted a number corresponding with that in my diary opposite the description of each larva. I then buried them in the garden, and at the end of February last brought them indoors.—*Charles Healy; 74, Napier Street, Hoxton, March* 30, 1863.

Pyriform Cocoon of Saturnia Carpini with two Tubes.—My friend Mr. Doubleday has just sent me a cocoon of the emperor moth with two holes side by side at that part where the caterpillar usually emerges; both these are much smaller than the one usually present: the pupa is alive, and in all respects of the usual form and size.—*Edward Newman.*

Occurrence of Ennomos alniaria at Brighton.—In the beginning of September last I caught at light, in Kemp Town, Brighton, a female specimen of Ennomos alniaria. Not recognising it I put it aside, intending to determine the name at some future time. On Thursday, April 16th, on showing it to H. Pratt, of that town, he recognised it immediately, and his opinion has since been confirmed by other competent persons. This specimen, which is damaged in the tip of one of the fore wings, was taken close to the Hospital, in which some years ago a specimen was taken.—*J. R. Griffith; Oriel College, Oxford.*

Note on the Larva and Food-plant of Eupithecia debiliata.—Some little time since I had a very interesting letter from Dr. Breyer, of Brussels, who has for the last year or two been devoting himself to the study of the economy of the genus Eupithecia. He makes the following remarks on the larva of Eupithecia debiliata, which will, I am sure, be interesting to the readers of the 'Zoologist':—"I took the larva in the early spring (May, I believe,) on Vaccinium myrtillus. It is pale green, and lives between united leaves like the larva of a Tortrix. There is not generally more than one larva on each plant. When you have found the first, and got your eye in, it is not difficult to find several more." I hope all entomologists who live in localities where Eupithecia debiliata occurs will try and get their "eyes in" during next month. I am afraid I shall not have the chance of doing so myself, but shall only be too glad to hear the result of the ocular investigations of others.—*H. Harpur Crewe.*

Occurrence of Notodonta Carmelita at West Wickham.—Entomologists will do well to keep a bright look-out for this rarity: a specimen, evidently fresh out of the chrysalis, was taken on the Archbishop's palings on the 19th of April: this is the first I have heard of: it will probably continue to emerge for the next fortnight.—*Edward Newman.*

A Noctua new to Britain.—A few weeks since, the Rev. Henry Burney sent me a male and female of a Noctua to examine, which were taken in Wales last summer. I saw at once that the species was new to Britain, and had little doubt that it would prove to be Luperina Desyllesi, which I saw several years since in Dr. Boisduval's cabinet. I obtained photographs of the two sexes, and sent a print to M. Guenée and also to Dr. Staudinger, of Dresden. The former wrote immediately he received my

letter, and said that, although he did not like to give a positive opinion without seeing the insect itself, he believed it was L. Desyllesi, a species of which but very little is known. Dr. Boisduval's specimens were taken near Havre. Soon after I received a letter from Dr. Staudinger, who said it was a species which he did not possess, but was most probably L. Desyllesi or L. Nickerlii. At the request of the Rev. H. Burney I have written these few lines for publication in the 'Zoologist,' but the identity of the Welsh insect with L. Desyllesi cannot be proved till they have been compared.—*H. Doubleday; Epping, April* 18, 1863.

Description of the Larva of Phlogophora meticulosa.—When touched or annoyed it feigns death, turning its head on one side until it touches the side of the body, and I have sometimes seen this larva form a compact ring. Form somewhat leach-like, the head small, the 2nd, 3rd and 4th segments gradually larger, those following much larger, the 12th gibbose, but not humped on the back: smooth, velvety. Colour of the head pale obscure green, semihyaline, reticulated with darker lines: colour of the body apple-green or olive-brown: in either case it is densely sprinkled with very obscure whitish dots; there is an interrupted, very narrow median white line on the back, and a broader obscure whitish line on each side, just below the spiracles, better defined on the 12th and 13th segments, and terminating in the anal claspers; the spiracles are whitish, surrounded by a delicate black line; the legs and claspers semihyaline-green. Feeds on Senecio vulgaris (groundsel), the cultivated Chrysanthemums, Primula vulgaris (primrose) and a variety of low-growing herbs. I am indebted to my friend Mr. Doubleday for a supply of these larvæ; they fed throughout the mild winter of 1862-3, and are full-fed now, at the end of April. It spins a slight web on the ground in April or May, and changes to a smooth brown chrysalis; the moths appear in May and June, and a second brood is out in September. The larvæ vary from bright green to olive-brown.—*Edward Newman.*

Amara brunnea, Gyll.—The claim of this species for a place among the British Coleoptera appears to rest on the following reference in Dawson's 'Geodephaga Britannica,' p. 127, "Stated by Mr. Haliday to have been taken at Portmarnoch, in Ireland, by Messrs. Tardy and Furlong;" since, although Stephens' description (Man. 38, 276) is apparently correct, the exponents of the species in his collection are wrong. Dawson (*loc. cit.*) mentions this circumstance, and refers them to his A. orichalcica, A. bifrons of Gyllenhal; but he also is in error, for, of the five specimens representing Amara brunnea in the Stephensian cabinet, the four upper insects are certainly A. rufocincta of Sahlberg, and are evidently the species considered as A. brunnea by Stephens, whilst the fifth only is A. orichalcica, a large dark specimen in a disguised condition. With reference, therefore, to the Irish specimens, on which Dawson relies, it appears, from enquiries I have made, that on the death of Messrs. Tardy and Furlong, their collections came into the possession of the Royal Dublin Society, from whom, in consequence of a circumstance hereafter mentioned, I have obtained the loan of one of Mr. Furlong's type specimens with the name "brunnea" attached, for which assistance I am much indebted to the courtesy of Messrs. Birchall, Dunlop and Wright. This insect is also decidedly Amara rufocincta of Sahlberg, a species not included in Dawson's work, but added subsequently by him in one of the Entomological Annuals. My attention was drawn to the matter by seeing the species marked in a list of Geodephaga belonging to Mr. E. Graham, of Preston, and, on my asking for some explanation as to its identity, &c., that gentleman kindly lent me his speci-

men for examination, informing me that he took two examples at Preston, which he sent to Mr. Dawson for his opinion, not being able to name them satisfactorily from the 'Geodephaga Britannica,' and of which one was returned by the latter as the Amara brunnea of his work. Mr. Graham also told me that it had been so named by another authority. This insect also is certainly A. rufocincta of Sahlberg, which occurs sparingly all over the kingdom, having been taken at Scarborough, Dublin, Preston and Deal, and in the Reigate district. As there could be no doubt about these specimens I was induced to examine the characters of A. brunnea as given by Dawson (*loc. cit.*), and find that although the Latin diagnosis evidently refers to that species, being nearly *verbatim* the same as that in Erichson's 'Käf. Brand.' 95, 29, yet his English description applies equally to A. rufocincta and A. brunnea, except in referring to the thorax, which he mentions as having the sides "nearly straight, or very slightly sloped inwards towards the base;" this can only apply to the former, the thorax in A. brunnea having the sides most decidedly rounded behind. Judging, therefore, from the specimens I have examined, and from the differences in the description above referred to, I can come to no other conclusion than that Dawson adopted the Latin diagnosis from Erichson, and that his English description is that of A. rufocincta. The species A. brunnea of Gyllenhal must, therefore, be expunged from our lists, and A. brunnea of Dawson (Geod. Brit., *et exempl.*) added as a synonym to A. rufocincta of Sahlberg. The true A. brunnea comes nearest to A. rufocincta, but still differs from it conspicuously as follows:—It is altogether a smaller and less robust insect; the joints of the antennæ are more slender, the legs shorter and more slender, and the tarsi especially shorter; the thorax is not so ample, having the anterior angles rather more acute, the posterior angles contracted behind and decidedly rotundate, the basal foveæ not so deeply punctured, and the reddish edging more evident, especially on the hinder margin; the scutellum is rather deeper and not quite so broad; the elytra are more parallel, and not so acuminate behind. I have not only examined the insects above referred to with the original descriptions, but have compared them with an undoubted specimen of A. brunnea sent by Dr. Schaum to Mr. Waterhouse.—*E. C. Rye.*

Characters of a Geodephagous Insect new to Britain.—

Bembidium Mannerheimii, *Sahlb. Ins. Fenn.* i. 201, 26; (*Schaum, Er. Ins. Deutschl.* iv. 740, 66). B. unicolor, *Chaudoir, Bull. d. Mosc.* 1850, iii. 176, 10. B. guttula, *var.* β, *Dawson, Geod. Brit.* 181? (*nec* Philocthus hæmorrhous, (*Kirby*), *Steph. Ill. Man. or Coll.*

Above are the references of a species to be added to our list of Geodephaga. It is one of the sub-genus Philocthus, and closely allied to B. guttula, *Gyll.*, having the posterior angles of the thorax subemarginate, but differs from that insect in having the elytra shorter, more convex, more decidedly oval (they are oblong-ovate in B. guttula), and without any red subapical spots, the extreme apex only being sometimes of a faint reddish tone; the thorax is broader, with the sides more rotundate, and the basal foveæ not extending quite so far upwards; altogether it is a shorter, broader, more convex insect, bearing a slight superficial resemblance to dark examples of Trechus secalis. In colour also it differs from B. guttula, being deep black, with a faint purplish tinge, and never exhibiting any æneous tendency. Taken at Hammersmith Marshes and Hampstead by Mr. Waterhouse and his sons, Mr. H. Montague, and myself: I have no doubt, however, that it will be found mixed up generally in collections with

B. guttula. Dr. Schaum (*loc. cit.*) gives Philocthus hæmorrhous of Stephens as a synonym of this species; but the description in the 'Illust. Mand.' ii. 9, 6, "elytra oblong-ovate, apex pale pitchy," and also in the 'Manual,' p. 53, decidedly refers to B. guttula, in which the subapical spots are sometimes suffused; and in neither case does Stephens allude to the differences in structure. In addition to this, the Philocthus hæmorrhous of Stephens' collection is represented by four pinned specimens, whereof the first and third are Bembidium (Tachys) obtusum; the second is B. (Philocthus) guttula; and the fourth, which stands below, is also B. guttula. The three upper insects are not marked in any way, but the fourth bears an old ticket attached to the pin (and apparently in Kirby's handwriting), on which the name B. hæmorrhous appears; this certainly does not belong to the species of which I have above given the leading characters, but is, as just stated, a specimen of B. guttula, in which the subapical testaceous spot is very distinct; and in which the whole apex of the elytra, below the spot, is fusco-testaceous. The elytra are thrust open by the pin with which the insect is pierced, and hence the light passing through their semitransparent apical portion causes that part to appear paler than in other specimens of the same species with their elytra in the ordinary position. Mr. Waterhouse has examined these specimens, and, without being aware of my conclusions, has arrived at precisely the same results. It seems to me doubtful whether Dawson's *var.* β of B. guttula can with certainty be referred to B. Mannerheimii, for, although he mentions the rounder sides of the thorax and unspotted elytra, he still refers it to P. hæmorrhous, *Steph.*, which must be incorrect for the reasons above given. The subapical spots in B. guttula vary much in size, sometimes existing only as the faintest possible indication of lighter colour, and at others reaching downwards until they meet the light edge of the extreme apex.—*E. C. Rye;* 284, *King's Road, Chelsea, S.W., April* 6, 1863.

Food of Phryganidous Larvæ.—In the current 'Zoologist' (Zool. 8463), Mr. Newman, in a note on the subject of the destruction of salmon ova, takes occasion to express his doubts as to the complicity of Phryganidous larvæ in this destruction, and remarks that he thinks that "all the Phryganidous larvæ are vegetable feeders." I have myself not had much opportunity of watching these insects in their larva state, but may be permitted to state the opinion of M. Pictet on the subject, than whom no one is better able to give his experience, no other entomologist having been equally successful in rearing these insects. At pp. 113, 114 of his 'Recherches pour servir à l'Histoire et l'Anatomie des Phryganides,' he states that "The larvæ of Phryganidæ are in general herbivorous. I have always fed them on willow-leaves, and all those that have cases have eaten them willingly. The large species eat all the leaf, commencing at the edge; but the small species are not able to do this, and content themselves with cutting the parenchyma, leaving the nervures intact. Moreover, almost all the larvæ of Phryganidæ eat other aquatic insects when they find occasion to do so, and they will even attack larvæ of their own kind (*leurs pareilles*) when these are deprived of their cases. I have sometimes seen them in captivity kill larvæ enclosed in cases when these offered little resistance. Their blunt mandibles only permit them usually to eat the soft part,—that is to say, the abdomen; they leave the head, corselet and feet intact. They are more or less voracious, according to their size; they are able, however, to live a long time without eating. I have kept them often in winter without giving them any food; they have lived several months without appearing to suffer in any way from this privation, and have even undergone their metamorphoses." After such testimony as this, I think we cannot for a moment doubt that these

larvæ are both carnivorous and herbivorous, and I should think it not at all improbable that the ova of fishes may occasionally serve them for food, and perhaps even the newly-hatched fry. In conclusion, I may remark that I think the term "stone-fly" is generally applied to the Perlidæ, as distinguishing them from the "caddis-flies" or Phryganidæ.—*R. M'Lachlan;* 1, *Park Road Terrace, Forest Hill, April* 6, 1863.

Food of Larvæ of Phryganidæ.—Since writing the above I have had an opportunity of witnessing an interesting instance of the herbivorous propensities of these larvæ. A few days ago I was in Richmond Park, and found a large number of caddis-worms (some species of Limnephilus) congregated about the rushes on the edges of a pond. On closer inspection it was evident that they were feeding on the bark of the rushes, sometimes eight or nine cases being attached to a single rush that was bent and lying on the surface. After having devoured the bark some of them cut the pith into short lengths, which they attached to their cases.—*Id.; April* 15, 1863.

Singular Caddis-Worms at Fat-si-jien.—Fat-si-jien is a small island in the Pacific, one hundred and fifty miles from the east coast of Niphon. It is a penal settlement of the Japanese. On landing in a little bay among rocks and rollers, we find the people mild, hospitable and well-behaved. Their place of banishment is by no means inviting, and their lives must doubtless be hard, while their luxuries must certainly be few. Notwithstanding the stony nature of their island they manage to cultivate two kinds of rice, and, with great industry and toil, they also grow the sweet potato and the taro. At the base of the island the huge waves of the Pacific come rolling in, rounding all the rock-fragments, which continually fall from the cliffs above. The greater part of the island is barren, or clothed with a useless scrub. The sandstone rocks here and there crop out, and are sometimes red and sometimes clothed with a scanty verdure, while deep chines and fissures, wall-faced cliffs and great angular ridges meet the eye at every turn. Hardly a bird but the rook is seen, and the only animals observed among the herbage are a smooth glistening skunk and a slim brown lizard, gliding and rustling, as is their wont, among the leaves and grass. Waterfalls of various shapes and sizes everywhere abound, the humid rocks about them covered with Marchantias, ferns, Sedums and Saxifrages. Under the rush of these waterfalls, adhering like limpets to the surface of the rock, I find my singular caddis-worms. Their singularity consists, not only in their peculiar habitat, but in the adaptation of their tubes to meet the deviation from the usual habits of their race. In running streams they are cylindrical, but here they are arched above and flat beneath, another form of tube being necessary to enable them to resist the action of the falling water. They are about half an inch long, and composed of small grains of sand cemented together. Their occupant does not appear to differ in appearance from the architect of the ordinary English form of tube with which, as a school-boy, I was formerly familiar.—*Arthur Adams.*

Larvæ of Lepidoptera.—Once more I beg to solicit readers of the 'Zoologist' to send me living specimens of the larvæ of Lepidoptera: the great harvest of night-feeding larvæ is during the month of May; and although it is uncertain when the descriptions can appear, there is no reason they should not be written while the insects are obtainable. Tin or brass tubing, closed at the ends, is the most convenient vehicle for the transmission of living larvæ.—*Edward Newman.*

Proceedings of Societies.

Entomological Society.

April 6, 1863.—Frederick Smith, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be returned to the respective donors:—'Proceedings of the Royal Society,' Vol. xii. No. 54; presented by the Royal Society. 'Journal of the Proceedings of the Linnean Society,' Vol. vii. No. 25; by the Society. 'The Journal of the Royal Agricultural Society of England,' Vol. xxiv. Part. 1; by the Society. 'The Entomologist;' by James Bladon, Esq. 'Exotic Butterflies,' Part 46; by W. Wilson Saunders, Esq. 'The Zoologist' for April; by the Editor. 'The Intellectual Observer,' No. 15; by Messrs. Groombridge & Sons. 'The Journal of the Society of Arts' for March; by the Society. 'The Athenæum' for March; by the Editor. 'The Reader' for March; by the Editor. 'On the Composition of the Head, and on the Number of Abdominal Segments in Insects;' by the Author, Dr. H. Schaum. 'Latreille, Familles Naturelles du Règne Animal;' by F. P. Pascoe, Esq.

Election of Honorary Members.

Professor Lacordaire, of Liège, Dr. Leconte, of Philadelphia, and Dr. Hagen, of Königsberg, were severally ballotted for and elected Honorary Members.

Exhibitions, &c.

Sir John Hearsey exhibited a box of Indian Lepidoptera, all having ocelli on their wings.

Mr. Waterhouse exhibited a specimen of a new British species of Aleochara, from the collection of Mr. Jeakes; it was in all probability captured by Mr. Squire, but there was no note of its locality, further than that the specimen was a British one. The insect was as large as a middle-sized A. mœsta, and was most remarkable for the unusually long terminal joint of the antennæ, this joint being equal to the three preceding joints taken together. It was glossy black, and rather densely clothed with very pale ash-coloured pubescence, especially on the thorax and elytra; the legs, palpi and basal joints of the antennæ were pitchy, the terminal joint of the palpi and the tarsi testaceous. The head presented very fine and scattered punctures. The antennæ were longer and less stout than usual; the second and third joints considerably elongated, the third being a trifle longer than the second; the fourth joint fully as long as broad; from the fifth to the tenth joints there was no perceptible increase in the width, but those joints gradually became shorter, the tenth joint was, however, but slightly transverse; the much-elongated terminal joint was cylindrical, with the apex rounded. The thorax was finely but not very thickly punctured, and presented two or three delicate setæ at the sides. The elytra taken together were more than one-third broader than long, slightly tinted with piceous behind, thickly punctured and faintly rugulose on the inner side. The abdomen had the transverse grooves on the basal segments strongly and thickly punctured, and on the apical half of those segments, as well as on the terminal segments, were finer scattered punctures: the penultimate segment had the hinder margin rather indistinctly emarginate in the middle, and was

simple, not crenulated. Compared with A. mœsta, this insect differed in the following points:—the head was smaller; the antennæ longer and more slender; the thorax less convex, more contracted in front, and more delicately punctured; the abdomen not only differed in the strong and rather dense punctuation of the transverse groove of the basal segments, but this strong punctuation existed even on the basal portion of the fifth segment, which in A. mœsta has the corresponding part smooth. The legs were slender, as in the species last mentioned; in A. lanuginosa the legs are stouter, and the posterior tarsi are shorter and stouter. The Aleochara inconspicua of Aubé is described as having a remarkably long terminal joint to the antennæ in the male sex, and as having the transverse grooves in the abdominal segments strongly punctured, and so far agrees with the insect exhibited, but the latter was larger than the size indicated for A. inconspicua, and the penultimate abdominal segment was not crenulated; hence Mr. Waterhouse was not inclined to identify it with A. inconspicua without a note of doubt.

The President exhibited specimens of Claviger testaceus found near Purley and Croydon in the nests of Formica flava; they had readily sucked sugar and water supplied to them in blotting-paper, and he had hoped to have exhibited them alive, but all had unfortunately died before the hour of meeting. He had not been able to find the larva of Claviger; so far as his experience went C. testaceus was confined to the nests of Formica flava, but in the course of last year his son had found it at Folkestone in the nests of the common garden ant.

Mr. Haward had found it in the nests of both these ants, but more commonly in that of F. flava.

Mr. Lubbock requested entomologists to supply him with specimens of the larva or imago of Acronycta Psi and A. Tridens, as he was desirous of making experiments in breeding and interbreeding those species.

The Secretary read an extract from a letter from Mr. Roland Trimen, dated Cape Town, February 18, 1863, in the following words:—

"Is it known that Deilephila Livornica is a *day*-flyer? In December last I saw several specimens flying about a long hill-ridge in the hot mid-day sunshine, and captured one of them. One specimen was hovering about the blue flowers of a species of Echium."

The Secretary also read a letter received from Mr. C. A. Wilson (a Corresponding Member of the Society), dated Kensington, near Adelaide, January 27, 1863, in which the writer gave a brief account of the successful passage, over the continent, to the north-west coast and back, of the South Australian exploring party under Stuart. Two unsuccessful attempts had previously been made; and the successful party, consisting of ten persons, had endured great hardships from continued drought and the barrenness of the country. Mr. F. G. Waterhouse, one of the party, was about to publish his journal of the Natural History of the Expedition; but, considering the vast extent of country traversed, only a small number of objects of interest was found, most specimens being met with in the settled districts, or in places before partially known or explored. Mr. Wilson added that his own South Australian collection of insects numbered between 5000 and 6000 specimens, of which fully one-third were Coleoptera, and he was gradually adding to them those of other colonies.

Mr. Benjamin T. Lowne (who was present as a visitor) exhibited specimens of thirty-three species of ants from Port Jackson, Australia, which he had collected during October and November last. The collection was entirely made in the immediate neighbour-

hood of Sydney; and so far as he had then been able to ascertain, eighteen of the thirty-three species were undescribed. Mr. Lowne had also been able, by personal observation of the nests, to unite four reputed species into two; Formica agilis, *Sm.*, and F. intrepida, *Kirby*, were (as was long ago suspected by Mr. F. Smith), the large and small workers of one species; and F. delecta, *Smith*, received from Hunter's River, was the female of F. purpurea, *Sm.*, a species received from Melbourne, showing that this interesting ant was distributed over a wide range of three hundred geographical miles, in which the fauna and flora varied considerably. The communities of Formica purpurea formed a nest very similar to that of our F. rufa, but built with small fragments of stone; near Sydney, where dark iron stone formed their building material, the hill was composed entirely of it; but in the mountains, where the rock was white, they carefully covered their hill with minute fragments of charcoal, which was very abundant in the Australian bush, a proceeding probably adapted to increase the internal temperature of their nest. As a rule, the nests of the genus Formica in New South Wales were subterranean, but one species excavated the hard boles of several species of Eucalyptus. The Australian Polyhachi did not, so far as Mr. Lowne's observations went, make a nest on leaves, like those of India, but excavated a domicile in the stumps of trees or under stones; whether those insects made any other nest at a later period in the year, he did not know. Crematogaster was a very numerous genus near Port Jackson, and, true to its character in Brazil and elsewhere, the species did not construct any nest, but lived under cracked bark and stones, or in the rotten stems of Xanthoreas. The Myrmecinæ were the most formidable looking of all the Australian genera, and armed with a sting which inflicted very severe but transitory pain. One species, M. nigrocincta, had the power of taking almost incredible leaps; it ran and leapt alternately, so that its progression was analogous to that of the Cicindelæ; although the ant was not more than an inch long, its leaps on ordinary occasions were about a foot in length, and when alarmed it had been seen by Mr. Lowne to leap a yard, rising a foot from the ground: he had been unable to discover anything in its structure to account for this remarkable power, which, however, was possessed by some other tropical ants.

Papers read.

The Secretary read a paper by Mr. Hewitson, entitled "Descriptions of two new Diurnal Lepidoptera," one of which belonged to the genus Papilio, the other to the genus Morpho.

The Secretary also read a paper by Mr. Roland Trimen, entitled "Descriptions of three new Species of Anthocharis, and a new Species of Pais, from Tropical South-Western Africa." They were described under the names of Anthocharis Regina, A. Phænon, A. Eosphorus, and Pais pulchra. Specimens of A. Regina and A. Eosphorus, which had been sent from Cape Town in a letter, were exhibited; A. Regina was a species of singular beauty, allied to A. Ione.—*J. W. D.*

Notices of New Books.

'*The Naturalist on the River Amazons.*' By Henry Walter Bates. 2 vols. 8vo. London: John Murray, Albemarle Street. 1863.

In the autumn of 1847 Mr. Wallace proposed to Mr. Bates a joint expedition to the River Amazons to make collections of objects in Natural History, dispose of duplicates in London to defray the cost of the expedition, and "gather facts towards solving the question of the origin of species." The first and second of these facts have, I trust, been fully accomplished; with respect to the third, however wide the fame acquired by Mr. Wallace, and Mr. Bates tells us that it has been wide, I incline to believe that the facts gathered and recorded by Mr. Bates will be quite as acceptable to sober, steady-going naturalists like myself as the most interesting hypotheses that may occur to the more lively imagination of my friend Mr. Wallace. In the spring of 1848 the fellow travellers met in London, and in April started on the passage across the Atlantic. Mr. Wallace returned after a sojourn of four years in primæval forests; Mr. Bates stayed seven years longer, returning home in 1859. Mr. Wallace published a narrative of his four years' sojourn under the title of 'Travels on the Amazons and Rio Negro;' Mr. Bates presents us with these two volumes as the record of his eleven years' labours.

It seems strange that four years should have been allowed to elapse after his return before Mr. Bates favoured the public with this record of his observations, but the truth is that he felt diffident of his own powers; doubts as to the value of his materials; and that reluctance which is the characteristic of modest men, to bring himself so prominently before the public. Indeed we are indebted to the solicitations of Mr. Darwin for the publication of the work at all. "Mr. Darwin," says the author, "strongly urged me to write a book, and reminded me of it afterwards, when, after having made a commencement, my half-formed resolution began to give way." I can readily believe how arduous was the task; the labour of collecting materials was a labour of love, the task of dishing up those materials for the public, dreary and wearisome. However, the task is done at last, and done well; and every naturalist will rejoice that a record has been preserved of one of the most interesting expeditions ever undertaken by a naturalist.

The very name of the Amazons, that monarch of rivers, conveys an idea of vastness that can scarcely be enhanced by descriptions, its course extending with its tributaries to more than 10,000 miles; its breadth so great that from the centre of the stream the shores are invisible; the volume of fresh water it pours into the Atlantic so immense as to conquer, overcome and annihilate the saltness of the ocean,—are facts taught us even in our school days, and once taught us are never to be forgotten. Now we have superadded to all this a picture of its banks, verdure descending to the water's edge, and ascending like a living wall two hundred feet above the stream. There is something oppressive in the idea of such a stream and such a forest, something quite as calculated to deter as to invite the traveller; in short, it seems a subject too immense, too boundless, too infinite shall I say, for us to grapple with. There are other features of this scene no less wonderful than its vastness: far more impressive to my mind than any computation of the millions of square miles now in the sole occupation of Nature as virgin forestry, is the power of Nature to reclaim her own when robbed by man. At Parà, for instance, man prevailed for a time, conquered the forest by great efforts, little by little, cleared spaces, marked out roads, squares and gardens, and built houses and churches and market-places; but at this point he quarrelled with himself, had rows and revolutions, and weakened himself and rendered himself incapable of further exertion; then Nature came leaping down upon him with her utmost power, blocked up the squares with superb bananas, covered the market place with forest, and shouted a loud triumphant "ha! ha!" in the hootings of unnumbered frogs and in the howlings of the monkeys, which make the very blood run cold. Now peace and commerce have returned; the plethora, the exuberance of life is again being driven back; and the sounds of music, the ringing of bells, the voices of men are again heard.

But I have ever felt, and still feel, that the only way to treat an author with perfect fairness is to let him speak for himself, and if the passages which I have selected are only as interesting to others as they have been to me, the readers of the 'Zoologist' will enjoy the pages that follow. I take them with the same disregard to classification which the author has himself shown, seeing no necessity for arrangement where the sights and sounds are so diversified and the objects of attraction so numerous.

The Japim.—"Another interesting and common bird was the japim, a species of Cassicus (*C. icteronotus*). It belongs to the same family of birds as our starling, magpie and rook. It has a rich yellow and

black plumage, remarkably compact and velvety in texture. The shape of its head and its physiognomy are very similar to those of the magpie; it has light gray eyes which give it the same knowing expression. It is social in its habits, and, like the English rook, builds its nest on trees in the neighbourhood of habitations; but the nests are quite differently constructed, being shaped like purses, two feet in length, and suspended from the slender branches all round the tree, some of them very near the ground. The entrance is on the side near the bottom of the nest. This bird is a great favourite with the Brazilians of Parà. It is a noisy, stirring, babbling creature, passing constantly to and fro, chattering to its comrades, and is very ready at imitating other birds, especially the domestic poultry of the vicinity. There was once a weekly newspaper published at Parà called 'The Japim,' the name being chosen, I suppose, on account of the babbling propensities of the bird. Its eggs are nearly round, and of a bluish white colour, speckled with brown."—(P. 16).

Immediately after this note our traveller philosophizes on the tails of lizards, and I must confess that, duly considered, the readiness with which lizards part with their tails on the instant when that decorative appendage is handled or insulted, I feel very much inclined to agree with Mr. Bates as to their inutility; but surely we must allow Nature the privilege of decoration, and a lizard's tail elevated in the air is doubtless an object of attraction to its mate, if not to phlegmatic man.

Lizard's Tails.—"The tails of lizards seem to be almost useless appendages to the animals. I used often to amuse myself in the suburbs, whilst resting in the verandah of our house during the heat of mid-day, by watching the variegated green, brown and yellow ground lizards. They would come nimbly forward, and commence grubbing with their fore feet and snouts around the roots of herbage, searching for insect larvæ. On the slightest alarm they would scamper off, their tails cocked up in the air as they waddled awkwardly away, evidently an encumbrance to them in their flight."—(P. 17).

From lizards to their insect food is but a step: I therefore only follow Nature, as well as my original, in next quoting his most able account of the Saüba ants, a creature that strips the trees of their leaves to be used in the construction of its habitations, carrying out the propensity of the leafcutter bee to an excess that would be fearful were it not that vegetation is too abundant, too wonderfully reproductive in these regions to be arrested by such puny assailants.

Ants.—"A far more interesting species was the Saüba (*Œcodoma cephalotes*). This ant is seen everywhere about the suburbs, marching

to and fro in broad columns. From its habit of despoiling the most valuable cultivated trees of their foliage, it is a great scourge to the Brazilians. In some districts it is so abundant that agriculture is almost impossible, and everywhere complaints are heard of the terrible pest.

"The workers of this species are of three orders, and vary in size from two to seven lines. The true working class of a colony is formed by the small-sized order of workers, the worker-minors as they are called. The two other kinds, whose functions, as we shall see, are not yet properly understood, have enormously swollen and massive heads. In one the head is highly polished, in the other it is hairy and opaque. The worker-minors vary greatly in size, some being double the bulk of others. The entire body is of very solid consistence, and of a pale reddish brown colour. The thorax or middle segment is armed with three pairs of sharp spines; the head has also a pair of similar spines proceeding from the cheeks behind.

"In our first walks we were puzzled to account for large mounds of earth, of a different colour from the surrounding soil, which were thrown up in the plantations and woods. Some of them were very extensive, being forty yards in circumference, but not more than two feet in height. We soon ascertained that these were the work of the Saübas, being the outworks or domes which overlie and protect the entrances to their vast subterranean galleries. On close examination I found the earth of which they are composed to consist of very minute granules, agglomerated without cement, and forming many rows of little ridges and turrets. The difference in colour from the superficial soil of the vicinity is owing to their being formed of the undersoil, brought up from a considerable depth. It is very rarely that the ants are seen at work on these mounds; the entrances seem to be generally closed, only now and then, when some particular work is going on, are the galleries opened. The entrances are small and numerous; in the larger hillocks it would require a great amount of excavation to get at the main galleries, but I succeeded in removing portions of the dome in smaller hillocks, and then I found that the minor entrances converged, at the depth of about two feet, to one broad elaborately worked gallery or mine, which was four or five inches in diameter.

"This habit in the Saüba ant of clipping and carrying away immense quantities of leaves has long been recorded in books on Natural History. When employed on this work their processions look like a multitude of animated leaves on the march. In some places I found an accumulation of such leaves, all circular pieces, about the size of a sixpence, lying on the pathway, unattended by ants, and at some

distance from any colony. Such heaps are always found to be removed when the place is revisited the next day.

"In course of time I had plenty of opportunities of seeing them at work. They mount the tree in multitudes, the individuals being all worker-minors. Each one places itself on the surface of the leaf, and cuts with its sharp scissor-like jaws a nearly semicircular incision on the upper side; it then takes the edge between its jaws, and by a sharp jerk detaches the piece. Sometimes they let the leaf drop to the ground, where a little heap accumulates, until carried off by another relay of workers; but generally each marches off with the piece it has operated upon, and as all take the same road to their colony the path they follow becomes in a short time smooth and bare, looking like the impression of a cart wheel through the herbage.

"It is a most interesting sight to see the vast host of busy diminutive labourers occupied on this work. Unfortunately they choose cultivated trees for their purpose. This ant is quite peculiar to Tropical America, as is the entire genus to which it belongs. It sometimes despoils the young trees of species growing wild in its native forests; but it seems to prefer, when within reach, plants imported from other countries, such as the coffee and orange trees. It has not hitherto been shown satisfactorily to what use it applies the leaves. I discovered it only after much time spent in investigation. The leaves are used to thatch the domes which cover the entrances to their subterranean dwellings, thereby protecting from the deluging rains, the young broods in the nests beneath. The larger mounds already described are so extensive that few persons would attempt to remove them for the purpose of examining their interior; but smaller hillocks, covering other entrances to the same system of tunnels and chambers, may be found in sheltered places, and these are always thatched with leaves mingled with granules of earth. The heavily laden workers, each carrying its segment of leaf vertically, the lower edges secured in its mandibles, troop up and cast their burdens on the hillock; another relay of labourers places the leaves in position, covering them with a layer of earthy granules, which are brought one by one from the soil beneath.

"The underground abodes of this wonderful ant are known to be very extensive. The Rev. Hamlet Clark has related that the Saüba of Rio de Janeiro, a species closely allied to ours, has excavated a tunnel under the bed of the river Parahyba at a place where it is as broad as the Thames at London Bridge. At the Magoary rice-mills, near Parà, these ants once pierced the embankment of a large reservoir. The great body of water which it contained escaped before the damage

could be repaired. In the Botanic Gardens at Parà an enterprising French gardener tried all he could think of to extirpate the Saüba. With this object he made fires over some of the main entrances to their colonies, and blew the fumes of sulphur down the galleries by means of bellows. I saw the smoke issue from a great number of outlets, one of which was seventy yards distant from the place where the bellows were used. This shows how extensively the underground galleries are ramified.

"Besides injuring and destroying young trees by despoiling them of their foliage, the Saüba ant is troublesome to the inhabitants from its habit of plundering the stores of provisions in houses at night, for it is even more active by night than in the daytime. At first I was inclined to discredit the stories of their entering habitations and carrying off grain by grain the farinha or mandioca meal, the bread of the poorer classes of Brazil. At length, whilst residing at an Indian village on the Tapajos, I had ample proof of the fact. One night my servant woke me three or four hours before sunrise, by calling out that the rats were robbing the farinha baskets; the article at that time was scarce and dear. I got up and listened, and found the noise was very unlike that made by rats; so I took the light and went into the store room, which was close to my sleeping-place. I there found a broad column of Saüba ants, consisting of thousands of individuals, as busy as possible, passing to and fro between the door and my precious baskets. Most of those passing outwards were laden each with a grain of farinha, which was in some cases larger and many times heavier than the bodies of the carriers. Farinha consists of grains of similar size and appearance to the tapioca of our shops; both are products of the same root, tapioca being the pure starch and farinha the starch mixed with woody fibre, the latter ingredient giving it a yellowish colour. It was amusing to see some of the dwarfs, the smallest members of the family, staggering along completely hidden by their load. The baskets, which were on a high table, were completely covered with ants, many hundreds of whom were employed in snipping the dry leaves which served as lining. This produced the rustling sound which had at first disturbed us. My servant told me that they would carry off the whole contents of the two baskets (about two bushels) in the course of the night if they were not driven off; so we tried to exterminate them by killing them with our wooden clogs. It was impossible, however, to prevent fresh hosts coming in as fast as we killed their companions. They returned the next night, and I was then obliged to lay trains of gunpowder along their line, and blow

them up. This, repeated many times, at last seemed to intimidate them, for we were free from their visits during the remainder of my residence at the place. What they did with the hard dry grains of mandioca I never was able to ascertain, and cannot even conjecture. The meal contains no gluten, and would therefore be useless as cement. It contains only a small relative portion of starch, and, when mixed with water, it separates and falls away like so much earthy matter. It may serve as food for the subterranean workers, but the young or larvæ of ants are usually fed by juices secreted by the worker nurses.

"Ants, it is scarcely necessary to observe, consist, in each species, of three sets of individuals, or, as some express it, of three sexes,—namely, males, females and workers, the last mentioned being undeveloped females. The perfect sexes are winged on their first attaining the adult state; they alone propagate their kind, flying away previous to the act of reproduction from the nest in which they have been reared. This winged state of the perfect males and females, and the habit of flying abroad before pairing, are very important points in the economy of ants, for they are thus enabled to intercross with members of distant colonies which swarm at the same time, and thereby increase the vigour of the race, a proceeding essential to the prosperity of any species. In many ants, especially those of tropical climates, the workers, again, are of two classes, whose structure and functions are widely different. In some species they are wonderfully unlike each other, and constitute two well-defined forms of workers. In others there is a gradation of individuals between the two extremes. The curious differences in structure and habits between these two classes form an interesting but very difficult study. It is one of the great peculiarities of the Saüba ant to possess *three* classes of workers. My investigations regarding them were far from complete; I will relate, however, what I have observed on the subject.

"When engaged in leaf-cutting, plundering farinha and other operations, two classes of workers are always seen. They are not, it is true, very sharply defined in structure, for individuals of intermediate grades occur. All the work, however, is done by the individuals which have small heads, while those which have enormously large heads (the worker-majors), are observed to be simply walking about. I could never satisfy myself as to the functions of these worker-majors. They are not the soldiers or defenders of the working portion of the community, like the armed class in the Termites or white ants, for they never fight. The species has no sting, and does not display active resistance when interfered with. I once imagined they exercised a

sort of superintendence over the others, but this function is entirely unnecessary in a community where all work with a precision and regularity resembling the subordinate parts of a piece of machinery. I came to the conclusion at last that they have no very precisely defined function. They cannot, however, be entirely useless to the community, for the sustenance of an idle class of such bulky individuals would be too heavy a charge for the species to sustain. I think they serve, in some sort, as passive instruments of protection to the real workers. Their enormously large, hard and indestructible heads may be of use in protecting them against the attacks of insectivorous animals. They would be, on this view, a kind of "*pièces de resistance*," serving as a foil against onslaughts made on the main body of workers.

"The third order of workers is the most curious of all. If the top of a small fresh hillock, one in which the thatching process is going on, be taken off, a broad cylindrical shaft is disclosed, at a depth of about two feet from the surface. If this be probed with a stick, which may be done to the extent of three or four feet without touching bottom, a small number of colossal fellows will slowly begin to make their way up the smooth sides of the mine. Their heads are of the same size as the before-mentioned class, but the front is clothed with hairs instead of being polished, and they have in the middle of the forehead a twin ocellus, or simple eye, of quite different structure from the ordinary compound eyes on the sides of the head. This frontal eye is totally wanting in the other workers, and is not known in any other kind of ant.

"The apparition of these strange creatures from the cavernous depths of the mine reminded me, when I first observed them, of the Cyclopes of Homeric fable. They were not very pugnacious, as I feared they would be, and I had no difficulty in securing a few with my fingers. I never saw them under any other circumstances than those here related, and what their special functions may be I cannot divine.

"The whole arrangement of a Formicarium or ant-colony, and all the varied activity of ant life, are directed to one main purpose,—the perpetuation and dissemination of the species. Most of the labour which we see performed by the workers has for its end the sustenance and welfare of the young brood which are helpless grubs. The true females are incapable of attending to the wants of their offspring; and it is on the poor sterile workers who are denied all the other pleasures of maternity that the entire care devolves. What a wonderfully organised community is that of the ant! The workers are also the chief

agents in carrying out the different migrations of the colonies, which are of vast importance to the dispersal and consequent prosperity of the species. The successful *début* of the winged males and females depends likewise on the workers. It is amusing to see the activity and excitement which reign in an ant's nest when the exodus of the winged individuals is taking place. The workers clear the roads of exit, and show the most lively interest in their departure, although it is highly improbable that any of them will return to the same colony. The swarming or exodus of the winged males and females of the Saüba ant takes place in January and February, that is at the commencement of the rainy season. They come out in the evening in vast numbers, causing quite a commotion in the streets and lanes. They are of very large size, the female measuring no less than two and a quarter inches in expanse of wing; the male is not much more than half this size. They are so eagerly preyed upon by insectivorous animals that on the morning after their flight not an individual is to be seen, a few impregnated females alone escaping the slaughter to found new colonies."—(P. 23).

Connected with the Saüba ant is a curious animal that resides in its formicarium: this is the Amphisbæna, an apod lizard blunt at both ends, and supposed to travel with equal facility backwards or forwards, a singular property, and one which has earned for it the enviable celebrity of having two heads, one at each extremity. Its skin is divided into small square departments or processes arranged in rings round the body, much as in our English slow worm. Mr. Bates calls these divisions scales, thus following the ordinary nomenclature, but scales they certainly are not, since it is impossible to remove them, and since also the cuticle which covers them is deciduous and shed at the annual ecdysis. The eye is so small as to be scarcely perceptible. These singular reptiles live entirely by day in the subterranean cavities excavated by the Saüba ant. The natives call it the mother of the Saübas, and believe it to be poisonous, although it is perfectly harmless like the rest of its tribe. The ants treat it with great affection, and the natives assert that if the Amphisbæna be removed from the nest the ants will immediately desert it, an assertion that must be received *cum grano salis*. The remains of Saüba ants were found in the stomach of an Amphisbæna opened by Mr. Bates, so that the mother of ants seems to be possessed of the same unnatural propensity as Saturn, and devours her own children.

The notices of monkeys by our traveller are not numerous, neither has he any of those monkey legends to relate which remind one of the

illustrious Munchausen. Every thing Mr. Bates has to say possesses the sober and dignified appearance of simple unvarnished truth, and leaves one no opportunity for cavil or cross examination. The only passage I have selected for extract relates to the little kitten-like marmosets, although there are interesting passages about other monkeys, especially the crimson-faced short-tail, with long pendant hair. Its portrait wonderfully resembles a Skye terrier that has submitted to an extraordinary amount of brushing and combing. But now for the marmosets.

Marmoset Monkeys.—"The Midas ursulus is never seen in large flocks; three or four is the greatest number observed together. It seems to be less afraid of the neighbourhood of man than any other monkey. I sometimes saw it in the woods which border the suburban streets, and once I espied two individuals in a thicket behind the English consul's house at Nazareth. Its mode of progression along the main boughs of lofty trees is like that of squirrels; it does not ascend to the slender branches, or take those wonderful flying leaps which the Cebidæ do, whose prehensile tails and flexible hands fit them for such headlong travelling. It confines itself to the larger boughs and trunks of trees, the long nails being of great assistance to the creature, enabling it to cling securely to the bark; and it is often seen passing rapidly round the perpendicular cylindrical trunks. It is a quick, timid, restless little creature, and has a great share of curiosity, for when a person passes by under the trees along which a flock is running they always stop for a few moments to have a stare at the intruder. In Parà Midas ursulus is often seen in a tame state in the houses of the inhabitants. When full-grown it is about nine inches long, independently of the tail, which measures fifteen inches. The fur is thick, and black in colour, with the exception of a reddish brown streak down the middle of the back. When first taken, or when kept tied up, it is very timid and irritable. It will not allow itself to be approached, but keeps retreating backwards when any one attempts to coax it. It is always in a querulous humour, uttering a twittering complaining noise, its dark watchful eyes, expressive of distrust, observant of every movement which takes place near it. When treated kindly, however, as it generally is in the houses of the natives, it becomes very tame and familiar. I once saw one as playful as a kitten, running about the house after the negro children, who fondled it to their heart's content. It acted somewhat differently towards strangers, and seemed not to like them to sit in the hammock which was slung up in the room, leaping up, trying to bite, and otherwise

annoying them. It is generally fed on sweet fruits, such as the banana, but it is also fond of insects, especially soft-bodied spiders and grasshoppers, which it will snap up with eagerness when within reach. The expression of countenance in these small monkeys is intelligent and pleasing. This is partly owing to the open facial angle, which is given as one of 60°; but the quick movements of the head, and the way they have of inclining to one side when their curiosity is excited, contribute very much to give them a knowing expression. Anatomists who have dissected species of Midas tell us that the brain is of a very low type, as far as the absence of convolutions goes, the surface being as smooth as that of a squirrel's. I should conclude at once that this character is an unsafe guide in judging on the mental qualities of these animals; in mobility of expression of countenance, intelligence and general manners, these small monkeys resemble the higher apes far more than they do any rodent animal with which I am acquainted." —(P. 96).

The cigana (*Opisthocomus cristatus*) is a bird that has proved very puzzling to ornithologists, from certain peculiarities of structure which they have failed to understand correctly. Those who have really studied the Fauna of the Amazonian districts have detected characters pervading entire tribes which distinguish them readily from corresponding tribes familiar in the Old World. Thus it is with monkeys: the instructed eye cannot fail to distinguish between the Simiadæ of the Old World and the Cebidæ. And thus with the gallinaceous birds: we have learnt to discriminate them with equal facility. Opisthocomus is one of the arboreal poultry of the New World, and has no characters, so far as I know, that raise any doubt of its taking rank amongst them. Nevertheless with the poultry of the Old World it has little in common. But let us hear Mr. Bates on the subject.

Cigana Fowl.—"A much commoner species was the cigana or gipsy (*Opisthocomus cristatus*), a bird belonging to the same order (Gallinacea) as our domestic fowl. It is about the size of a pheasant; the plumage is dark brown, varied with reddish, and the head is adorned with a crest of long feathers. It is a remarkable bird in many respects. The hind toe is not placed high above the level of the other toes, as it is in the fowl order generally, but lies on the same plane with them; the shape of the foot becomes thus suited to the purely arboreal habits of the bird, enabling it to grasp firmly the branches of trees. This is a distinguishing character of all the birds in Equinoctial America which represent the fowl and pheasant tribes of the Old World, and affords another proof of the adaptation of the Fauna to a

forest region. The cigana lives in considerable flocks on the lower trees and bushes bordering the lagoons, and feeds on various wild fruits, especially the sour goyava (*Psidium* sp.). The natives say it devours the fruit of arborescent arums (*Caladium arborescens*), which grow in crowded masses around the swampy banks of lagoons. Its voice is a harsh grating hiss; it makes the noise when alarmed, all the individuals sibilating as they fly heavily away from tree to tree, when disturbed by passing canoes. It is polygamous, like other members of the same order. It is never, however, by any chance seen on the ground, and is nowhere domesticated. The flesh has an unpleasant odour of musk, combined with wet hides—a smell called by the Brazilians *catinga*; it is, therefore, uneatable. If it be as unpalatable to carnivorous animals as it is to man, the immunity from persecution which it would thereby enjoy would account for its existing in such great numbers throughout the country."—(P. 119).

It is a treat to receive any information about that little-known beast the ant-eater. Mr. Bates made acquaintance with four species, of which one only is terrestrial, the others arboreal.

Ant-eater.—"The habits of the Myrmecophaga jubata are now pretty well known. It is not uncommon in the drier forests of the Amazons valley, but it is not found, I believe, in the Ygapó or flooded lands. The Brazilians call the species the Tamanduá bandeira, or the banner ant-eater, the term 'banner' being applied in allusion to the curious coloration of the animal, each side of the body having a broad oblique stripe, half gray and half black, which gives it some resemblance to a heraldic banner. It has an excessively long slender muzzle, and a worm-like extensile tongue. Its jaws are destitute of teeth. The claws are much elongated, and its gait is very awkward. It lives on the ground, and feeds on Termites or white ants, the long claws being employed to pull in pieces the solid hillocks made by the insects, and the flexible tongue to lick them up from the crevices. All the other species of this singular genus are arboreal. I met with four species altogether. One was the Myrmecophaga tetradactyla; the two others, more curious and less known, were very small kinds, called Tamanduá-i. Both are similar in size—ten inches in length, exclusive of the tail—and in the number of the claws, having two of unequal length to the anterior feet, and four to the hind feet. One species is clothed with grayish yellow silky hair: this is of rare occurrence. The other has a fur of a dingy brown colour, without silky lustre. One was brought to me alive at Caripí, having been caught by an Indian clinging motionless inside a hollow tree. I kept it in the house about twenty-four hours. It had a

moderately long snout curved downwards, and extremely small eyes. It remained nearly all the time without motion, except when irritated, in which case it reared itself on its hind legs from the back of a chair to which it clung, and clawed out with its fore paws like a cat. Its manner of clinging with its claws, and the sluggishness of its motions, gave it a great resemblance to a sloth. It uttered no sound, and remained all night on the spot where I had placed it in the morning. The next day I put it on a tree in the open air, and at night it escaped. These small Tamanduás are nocturnal in their habits, and feed on those species of Termites which construct earthy nests, that look like ugly excrescences on the trunks and branches of trees. The different kinds of ant-eaters are thus adapted to various modes of life, terrestrial and arboreal. Those which live on trees are again either diurnal or nocturnal, for Myrmecophaga tetradactyla is seen moving along the main branches in the day-time."—(P. 178).

But I must hurry on to the humming birds, and then as rapidly as possible close my remarks and extracts, which I feel it extremely difficult to compress into a single number of the 'Zoologist.' In a book like that before me there is such a redundance of quotable passages that I feel overpowered by the very excess. In returning to the delightful subject of humming birds I must not omit to express my obligation to Mr. Wallace for his valuable paper in the April number (Zool. 8486) on the "Humming Bird's Relations." At the same time it would be uncandid in me to abandon the position I had taken up with respect to the near relationship between the hummers and the sun-birds, a relationship supported, as it appears to me, by the only unpublished character Mr. Wallace has adduced, the tubular structure of the tongue of the sun-birds. The growth of the beak in birds, alluded to by Mr. Wallace in the case of the hummers, is a subject very familiar to me: I may mention the curlew as a striking but not singular instance, though it proves literally nothing.

Humming Birds.—"In January the orange trees became covered with blossom,—at least to a greater extent than usual, for they flower more or less in this country all the year round,—and the flowers attracted a great number of humming birds. Every day, in the cooler hours of the morning, and in the evening from four o'clock till six, they were to be seen whirring about the trees by scores. Their motions are unlike those of all other birds. They dart to and fro so swiftly that the eye can scarcely follow them, and when they stop before a flower it is only for a few moments. They poise themselves in an unsteady manner, their wings moving with inconceivable rapidity,

probe the flower, and then shoot off to another part of the tree. They do not proceed in that methodical manner in which bees follow, taking the flowers *seriatim*, but skip about from one part of the tree to the other in the most capricious way. Sometimes two males close with each other and fight, mounting upwards in the struggle as insects are often seen to do when similarly engaged, and then separating hastily and darting back to their work. Now and then they stop to rest, perching on leafless twigs, when they may be sometimes seen probing, from the place where they sit, the flowers within their reach. The brilliant colours with which they are adorned cannot be seen whilst they are fluttering about, nor can the different species be distinguished, unless they have a deal of white hue in their plumage, such as Heliothrix auritus, which is wholly white underneath, although of a glittering green colour above, and the white-tailed Florisuga mellivora. There is not a great variety of humming birds in the Amazons region, the number of species being far smaller in these uniform forest plains than in the diversified valleys of the Andes, under the same parallels of latitude. The family is divisible into two groups contrasted in form and habits; one containing species which live entirely in the shade of the forests, and the other comprising those which prefer open sunny places. The forest species (Phaethorninæ) are seldom seen at flowers, flowers being, in the shady places where they abide, of rare occurrence; but they search for insects on leaves, threading the bushes and passing above and beneath each leaf with wonderful rapidity. The other group (Trochilinæ) are not quite confined to cleared places, as they come into the forest wherever a tree is in blossom, and descend into sunny openings where flowers are to be found. But it is only where the woods are less dense than usual that this is the case: in the lofty forest and twilight shades of the lowlands and islands they are scarcely ever seen. I searched well at Caripí, expecting to find the Lophornis Gouldii, which I was told had been obtained in the locality. This is one of the most beautiful of all humming birds, having round its neck a frill of long white feathers tipped with golden green. I was not, however, fortunate enough to meet with it. Several times I shot by mistake a humming-bird hawk-moth instead of a bird. This moth (*Macroglossa Titan*) is somewhat smaller than humming birds generally are, but its manner of flight and the way it poises itself before a flower whilst probing it with its proboscis are precisely like the same actions of humming birds. It was only after many days experience that I learnt to distinguish one from the other when on the wing. This resemblance has attracted the notice of the natives,

all of whom, even educated whites, firmly believe that one is transmutable into the other. They have observed the metamorphosis of caterpillars into butterflies, and think it not at all more wonderful that a moth should change into a humming bird. The resemblance between this hawk-moth and a humming bird is certainly very curious, and strikes one even when both are examined in the hand. Holding them sideways, the shape of the head and position of the eyes in the moth are seen to be nearly the same as in the bird, the extended proboscis representing the long beak. At the tip of the moth's body there is a brush of long hair scales resembling feathers, which, being expanded, looks very much like a bird's tail. But of course all these points of resemblance are merely superficial. The negroes and the Indians tried to convince me that the two were of the same species. "Look at their feathers," they said, "their eyes are the same, and so are their tails." This belief is so deeply rooted that it is useless to reason with them on the subject. The Macroglossa moths are found in most countries, and have everywhere the same habits; one well-known species is found in England. Mr. Gould relates that he once had a stormy altercation with an English gentleman, who affirmed that humming birds were found in England, for he had seen one flying in Devonshire, meaning thereby the moth Macroglossa stellatarum. The analogy between the two creatures has been brought about probably by the similarity of their habits, there being no indication of the one having been adapted in outward appearance with reference to the other. It has been observed that humming birds are unlike other birds in their mental qualities, resembling in this respect insects rather than warm-blooded vertebrate animals. The want of expression in their eyes, the small degree of versatility in their actions, the quickness and precision of their movements, are all so many points of resemblance between them and insects. In walking along the alleys of the forest a Phaethornis frequently crosses one's path, often stopping suddenly and remaining poised in mid-air, a few feet distant from the face of the intruder. The Phaethorninæ are certainly more numerous in individuals in the Amazons region than the Trochilinæ. They build their nests, which are made of fine vegetable fibres and lichens, densely woven together, and thickly lined with silk cotton from the fruit of the Samaüma tree (*Eriodendron samaüma*), on the inner sides of the tips of palm fronds. They are long and purse-shaped. The young when first hatched have very much shorter bills than their parents. The only species of Trochilinæ which I found at Caripí were the little brassy green Polytmus viridissimus, the sapphire and

emerald (*Thalurania furcata*) and the large falcate-winged Campylopterus obscurus."—(P. 179).

At page 40 of the second volume is a very graphic account of the mode in which a Brazilian wasp of the genus Pelopæus builds its nest; there is nothing perhaps very novel in the narrative, but it is certainly very interesting. The nest was made of clay, and the little creature flew straight to the pit with a loud hum, settled at once, and, losing not a moment in any unnecessary survey, proceeded at once to knead the clay into little round pellets, one of which it carried off at each journey to its pouch-like nest. This was two inches in length, and generally attached longitudinally to a twig. One of these little masons began to build on the handle of a chest in our traveller's canoe when stationary in the river. Every pellet was brought to the new edifice with a song of triumph, which subsided into a cheerful hum as soon as the creature alighted and began to work. The little ball of moist clay was laid on the edge of the cell,—the nest contains but one,—and then spread out around the circular rim by means of the lower lip guided by the mandibles. The insect placed itself astride over the rim to work, and on finishing each addition to the building walked round it and patted the sides with its feet before flying away for another pellet. These nests generally occupy one week in building, but in this instance the canoe moved away before the architect had finished, and the wasp declined to follow. These nests are stocked with small spiders of the genus Gastracantha, in that semi-animate state we so often observe in the nests of our British fossorial Hymenoptera.

A species of Melipona, a genus of bees which seems to represent the hive-bee of Europe, has the same habit of collecting clay. The rapidity and precision of their movements while thus engaged is truly wonderful. They first scrape the clay with their mandibles; the small particles thus obtained are then cleared from the mandibles by the anterior paws and passed to the middle pair of feet, which in their turn transfer the clay to the dilated posterior tibiæ, just where our honey-bee stores its collected pollen; the middle feet pat the growing pellets on the hind legs, thus keeping them in shape. As soon as a bee is well loaded off she flies to the nest where the clay is used, not in the construction of cells, but to wall up the exterior of the nest or the rent in the bark of a tree in which the nest is constructed, a small hole only being left, just sufficient for the entry and exit of the bees.

The sloth is another most tempting subject, and one perhaps rather perilous to introduce; but I feel it would be a bit of inexcusable cowardice to suppress the information Mr. Bates has given us. We

all know that the very name of this strange creature was given to express its character; we all know that the belief obtained for very many years that the name was a description and conveyed a truthful idea; and it is also known that the sloth in the Zoological Society's Gardens well merits the character for slothfulness assigned to its kindred. But there is another side to the question, or, as it is rather coarsely expressed, another end of the stick, and one of our most illustrious travellers has seized the other end of the stick, and has given his testimony as an eyewitness that the sloth belies his name, and runs along the under side of a bough, back downwards, with considerable speed and a reasonable amount of activity. Now Mr. Waterton certainly saw the sloth in a state of Nature, and Buffon and Cuvier certainly did not, and so Natural-History readers in general were inclined to side with Mr. Waterton, and to believe that the sloth had first obtained and long retained his place in our system in virtue of a false character. At this point of the controversy another eyewitness enters the box and gives his evidence as follows:—

"The inhabitants of the Amazons region, both Indians and descendants of the Portuguese, hold to the common opinion, and consider the sloth the type of laziness. It is very common for one native to call another, in reproaching him for idleness, 'bicho do Embauba' (beast of the Cecropia tree), the leaves of the Cecropia being the food of the sloth."—(Vol. II. p. 56).

Now it is quite impossible that the Indians, and very improbable that the descendants of the Portuguese, should have adopted a fable from Europe concerning an animal with which they are so familiar as with the sloth. But what says Mr. Bates of his own observation. He watched the creature with truth-seeking eyes, not to establish a theory, but fully alive to the conflict of opinions.

"It is a strange sight to watch the uncouth creature, fit production of these silent shades, lazily moving from branch to branch. Every movement betrays not indolence exactly, but extreme caution. He never loses his hold of one branch without first securing himself to the next, and when he does not immediately find a bough to grasp with the rigid hooks into which his claws are so curiously transformed he raises his body, supported on his hind legs, and claws around in search of a fresh foot-hold."—(Vol. II. p. 57).

I leave this without comment. On one occasion our traveller saw a sloth swimming a river three hundred yards wide. No doubt can be entertained as to what the animal was, for the boatmen caught, killed, roasted, and ate him.

But now a word on toads. It may be supposed that wherever nocturnal insects abound there are toads to devour them on the ground, and goatsuckers in the air: both these tribes abound in the valley of the Amazons. As soon as night comes on swarms of goatsuckers make their appearance, and on every track through the forest toads are squatted waiting in stolid patience for the movement of their insect prey. "A great number of toads," says Mr. Bates, "are seen on the bare sandy pathways soon after sunset. One of them was quite a Colossus, seven inches in length and three in height. This big fellow would never move out of our way until we were close to him. If we jerked him out of the path with a stick he would slowly recover himself, and then turn round and have a good impudent stare. I have counted as many as thirty of these monsters within half a mile."—(Vol. II. p. 59).

I lay down these volumes with the utmost reluctance, and without any present intention of again returning to them; but I can truly say that it has never been my fortune to meet with such a mine of Natural-History wealth. A kindly spirit, an entire truthfulness, a power of exact observation, and a plain and unornamented yet easy and eloquent style, are the characteristics of every page; and I cannot resist the temptation this passing notice affords me of offering a tribute of thanks to Mr. Darwin, without whose strenuous recommendation we might possibly have lost for ever an invaluable contribution to the Natural History of the Great Father of Waters.

EDWARD NEWMAN.

Occurrence of the Bank Vole, or Campagnole (Arvicola pratensis), *in Derbyshire.*—On the 13th of February, when staying with my relative, Sir T. Harpur Crewe, at Calke Abbey, near Ashby-de-la-Zouch, I was fortunate enough, with the assistance of two cousins, to capture six fine specimens of this very distinct but little-known species. We found them all in a large heap of rotten straw, stalks of Angelica sylvestris, twitch, &c., which had been lying for nearly two years undisturbed in a wet plantation. I am not aware that this species has previously been noticed as occurring in Derbyshire; but this is probably owing to its not having been looked for.—*H. Harpur Crewe; The Rectory, Drayton-Beauchamp, Tring, April* 14, 1863.

On the Breeding of the Nutcracker.—About six months ago I expressed a hope of being able before long to give the Society some more certain information with respect to the breeding of the nutcracker (*Nucifraga caryocatactes*). In that hope I have not been altogether disappointed. The nest and young bird now exhibited, the latter

still showing traces of its original downy clothing, have been received by me, within the last few days, from my excellent friend Herr Pastor P. W. Theobald, of Copenhagen, to whom I think the Society will join with me in hearty congratulations on his success in obtaining these decisive facts in regard to the nidification of this mysterious bird, and whose zeal in the quest of zoological discovery fully deserves, in my opinion, all the praise that can be accorded to it. Believing, however, that the Pastor will himself publish fuller details of this interesting capture, I will only briefly recount the information with which he has supplied me. It appears that previously to the summer of 1860 a forester in the island of Bornholm had satisfied himself that the nutcracker was in the habit of breeding there annually. He had seen it every month in the year, from May to November inclusive; and this intelligence being communicated to Herr Theobald, that gentleman made an expedition to the island, but without finding the special object of his search—a nest of the bird. This present spring, however, the Pastor, accompanied by two of his friends, HH. Erichsen and Fischer, both keen oologists, visited Bornholm a second time; and one of their achievements I have now the pleasure of making known to you. Writing from that island, on the 30th of May last, Herr Theobald says:—"Returning to the result of our ornithological expedition, I can tell you that, after many days' inquiries, we succeeded in finding two nests of Nucifraga caryocatactes, the young birds flying near them. As we presumed, we came too late for getting the eggs; but I think we have advanced a good deal, and after this discovery we dare be almost sure of receiving them next year. Our gentle and clever host, the forester Rosen, who now knows the time and manner of nidification of this bird, may be considered a guarantee for our hopes. We have thought it might be of interest to you to possess an undoubtedly genuine nest of N. caryocatactes, and also a young bird in the first plumage; we therefore send you one nest and one skin. Both the nests are of the same size and construction. They were in fir trees (*Pinus rubra*), not very private, but rather easy to find. It is likely that the young birds had left the nest perhaps eight days. None of them moved, except with difficulty, among the branches; and one of them fell on the ground. The old birds cried, but only sometimes, with an anxious voice that was not unlike a magpie's, and then all was silent again. In the neighbourhood of the nest, where the birds had been previously observed, we found on the rocky ground a good number of freshly-cracked hazel-nuts; and as no nut trees grow there, the birds must fetch them from a distance of an English mile at least. We are inclined to think that they collect them in autumn, and secure them in a private spot; and perhaps it is on this account also that the bird, whose economy is very hidden, is seldom to be seen in the breeding time. As I have already mentioned, the nest is not of the most difficult class to find. It is not built on the top of the tree, but close to the stem, about twenty-five or thirty feet high. The bird is an early breeder, but can scarcely have eggs before the beginning of April. Now you have the nest wherein the young birds were lately hatched, and a young bird in its first plumage. Next year we hope to send you very well-authenticated eggs." I have only to conclude by mentioning that the nest, as will be seen on examination, is of large size, some five or six inches in thickness, with an outside diameter of about a foot, and a shallow depression of six inches across; but the cup was probably a good deal deeper before its brim was subjected to the weight of the young birds. It is composed outwardly of sticks and twigs, among which I recognize those of the larch, spruce and birch. These latter show the period at which it must have been built, as the buds, though enlarged, had not burst. It has a thick

lining of grass, which appears to have been plucked while growing. The very small bits of moss and lichen do not seem to have been intentionally added, but to have adhered to the other materials. The down with which the nestling has been covered, and of which traces may be observed on a few of the back-feathers, is of a dark brownish gray, as is usual among the Corvidæ. The first plumage much resembles that of the adult, being, however, duller in colour, and with the white tear-like spots less conspicuous; but the quill-feathers of the wings and tail are not so entirely destitute of metallic reflections as some authors lead one to imagine. Whether the nutcracker builds the whole structure for itself, or only furnishes the forsaken nest of some other animal, I do not know. This and other particulars we shall probably soon learn from Pastor Theobald himself; and I need scarcely say I look forward with the greatest interest to the clearing up of our doubts as to what its eggs are really like.—*Alfred Newton, in* '*Proceedings of Zoological Society*,' *June* 24, 1862. [*Communicated by the Author*].

On the supposed Gular Pouch of the Male Bustard. — Now, thinking it quite possible, from my knowledge of the various opinions I have here arrayed, that the belief in this mysterious organ might have been prematurely abandoned, I was very anxious to investigate the matter for myself. I thought it highly desirable that an examination of a really old cock bird should be made, and *that* at the season of the year when a structure of the sort might be supposed to be most fully developed. As our native race of bustards has been extinct since 1838, or thereabouts, it was not easy to obtain such a specimen as I wished. * At length, through the kindness of a correspondent, Mr. Henry Smurthwaite, on the 12th of March, 1858, I received a magnificent old male Otis tarda, which had been killed near Leipzig a few days before, and had been forwarded to me with all possible speed. It weighed 23¼ lbs., and arrived in beautiful condition. With the greatest anxiety I immediately looked under the tongue—no hole was visible; I took a probe—no opening appeared. Mistrusting my own powers of manipulation and dissection, I hurried off with it to London, and secured the assistance of Mr. A. D. Bartlett, than whom there can scarcely be a more practical or more careful observer. We again searched for the opening under the tongue, and we came, I confess reluctantly, to the undoubted conclusion that in this specimen it did not exist. Mr. Bartlett then began to skin the neck—not in front, lest we should cut into the pouch, but from the axilla along the side to the corner of the mouth, laying bare the skin on either side: nothing like a pouch could be seen. Subsequently we separated the windpipe and gullet, and cut them off from the head. Then with a blowpipe it was easy to inflate the body by the œsophagus: by the trachea we failed to do so, as the air escaped through a broken wing-bone; but by blowing down the former we could swell out the whole body and neck wonderfully. After that we cleared the skin away from the entire neck, and presently from the body. The neck was

* Most, if not all, of the stray examples which have of late years occurred in England appear to have been birds of the preceding summer, and, with two exceptions only, have been females. The very fine young male obtained near Hungerford, January 3, 1856, was preserved at Mr. Leadbeater's establishment ('Proceedings of Zoological Society,' 1856, p. 1). Mr. J. Wolley, who was then in London, at my request, questioned the man who skinned it, but no special search for a gular pouch was made. The breast-bone of this bird, with some of the membranes still adhering to the anterior part, is now lying before me.

entirely clothed with cellular tissues in a most remarkable manner; they were very delicate, and so close to the skin that even when we grazed the roots of the feathers we occasionally cut them. On the blowpipe being inserted into one of the apertures thus made, a small bubble was immediately raised, which increased on greater power being applied, so as to form a considerable bag, perhaps three inches long. This peculiarity we found in every part of the neck; but it was plain, after one or two trials, that none of these bags existed of themselves, but were the result of the membranes being forcibly ruptured by the pressure of the air. Once or twice, on inflating the tissues, a sort of hour-glass form, such as is mentioned by Naumann, was apparent, but generally the bags were wider at the top than at the bottom. The examination took us between three and four hours, but at last the membranes became so dry that we had some difficulty in inflating a small cluster of bubbles to preserve as a specimen, which Mr. Bartlett still keeps. I can most honestly assert that if I had any prepossession beyond the wish of arriving at the truth, it was in favour of the existence of the pouch; and I am sure Mr. Bartlett took all possible pains to find it. I had told him of much that had been written and of much that I had heard on the subject; among other things a communication I have not before mentioned here, made to me by my friend Mr. John Scales, to the effect that many years ago, when residing in Norfolk, he obtained a very large male bustard, now one of the glories of the Museum at Norwich, from which he "dissected out the pouch." Mr. Bartlett, as my readers are no doubt aware, now holds the situation of Superintendent at the Gardens of the Zoological Society, and, knowing that he has since had other opportunities of observation, I lately applied to him to furnish me with the results. His answer, containing, as I think, a most valuable suggestion, is as follows:—"The interest I have felt with reference to the existence or otherwise of the pouch in the throat of the great bustard has naturally led me to examine with great care all the birds of that species that have come within my reach. Notwithstanding my want of success, and, I must add, my disappointment, I am of opinion that it would be unwise and unfair to deny that something differing from what I have found does occasionally exist. The fine large adult male obtained by you in March, 1858, and in which we failed to find any opening under the tongue, or any natural pouch, on examination exhibited a structure capable of being easily converted into an appearance of that which is so carefully described by older authors. Since that opportunity I have dissected two other males; one on February 14, 1861. Dr. Albert Günther, Dr. Sclater and Mr. E. W. H. Holdsworth were present on this occasion. The bird was a large male, not an old one, but probably in the second year, the whiskers being somewhat developed. The most careful examination, made by myself and the above-named gentlemen, failed to discover any opening under the tongue. Being perfectly satisfied on this point, an incision was made in the skin, beginning at the corner of the mouth; and, as in the specimen which you and I formerly examined, we found the same abundance of delicate membranes spread over the fore part of the neck and throat. By inserting the end of a blowpipe any number of cells could be inflated, the walls of which, on the application of a little force, would give way, and thus form one or more large cavities or bags. During the examination a discussion took place with reference to the means whereby these membranes were distended in life,—whether by muscular dilatation or by inflation; and I must admit that this part of the subject has since appeared to me to require more consideration than I at first thought it deserved. On February 21st, 1861, another fine male great bustard, of about the same age as the

last, was examined by me, and with precisely the same result as before. In conclusion, the only suggestion I can offer as a means of explaining the existence of a pouch in the fore part of the neck is that, in the males, some of the membranes surrounding the throat may occasionally be ruptured through the excessive distention that takes place during the violent paroxysms to which the birds are subject on the approach of the breeding-season. I have seen them with throats enlarged to an extraordinary extent, the pinions lowered to the ground, while the points of the primaries are crossed over their backs. In this distorted attitude they rush on and attack each other, affording one reason to imagine that these delicate membranes may at such a time give way, and produce the abnormal condition so often alluded to as being found in old males. As a further probability of this being the true explanation, I would call attention to the great diversity in size and shape of the so-called pouch, as given by different observers. The fluid contained therein would be also fully accounted for, if my hypothesis be correct." Dr. Günther besides has furnished me with his observations on the dissection of one of these specimens, at which he, as Mr. Bartlett states, was present. Dr. Günther says:—"It was an adult male, as we saw by the plumage and by the testicles. There was no trace of a foramen below the tongue, or of any peculiar sac communicating with the cavity of the mouth. The œsophagus dilated into a large crop. The cellular tissue between the œsophagus and the trachea, and in the region above the furcula, did not show any development greatly differing from what we find in other birds." Dr. Günther, I believe, does not entirely assent to the probability of Mr. Bartlett's ingenious suggestion being the true explanation of the case, but says that "It is possible that an accessory organ, peculiar to the male sex, like this sac, may be found in some males, probably in the larger portion, and in others not. From this single example which I have seen, I should for the present draw the conclusion only that the sac is not constant in all specimens." It has long been known in this country that at the death of John Hunter, in 1793, his manuscripts passed into the hands of Sir Everard Home, by whom they were burnt, after he had adopted from them many ideas, which he announced as his own, but fortunately not before copies of a considerable number of the papers had been made by Mr. Clift. At the death of this gentleman these copies came into the possession of Professor Owen, who in the course of last year published them. In this work ('Essays and Observations on Natural History,' ii. pp. 300, 301) occurs the following passage:—"The cock bustard has a very thick neck, and long hairy feathers under his throat. On the fore part of his neck, reaching lower down than the middle, is a large bag, as large as the thick part of one's arm: it terminates in a blind pouch below, but has an opening into it at the upper end from the mouth. This aperture will admit three or four fingers; it is under the tongue, and the frænum linguæ seems to enter it; and it seems to have a sphincter. What the use of this is I don't know. In a young cock bustard, about a year and a half old, this pouch did not exist; therefore it becomes a question whether or not this is a matter of age."—*Alfred Newton, in the 'Ibis,' April*, 1862. [*Communicated by the Author.*]

Reported Discovery of the Moa.—Explorers in New Zealand report that they have found traces of the gigantic bird called by the natives the "moa," which induce them to think it is not extinct. The bones found in the earlier days of the colony, though not very recent, were not fossil. Some, indeed, which I have seen had cartilage about them which Papin's digester would have been capable of converting into soup. The bones found by the last explorers were much more recent, and were on the sur-

face; and it is said that they found foot-marks which they believe to have been made by some large bird very recently. I see no reason to believe that the moa does not exist, and I think the probability is that it does. The Middle Island was never very thickly peopled, and it is nearly thirty years since it was almost depopulated by Te Ranperaha's tribe. The natives were confined to the eastern side of the island, and never penetrated to the mountains on the east coast. Their superstitions militated against it. They believed that a race of wild men inhabited the mountains, which were also infested by the dreaded taniwa, a great lizard which ate men. They also had a tradition that the moa still lived in the ranges. Since the Europeans have inhabited New Zealand no lizards have been seen larger than about eighteen inches, and certainly no wild men have been met with by the explorers; so that the superstition of the natives only proves their ignorance. The bones discovered during the last twenty years prove that the moa lived at no very distant day. Why should he be extinct? We know of no enemy likely to exterminate him; and if the untrodden wastes of the Middle Island furnished him with food at a period not distant enough to fossilize his bones, we know of no change which has altered the condition of the islands on that score up to the present day. There are birds which could not so easily preserve their existence, and which have not as yet become extinct. The kiwi-kiwi (apteryx) for instance, and the kaka-po (night parrot), which is also wingless. Both these birds are small, and have numerous enemies, especially native dogs, which would be powerless against the moa. It is, therefore, by no means impossible—I even think it probable—that Professor Owen may yet be gratified by a recent specimen of this gigantic bird.—*Correspondent of 'Times' Newspaper.*

Reported Discovery of the Moa.—In your impression of this morning I see, in your Australian intelligence, that a party of explorers, travelling to the west coast of New Zealand, have found traces of the above-named bird, which lead them to believe that the bird is not, as is commonly supposed, extinct. Your correspondent also adds that he is not aware of any enemy capable of having exterminated it. Now, in New Zealand, especially in that dense bush which covers the greater part of the west coast of the Middle Island, bush fires (supposed to be occasioned by the friction of the boughs of trees, which grow very close to each other) are constantly occurring, and the commonly received opinion in New Zealand is that by these fires the moa has been burnt out. In fact, to a certain extent the old Maori legends bear this out. They say that before the depopulation of the Middle Island by Te Ranperaha and Co., the whole of the vast extent of country known as the Canterbury Plains was bush, and that they burnt it all on account of the misbehaviour of the moa, who, they say, used to carry away their children and devour them. Be this as it may, certain it is that pieces of timber have been found a very small distance from the surface on the Plains, which bore unmistakeable evidence of having flourished at no very distant date. I may add that all the remains of moas which I have seen in New Zealand bore traces of having been subjected to the action of fire.—*Hulton J. Webber; Tunbridge Wells, April* 13.—'*Times' Newspaper.*

Reported Discovery of the Moa. — As anything connected with the rumoured discovery of this long-supposed extinct bird is interesting, we make no apology for reproducing from another source our previous account of its alleged appearance. The gentleman to whom we are indebted for our former narration had it from the lips of one of the discoverers. We have now an account from another gentleman, who also received it from one of the men; and it is noticeable, as indicative of their truth, how

entirely the two statements tally. Mr. Rees, of the Wakatipu, our present informant, has taken one of the men in his employment, and has frequently conversed with him on the subject. He has tested his veracity in every way he could conceive, and is thoroughly convinced that the man is stating only the truth. His narration is as follows:—He and his mate started for the Arrow Township in search of a new gold discovery, which was rumoured as being worked "on the quiet." One evening, they encamped about twenty-five miles north-west of the Arrow. It was just sundown, and they were sitting by their camp fire, when one of them exclaimed, "Look at that rise above us, Jim; there's some one there." They looked, and beheld an enormous bird approaching to the edge of a hill immediately above them, at a distance of between 300 and 400 yards from where they were sitting. The bird seemed to perceive the camp fire, and squatted down, keeping its head turned on one side, fixed on the fire. It continued so for several minutes, and at last got up and walked off. Although it stepped slowly it was soon out of sight, the length of its stride being so great. Its height appeared about seven feet, without reckoning the head and neck. Its head was very long and flat, and it carried its head bent forward, instead of carried back as is usual with birds of the ostrich species. The next morning the men, having provided themselves with tent poles, proceeded to the spot, where they at once saw the track of the bird and followed it a long distance, but without success. The track-mark showed three claws, a distance of twelve inches intervening between the points of each. Back about a foot was the mark of a pad, and behind that, again, that of a spur. As we have said, the man from whom Mr. Rees had these particulars is now in his employment. As soon as he has finished the work he is about, he is going in search of the bird, Mr. Rees having promised him £500 for it, dead or alive. Mr. Rees has entire faith in the truth of the account; the man has been many years in the province, and is not likely to have imagined or invented the story.—'*Otago Daily Times*,' *February* 16.

The Moa.—Reports coming from different quarters, together with the information received at different times from the natives, point to the existence of a large bird in the solitary parts of the interior of New Zealand, which is doubtless the long-coveted moa. The bird was never very numerous, and, according to native authority, very shy and retiring. The existence of this much-talked-of bird will not be long a question of doubt, for every corner of the locality where it is said to be still in existence will soon be ransacked by the gold-diggers of Otago and the district, who in their thirst for gold are making daily encroachments on its solitary domains. Such of your readers as have friends in New Zealand would confer a favour on us stay-at-home boys if they would request their friends to keep them furnished with any new facts that come to light, which they may easily do, as the question of the existence of the moa is causing considerable stir in the colony, and any facts, however trivial, are eagerly seized upon by the papers.—*John Ranson, York.*

[Mr. Ranson cites two of the Reports I have here reprinted. I would also direct the reader's attention to passages already published in the 'Zoologist.' See especially Zool. 7847. I am quite inclined to adopt the theory that the moa still exists. —*Edward Newman.*]

Descriptions of Twenty-four New Species of Spiders lately discovered in Dorsetshire and Hampshire; together with a List of rare, and some other hitherto unrecorded, British Species. By the Rev. O. Pickard-Cambridge, M.A.

Family Salticidæ.

Salticus citus.

Female, immature. Length 1-fourth of an inch. Length of cephalothorax 5-thirty-seconds. Relative length of legs, 4, 1, 3, 2.

Cephalothorax large, square and massive, sloping abruptly at the hinder part, and slightly compressed behind each posterior eye, glossy and sparingly clothed with hairs. Colour black-brown, paler and with a reddish tinge on the upper side, especially in the ocular region, which is circled with a band of yellowish hairs, commencing on either side below the outer eyes of the front row.

Eyes eight, forming three sides of a square; the front side curved. The two centre eyes of the front row more than double the size of the end ones of the same row. The centre eyes of the side rows are very small, and rather nearer to the hinder than to the front eyes of these rows.

Abdomen small, of a slender oviform shape, and of a deep black colour. The upper side has a transverse band at the front extremity, formed of pure glistening white hairs; this band is of a somewhat semicircular or rather crescent shape. Towards the spinners are four intensely white spots, two on each side of the medial line, those nearest the spinners being the smallest and nearest together. Along the centre of the hinder half of the abdomen are two reddish dentated lines formed by red hairs, and making a pattern of an oblong form with dentated sides. Under side paler than the upper, and has four pale white longitudinal lines converging towards the spinners. Plates of the spiracles pale white.

Palpi of moderate length. Colour black. The radial, cubital and humeral joints have their upper sides fringed with intensely white longish hairs.

Legs longish and stout (the first pair much the stoutest, fourth pair longest, first pair next in length, and second pair shortest), clothed with hairs and black spines. Colour blackish, with a

greenish tinge; the tarsal and metatarsal joints being pale murky yellowish.

Falces short, stout, and inclined towards the maxillæ. Their colour is a rich dark brown.

Maxillæ and labium of a pale murky brown, palest at the extremities.

I have described this distinctly marked and very active species from an immature female, kindly given me alive by Mr. Samuel Stevens, who captured it in August, 1862, among orchideous plants in the conservatory of Mr. G. Read, at Burnham, near Bridgewater, Somerset. Mr. Stevens says it was of frequent occurrence there, and was cherished by Mr. Read on account of its services in destroying insects injurious to his plants. He conjectured that it might have been imported from South America among some of his plants. This may have been so; still, as it appears to be of an undescribed species, and has nothing particularly foreign about its appearance, I have described it as a British spider, leaving it to future observations to determine whether it is an imported species or not.

Salticus cocco-ciliatus.

Male, adult. Length 1-tenth of an inch. Length of cephalothorax 1-eighteenth. Relative length of legs, 4, 3, 1, 2.

Cephalothorax oblong and massive, sloping abruptly behind. Colour dull yellow-brown, with a reddish hue, obscurely mottled with fine blackish spots. The margins are clouded with blackish. The square bounded by the eyes jet-black, and continued in a tapering form to the hinder margin; it is thinly clothed with red and blackish hairs. The four eyes of the front row are surrounded with a sort of iris, or cilia of bright scarlet sessile hairs; this iris is broadest on the lower margins of the eyes, and gives the spider a very remarkable appearance.

Eyes eight, forming three sides of a square; the front side slightly curved; the sides straight. The two central eyes of the front row are very much larger than that on either side, and the space between them is rather wider than that between each and the outer eye on its side. The intermediate eyes of the side rows are much the smallest, and they are equidistant from the other two eyes of the row, and in the same straight line.

Legs moderately long, very stout and strong; clothed, but not very thickly, with black and yellowish hairs, and black spines. The

two foremost pairs are jet-black, except the tarsi, which are greenish yellow. The two hind pairs are also jet-black, but have the tibial, tarsal and metatarsal joints annulated with reddish yellow. In some specimens all the legs have the two joints nearest the sternum of a greenish yellow, with blackish blotches.

Maxillæ strong, broad at the extremity, where they are rounded on the inner margins; slightly inclined to the labium. Their colour is the same as that of the cephalothorax, but paler at the top; that of the labium (which is short but broad at the base, and rather pointed at the top) is somewhat darker than that of the maxillæ.

Sternum of a blackish brown colour.

Palpi short, stout. Colour greenish yellow-brown, mottled with black. Radial joint shorter and smaller than the cubital, and, with the digital joint (which is large and shining black), has its upper side furnished with long shining white hairs: these form a very marked and striking contrast with the black cephalothorax and scarlet irides. Palpal organs prominent and highly developed, but not very complicated in structure; they have a strong black spine, curved in a circular form towards their extremity; this spine springs from their inner side, and is closely attached to their surface: their colour is brownish yellow, tinged with greenish.

Abdomen oviform, slightly shorter than the cephalothorax, over which it does not project much. Its colour is black-brown, thickly clothed with black hairs on the upper side, where it is marked with two strongly dentated longitudinal lines throughout its whole length; and from the outer angular points of these lines three or four curved ones run obliquely to the inner side: all these lines are formed by longish coppery red hairs thinly disposed, and are sometimes not easy to make out, especially as in capturing the spider they are liable to be displaced and rubbed off.

The female is rather larger than the male, and has the cephalothorax not so broad and massive as in that sex. Her palpi are yellow, fringed on the upper side with white hairs mixed with a few long black ones, and she wants the scarlet hairs round the anterior eyes. The cephalothorax is black, covered with black and coppery hairs. Her abdomen is in general more distinctly marked, though in pattern like that of the male; and the under side is brown, clothed with

palish hairs. The plates of the spiracles are yellowish, and her legs are also yellowish, annulated with red-brown.

This very pretty and distinct Salticus was discovered by myself on Bloxworth Heath, in the young state, in May, 1861; and in June, 1862, I met with adults of both sexes. It is an exceedingly active spider, and appears to prey, among other things, on the small black ants which are not rare where this spider occurs. One of those that I captured had in its falces a young ant, for which it must have entered the ant's burrows. Another had just made a prey of one of the spring-tails (*Poduræ*).

Family Thomisidæ.

Philodromus deletus.

Female, immature. Length 3-sixteenths of an inch. Length of cephalothorax 1-tenth. Relative length of legs, 2, 1, 4, 3.

Cephalothorax large, circular, compressed at the eyes; clothed sparingly with short yellowish hairs. Colour dull sandy yellow, slightly darker on the sides. A dark yellowish brown stripe occupies the medial line of the hinder half; on each side of this stripe is a band of the same colour, scalloped out on either margin. The intervals of the scallops on the outer margin are paler than the rest of the cephalothorax, and form a short series of pale patches or blotches.

Eyes black, small, of nearly uniform size, and forming a semicircle; the two centre ones of the front row slightly the largest, and nearer together than the two corresponding ones of the hinder row.

Legs long, of the same colour as the cephalothorax, furnished with hairs and a few spines of different sizes, and scantily and irregularly marked with dark yellow-brown blotches and spots. The under sides of the tarsal and metatarsal joints are thickly clothed with strong papillæform hairs, which spread outwards on each side, and form quite a tuft at the articulation of these two joints. The metatarsal joints of the fourth pair have but a few of these hairs.

Abdomen broader at the middle than at the extremities, rather darker coloured than the cephalothorax, clothed with hairs. A large fusiform band of dark yellow-brown, edged with pale yellowish, scalloped on each outer margin, and, ending in a fine point, runs down the centre to about a third of its length

from the spinners; the scalloping of the margins of this band leaves two angular points on each side of it. The sides of the abdomen towards the spinners have four or five rows of more or less distinctly marked pale yellowish white spots, varying in size; and now and then two or more spots are confluent: these rows run obliquely backwards from the upper to the under side. The under side, sternum and maxillæ are clothed with hairs, and of the same colour as the cephalothorax and legs. The falces and labium are rather darker.

Three females of this species were captured by myself, in June, 1862, running in bright sunshine on the sand-hills at Bournemouth, in Hampshire; but I was unable to discover the male. In the character of the markings this spider bears some resemblance to Philodromus elegans (Blackwall's 'British and Irish Spiders,' p. 94), but may be easily distinguished by its paler and more "washed-out" appearance, by the markings being all far less vivid, and by its shorter and more robust form; the bands on the cephalothorax differ from those of P. elegans in being *narrower*, scalloped on the margins, and so with *several angular points on each side;* the central band also of the abdomen has, in P. elegans, only *one* angular point on each side. This spider, which is also allied to Philodromus fallax (Sundevall), is, I think, quite distinct from that species; and though far less striking looking than P. elegans, is yet a very distinctly marked one. When at rest on the bare sand, with its legs extended, it was quite invisible, and only caught the eye by its very rapid movements, composed of sundry short runs.

Philodromus hirsutus.

Female, adult. Length 3-twentieths of an inch. Length of cephalothorax 1-twentieth. Relative length of legs, 4, 2, 3, 1.

Cephalothorax of a dull yellowish drab-colour, sparingly clothed with short brownish and yellowish hairs, amongst which are some long black bristly nearly erect ones; those on the forehead are very long and directed forwards. It has three longitudinal bands, of a blackish brown colour—one, down the centre, commences at the two centre eyes of the hinder row (which it includes); it has the margins scalloped, and tapers to a point at the hinder part of the cephalothorax: the other two bands commence at the outer eye on either side, and increase in breadth towards the hinder part, where they end abruptly.

Eyes black. The outer ones of the front row (which is exactly on the upper edge of the forehead) are rather the largest of the eight, and considerably larger than the two middle ones of the same row; these four eyes are equidistant from each other. The hinder row is much the longer, and rather less curved than the front row; the eyes composing it are equidistant from each other, the two central ones being slightly smaller than the outer ones.

Legs moderate in length, rather robust, of the same colour as the cephalothorax, and similarly furnished with hairs and fine spines. The tarsal and metatarsal joints have two rows of papillæform hairs on their under side; but this character is not nearly so strongly marked as in P. deletus (above described).

Palpi like the legs in colour, and similarly clothed with hairs and spines.

Maxillæ and falces similar in colour and clothing to the palpi, but the bristly hairs on the maxillæ are not of such a marked character.

Sternum and labium yellowish drab, freckled with dark brown, and clothed with brown hairs.

Abdomen oval, rather abruptly truncated at the upper end, and not very sharply pointed at the spinners. Colour slightly paler than that of the cephalothorax. Clothed with short yellowish brown hairs, and, like the cephalothorax, legs, &c., the upper part and sides are furnished with long erect blackish bristly ones. On the upper side are five dark brown lines or bands, formed by spots and blotches more or less near together; one of these bands is of a diamond shape much elongated; it runs down the centre, ending about half-way towards the spinners, and is continued towards them by one or two isolated spots of the same colour; on either side of the hinder part of this band is another, these two coming together in a point just above the spinners; and on each upper margin of the forward end of the abdomen is another, running (at first continuously and then with irregular dots) round the whole margin towards the spinners; sundry small spots of the same colour as these bands may be seen dispersed between them, and from these spots spring the most conspicuous of the bristly hairs. On each side of the abdomen, towards the under part, is another broad longitudinal band of the same colour, reaching nearly, but not quite, to the spinners. Three longitudinal bands of rather a lighter

brown (and of which the centre one is much the widest) occupy the under side, and converge towards the spinners, where they are connected by a transverse line of the same hue, composed of short hairs; the central band is interrupted at the site of the sexual aperture, and in the part of it next the sternum there are two pale spots. The sexual organs are of a horse-shoe shape, slightly prominent and edged with red-brown.

This spider, which is closely allied to the genus Thomisus, was captured by myself on a gate-post at Bloxworth, Dorset, in June, 1862. It is unlike any other spider of this family that I have met with, and, from being almost wholly clothed with long black bristly hairs, presents a very striking appearance.

Family Drassidæ.

Clubiona reclusa.

Male, adult. Length 1-fifth of an inch. Length of cephalothorax 1-tenth. Relative length of legs, 4, 1, 3, 2.

Cephalothorax slopes gradually into a slightly curved outline from the centre to the eyes, where it is slightly compressed on the sides. It has a slight longitudinal indentation in the medial line of the hinder part. Colour yellowish, tinged with red. The margins are red, and sundry veinings of a reddish brown run from the eyes and lateral margins to a point in the centre. It is clothed with short yellowish hairs, which considerably obscure the veinings, except when seen in spirits of wine.

Eyes eight, in two curved rows, the curves directed backwards. The foremost row is nearly straight, and is just above the frontal margin; the eyes of this row are about equidistant from each other; the centre ones are the darkest coloured, and slightly the largest of the eight. The centre ones of the hinder row are further from each other than each is from the end one on its side; the eyes of this row are about equal in size, and, with the end ones of the front row, are edged with deep bistre-brown, and in two out of three specimens that have come under my notice the eyes themselves were tinged with the same colour: in one specimen the brown colour almost approached to black. The lateral pairs of eyes are not contiguous, being separated rather further from each other in an oblique direction than the one forming the end eye of the front row is from the next to it in that row.

Legs long. Colour pale yellow. Clothed sparingly with hairs and a few longish black spines. The fourth pair are the longest, and the third pair the shortest, and but little shorter than the second pair.

Maxillæ same colour as the legs. Longish, straight, enlarged at the tops, where they are rounded on the outer sides. The inner sides are obliquely hollowed, and thickly clothed with short black hairs.

Labium tinged with reddish brown, broader at the top than at the base. The top is slightly hollowed or notched.

Falces straight and cylindrical, but neither remarkably long nor stout. Rather darker coloured than the cephalothorax, and cut away on the inner sides near their extremity in an obliquely transverse line.

Sternum long-oval, pointed near the abdomen. Colour yellowish, sometimes suffused with blackish brown.

Palpi short and stout. Cubital joint slightly clavate, and the margin underneath protuberant; it is longer than the radial joint, which is enlarged at its extremity, and has on the outer side three strong projections or apophyses, of a deep black-brown colour tinged with red—one, towards the front, is broad, with the extremity hollowed out or notched; another, less strong than the former, projects just behind it, at right angles to the joint, and has its extremity sharply bent forwards; the third is flattish, and has the appearance of a dagger-blade slightly folded on one side; it is the longest of the three, and has a sharp point; it issues from beneath the other two, and applies closely to the digital joint, rather underneath on its outer side, extending to nearly half its length. The radial joint has also two slight conical protuberances at its extremity—one on its upper side, the other on the inner side. The digital joint is long-oval and hairy, its colour yellowish, slightly suffused with brown. Palpal organs simple and not very prominent; from their extremity on the inner side there projects a short, stout, slightly curved, dark black-brown spine; and from their extremity towards the inner side is a longish, narrow, semitransparent projection, in contact with which is the prominent sharp point of a slender reddish spine; this spine issues from underneath the extremity of the palpal organs, but its true origin and situation I could not satisfactorily ascertain; but apparently its origin is underneath the outer extremity of the outer lobe.

Abdomen long-oval, of a deep brownish red colour thickly freckled with yellowish, and thickly clothed with yellowish hairs. At the front extremity there are a few stiff, strong, dark hairs, curving upwards and slightly backwards. When in spirits of wine there may be traced a pale yellowish medial line on the forward half of the upper side, followed by some transverse angular ones towards the spinners, which are long, prominent, and of a dull yellow colour; the upper ones suffused with brownish red. Plates of the spiracles yellow, and two yellow lines, running from the outer side of the spiracles, converge to the spinners.

The female is rather larger than the male, and much darker coloured (which is usually the case with females of this genus after the deposition of their eggs); the falces are also shorter and stouter, and their profile, instead of being nearly straight, is much curved outwards, owing to the base of the falces being far more prominent in front than in the male.

The male of this species bears some resemblance to the male of Clubiona holosericea in the form of the palpi, but its general appearance is more like that of C. amarantha; and for this latter species it was mistaken by Mr. Meade, who has for several years had it among specimens of C. amarantha, but cannot remember where it was captured. I have, during the summer of 1862, met with it at Bloxworth, Dorset, in woods. The females were abundant, sewn up, with their eggs, in leaves of low-growing plants, principally in leaves of young plants of Angelica sylvestris. The season for the males was evidently passed: the only one of this sex I met with was enclosed in a leaf, like the females, but, unlike them, there was a place of exit left in the folded leaf. In some of the leaves the young were hatched, and the old females seemed to be exhausted and nearly dead: their nests were to all appearance hermetically sealed, for I could find no entrance in any direction, every corner being closely sewn up with white silky web. The eggs were enclosed in a flattish lenticular cocoon of the same material.

In the veinings on the cephalothorax this species resembles Clubiona brevipes, but the male palpi differ totally in the form of the radial joint; and by the form of this joint it may also be distinguished at once from both C. amarantha and C. holosericea. From this latter species it may be known also by its yellower colour, and coarser hairs on the abdomen, the appearance of C. holosericea being gray, soft and

silky; the radial joint of the palpi of C. holosericea also wants the stout notched projection at its extremity in front.

Family Ciniflonidæ.

Ciniflo puta.

Female, immature. Length 1-fifteenth of an inch. Length of cephalothorax 1-thirty-first. Relative length of legs, 4, 1, 2, 3.

Cephalothorax broadly truncated in front, and slightly compressed on the sides forwards. It is rather convex behind the eyes, towards which it slopes gradually. Hinder slope abrupt, and with a broadish, shallow, longitudinal indentation. Colour yellow-brown; margins and ocular region rather darker. The hinder part has some long bristly hairs, slightly directed forwards.

Eyes in two curved rows; the curves directed backwards; the hind row the most strongly curved. The eyes of that row are about equidistant from each other; the end ones are the largest. The two centre ones of the front row are dark-coloured, and rather closer together than each is to the end one on its side. The eyes of the lateral pairs near together, but not contiguous; the front eye of these pairs the largest of the eight. The front row is situated close above the frontal margin.

Legs stout, moderate in length, clothed with hairs and spines, and with a calamistrum on the upper side of the metatarsi of the hinder pair. Colour yellowish, tinged with brown.

Falces short, very powerful, slightly compressed at their base on the sides, prominent in front. Hairy, and similar in colour to the cephalothorax.

Maxillæ strong, hairy, slightly inclined to the labium, which is longer than broad, and squarish at the top. These parts are similar in colour to the falces, the labium being rather darker.

Sternum broad, convex, heart-shaped and hairy. Colour yellowish brown, mottled with darker brown, and the margin bounded by a dark brown line.

Palpi moderately long, hairy, and like the legs in colour.

Abdomen large, very convex above, abruptly sloping at the spinners, and much projecting over the base of the cephalothorax. It is clothed with hairs, of which there are a good many strong dark ones just underneath the upper end, directed upwards and forwards. Colour yellow-brown, thickly mottled and suffused

with darker brown. Plates of the spiracles paler. On the upper side towards the cephalothorax are several longish, obscure, pale yellow-brown spots, forming somewhat of an oblong figure; these are followed towards the spinners by some shortish transverse angular lines of the same colour (formed by short pale yellowish hairs), the angles directed forwards.

The specimen above described was not quite adult, but is distinct from any species I have seen, and is, I believe, a species hitherto undescribed. It may easily be distinguished by its general plain yellow-brown colour, and the obscurity of the pattern on the abdomen. It was captured by myself at Bloxworth, in 1861.

Family Agelenidæ.

Agelena boopis.

Female, immature. Length 1-fifteenth of an inch. Length of cephalothorax 1-thirty-second.

Cephalothorax compressed on the sides forwards, and slightly prominent at the eyes. Colour dull yellow, suffused with sooty brown. The space occupied by the eyes is black. A sharply angulated yellow patch, with the angle directed backwards, commences close behind each of the two central eyes of the hinder row; these patches are separated from each other by a fine blackish longitudinal line. There is a slight rise in the cephalothorax, followed by a transverse dip, behind which, on each side, is an oblique yellow line.

Eyes in two rows, on the, almost vertical, front of the cephalothorax, and very unequal in size. The front or lower row is nearly straight; the upper one is the longest, and very much curved, the curve directed backwards. The eyes of the lower row are equidistant from each other, the end ones being rather smaller than the centre ones, and the smallest of the eight. The central eyes of the upper row are very disproportionately large, protruding and wide apart, their outer rims extending nearly to the entire length of the lower row. The outer eyes of the upper row are about the same size as the centre eyes of the lower row; and the space between the centre ones of the upper row is greater than that between each of them and the end one on its side.

Legs short, moderately stout. Colour dull straw-yellow, with a

faint appearance of being annulated with sooty brown. Sparingly clothed with hairs and a few long black spines.

Falces moderate in length and strength, convex and protuberant in front near their base. Hairy, and like the cephalothorax in colour.

Maxillæ same colour as the falces, slightly inclined towards the labium, which is rather broader at the base than at the top, where it is flat, rounded at the corners, and, with the sternum, of the same colour as the maxillæ.

Abdomen oval, convex above, and projecting greatly over the base of the cephalothorax. Colour pale straw-yellow, slightly suffused with sooty points on the sides and upper side forwards. No trace was visible of any pattern, but this may have been owing to its very immature state. Spinners very unequal in length; upper one of each of the side pairs much the longest.

The specimen from which I have described this species was evidently too young to be in any way depended upon for size, colour or markings; but I have notwithstanding been induced to describe it, from the strong specific character furnished by the eyes alone; and this character would not be affected by age. The great relative disproportion in the size of the eyes, and their situation on the perpendicular facial space, will at once distinguish it from all its congeners. It was met with by myself at Bloxworth, Dorset, in 1861.

Cælotes mærens.

Female, immature. Length 1-fifteenth of an inch. Length of cephalothorax 1-thirtieth.

Cephalothorax broad and squarish in front, rather sloping from the hinder part of the ocular region to the forehead, and very abruptly sloping behind the abdomen. On this hind slope is a broad shallow longitudinal indentation. Colour pale yellowish brown, with a green tinge, suffused with blackish at the eyes. About the centre of the cephalothorax is an irregular spade-shaped patch, of a dull sooty colour, from which several lines run from the front to the eyes, and from the sides obliquely forwards. Margins black, and from them several broadish stripes of dull sooty brown converge towards the hinder part of the central patch, and narrow to a point as they approach it.

Eyes in two rows, just above the insertion of the falces; the front row shortest, and nearly straight; the hinder one curved slightly

from it. The outer eyes of the front row are very slightly the largest of the eight, the outer ones of the hind row next, and the centre ones of the front row the smallest. The distance between the two centre ones of the hind row is slightly greater than that between each and the end one on its side. The central eyes of the front row are close together, but do not touch; and each touches the end eye nearest to it.

Legs strong, moderate in length, clothed with hairs and a few spines. Rather paler in colour than the cephalothorax. The tibial, tarsal and metatarsal joints (except at the articulations) suffused with blackish.

Falces short, strong, and of a pale dull greenish colour.

Palpi similar to the legs in colour. Radial and digital joints long, and slightly suffused with blackish.

Maxillæ moderately long, strong and convex, enlarged at the top, where they are rounded on the *inner* and obliquely truncated on the *outer* sides. They are strongly inclined to the labium, and are of a dull greenish hue.

Labium broad at the base, from which it narrows into a triangular shape, with the point blunted. Colour blackish brown.

Sternum: line of junction with the labium, hollowed out. It is heart-shaped and very convex, hairy, and of a greenish colour, thickly mottled and suffused with dull blackish.

Abdomen short-oval, thickly clothed with hairs, among which are many long palish ones. It projects considerably over the base of the cephalothorax. Colour black, freckled with minute pale points. Upper side with a whitish spot on each side of the medial line, at about half its length towards the spinners; to these succeed, on each side, an oblong, slightly oblique, pale whitish patch, followed by two others rather more oblique, forming chevrons interrupted at the centre; these are followed by one or two short, but rather curved transverse lines of the same colour.

Spinners dull greenish in colour. Inferior pair much stouter and longer than the rest. Plates of the spiracles greenish, suffused, especially towards the upper ends, with dull black.

I met with the specimen above described on low plants in a wood at Bloxworth, in May, 1862. It is evidently a very young specimen. Its characters are, however, sufficiently marked to enable me to describe it as distinct from any known species; and it appears to belong

to the genus Cælotes, of which only one species has been before described.

Family Theridiidæ.

Theridion spirafer.

Male, adult. Length 1-ninth of an inch. Length of cephalothorax 1-nineteenth. Relative length of legs, 1, 2, 4, 3.

Cephalothorax but slightly raised in front. A deep oblique indentation behind each lateral pair of eyes, and one in the medial line of the hinder part. Very sparingly furnished with hairs. Colour dull yellow, of an amber tint. Margins dull blackish brown. A broad central band of red-brown includes the eyes, and narrows gradually to the hind margin.

Eyes on tubercles. The two centre ones form a square, if anything a trifle wider in front than behind. The eyes of the side pairs almost touch each other, and are placed slightly obliquely.

Legs of the same colour as the cephalothorax, and hairy. The first pair is much the longest; they are blotched with dark reddish brown at the joints, and the upper halves of the tibial joints of the males are suffused with red-brown.

Abdomen oval, very convex above, thickly clothed with hairs, and projecting considerably over the base of the cephalothorax. Its pattern on the upper side consists of three longitudinal bands; the centre one narrows towards the spinners, and is of a dark black-brown, strongly dentated on the edges, which are bounded by a clear broad line; this line dilates over the fore part of the abdomen, and is often tinged with green and red: the central band may be described as consisting of a series of blunt-ended, black-brown, diamond-shaped patches, of which that nearest the cephalothorax is far the largest, and has its hinder part much shorter than the fore part. The band on each side of the central one is of a yellow-brown colour, with a warm reddish tinge, obscurely mottled with whitish yellow and brown points: these bands are irregularly dentated on their lower sides, and also edged with a bright yellow line. The sides of the abdomen are yellowish brown, with numerous zigzag perpendicular lines of deep black-brown, in some specimens having merely the appearance of being mottled with that colour. A broad longitudinal band of dark brown, edged with bright yellow, occupies the under side.

Maxillæ, labium and falces like the cephalothorax in colour; the

latter mottled at their base and outer sides with blackish, suffused with brown. Sternum the same, broadly edged with black-brown and thinly freckled with black points.

Palpi short, hairy, and similar in colour to the legs. Cubital joint shorter than the radial, and furnished with several long bristly hairs. The radial joint is produced, on its outer side forwards, into a strong abruptly-pointed projection, overlapping the side of the digital joint, which is roundish-oval, prolonged at the end into a kind of snout. The convex sides of the digital joints are turned underneath and slightly towards each other, thus turning the palpal organs upwards and slightly outwards. These organs are not complicated, nor very highly developed: they consist chiefly of a circular lobe, of a dull reddish yellow colour, palest in the centre. This lobe is arched over by a fringe of long, bristly, black hairs, springing from the outer edge of the produced part of the radial joint, which has a deep red-brown horny margin. This fringe is met by another of less conspicuous hairs, issuing from the opposite and black margin of the digital joint. The outer edge of the palpal organs is encircled by the coils of two very long dark red-brown filiform spines, one of which issues from the inner side of the circular lobe, and the other from near the inner side of the radial joint: these spines have the appearance, in some specimens, of being but *one* of a larger size, but with a little care they may be separated, and seen to consist of two smaller ones: the length of these spines, when uncoiled, is upwards of 1-fourth of an inch. The female is rather larger than the male, but resembles it in colour and markings.

An adult male and immature females of this species were captured on furze-bushes at Hursley, near Winchester, in May, 1860, but were overlooked among specimens of T. pulchellum, to which it is allied, until I met with it again in tolerable abundance at Bloxworth, in June, 1862. It differs very remarkably from T. pulchellum in the form of the palpi, and structure of the palpal organs (especially the long, fine, coiled spines connected with them), although resembling it somewhat in the markings of the cephalothorax and abdomen; it is, though, less vivid in its colours than that species. It spins an irregular web among the shoots and blossoms of the common furze.

THERIDION CONGENER.

Female, adult. Length 1-ninth of an inch. Length of cephalothorax 1-twentieth. Relative length of legs, 1, 4, 2, 3.

Cephalothorax small; ocular region elevated, prominent, and compressed on the sides forwards. Colour deep shining black-brown. The space between the eyes and frontal margin (*i. e.*, the insertion of the falces), is of considerable extent, and slopes much forwards.

Eyes in two curved rows, forming almost an oval at the extremity of the prominence. The centre ones of the hinder row are closer to each other than each is to the end one on its side. Those of the side pairs are contiguous, and obliquely seated on a strong tubercle. The two centre eyes of the front row are the widest apart and the largest of the eight: these last two are black; the rest are pearly white.

Legs short, stout, sparingly clothed with hairs and a few fine spines. Colour pale yellow, blotched and annulated with deep shaded black and yellow-brown, giving much the appearance of tortoise-shell.

Maxillæ rather dilated at the base, longish and almost meeting over the labium, which is pointed: these parts are of a dark brown colour.

Falces short, strong, and of a deep blackish brown colour.

Sternum heart-shaped, broad, very convex, and of a deeper colour than the cephalothorax.

Palpi of moderate length, coloured and annulated like the legs.

Abdomen large, very like some of the Epëiridæ in its form, *i. e.*, much broader in front than at the spinners. Upper side yellowish, thickly mottled and suffused with yellow-brown, and with numerous black dots and points, forming five or six obscurely defined, yellowish, transverse, angulated stripes, the angles directed forwards; the stripes running quite to the lower margins, where they melt into the clearer yellow of the sides. These stripes contain the principal black spots and points, which are largest, and appear as if run together, at the angle of each stripe. The sides towards the front are black, edged broadly underneath with yellow; and the part projecting over the cephalothorax is also black, as is the whole of the under side and the part surrounding the spinners. About one-third of the distance between the spinners and the plates of the

spiracles are two transverse, oblong, rather curved, yellow spots, one on each side of the medial line. Sexual organs well-developed, and of a deep red-brown colour.

This spider, which is remarkable from the form of the abdomen and its short stout legs, is evidently allied to, though very distinct from, T. denticulatum. The specimen from which the above description has been made was captured by myself, in July, 1858, at Lyndhurst, Hants. I have left it undescribed hitherto, in hopes of finding the male.

Family Linyphiidæ.

Linyphia albicincta.

Male, immature. Length 1-eighth of an inch. Length of cephalothorax 1-sixteenth. Relative length of legs, 1, 4, 2, 3.

Cephalothorax narrow in proportion to its length, but broad and square at the eyes. It is very glossy and shining. Colour dull yellow, slightly suffused with brown, especially towards the margins and hinder part. Margins indistinct brownish red.

Eyes dark-coloured, and on very distinct black spots. The centre ones of the hinder row are considerably the largest of the eight. The side pairs are seated obliquely on a tubercle, and are about equal in size, and the smallest of the eight.

Legs moderate in length and strength, pale dull yellow in colour, and furnished very sparingly with hairs and a few longish black spines.

Maxillæ stout, convex and straight, slightly rounded at their extremity on the outer side, obliquely truncated and excavated on their inner corners, where their colour is a deep red-brown, the rest being a little darker coloured than the cephalothorax.

Labium short, broad at the base, narrower at the top, where it is rounded off. Colour dark red-brown.

Falces very strong, convex and straight, slightly cut away on the inner sides at their extremity, where they are furnished with strong dark red-brown teeth. Colour similar to that of the cephalothorax.

Sternum heart-shaped, and of a deep red-brown colour.

Palpi short, like the legs in colour. Radial joint longer and stronger than the cubital. Digital joint very large; but as these parts

required the last moult to complete their development, the structure of the palpal organs could not be discerned.

Abdomen oblong-oval, very convex above throughout, and glossy. Upper side dull yellow-brown, tinged with red. Under side dark red-brown. These portions are separated from each other by a narrow horizontal band of white, which runs completely round the abdomen, though commonly interrupted just above the spinners. On the upper side two longitudinal rows of red-brown blotches or spots are visible in most specimens, and between these rows many specimens have a narrow tapering longitudinal band of the same colour: these spots vary much in appearance and size, and in some specimens they run together, and form a kind of broad, dentated, red-brown band, occupying nearly the whole of the upper side of the abdomen: in most specimens the blotches nearest the spinners run together into an irregular patch. The white band, too, presents considerable variety in different specimens, in some being only a white line, in others much broader, but interrupted. Some specimens have the sides and spaces between the rows of red-brown spots more or less suffused or mottled with white; in some the red-brown spots are more or less nearly obsolete. The female resembles the male, but is rather larger.

I captured specimens of this species at Hursley, near Winchester, in August, 1861, and have since found it numerous at Bloxworth, Dorset. It spins an irregular web among the leaves and stems of low-growing plants in woods. I have not yet met with it quite adult, most of those met with having another moult to undergo before becoming so.

This species may readily be distinguished from any other known *native* species by *its reddish yellow hue*, as well as by the white band which separates the upper and under sides of the abdomen. It is evidently allied to, but I think quite distinct from, the Linyphia cincta of Walckenäer. In the general character of its markings it bears some resemblance to females of L. fuliginea, but its colours differ totally.

Linyphia setosa.

Male, adult. Length 1-tenth of an inch. Length of cephalothorax 1-twentieth. Relative length of legs, 1, 2, 4, 3.

Cephalothorax broad, raised and prominent at the eyes, and with a longitudinal indentation on the hinder part. Colour brownish

yellow, rather clouded with brown towards the margin. Space occupied by the eyes black, and from and behind this space issues a thinnish tuft of strong bristly hairs, curving forwards and downwards.

Eyes set about the prominence on the fore part of the cephalothorax, on geminated black spots, in two rows curved slightly away from each other. The eyes of the side pairs are very near together, but do not touch each other. The centre ones of the hinder row are wide apart, and those of the front row are almost contiguous. The end ones of the front row are the largest of the eight, the other six being nearly uniform in size.

Legs long, rather slender, of a brownish yellow colour, slightly tinged with greenish, furnished with longitudinal rows of brown hairs, and a few fine spines of a darker colour. An erect spine issues from each of the genual joints. Their relative length is 1, 2, 4, 3, the third pair being considerably the shortest.

Palpi short and slender. The cubital and radial joints about equal in length; the latter is much the stronger, protuberant at its extremity, and has a tuft of strongish hairs on its upper side, but no marked projections. Cubital joint furnished with a long bristly hair, issuing forwards from the upper side of its lower extremity. Digital joint hairy; it has a prominent lobe on the outer side, and a strong, dark red-brown, corneous projection, issuing from its base near the radial joint on the outer side, and curving across it to the inner side. Underneath this projection the base of the digital joint has a curved conical prominence, pointed in the same direction. The palpal organs are highly developed, prominent and complicated, consisting of lobes and irregular processes, of a red-brown colour; two prominent, black, curved spines, parallel but not close together, enveloped in membrane, issue from underneath the outer side towards their extremity, and curve under towards the inner side.

Falces moderately long and strong; divergent at their extremities.

Maxillæ long, strong and straight, and, with the labium, which is short and semicircular, of a yellowish colour clouded with brown.

Sternum of a black-brown colour, clothed with longish hairs.

Abdomen oval, not very convex on the upper side, thinly clothed with hairs. Upper side straw-yellow. A large irregular patch of black-brown occupies the forward half, and is succeeded by several transverse angulated bars of the same colour (the angles

directed forwards), but of different widths. Sides, part just above the spinners, and under side black-brown, the latter part the darkest coloured.

An adult female differed from the male in having the cephalothorax dark brown, and in the patch and bars on the abdomen being of greater extent and all run together, leaving an interrupted band of yellow on either side, and two or three obscure spots of the same colour below each band on the lower margin of the abdomen. The specimens above described were captured by myself on Bloxworth Heath, in May, 1862. It is a striking-looking species, and the horn-like projection at the base of the digital joint, together with the two curved spines enveloped in membrane connected with the extremity of the palpal organs, will serve to distinguish it at once from others of the genus Linyphia.

LINYPHIA PULLATA.

Male, adult. Length 1-tenth of an inch. Length of cephalothorax 1-twenty-first. Relative length of legs, 1, 4, 2, 3.

Cephalothorax rather shorter than the abdomen. A strong oblique indentation on the sides just behind the ocular region, and a broad shallow one towards the hinder part. Colour brownish yellow, suffused on the sides and margins with sooty black; some specimens have but little of this suffusion; others are entirely of a sooty black on the cephalothorax.

Eyes in two rows, on front of cephalothorax. The front row is the shortest and nearly straight, and the hinder row is curved away from it. They are nearly equal in size; the two centre ones of the hinder row slightly the largest, and those of the front row slightly the smallest of the eight: these last are close together, but do not touch each other. The eyes of the hinder row are about equidistant from each other.

Legs long and rather slender. The first, fourth and second pairs do not differ much in length. They are of a yellow colour, thinly clothed with hairs and a few longish fine spines on the upper sides of the femoral and tibial joints.

Palpi short, like the legs in colour. Radial joint larger and stronger than the cubital: these joints are furnished with several longish, curved, black, bristly hairs, directed forwards. Digital joint large and slightly protuberant on the outer side; it is darker in colour than the rest of the palpus, and hairy. Palpal organs well-developed and prominent, but not very complicated. One

strong, straight, corneous process, of a reddish colour, runs along the inner side, and ends near their extremity in a blunt point. Two other processes, edged with black, occupy the centre, and end near the extremity in curved or hooked points; and there is a shorter curved process on the outer side of the palpal organs near their base.

Falces long and moderately strong, rather sharply and abruptly divergent towards their extremity. Similar in colour to the cephalothorax.

Maxillæ long, strong, and curved towards the labium, which is short and rather pointed at the top.

Sternum broad, convex and hairy. These parts are of a yellowish colour, more or less suffused with sooty black.

Abdomen not so convex above as many others of this genus. Underneath and on the sides it is of a blackish brown colour. Upper part towards the cephalothorax pale dull yellowish brown, divided by a more or less distinct blackish longitudinal streak, from which on either side issue two or more oblique lines, each of which sometimes ends in a largish spot: these lines form two chevrons, with the vertices directed forwards: to these succeeds a longitudinal dentated band of the same colour, narrowing to a point just above the spinners, and bordered with black; the black border joining in with the black-brown of the sides and under part. This pattern is more or less distinctly visible in all the specimens I have seen: in some the whole abdomen is suffused with sooty black, and thus the pattern is almost obliterated. The female differs from the male only in having the abdomen somewhat more convex above. The sexual organs are not very prominent, but they have connected with them a longish nearly straight process (or ovipositor ?), of a yellowish colour tipped with red-brown: this process is directed backwards, and applies closely to the surface of the abdomen.

Adults of both sexes of this spider were captured by myself on iron railings at Bloxworth, in May, 1862. It is very closely allied to L. pulla, which it much resembles in general colour and appearance; it is, however, smaller, and differs in the pattern on the abdomen, and specially in the structure of the palpal organs; these want the spine curved in a circular form at their extremity, enclosing another spine within its coil, which is characteristic of L. pulla: these organs also

differ in other points of their structure. The female also differs from that of L. pulla by the ovipositor (?) being longer and stronger.

NERIENE INNOTABILIS.

Male, adult. Length 1-twelfth of an inch. Length of cephalothorax 1-twenty-sixth. Relative length of legs, 4, 1, 2, 3.

Cephalothorax shortish-oval, much compressed at the eyes, where it is slightly prominent. The hinder part has a shallow indentation in the medial line. Colour dull yellowish brown, with a green tinge. Margins bounded by a sooty brown line, and some obscure lines of the same colour converge to a point in the centre.

Eyes on black spots, in two rows of equal length, curved away from each other, the hinder row most curved. Nearly equal in size, except the two centre ones of the front row, which are much the smallest, and are nearly contiguous. The two centre ones of the hinder row are further from each other than each is from the end one on its own side. The eyes of the side pairs are close together, but not contiguous.

Legs moderately long and stout, rather paler and clearer coloured than the cephalothorax, almost equal in length, the third pair rather the shortest, and the fourth pair slightly the longest. They are furnished with brownish hairs, and a few short slender spines.

Maxillæ short, strong, dilated at the base, and much inclined towards the labium, which is broad, and semicircular at the top. These parts, together with the falces, which are of moderate length and not very powerful, are of the same colour as the legs.

Sternum moderately convex, hairy and of a sooty brown colour.

Abdomen largish, oval, moderately convex above, and projects over the base of the cephalothorax. It is of a dull greenish yellow-brown, suffused and mottled with sooty brown.

Palpi short, moderately stout. Radial joint rather longer and stouter than the cubital: the former is rather produced in front on the inner side, ending in an obtuse point. Cubital joint has several black spiny hairs in front on the upper side. Digital joint large, obtusely conical on the upper side, the point of the cone rather directed outwards; it has also an angular enlargement near the base on the outer side. Palpal organs highly developed, prominent and complicated, of a pale colour, with red-

dish edges and marks on their lobes and processes. At their extremity are several fine, short, curved and other black spines.

An adult male of this spider was captured by myself among the rugged bark of Scotch firs, at Hursley, near Winchester, in May, 1862. A close and critical examination of the palpi of this species will be necessary to distinguish it from others nearly allied, and equally obscure-looking in their general characters.

Neriene conigera.

Male, adult. Length 1-fifteenth of an inch. Length of cephalothorax 1-thirty-third. Relative length of legs, 4, 1, 2, 3.

Cephalothorax short, rather pointed at the eyes, where it is but slightly compressed on the sides. It has a very slight longitudinal indentation in the medial line of the hinder part. A very slight transverse dip behind the ocular region. Colour pale brown, with a greenish tinge. Margins bounded by a sooty brown line.

Eyes in two rows slightly curved from each other, nearly equal in size; the centre ones of the hinder row rather the largest, and those of the front row rather the smallest of the eight. The centre ones of the hinder row are rather further apart than each is from the end one on either side. The eyes of the front row are about equidistant from each other; those of the side pairs close together, but do not touch.

Legs moderate, and not greatly different, in length. The fourth pair are very slightly longer than the first, and the third pair shortest. Colour pale whitish, tinged with greenish yellow. They are sparingly clothed with longitudinal rows of blackish hairs, and a very few short, fine, nearly erect, black spines.

Falces longish, but not very powerful, slightly paler in colour than the cephalothorax.

Maxillæ strong, dilated at the base, slightly inclined towards the labium, and obliquely truncated on the outer side. Similar in colour to the falces, but paler at the top, and clothed on the inner margins with sooty black hairs.

Labium very short, semicircular, slightly dilated at the top. Colour greenish, mottled with sooty specks.

Sternum broad and very convex, square at the labium, to which it is similar in colour.

Abdomen pale murky greenish yellow, thickly mottled and obscured with light sooty brown; thinly clothed with fine blackish hairs; very convex above, and of a short-oval form.

Palpi moderately stout, not very long, similar in colour to the legs. Humeral joint slightly curved inwards. Cubital joint very short, and with a slight sharpish prominence in front, furnished with two or three short black bristly hairs. Radial joint about equal in length to the cubital, but rather stronger, and with a slight projection on the inner side over the base of the digital joint, which is rather darker colour than the rest and of a largish size, furnished with blackish hairs: this joint has, on the upper side near its base, a large conical prominence, the point of which is slightly directed backwards and outwards: this prominence is convex on the inner and slightly concave on the outer side. Palpal organs prominent, highly developed and complicated: connected with them, at the base underneath, is a dark-coloured, flattish, reap-hook shaped, corneous process. These organs project far outside and beyond the margins of the digital joint, and consist of lobes and corneous processes, with one or two short black spines at their extremity: they are of a pale colour, edged with reddish.

Two adult males of this spider were captured by myself on furze-bushes at Bloxworth, in April, 1862. The most striking and leading characteristic of the species seems to be the conical prominence on the base of the digital joint of the palpi.

Neriene subtilis.

Male, adult. Length 1-twelfth of an inch. Length of cephalothorax 1-twenty-sixth. Relative length of legs, 4, 1—2, 3. In the general form and structure of the palpi this species bears considerable resemblance to Nëriene conigera (last described), but it differs in being larger, of a more elongated form, and of a totally different colour.

Cephalothorax yellowish brown tinged with red, and suffused with brown near the eyes.

Legs brightish red-brown, paler at the articulations of the joints. Fourth pair perceptibly longer than the first, which scarcely differ in length from the second pair.

Sternum similar to the legs in colour.

Abdomen long-oval, of a deep brown-black above, and reddish

brown underneath, with a pale oblique line forwards, just above the plates of the spiracles, and a longitudinal pale line on each side, meeting at the spinners, which are of a pale drab colour.

Palpi short, not very strong. The cubital joint has a strong black bristly hair on its upper side. Radial joint produced into a sharp projection in front on the inner side. Digital joints large; their convex sides turned towards each other. Near the middle of the digital joint on the upper side there is a strong conical prominence, flattened on the outer side; but this prominence is not proportionally so large, nor is its apex directed backwards, as in N. conigera; neither is its outer side so concave, and it does not spring from so near the base of the joint. Palpal organs very prominent and complicated; their colour is yellowish red, edged and marked with red-brown.

I captured an adult male of this species among heath-stems and roots, at Bloxworth, in June, 1862.

Neriene anomala.

Female, adult. Length 1-eleventh of an inch. Length of cephalothorax 1-twenty-fourth. Relative length of legs, 4, 1—2, 3.

Cephalothorax small, oval, compressed forwards. Colour dull yellow-brown, with some sooty lines springing from the margins (which are similarly bounded), and meeting in a point near the centre. A little way behind the eyes there is a figure of a triangle with the angles cut off, and divided down the centre, formed by similar sooty brown lines. A short transverse indentation occupies each side of the medial line, and there is a longitudinal one in the medial line of the hinder part.

Eyes in two rows of equal curvature, the curves directed from each other; the hinder row is slightly the longest. The eyes of both rows are nearly equal in size; the centre ones of the front row slightly the smallest, and near together, but not touching each other. The centre ones of the hinder row are rather further apart from each other than each is from the end one on its side. The eyes of each of the side pairs are placed very slightly obliquely, and are contiguous.

Legs bright yellow-brown, tinged with reddish, pale at the articulations of the joints. Fourth pair decidedly longer than the first, which are little if any longer than the second, and the

third pair slightly shortest. They are moderately long and stout, and are furnished with rows of darkish hairs, and a few fine short spines.

Falces short, strong. The frontal margin projects rather over their base. Colour murky yellow-brown.

Maxillæ large, stout, inclined towards the labium, much dilated at their base, and obliquely truncated on their outer sides. Like the falces in colour, but rather paler on the inner margins.

Labium broad, short, squarish at the top. Colour yellow-brown, mottled with sooty brown; the top rather paler.

Sternum rather convex, scalloped on the margins. Similar in colour to the labium. Margins sooty brown.

Palpi short, same colour as the legs. Radial joint longer and stouter than the cubital. Digital joint hairy, large, long-oval and pointed at the end, tumid and protuberant at the base, like the undeveloped palpus of male spiders. The radial and cubital joints have two or three black bristly hairs on their upper sides.

Abdomen large, long-oval, moderately convex above, slightly glossy and of a sooty brown-black colour, thinly clothed with short pale hairs. When in spirits of wine a tolerably well-defined pattern may be traced, consisting of a longish, fusiform, longitudinal band, formed by two pale lines ending in a point at about half the length of the abdomen. From the sides of this band several fine pale lines run at a sharp angle to the side margins; and following the band are several sharply-curved lines, which span the hinder half of the abdomen towards the spinners. Under side paler than the upper, and sometimes with a strong yellowish tinge. It has an oblique pale line on each side forwards, and two longitudinal ones meeting at the spinners. All these lines are scarcely perceptible, except when in spirits of wine. The sexual organs are very large and prominent: at their extremity there is a reddish process, curving inwards and over their orifice.

Several specimens of this very remarkable spider were captured by myself among heath at Bloxworth, in the spring of 1862. It may at once be distinguished from every other known spider by its combining the characters of both the male and female sex, having the large tumid digital joint of the immature male palpus and the highly-developed female sexual organs at the base of the abdomen.

NERIENE BIFIDA.

Male, adult. Length 1-ninth of an inch. Length of cephalothorax 1-seventeenth. Relative length of legs, 1—4, 2, 3.

Cephalothorax depressed and indented in the medial line of the hinder part. Ocular region considerably and abruptly elevated, the upper part of the elevation being divided longitudinally into two segments by a deep cleft or notch. Colour yellowish red.

Eyes on deep black spots, four being placed nearly in a square on each of the segments of the frontal eminence. The outer eye of the front of each square is the largest, and the inner one the smallest of the eight. The eyes of the inner sides of the squares are further apart than those of the outer sides, which are very near together, but not quite contiguous.

Legs moderately long, and furnished with hairs, but no spines. The first pair is, if anything, rather longer than the fourth. Their colour is clear bright yellow. The femoral joints of the first pair are disproportionately stout and bent forwards at the extremities; the tibial joints of the same pair are also stout, and enlarged underneath towards their extremities, which are bent in a direction contrary to the bend in the femoral joints. The short joint connecting the tibial and femoral joints is stout and enlarged at its front extremity. The hairs on the enlargement of the tibial joints are long and fine.

Falces strong, straight, rather enlarged at their base, and like the cephalothorax in colour.

Maxillæ greatly dilated at their base, strongly inclined towards the labium, and similar in colour to the falces.

Labium and sternum darker coloured than the cephalothorax.

Palpi long and stout, remarkable in the form of the different joints. The humeral joint is very strong, and gradually enlarges from its base to its upper end, where, on its upper side rather towards the inner margin, it has a strong spur slightly directed backwards, and near this spur are a number of short, strong, sharp-pointed, black spines. The cubital joint is short and gouty. The radial joint has a long projection on its inner side, curving obliquely outwards over the digital joint, to the surface of which it closely applies, reaching almost to its extremity: this projection issues from the extremity of the joint. Above it, and issuing from the base of the joint, is a second strong projection, pointed at its extremity, but scarcely half the length of

the former one. On the outer side of the joint, also issuing from its base, is a third projection, shorter and stouter than the last, and rather more obtuse at its extremity. These two last projections are strongly edged with black. Digital joint oval, with a large lobe on the outer side. Palpal organs well-developed and rather complicated: at their extremity is a fine, black, filiform, coiled spine, in contact with which is a mass of semitransparent membranous substance.

Abdomen short, oval and convex, thinly clothed with hairs, glossy and of a yellowish red-brown colour.

This spider was captured by myself among low herbage at Bloxworth, in the summer of 1861, and was at first mistaken for Nëriene rubens, to which it bears close resemblance, both in general form and appearance, and also in the form of the palpi. It may, however, be immediately distinguished from that species by the ocular eminence being divided into two segments by the longitudinal cleft above described, and which gives its eyes a totally different relative position from that of N. rubens.

Neriene bicuspis.

Male, adult. Length 1-twenty-first of an inch. Length of cephalothorax 1-forty-second. Breadth 1-forty-first. Relative length of legs, 4—1, 2, 3.

Cephalothorax broad and flat, almost circular in shape, with the front part squared off. Towards each frontal corner is a moderately high tubercular eminence, surmounted by a short, strong, black cusp or spine, slightly curved, and its point directed inwards and forwards. Colour pale dull semitransparent greenish. Margins black, and a black line runs longitudinally through the centre, and several sooty lines converge towards a central point in the medial line.

Eyes in four pairs, nearly equal in size; one pair (the eyes of which are widest apart) between the tubercular eminences; the eyes of another pair, seated on a large black spot below each eminence near the frontal margin, are near together but not contiguous; the lateral pairs are seated very obliquely at the bases of the eminences in front.

Legs moderately long and strong, furnished with hairs. Colour pale semitransparent yellow-brown, the central part of each joint being strongly tinged with reddish orange-brown.

Falces strong and straight, and of a dull yellowish colour.

Maxillæ like the falces in colour; long, strong, obliquely truncated at the top on the outer side, and slightly inclined towards the labium, which is broad, short, semicircular, and of a sooty brown colour.

Palpi rather long, moderately stout, similar to the falces and maxillæ in colour. Cubital joint double the length and stoutness of the radial: the latter joint has the upper extremity produced into a longish tapering kind of spur; this projection is nearly straight, and has a dark-coloured pointed tip; it is directed slightly outwards, over the basal half of the digital joint, but does not lie flat upon it as in many other species. Digital joint of moderate size and hairy. Palpal organs highly developed and prominent, but not very complicated. A long, strong, black spine, enveloped in transparent membrane, issues from their outer side, and, curving rather forwards and downwards, forms a large loose coil on their outer and under side: the end of this spine is very fine and filiform, and projects among a mass of semitransparent membrane on the outside, near about the middle of the length of the digital joint.

Abdomen moderately convex above, glossy, and projecting over the base of the cephalothorax. Colour dark sooty brown, with a greenish tinge. It is sparingly clothed with dark hairs.

The female differs from the male in being rather larger, and in wanting the tubercular elevations and cusps on the frontal corners of the cephalothorax. I met with this very remarkable, though minute, spider in tolerable abundance on iron railings at Bloxworth, in April and May, 1862. It was commonly to be found in an inverted position, in an irregular web spun in the angles of the posts and upper rails. It may at once be distinguished from others of its genus by the broad, flat and almost circular cephalothorax, as well as by the two frontal eminences, which give it a very striking appearance. Mr. Blackwall tells me that it is allied to Theridion sulcifrons, *Wider*, a species I have never yet seen. Except for Mr. Blackwall's opinion to the contrary, I should have unhesitatingly included it in the genus Walckenäera, to which it appears to be as nearly allied as to the genus Nëriene.

Walckenaera trifrons.

Male, adult. Length 1-eleventh of an inch. Length of cephalothorax 1-twenty-fourth. Relative length of legs, 4, 1, 2, 3.

Cephalothorax broad, obtuse, prominent, obliquely and abruptly truncated in front, thus giving the appearance of two frontal margins, a little way behind the upper one of which is a strong, abrupt, perpendicular eminence, hood-shaped, *i. e.*, convex behind and sloping forwards, but flattish in front when looked at in profile: when looked at in front, or full-face, the summit of the eminence is circular, much broader than at the base, and divided longitudinally into two segments. There is a deepish transverse indentation behind each side pair of eyes, one at the base of the eminence, and a longitudinal one in the medial line of the hinder part. Colour dark black-brown and shining.

Eyes in four pairs; one pair on the top of the eminence towards its frontal margin, and three pairs in a straight line, just below the upper frontal margin of the cephalothorax. The eyes of the side pairs are slightly obliquely placed, and those of the central pair are close together and the smallest of the eight: the other six do not differ much in size. Between the eyes at the top of the eminence there are some strong black bristly hairs, directed forwards, and meeting others which spring from the middle frontal margin.

Legs of moderate length and strength. Fourth pair slightly the longest; first and second pairs nearly equal, and the third pair shortest. Their colour is a bright yellow, tinged with orange.

Falces long, strong and very convex. In colour rather paler than the cephalothorax.

Maxillæ similar in colour to the falces, moderately long and strong, and much inclined towards the labium, which is broad, short and semicircular.

Sternum very convex, black and shining.

Palpi of moderate length, and similar in colour to the legs. Humeral joint curved inwards. Cubital joint much longer than the radial, and slightly clavate. Radial joint short, and with two projections—one, on the outer side, is broad, obtuse and concave, with a red-brown corneous process issuing from its concavity; the other, on the inner side rather towards the front, is slighter, but longer, than that on the outer side, and is bifid at its extremity. Digital joint large, broad at its base, gradually lessening to the extremity, and is suffused with brownish black. Palpal organs not very prominent nor complicated; they consist of

two principal lobes: towards their extremity there are two spines—one, long, strong, corneous and black, issues from their extremity on the under side, curves round their extremity, and so on round the outer margin of the digital joint, across their base, and projects outwards in a long filiform point; the other spine is short and stout, and springs from within the coil formed by the other spine, within which it lies, curved round in an opposite direction.

Abdomen jet-black, sparingly clothed with very short hairs, oviform, very convex above, and projecting over the base of the cephalothorax. The plates of the spiracles have a greenish hue.

An adult female, captured with the male, differed in being generally lighter coloured, the cephalothorax being less prominent and obtuse, and without the eminence, characteristic of the *male* spiders only, of this genus.

This very distinct species was captured by myself on iron railings at Bloxworth, in May, 1862. The shape and position of the cephalothorax and its frontal eminence (forming, in fact, three frontal margins) are very characteristic, as also are the radial and digital joints of the palpi, and the spines connected with the palpal organs.

Walckenaera affinitata.

Male, adult. Length 1-fifteenth of an inch. Length of cephalothorax 1-thirtieth. Relative length of legs, 4, 1, 2, 3.

Cephalothorax dark brown, much elevated and rather prominent, broad and obtuse in the ocular region, which is truncated in a sharply sloping direction from the top forwards, and thence downwards, with a slight inward curve, to the frontal margin: the slope of the hinder part of the ocular region is in a rather convexly curved line, and joins almost in the same line as the slope of the hinder part of the cephalothorax.

Eyes in four pairs, on the summit and front slope of the ocular region. Those of the two side pairs are contiguous and equal in size, and the smallest of the eight. Those of the front pair are slightly below the straight line of the foremost eyes of the side pairs, and are near together, but not contiguous; around them are some short bristly hairs. The eyes of the hinder pair are the same distance from each other as each is from the hinder one of the side pair on its side.

Legs moderately long and stout, clothed with hairs, and of a pale yellowish brown colour, blackish at the articulations of the joints.

Falces short, powerful, and of a yellow-brown colour.

Maxillæ short, inclined towards the labium, and similar to the legs in colour.

Labium broad, short, semicircular, and, with the sternum, which is broad and convex, of a black-brown colour.

Abdomen short-oval, very convex, and much projecting over the base of the cephalothorax. Its colour is a deep black-brown, with a few obscure, pale, curved, transverse lines on the upper side towards the spinners: these lines are only visible when in spirits of wine.

Palpi moderately long, same colour as the legs, except the digital joint, which is darker. Humeral joint curved inwards. Cubital joint long, rather bent downwards and clavate, notched at the end on the outer side. Radial joint short and stout, produced in front into a long strong projection, curving towards the outer side, reaching nearly to the end of the digital joint: the end of this projection is dilated, and in the form of a crescent, whose outer limb is broad, obtuse and dark-coloured; the tip of the lower limb is small, pointed and curved. Palpal organs highly developed, but not very prominent nor complicated: a large lobe at their base has its margin next to the radial joint, shining and corneous: from their extremity issue several spines; the most conspicuous is a very strong corneous one, of a dark reddish brown colour, issuing from their extremity on the inner side, and, curving across to and round their extremity, passes round their outer side, and projects its sharp point into some semitransparent membrane; another smaller, slightly curved, black spine, issues from within the curvature of the former one, and projects its point into the same membrane.

An adult female only differed in the less elevation of the ocular region.

I captured this species at Bloxworth, in May, 1861, and for some time mistook it for W. humilis, to which it is nearly allied, but from which, however, subsequent examination has shown it to differ considerably, especially in the form of the ocular region: this part, in W. humilis, is less elevated, less prominent, rises more abruptly, is more obtuse at its upper end, where it is truncated more in a

horizontal line. The eyes also of the side and hinder pairs differ in their relative size and position from the corresponding ones in the present species.

WALCKENAERA ALTIFRONS.

Male, adult. Length 1-fifteenth of an inch. Length of cephalothorax 1-thirty-second. Relative length of legs, 4—1, 2, 3.

Cephalothorax blackish brown, tinged with greenish. Ocular region much elevated; face of the elevation flattish, and nearly perpendicular at the upper part. The hinder part is convex, and arched into a kind of hood shape. On each side of the base of the upper part of this elevation is a strong horizontal indentation: the lower part of the elevation forms a kind of second segment, projecting slightly beyond the upper segment, and divided from it by a transverse groove; this lower segment joins imperceptibly into the rest of the cephalothorax. The face of the upper segment is thickly clothed with short bristly palish-coloured hairs, directed forwards and downwards; the frontal margin below the lower eyes is rather prominent.

Eyes in four pairs—one on the fore part of the summit of the upper segment, wide apart and the largest of the eight: another pair on the line of division from the lower segment; these are near together, but not contiguous: the eyes of the side pairs are very nearly equal in size; they are placed obliquely and are contiguous; they are also slightly below the line of the pair on the lower segment.

Legs moderate in length and strength, of a bright orange-yellow colour, sparingly clothed with fine hairs. There is but little difference in the length of the first, second and fourth pairs.

Maxillæ short, broad, convex, and much inclined towards the labium, and of a greenish brown colour.

Labium short, convex, semicircular, and of a black colour.

Falces short, strong. Colour greenish brown.

Sternum heart-shaped, very convex, and sparingly clothed with yellowish hairs.

Abdomen longer than the cephalothorax, very convex above. Colour black. Sparingly clothed with hairs.

Palpi moderately long, and of a yellowish colour. Cubital joint slightly clavate, and about double the length of the radial joint, which is stout, hairy, and produced in front into a projection,

which curves over the base of the digital joint towards the outer side, and ends in a fine red-brown point. A small, brownish, semitransparent process issues from the curvature, and projects outwards. Palpal organs complex and prominent, of a red-brown colour. Several black spines issue from them, one of which curves across the middle; another shorter and stouter, and sharply curved like a reap-hook, issues from their extremity. The female is rather larger, but resembles the male in all except the absence of the frontal elevation.

I met with adult males and females of this very distinct species on underwood at Lyndhurst, in the New Forest, in May, 1860. It is allied to W. fastigata, but in that species the division of the upper and lower segments of the frontal elevation is much more clearly and strongly marked; it differs much also from the present species both in colour and in the form of the palpi and palpal organs.

Walckenaera latifrons.

Male, adult. Length 1-fourteenth of an inch. Length of cephalothorax 1-twenty-eighth. Relative length of legs, 1—4, 2, 3.

Cephalothorax deep blackish brown. Ocular region prominent and elevated, and divided into two segments by a deepish transverse groove; the front segment rather below, as also less large, bold and obtuse than, the hinder one, which is broad, obtusely rounded, and slightly enlarged laterally at the top: this segment has a deep horizontal indentation on each side at its base, behind each side pair of eyes. A few very short, strong, bristly, blackish, erect hairs are on the top of the hinder segment; and the summit of the front segment has a tuft of paler hairs stretching over the groove that divides it from the hinder one.

Eyes in four pairs—one pair on the fore part of the summit of the hinder segment; the eyes of this pair are wide apart, and the largest of the eight: the other three pairs are on the front segment; each pair wide apart from the other; one pair is on the black, obtusely-pointed and rather prominent summit of this segment; the eyes of this pair are smallest of the eight. The side pairs have each the front eye larger than the hinder one.

Legs not very long; stout and hairy, of a paler and brighter brown than the cephalothorax.

Falces, maxillæ and labium similar in colour to the legs, the labium being rather the darkest.

Sternum broad, convex, and of a black-brown colour.

Palpi not very long; similar to the legs in colour. Cubital joint slightly clavate, and longer than the radial joint, which is stout, and has a pointed blackish projection on the outer side, and is produced at its extremity in front into a long nearly straight projection, which stretches over the digital joint towards the inner side: from the under side of this projection there issues a conspicuous semitransparent point-process, directed downwards. Digital joint hairy, and darker-coloured than the rest. Palpal organs prominent and complicated, with several short, black, curved spines at their extremity; their colour is dark red-brown mixed with black.

Abdomen broadish and convex. Colour deep sooty black.

I captured an adult male of this species on a wall at Bloxworth, in May, 1862, and have since (in March, 1863) met with several, both males and females, among low-growing plants and moss in woods. The female differs from the male only in the absence of the ocular elevation, and in being slightly larger. Though allied to other species in the division of the ocular region into two segments by a transverse groove, it may easily be distinguished by the breadth, boldness and comparative lowness of the hinder segment.

Walckenaera minima.

Male, adult. Length 1-twenty-second of an inch. Length of cephalothorax 1-forty-second. Relative length of legs, 1—4, 2, 3.

Cephalothorax has the ocular region moderately elevated; this elevation rises from the cephalothorax rather abruptly behind; it is obtusely rounded at the back part of its summit, from which it is truncated by a long slope to the lower pairs of eyes, where there are some coarsish black hairs. Its colour is pale yellow-brown, tinged with green, and with a strong sooty-coloured line round the base of the ocular eminence. The cephalothorax, at the upper part of its hinder slope, is slightly raised above the part that comes between it and the ocular region.

Eyes in four pairs—one pair on the top of the ocular elevation, at the commencement of the slope; these are wide apart, and the largest of the eight: the lateral pairs are just below the termination of the slope on either side; the eyes of each of these pairs are contiguous, and placed slightly obliquely; the foremost eye, if anything, rather larger than the hinder one.

Legs stoutish, not very long. Their colour is a pale yellow-brown, slightly tinged with red; and they are clothed with short pale hairs. The first and fourth pairs differ but slightly in length; the second pair is a little shorter, and the third pair shortest.

Falces of moderate length and strength, and similar in colour to the cephalothorax.

Maxillæ broad at the base, inclined towards the labium, rather rounded at the tips, and obliquely truncated on the outer sides. Similar in colour to the falces, but pale whitish at the tops.

Labium small, short, flatly curved at the top.

Sternum broad, very convex, squared off at the labium, and, with that part, of a greenish yellow colour, mottled and suffused with dark sooty brown.

Palpi similar to the cephalothorax in colour, not very long. Humeral joint bent inwards. Radial and cubital joints both short, the latter sharply bent in the middle; radial joint stoutest of the two, and produced, rather on the outer side in front, into a strong projection, which curves outwards over the basal half of the digital joint, and is bifid at its extremity: on the outer side of the extremity of the radial there is another projection, shorter than the former; it is rather obtuse at the end, and curves slightly in an opposite direction. Palpal organs not very complex, but highly developed and prominent. A strong corneous red-brown spine springs from their base rather on the inner side, curves over them and obliquely round their extremity, and so down the outer side of the digital joint, having its filiform point in contact with a semitransparent lobe near its origin.

Abdomen short-oval, very convex above, and projects slightly over the base of the cephalothorax. Its colour is a dark sooty brown, tinged with greenish.

Specimens of this very minute and rather puzzling species were met with by myself on furze-bushes and underwood at Bloxworth, in May, 1862.

In addition to the above twenty-four species, the following have come under my notice, either as new to Britain, or else as met with by *myself* for the first time; and I give them here as supplementary to the lists contained in Zool. 6493, 6862, 7553, 7945.

Family Lycosidæ.

Hecaërge nemoralis, *Blackw.* A male and female adult of this species was met with by myself among heath at Bloxworth, in May, 1862. It is chiefly distinguishable from H. spinimana by its darker colour, and by being almost wholly clothed with long, fine, silky hairs.

Family Salticidæ.

Salticus scenicus, *Koch.* The species hitherto commonly known under this name by British arachnologists appears to be Salticus histrionicus, *Koch.* My attention was first drawn to the fact that there were two species confounded together under the name "scenicus" in June, 1862, on the capture of an adult male and female of the true scenicus among heath, near Bournemouth, Hants. These, appearing to me different from the ordinary run of what I had usually considered to be of this species, caused me to examine carefully a large number of specimens captured here and in other places. The result of this was that I found two undoubted species mixed together; and on consulting, a short time after, Westring's 'Araneæ Suecicæ,' I found both species well and accurately distinguished. The commoner of the two—*i. e.*, the one I have most frequently met with, on walls of houses, gate-posts, palings, &c.—is S. histrionicus, *Koch* and *Westring;* the other, which I have only as yet met with rarely and among heath, is S. scenicus, *Koch.*

Salticus terebratus, *Kooh.* An adult male and female captured by myself on a garden wall at Southampton, in August, 1862. This is its first record as a British species.

Family Thomisidæ.

Philodromus jejunus, *Panzer.* An immature female of this species (new as British) was given me in June, 1862, by Mr. Dale, of Glanvilles Wooton, who captured it among lichens on an apple tree. Since that I have met with several, both males and females, on apple trees and Scotch firs, but none adult. I am almost inclined to think it is but a variety of P. pallidus.

Family Agelenidæ.

Agelena subfusca, *Camb.* Males of this species were recorded as new to Science in Zool. 7559 and 7947; but the female has been until now unrecorded. I met with a single specimen of that sex, adult, in June, 1862, at Bloxworth.

Family Theridiidæ.

Theridion stictum, *Camb.* An adult male was captured by myself at roots of heath, in May, 1862. Before that time only females had been observed.

Theridion riparum, *Blackw.* I met with an adult male of this species under the rooty ledge of a sand-bank at Bournemouth, Hants, in June, 1862.

Family Linyphiidæ.

Neriëne parvula, *Westring.* An adult male and female on iron railings, at Bloxworth, in May, 1862. New to Britain.

Neriëne dentata, *Wider.* An adult male and female on the woodwork of an old weir, near Bloxworth, in June, 1862.

Neriëne abnormis, *Blackw.* An adult male and immature female at roots of heath, at Bloxworth, in May, 1862.

Neriëne dentipalpis, *Wider.* This species is very closely allied to Neriëne longipalpis, and has long escaped distinction from that species by British arachnologists. Mr. Blackwall lately called my attention to its distinguishing peculiarities, by a reference to its description in Westring's 'Araneæ Suecicæ;' and on examining my specimens of N. longipalpis I found many specimens of N. dentipalpis among them. This is its first record as a British species, though the credit of its discovery is due entirely to Mr. Blackwall.

Walckenäera hiemalis, *Blackw.* An adult male of this species was met with on iron railings, at Bloxworth, in May, 1862. The species recorded as W. hiemalis (Zool. 7561) appears, on examination, to have been so named by mistake; and it turns out to be a very distinct and undescribed species; *now*, however, described above, under the name of W. altifrons.

Walckenäera obscura, *Blackw.* An adult male on iron railings, at Bloxworth, in April, 1862; also one in March, 1863, in the same place.

Walckenäera picina, *Blackw.* Males and females (adult) of this species tolerably abundant on iron railings, at Bloxworth, in April and May, 1862.

Walckenäera fuscipes, *Blackw.* Males and females (adult) among moss in woods, and one male on iron railing, Bloxworth, in March, 1863.

Family Epeiridæ.

Epëira patagiata, *Koch*. A male adult, and both sexes immature, of this species, on trees and furze-bushes, at Bloxworth, in a low damp situation, in June, 1862.

Tribe Senoculina.
Family Scytodidæ.

Savignia frontata, *Blackw.* Males of this remarkable species were not rare on iron railings, at Bloxworth, in March and April, 1862, and in March, 1863. Mr. Blackwall, unable to discover a fourth pair of eyes in this species, has included it (in its present position) among the six-eyed spiders (Senoculina). I have constantly fancied myself able to discover a fourth pair, though sometimes with great difficulty, at the apex of the frontal eminence; and I am borne out in my idea by the microscopical investigations, directed specially to this point, of Mr. Richard Beck (Lister Works, London); though, as the matter at present stands, Mr. Blackwall is yet doubtful on the point. Westring describes this species under the name Erigone conica ('Araneæ Suecicæ,' p. 220); and he there says, "Oculos duos intermedios anticos, ægre observandos," which exactly agrees with my own observations. In the event of its being decided to have *eight* eyes, it will have to be removed to the genus Walckenäera, with which it agrees in all generic characters, as well as by its general form and size.

O. Pickard-Cambridge.

Bloxworth, Blandford, Dorset,
April 1, 1863.

On the Name "Lithosia molybdeola." — The Rev. Joseph Greene having mentioned my name (Zool. 8468) in connexion with the Lithosia molybdeola of Guenée, I feel compelled, though very reluctantly, to say a few words on the subject. I admit that Mr. Gregson's name "sericea" was published in the 'Intelligencer' before my friend M. Guenée's 'Monographic Notice of the European Species of the Genus Lithosia' appeared in the 'Transactions of the Entomological Society of France;' but the practice of describing new species in ephemeral periodicals like the 'Intelligencer' is very objectionable.* In October, 1859, I sent specimens of all our Lithosiæ (except L. quadra and L. rubricollis) to M. Guenée, and among them two

* M. Guenée's paper upon the European Lithosiæ was read at the Meeting of the Entomological Society of France, on the 12th of December, 1860, and published immediately afterwards in the 'Annales.'

which Mr. Greening had kindly given to me some time previously. Soon afterwards I received a letter from M. Guenée, acknowledging the safe arrival of the insects, and containing a few hasty remarks upon some of them. He says of Mr. Greening's specimens:—"The two small individuals with clouded under wings, and abdomens gray as far as the anus, which you have sent as curious varieties of L. complana, appear to me to belong to a distinct species, which I shall design provisionally under the name of L. molybdeola. I wish you to say nothing of this at present, as they demand a more attentive examination than I have yet been able to give them." On the 11th of April, 1860, I received another letter from M. Guenée, in which he said that his opinion was unchanged with regard to the northern Lithosia, but he wished to see more specimens, and especially females, and was very desirous that the larva should be discovered. A few days afterwards I wrote to Mr. Gregson on the subject, and received a letter in reply, from which I will quote what relates to this insect: — "I was delighted to see your letter this morning, and will forward you some of our Lithosia from my cabinet. We have often remarked the dark under wings of our specimens; but we rarely see any from the South. I have one in my cabinet from the New Forest, as a variety. Females are scarce with us, as they do not fly much. I found one just creeping out of the lichen which covers the part of the moss where we take this insect. There are no trees, posts, sticks, or anything else, except the usual low herbage of the swampy part of our moss where this insect flies. It seems to be attached to the crisp lichen which grows on the flat parts of the moss. How we are to find the larva remains to be seen; however, I hope it is in good hands: what can be done will be done. It is always a pleasure to me to assist any one in working out the history of an insect, and especially you, who have so often assisted me." In the following autumn Mr. Greening wrote to me, and said that Mr. Gregson had read a description of this Lithosia at a Meeting of the Northern Entomological Society, and named it "sericea." I certainly was surprised when I heard this, and wrote to him saying that as he was aware that M. Guenée was at work upon a Monograph of the European species, I regretted his attempt to supersede him with regard to this insect. Mr. Gregson appears to have written a letter which I never received, but in a subsequent one he repeats what he said in that which was lost, *viz.*, that I did not tell him that M. Guenée was engaged upon a Monograph of the genus Lithosia, but only said that he was studying it. I had mentioned it to most of my friends, and supposed that Mr. Gregson was perfectly cognizant of M. Guenée's intention of publishing the result of his labours. I also think that, after what had passed between us, it would only have been an act of common courtesy on the part of Mr. Gregson to have mentioned to me his intention to name the insect before doing so. I will quote the admirable remarks of Major Parry upon this subject, published in the last part of the 'Transactions of the Entomological Society of London:' — "It certainly is very unimportant to Science in general, so long as new and interesting species are described, whether A or B describes them; but it is important to those connected with Science that there should exist a rigid system of mutual courteous consideration, with an entire absence of petty scientific jealousy." At the September Meeting of the Entomological Society, Professor Westwood said that the time required for composing and publishing Monographs was often very considerable, and much delay occurred, over which the monographer had no control: in such cases he thought that courtesy to the monographer should give him precedence over the authors of at least such descriptions

of detached species as appeared during the year in which the Monograph should be published.—*Henry Doubleday; Epping, April* 10, 1863.

[I beg this subject may now be dropped: it is evident that my friend Mr. Doubleday has never had any selfish feeling with regard to Entomology, but has always done everything in his power to assist his fellow-labourers in the science. It may be thought by most of my readers that there was no necessity for even this reply on his part; but to me it seems that a feeling of courtesy to Mr. Greene demands the explanation Mr. Doubleday has now given. I may add that I entirely and heartily concur in the spirit of the passages Mr. Doubleday has cited from Major Parry and Professor Westwood, and I should decline to enter into the question whether the description of M. Guenée or Mr. Gregson were the first printed. Mr. Gregson will, I trust, kindly accept these lines as an intimation that I respectfully decline his rather voluminous paper on the same subject.—*Edward Newman.*]

Remarks on a few Rare British Species of Lepidoptera.

By Mr. Thomas Huckett.*

Having for a short time in my possession continental specimens of some of our rarer British species of Lepidoptera I have taken the liberty of bringing them for exhibition, thinking that some of the members would feel interested in seeing a few of those species of which they may have heard, but have seen, perhaps, very little.

The species I exhibit are Pieris Daplidice, Argynnis Dia, Vanessa Antiopa, Lycæna Bœtica, Polyommatus Hippothöe, P. Chryseis, P. Virgaureæ, Sphinx Pinastri, Deilephila Euphorbiæ, Chœrocampa Nerii and Deiopeia pulchella. On some of these I have made a few remarks, which, with your permission, I will read.

Pieris Daplidice. Of this insect specimens have occurred in various parts of the country, according to the various notices of capture that have appeared from time to time in the 'Zoologist' and 'Intelligencer,' but its principal locality I believe is Dover, where our late member, Mr. Harding, took a specimen in 1860. This species is considered by most of our first entomologists to have good claims to be British, from one or two specimens occurring nearly every year, but whether the insect is, or ever was, a resident in this country is doubted by many, of whom I am one. Some of the members may ask, How is it possible they could be caught were they not to breed here? This question can be answered in more ways than one. The coast of France, where this insect may be taken very commonly, being such a short distance

* Read at a meeting of the Haggerstone Entomological Society, April 9, 1863.

from Dover, offers easy access to our shores by the following means. Suppose a ship bound for this country from France,—what is to prevent an insect taking refuge on board or in the rigging, passing a few hours away in rest after a long flight, and before it wakes from its dream being carried to a foreign country to die alone, far from all its relations. This mode of immigration is not merely a surmise of my own, but I have been informed that an insect was observed to travel from one country to another in the manner described.*

It is also a known fact that insects of various orders, including Lepidoptera, have the power of keeping on the wing a long time, and flying an immense distance, quite far enough to bring them from the shores of France to those of England. In confirmation of what I have written I extract a few lines from an article by the late Mr. Wolley in the fifth volume of the 'Zoologist' (Zool. 1900). He says, "Migratory flights of butterflies of various species have often been observed. Swarms of white butterflies have been actually seen to arrive at Dover. Can we doubt that the Sphinx Convolvuli as well as the locusts of last year, the Colias Hyale of two or three years before, the Vanessa Antiopa of some score years since, and also the occasional specimens of V. Antiopa, of Pontia Daplidice, of Argynnis Lathonia, and perhaps even of Papilio Podalirius, are arrivals from the Continent? Might we not even extend this to Colias Edusa, and consider it a more regular immigrant? Nay, the common Cynthia Cardui is a notoriously migratory butterfly, not even fearing to cross the snow of the highest Alps." With this extract I think I have clearly answered the question I thought would be asked by some of the members, How was it possible to take insects in this country that did not breed here? but I may observe that what I have written on the migration of insects is not confined to P. Daplidice, but will apply equally to most of the other species I exhibit.

Vanessa Antiopa. This butterfly has good claims to be called British from its repeated occurrence in Great Britain, though I can find but little evidence that the larva has ever been found in England. In 1859-60 a goodly number of this species were taken, but from what cause they should occur plentifully in one year and entirely disappear the next is a question yet to be solved, and one which opens a wide

* A relation of mine on leaving the pier at Calais observed the rigging of the steamer to be crowded with "white butterflies," which never left the position they had taken up during the passage. Whether they returned with the packet, and whether they were P. Rapæ, P. Napi or P. Daplidice I have no means of forming even a guess.—*E. Newman.*

field for investigation, for it is a subject that concerns a number of other species besides V. Antiopa.

Argynnis Dia. This insect is rather common in various parts of the Continent. Its claims to be considered British rest on the observations of the late Mr. Stephens in his various works on Lepidoptera; but in Mr. Newman's work on 'British Butterflies,' after noticing Mr. Stephens' observations, we read, "This insect has not the slightest claim to be considered British." But there is a notice of the capture of this insect of much later date than Mr. Stephens'. In the 'Intelligencer' for November 21, 1857, will be found an announcement of the capture of a specimen by a village lad, who knocked it down with his cap. Some doubt being thrown on the authenticity of the capture, in a communication which followed, caused the Hon. Charles Ellis to send a notice to the editor of the 'Intelligencer' to the effect that he himself had taken the specimen in the Rev. S. Hodson's garden, at Cookham Dean, near Maidenhead. Thus we see there were two recorded captures of one specimen. As might be expected a great number of communications followed an announcement so opposite to that first published. These conflicting statements seemed to confirm the doubts already existing on the subject, in which I fully participate, and think Mr. Doubleday perfectly justified in placing it among the reputed British species.

Lycæna Bœtica. This insect is of very rare occurrence in this country: the only notice of its capture is in the 'Zoologist' for 1859, by Mr. Newman, and conveys all the published information on the subject, from which I extract a few lines. He says, "I am indebted to Mr. Thomas Thorncroft, of North Lane, Brighton, for the information that a new butterfly had been taken near the Chalk Downs, on the 5th of August, 1859. The fortunate captor is Mr. M'Arthur of Brighton. The insect is common on the Continent, and simultaneously with its appearance at Brighton was seen in profusion along the northern coast of France and in the Channel Islands, so that its appearance here does not appear remarkable; nevertheless it can only be regarded, like P. Daplidice and C. Nerii, a purely casual visitor."* Thus we see that Mr. Newman considers the specimen to have blown over or migrated from the coast of France to that of England, and I think this the most correct view that can be taken,

* I have seen a second specimen taken near the same locality, of the authenticity of which I have not a shadow of doubt.—*E. Newman.*

and should have great doubts about calling this a British species until some half dozen or more specimens had been caught.

Lycæna Acis. There is no doubt of this insect being a good British species, though now of very rare occurrence. Notices of the capture of this species have appeared in the 'Zoologist' and 'Intelligencer' on one or two occasions from various parts of the country, and in 'Young England' for 1860 is a notice that the insect had been taken in Epping Forest by a gentleman living in the neighbourhood of the Caledonian Road, but of this capture I have very grave doubts. I think it more likely that the person who took the insect had mistaken a specimen of L. Argiolus to be L. Acis. As the under side of the two have some resemblance I think there is a chance of a mistake having been made, and it will not be the first time that such a blunder has occurred: I will relate an instance of mistaken identity. It is in the recollection of some of the members that a notice appeared in one of the earlier numbers of the 'Intelligencer,' signed by a late member of this Society, stating that he himself had taken a specimen of Pieris Daplidice at South Weald, Essex, and also recorded a second specimen taken in the same locality. This notice, as might be expected, raised doubts in the mind of some of our entomologists, and was the means of inducing one of them to visit the lucky captor, when, alas! both the specimens were pronounced without any hesitation to be females of the common orange-tip (*Anthocharis Cardamines*). Now, when A. Cardamines is taken and named as P. Daplidice I think I may be allowed to entertain doubts as to the correctness of the naming of a Lycæna Acis said to have occurred in Epping Forest. Its principal locality is near Leominster in Herefordshire, where Mr. Newman used to take it in considerable numbers, and where he still believes it has continued to abound.

Polyommatus Hippothöe. This beautiful insect is I fear now extinct in this country, but there is no doubt whatever that it was once a good British species, though now numbered with things of the past. The locality where it used to be taken in rather considerable numbers was the Fens of Cambridge and Huntingdonshire. Let us then inquire how it is possible that an insect once occurring commonly should be entirely exterminated. It is of course known to the greater part of the members that owing to agricultural improvements a large portion of the fens and marshy places in the country have been drained and turned into meadow land, and, since the food-plant of this insect grows in such places, it has been to a large extent destroyed, and thus the species has been restricted to places of small extent, where,

owing to its gorgeous colours, it has been an easy and tempting prey to all who sought it. And I think the brightness of its wings has had a great deal to do towards its extermination in this country, for who could have passed a large copper, whether an entomologist or not, without trying to catch it!

Polyommatus Chryseis. With this insect I am but little acquainted, but it is the opinion of many entomologists that the species has never occurred in this country, though it has been described in some of our works on Lepidoptera. I have copied what Mr. Newman says of this species in his work on 'British Butterflies:'—"An inhabitant of Europe. It is described by all our authors, yet no one, as far as my information extends, pretends to be the possessor of a single specimen."

Polyommatus Virgaureæ. I copy again from Mr. Newman for my information respecting this species. "An inhabitant of Germany and France. It is described without hesitation as a British species, but exists nowhere, unless in the imagination of the writers."

Sphinx Pinastri. This species is of very rare occurrence in this country, but is common on the Continent in several places. Records of the capture of this insect have been published from various parts of the country, though its claims to be called British do not appear to be considered sufficient, Mr. Doubleday placing it among the reputed species in his list.

Deilephila Euphorbiæ. This species, like the preceding, is also of very rare occurrence in this country, though common in various parts of the Continent, and especially in the British island of Jersey, from which Mr. Newman received a number of the larvæ two or three years ago. The insect was formerly taken in England by the late Mr. Raddon, who found the larvæ for several years on the sea spurge in some numbers. It has therefore good claims to a place in the list of British Lepidoptera. Mr. Newman speaking of this species says, "It has never been found in the perfect state in this country."

Chærocampa Nerii. This beautiful moth, like the two preceding, is also of very rare occurrence in this country, but is not at all scarce in various parts of Europe. I think it is the opinion of all entomologists that the specimens taken in this country have arrived here by migration and other means, and have not bred from native larvæ.

Deiopeia pulchella. Of this species Mr. Newman, in his work on 'British Moths,' says, "Mr. Doubleday has a single specimen, taken at Epping, and I believe there are two or three other specimens in

different cabinets." So by Mr. Newman's account this insect is very rare in this country, though not so I believe on the Continent.

With this species I bring my few remarks to a close, trusting I have not occupied the time and attention of the Society without imparting a little information, if not to all, to at least a few of the members. In conclusion I hope what I have read will be the means of inducing a discussion, and thus eliciting more information than I am able to impart.

THOMAS HUCKETT.

April 9, 1863.

Description of the Larva of Papilio Machaon.—Head much narrower than the body: body nearly uniformly cylindrical, but having the segmental divisions strongly marked; every part of the body emitting very short stiff black bristles; these are abundant and conspicuous on the 12th and 13th segments. Head green, with a yellow spot in the centre of the face; a black spot below this and above the mouth; two longitudinal black stripes down the face; a large spot outside these on each cheek; and a smaller black spot on each side of the mouth: ground colour of the body delicate green, the second segment having three black spots immediately behind the head, and again behind these spots is a transverse slit from which the larva can protrude at pleasure, but more particularly when annoyed, two yellowish divaricating processes, the use of which is not known; at the same time the creature emits a disagreeable scent; the interstices of the segments are velvety black and unspotted, and every segment, except the 13th, has also a transverse jet-black velvety band, in each of which, except that on the 2nd segment, are six bright orange-coloured spots; the 2nd segment has the black band unspotted, and the 13th segment has its place supplied by four roundish black spots; there is also a roundish black spot above the insertion of each leg, and two roundish black spots above each clasper; the side of each clasper is also black; the ground colour of the belly is paler green than the back, and is adorned with a series of large black markings. It feeds on Peucedanum palustre (hog's fennel) and Heracleum sphondylium (cow parsnep), and also in gardens occasionally on rue, and in confinement thrives very well on the leaves of carrot: when full-fed it ascends the reed-stems in the neighbourhood of its food-plant, and assuming a vertical or ascending position, fastens itself to the reed-stalk by its tail and by a silken belt round its body; it then turns to a chrysalis of a uniform pale yellow-green colour, the anterior extremity having four lobes or protuberances ranged transversely, the exterior ones much larger than the others; the thorax also has three distinctly pronounced prominences, one on each side, the others dorsal and median. It remains in the pupa state throughout the winter, and the perfect insects begin to emerge in the following May, and continue emerging until August; a constant succession of individuals appear on the wing, thus giving some colour to a prevalent belief that there are two or more broods in the year, a belief at variance with the facts that have come under my notice.—*Edward Newman.*

Description of the Larva of Melitæa Cinxia.—Falls off its food and rolls itself into a tight compact ring when disturbed. Head distinctly exserted, distinctly notched on

the crown, hairy, obviously of less diameter than all the other segments, except the 2nd and 13th. Body obese, slightly decreasing in size at the extremities, incisions distinctly marked ; on each segment are eight warts in a transverse series, each prolonged into a pointed conical process with rugose surface, and each seated in the midst of a fascicle of short stiff radiating bristles. Head red, shining, its hairs black: body intense velvety black, with belts of pure white dots in the incisions between the segments, its hairs intensely black; legs pitchy black ; claspers dull red. Feeds on Plantago lanceolata (ribwort or narrow-leaved plantain), and is full-fed at the end of April, when it attaches itself by the tail to the stem of the plantain, almost close to the ground, and there changes to a short stout pupa, which is of a very dark colour and almost smooth. I have found dozens of the pupæ in company. The insect remains but a short time in the pupa state, rarely more than a fortnight, sometimes less ; they continue to emerge during the whole of May and June, and continue on the wing, although in a very dilapidated condition, until the end of that month. The early history of this insect has already been given in the 'Zoologist' (Zool. 1271), by the able pen of the Rev. J. F. Dawson. The eggs are laid in batches on the plantain, and are hatched in August; the larvæ unite in spinning a web very compact and tent-like, forming a weatherproof domicile in which they hybernate. I had the good fortune to discover the now-celebrated habitat for this insect in the Isle of Wight, in 1824, finding larvæ, pupæ and perfect insects, but am induced to republish these particulars, Mr. Wright having kindly placed a full-grown larva in my hands. — *Edward Newman.*

Description of the Larva of Macroglossa stellatarum.—Rests in a straight posture, with the feet and claspers holding its food-plant ; never rolls in a ring when disturbed. Head of much less diameter than the body: body cylindrical, decidedly tapering towards the head, and having an acute straight horn on the 12th segment. Colour of the head glaucous-green, powdered with white points so minute as only to be visible under a lens of a high power: body glaucous-green, irrorated with circular white dots, which are arranged, although somewhat irregularly, in transverse series; on each side is a pure white stripe, commencing almost close to the head, and terminating in the caudal horn ; the green colour above this is rather more intense, making the white stripe more conspicuous ; caudal horn blue at the base, black in the middle and orange at the tip ; it is covered with scabrous points, each of which emits a bristle at the extremity ; spiracles black, with an orange point at each extremity ; below the spiracles on each side is a slightly waved pale yellow stripe, commencing immediately behind the head, and terminating on the 12th segment; margin of the anal aperture yellow; legs pinkish orange; ventral claspers with a black patch at the base, a white stripe in the middle, and rose-coloured at the extremity ; the white portion emits minute bristles; anal claspers pink only. Subject to vary to a red-brown colour. Feeds on Galium verum (ladies' bedstraw), and in confinement on Asperula odorata (sweet woodruff). I am indebted to the late lamented Mr. Hubert Oswald Fry and also to Mr. H. J. Harding for examples of these larvæ, which were full-fed on the 10th of August, 1861. By day they are generally to be found close to the ground, secreting themselves beneath the plants on which, by night, they feed.—*Id.*

Description of the Larva of Ino Statices.—Hybernates when very small at the roots of grasses, &c.; feeds again in April and May. When disturbed it falls to the ground, assuming a crescentic form, the two extremities approaching, but not touching. Head very small, withdrawn entirely into the 2nd segment except when

the larva is feeding: body obese, decreasing in size towards both extremities; the incisions between the segments deep and well marked; each segment has six flattened warts ranged in a transverse series, none of them very conspicuous, but each emitting a thin radiating fascicle of short stiff bristle-like hairs, among which are interspersed a few longer silky hairs; every part of the upper surface, the warts alone excepted, is covered with minute elongate black papillæ, which, viewed sideways, impart a black tint to the surface; these minute papillæ remind one forcibly of those stalked glands often observable in plants having a viscous surface. Median line of the back obscure white, narrowly bordered on each side with reddish purple; adjoining these narrow borders is a broad yellow stripe, swelling into a rounded lobe on each segment; below this stripe the sides are reddish purple; belly and claspers dingy yellowish white, legs shining black. In general appearance, and in some of its characters, this larva resembles that of Limacodes Testudo, while its hirsute warty surface reminds one of the ursine group; it differs but little in any important character from Zygæna, and certainly, in connection with that genus, constitutes a family exactly intermediate between the Cochliopodidæ and that large group to which Nola and Lithosia belong. Its food-plant is Rumex acetosa (sour dock or sorrel); it is full fed at the end of April, when it spins a white, very thin but very tough cocoon, attached to the stems of grasses, and in this it changes to an obese brown pupa, the anterior extremity of which is rather acute, the posterior remarkably obtuse; the dorsal surface is evidently incised at the division of the segments as in the larva, and the posterior margin of each segment slightly projects over the anterior margin of the segment next following; the wing-cases are ample and well-defined, and the cases of the legs extend slightly beyond the extremity of the abdomen. The perfect insect appears in June. I am indebted to Mr. Wright for the opportunity of describing this larva.—*Edward Newman.*

Description of the Larva of Zygæna Filipendulæ.—Hybernates when very small at the roots of grasses, &c.; feeds again in April and May. Rests in a straight posture, with both legs and claspers attached. Falls off its food-plant when touched or disturbed, feigning death and rolling itself in a ring, the extremities meeting. Head very small, retractile within the 2nd segment: body short, obese, somewhat onisciform, slightly decreasing in size towards each extremity; the incisions between the segments deep and distinct. Head shining black, with the clypeus and a spot at the base of each antennal papilla yellow; ground colour of the body dull yellow-green, with six longitudinal series of velvety black spots; one series, consisting of ten spots, on each side of a median dorsal line, one series on each side just above the spiracles, and one series below them on each side of the ventral surface; each spot in the dorsal series, when the larva crawls, is distinctly seen to be double or composed of two spots, one on the anterior and the other on the posterior margin of each segment; when the larva is at rest these meet so exactly that each pair has the appearance of a single spot; the lateral series is composed of spots, which are still more evidently double; and the third or ventral series on each side is composed of still smaller and less distinct spots, and on account of its situation is very imperfectly visible from above; it is continued as a band round the posterior margin of the 12th segment; each segment has eight rugose patches or flattened warts arranged transversely, and each of these emits a thin radiating fascicle of short silky hairs, each individual hair emanating from a minute black dot; the hairs are either black or pale, the latter predominating. The legs are opaque green at the base, black and shining at the apex; the claspers dull green, their fringe of recurved

hooks black. Feeds on Lotus corniculatus, Anthyllis vulneraria and other leguminous plants. Is full-fed in May, and spins a bright yellow glossy shuttle-shaped cocoon, very acute at both extremities, attached to the upright flowering stems of grasses; in this it changes to a smooth black shining pupa, from which the perfect insect emerges in June and July.—*Edward Newman.*

Occurrence of Xylomiges conspicillaris at Worcester.—I had a fine specimen of Xylomiges conspicillaris out, on the 14th of April, from a number of mixed pupæ dug under elm and oak. At present I have only had one out of 550 pupæ. Last year I also had one from about 700 pupæ, but it was unfortunately cramped.—*E. Horton; Wick, Worcester, April* 21, 1863.

Parasites and Hyperparasites.—In the course of last summer an investigation was instituted into the identity or otherwise of a pair of species of Lepidoptera, both of which are somewhat mouse-coloured and might be called without impropriety the town mouse and the country mouse. Both are common, very common, but there is this difference; one, Boarmia rhomboidaria of London collections, is confined to London, and looks dingy and very smoky, as though it had lived for centuries in this smoky city; the other, Boarmia rhomboidaria of Guenée, looks bright and fresh, and as though it had always lived in the country. I propose to leave the country insect in undisputed possession of Guenée's name, and to rechristen the cockney race Boarmia perfumaria, not on account of any delicious perfume it exhales, but because its appearance is so very, very smoky. Now as far as my investigations have yet proceeded there seems a constant although not great difference between the larvæ of the two species, a subject on which I trust I shall hereafter be able to dilate greatly to the edification of the readers of the 'Zoologist;' but I will not forestall. I have only to say now that the larvæ of Boarmia perfumaria have an occasional habit of not producing any Boarmia at all, but a neat little structure which vastly resembles a honeycomb in miniature. This structure is pronounced by Mr. Smith to be the habitation of a gregarious parasite, Microgaster alvearius, yet so great is its perversity that it refuses to produce Microgaster alvearius, and has produced instead two distinct species of Hymenoptera, the first of which appears to be parasitic on the second. They belong to the genera Pteromalus and Tetrastichus, and the species being both heretofore undescribed I have appealed to my friend Mr. Walker in their behalf, and he, with his customary courtesy, has written descriptions, which, being the pith and marrow of my communication, I arrange as a postscript. How the Pteromalus contrived to introduce its eggs into the Tetrastichus, and how the Tetrastichus managed to oust the Microgaster must for the present remain open questions for the consideration of the learned.—*Edward Newman.*

PTEROMALUS BOARMIÆ, *Walker.*

Fœm. Æneus, subtilissime punctatus; caput thorace paullo latius; antennæ nigræ, subclavatæ, thorace vix breviores, basi fulvæ; prothorax brevissimus; scutum subdepressum, parapsidum suturis vix conspicuis; metathorax virides-cens, tricarinatus; abdomen subsessile ellipticum, nigricante cupreum, basi æneo-viride, thorace paullo longius; pedes fulvi; alæ limpidæ.

Female. Bright green. Antennæ black, clavate, shorter than the thorax. Thorax elliptical, with the usual structure. Abdomen somewhat lanceolate, longer than the thorax; hind borders of the segments dark cupreous. Femora and tibiæ with yellow tips; tibiæ yellow at the base; tarsi black. Wings limpid; veins black; ulna longer

than the humerus; radius obsolete; cubitus of the usual length; stigma extremely small. Length of the body 1⅓ line; of the wings 2 lines.

TETRASTICHUS DECISUS, *Walker.*

Fœm. Læte viridis; antennæ nigræ, clavatæ, thorace breviores; thorax ellipticus; abdomen sublanceolatum, thorace longius, segmentorum marginibus posticis cupreis; femora tibiæque apice, tibiæque basi flava; alæ limpidæ, venis nigris.

Female. Dark æneous. Head and thorax extremely minutely punctured. Head a little broader than the thorax, slightly impressed between the eyes. Antennæ black, subclavate, inserted near the mouth, almost as long as the thorax; first joint tawny, long, slender; second elongate-cyathiform; third and fourth extremely short; fifth and following joints short, successively decreasing in length to the tenth; club lanceolate, longer than the ninth and tenth joints. Thorax nearly elliptical. Prothorax very short. Scutum somewhat depressed; sutures of the parapsides very indistinct. Metathorax greenish, of moderate size, with three slight keels. Abdomen subsessile, elliptical, blackish cupreous, concave above, flat beneath, æneous-green at the base, acute at the tip, a little longer than the thorax. Legs tawny; coxæ æneous. Wings limpid, with a diffuse indistinct brownish patch behind the ulna; veins brown; ulna about half the length of the humerus; radius shorter than the cubitus, and hardly half the length of the ulna. Length of the body 1½ line; of the wings 2 lines.—*F. W.*

Capture of a Bembidium new to the British Fauna in the North of England.—On the 2nd of this month I had the pleasure of capturing three specimens of Bembidium [Tachys] Fockii, *Hummel*, beneath stones on the sea-shore near South Shields. It is an insect of a very peculiar form, with broad, short and convex elytra. Some difficulty was met with in determining its genus, owing to the peculiar shape of the maxillary palpi, which have the second joint very large, and apparently without a minute terminal joint. Mr. Waterhouse, however, with his usual acumen, detected this joint, and furnished me with its specific name. It appears to be nowhere common, but nevertheless is very widely distributed, France, Tyrol, Switzerland, South of Europe, Madeira, Caucasus, Algiers and Syria being given as its habitats.—*Thomas John Bold; Angus' Court, Bigg Market, Newcastle-on-Tyne, April* 23, 1863.

The British Species of Helophorus.—Some remarks made by Dr. Schaum, during his late visit to England, led me to think some confusion existed in our species of the genus Helophorus, particularly in H. dorsalis; for the species standing as H. dorsalis of Marsham in our collections and those described by Erichson and Mulsant are all three different. When in Paris, in the winter, I took the opportunity of comparing a series of our British species with the rich collections there, and came to the conclusion that we have eleven species, *viz.*:—

1. H. rugosus, *Oliv.* Common.

2. H. nubilus, *Fabr.* Common.

3. H. intermedius, *Muls.* This I found not rarely at Liverpool last autumn in brackish water.

4. H. aquaticus, *Linn.* Common and very variable in size.

5. H. dorsalis, *Muls.* I obtained a fine series of this species at Liverpool. It is readily distinguished from H. granularis by its superior size and crenate striæ. H. lapponicus, *Thoms.*, must be very near this species from the description.

6. H. griseus, *Herbst.* The largest of the common small Helophori, and recognisable by its generally unicolorous elytra.

7. H. granularis, *Linn.* The commonest species, and very variable.

8. H. æneipennis, *Thoms.* About the size of H. griseus, with the elytra subæneous and the legs darker; the interstices of the striæ are also clearly more convex. This species and the two preceding were united by Mulsant, in his 'Palpicornes,' under the name H. granularis, and it is very possible that they may be found analogous to those found in Hydrobius globulus or Laccobius minutus.

9. H. nanus, *Sturm.* Formerly taken in Cambridgeshire, I believe, but I have never met with it. The smooth interstices of the thorax render it unmistakeable.

10. H. quadrisignatus, *Bach.* This is the species which generally stands as H. dorsalis in our collections; it is found, I believe, in brackish water near Gravesend. The dilatation and pattern of the elytra sufficiently characterize it.

11. H. arvonicus, *Muls.* All the specimens I have seen of H. pumilis of Erichson belong to this species. The true H. pumilis is a much shorter and broader insect. This may be recognised from our other indigenous species by the subcarinate interstices of its elytra.

While on the subject of Philhydrida, I may mention that I have identified as British the Philhydrus frontalis of Erichson and P. ovalis of Thomson from types sent me by Mr. Thomson.—*G. R. Crotch.*

Description of two new Species of Mycetoporus.—

Mycetoporus longicornis, (*Mäklin, Symbol.* 12, 11?); *Kraatz, Ins. Deutschler.* ii. 467, 14.

M. splendidus, *var.* 2, *Erichs. Gen. et Spec. Staph.* 287, 9.

I have recently taken, near Croydon, an example of this species (hitherto, I believe, unrecorded as British), and have since detected in Mr. Waterhouse's collection four other specimens, including one male, taken by him, at different times, near Erith and Croydon. It is closely allied to M. splendidus, but differs from that species in the following points:—In the first place, it is apparently always larger, somewhat flatter and broader, the thorax especially being wider; and I may here remark that the unvarying size of "one line" given by Kraatz for M. splendidus is evidently erroneous, as I have seen examples of that insect sent over by Kraatz himself, and which are precisely the same as our common species of that name, for which the smallest length given (and correctly so) by Erichson is one line and a half. Besides the above-mentioned differences of size and shape, M. longicornis also differs from M. splendidus in having the joints of the antennæ comparatively not quite so stout, with the terminal joint more oblong-ovate, and in the punctuation of its abdomen on the upper side being rather more remote. In colour also it differs very considerably, being more uniformly rufo-testaceous, with only a slight scutellar patch, and merely the base of the abdominal segments (especially the fifth and sixth) more or less pitchy; whilst M. splendidus has the head and often the greater portion of the elytra, pitchy or even black, and the abdomen more or less black, with the outer margins of the segments testaceous; beneath, in both species the metathorax is dark (but blacker in M. splendidus), and the under surface of the head is rufo-testaceous in M. longicornis, but black with the gular area yellow in M. splendidus. The antennæ, moreover, in M. longicornis are altogether lighter in colour, the *three* first basal joints being especially lighter, whilst in M. splendidus the *first* joint only is light. The principal distinguishing characters, however, of the two species are to be found in the male of each; in M. splendidus the

sixth segment of the abdomen in this sex on the under side is widely emarginate, the sides set with stiff black hairs, and the emargination itself filled up with a very thick bushy fringe of stout yellow hairs; the seventh segment is more deeply, but not so widely emarginate, the emargination having its sides also thickly fringed with stout yellow hairs and terminating at its upper and smaller end in a thick button of similar golden pubescence, the whole forming a very stout semi-erect cushion, slightly curved towards the apex of the abdomen. In M. longicornis the sixth segment is very gently emarginate, the sides set with stiff black hairs, and the emargination fringed with very short fine yellow pubescence; whilst the seventh segment is not so decidedly emarginate as in M. splendidus, the emargination being edged with short slight yellow hairs, and terminating at each outer angle in a pencil of long golden pubescence, the flat part of the under surface of the segment being clothed with very short fine yellow down. Altogether a very different appearance is presented when compared with the same parts in M. splendidus, and the distinctions are most easily seen by looking sideways at the apex of the under side of the male in each against the light, when M. splendidus will be found to exhibit a much more conspicuous and erect mass of hairs, &c. Fairmaire (Faune Franc. iii. 496, 13) considers M. longicornis a variety of M. splendidus,—as usual, ignoring the structural characters; "nimium ne crede colori" would be a good motto for a criticism on his work. The present position of both M. splendidus and M. longicornis at the end of the genus appears to me very unsatisfactory. How can they be allied to such an insect as M. pronus (clavicornis), with which they are associated both by Erichson and Kraatz? If they be true Mycetopori, why not place them at the head of the genus, as affording a better link to Boletobius than any other of their associates? indeed, it seems to me very doubtful whether their general structure would not warrant their being placed in the last-mentioned genus, near B. inclinans. The palpi are not sufficiently distinct to afford a cause for generic distinction, and the antennæ exhibit a very similar structure to that insect, whilst they are quite different from the other species of Mycetoporus. Boletobius also already includes species with the front tarsi in the males both dilated and not dilated; and both genera comprise insects in which the punctuation of the elytra is either scattered or in the form of single striæ.

Mycetoporus nanus, *Grav. Mon.* 28, 8 (Tachinus). *Erichs. Gen. et Spec. Staph.* 286, 7. *Kraatz, Ins. Deutschl.* ii. 463, 10.

I have recently detected the above species among some Coleoptera taken by Mr. A. Haward, near Croydon. Its very small size prevents it from being confounded with anything but M. clavicornis (M. pronus, *Erichs.*) and M. angularis, *Mulsant*, from the former of which it may be known by its more parallel shape and much narrower antennæ; also by having the abdomen less strongly punctured, by the large punctures on the anterior part of the thorax being closer to the front margin, and particularly by an accessory stria of punctures on each elytron, commencing at the apical margin, and running upwards for nearly the whole length of the elytron parallel to the dorsal row, and between the latter and the sutural stria. It may be as well to remark here, for the benefit of those who happen not to have examined the elytra in these insects, that the normal three rows of punctuations referred to by the authorities are situated as follows:—one along the outer reflexed margin, one running parallel with and close to the suture, and an intermediate or dorsal row parallel to both and rather nearer the outer edge than the suture. From M. angularis the present

insect may be known by its shorter elytra, and by the presence of the accessory row of punctures above mentioned. These three species have no oblique punctures on the sides of the thorax, but Fairmaire (*loc. sup. cit.* 493, 5) erroneously includes M. angularis in a section of the genus which he specifies as possessing these punctures. The normal colour of M. nanus appears to be black, with the apex of the elytra rufo-testaceous, but it seems to vary considerably in this respect, having sometimes the thorax and elytra pitchy, rufo-piceous, or testaceous, with the head darker. The British specimen I have examined is a small example of one of those varieties, being rufo-piceous, with the head and abdomen darker, the latter having the hinder margins of the segments and the entire apical segment testaceous. There appears to be another small species closely allied to M. nanus, also possessing a reduplicated dorsal stria, but not yet recorded as British; I allude to M. tenuis, *Mulsant*. This species is more linear in shape, more uniformly (and I believe invariably) light in colour, the joints of the antennæ more transverse, and the accessory dorsal stria more complete.—*E. C. Rye;* 284, *King's Road, Chelsea, May* 9, 1863.

Proceedings of Societies.

Entomological Society.

May 4, 1863.—Frederick Smith, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the respective donors:—'The Transactions of the Linnean Society of London,' Vol. xxiii. Part III., Vol. xxiv. Part I.; presented by the Society. 'Bulletin de la Société Linnéenne de Normandie,' Vols. i.—vii., 1855—62; by the Society. 'Annales de la Société Entomologique de France,' 3e Serie, Vol. iii., Trim. 2—4, 1855; Vol. vii., Trim. 1—4, 1859; Vol. viii., Trim. 1—4, 1860; 4e Serie, Vol. i., Trim. 1—4, 1861; Vol. ii., Trim. 1—4, 1862; by the Society. 'Descriptions of Twenty New Species of Australian Coleoptera belonging to the Families Cicindelidæ and Cetoniidæ,' 'Descriptions of Twenty New Species of Buprestidæ belonging to the Genus Stigmodera, from the northern parts of Australia,' by William MacLeay, jun., Esq., M.L.A.; by the Author. 'The Intellectual Observer' for May; by the Publishers. 'The Zoologist' for May; by the Editor. 'The Journal of the Society of Arts' for April; by the Society. 'The Athenæum' for April; by the Editor. 'The Reader' for April; by the Editor. 'The Weekly Entomologist' for 1862—3; by the Editor. A Collection of upwards of 100 Volumes of Works on Bees and Bee-keeping; deposited in the Library by the Apiarian Society, on certain conditions embodied in a Minute of Council dated the 6th of April, 1863.

Exhibitions, &c.

Mr. S. Stevens exhibited a collection of insects from the Feeje Islands, consisting principally of Coleoptera, and comprising many new species; also a collection from Madagascar, sent home by Mr. Plant, containing Coleoptera and some fine Lepidoptera, conspicuous amongst which was a new Diadema; also a collection from the Cape of Good Hope, sent by Mr. Trimen; also some spiders of enormous size from

Bogotà; and a single specimen of a Coleopterous insect received from Australia, which appeared to be precisely identical with the British Sinodendron cylindricum, and which, it was suggested, had probably in the larva state been imported into Australia from this country, in wood.

Mr. M'Lachlan exhibited the case of a caddis-worm (a species of Limnephilus), which was almost entirely composed of from 250 to 300 minute shells of a Planorbis, arranged with the utmost regularity, so as to resemble a piece of mosaic.

Mr. Edwin Shepherd exhibited specimens of Biston betularius, which had been raised from eggs forwarded to him from Lancashire by Mr. Edleston. In the course of last year Mr. Edleston had found a pair of that species *in copulâ*, one of the specimens being of the usual gray colour, and the other of the black variety occasionally found in the North of England: the eggs forwarded were the fruit of that union, and Mr. Shepherd had succeeded in breeding twelve specimens of the perfect moth; of these, eight were of the normal colour, and four of the negro variety; ten of the twelve were females, and of the two males one was of the typical form and the other was a negro. The whole of the larvæ were fed on the same food, principally on lime leaves. It was remarkable that the negro variety had never been captured in the South, and that even in the North no intermediate forms had ever been met with to connect and link together the light gray type and the sooty black variety.

Mr. Waring exhibited some dead pupæ of drones, which he had found near the mouth of one of his bee-hives: the pupæ had not quite arrived at maturity, and it would seem that the bees must have cut off the caps of the cells containing them, and have cast them out of the hive. He was unable to throw any light upon the cause of the death of the pupæ.

Mr. T. W. Wood made some remarks on the mimicry of Nature by herself, as exemplified by the colouring of the under side of the wings of Anthocharis Cardamines, and on the utility of such mimetic resemblances in the preservation of insects. During the present month of May, towards evening or in cloudy weather, the orange-tip butterfly might be found at rest in exposed situations by the sides of roads and lanes, on the tops of grass and flowers, but more particularly on Anthriscus sylvestris, and almost always in the neighbourhood of that plant: the chequered white and green, which alone were visible when the insect was at rest, exactly represented the small white flowers of the Anthriscus, as seen against the green background of the hedgerow behind. It was remarkable also that the butterfly did not appear to be partial to the Anthriscus, except as a secure resting-place, but preferred to hover over and suck the juices of the wild geranium and other flowers.

Mr. Waterhouse exhibited British specimens of Oxypoda lentula, *Erichs.*, *Kraatz*, &c., Oxypoda misella, *Kraatz*, Trechus obtusus, *Erichs.*, and Bembidium (Philochthus) Mannerheimii, *Sahlberg;* and read the following notes on those species:—

"1. The Oxypoda lentula is about equal in size to the Homalota Fungi, and has antennæ with very nearly the same proportions as to length and thickness, but the elytra and basal half of abdomen are rather narrower, and hence the general form is more inclining to the linear. The colouring is dullish slaty black, reminding one of the Myllænæ in this respect; the antennæ and legs are piceous, the knees and tarsi a little paler than the other parts; the punctuation of the upper parts is very fine and dense throughout, a little less dense on the head; and the insect is densely clothed

with fine ashy pubescence. In certain lights the elytra exhibit an indistinct faint brownish tint, and the apex of the abdomen is more distinctly tinted with brown. The thorax has a pretty distinct transverse fovea behind, and running forwards from this is a faint dorsal channel, which, however, disappears near the front of the thorax. The basal joint of the posterior tarsi (which are but of moderate length) is equal in length to the two following joints, taken together; and joints two, three and four are very nearly equal to each other. I have taken this insect in the Hammersmith Marshes.

"2. Oxypoda misella belongs to the little section of the genus, the species of which have the elytra shorter than the thorax. Of this section but two British species have hitherto come under my notice, *viz.*, O. annularis of Mannerheim and O. brachyptera of Kirby = O. ferruginea of Erichson. The species regarded as O. misella now exhibited was taken near Wickham, by Mr. Rye, and was at once separated by him from the other two species above named, in company with which it was found, through its dark colouring combined with its comparatively short antennæ. In the structure of the antennæ it most nearly resembles O. annularis, the terminal joint being short (very little longer than broad), as in that insect, and the intermediate joints being strongly transverse; but these organs are rather less stout in O. misella than in O. annularis, and are of a dark pitch colour, excepting at the base. The insect, moreover, is rather smaller, and its general colour is pitchy; the thorax and elytra, apex of the abdomen and the edges of the abdominal segments more or less rufous-piceous; the legs and base of the antennæ testaceous. O. annularis is entirely rufous-testaceous, with the exception of the head and middle of the abdomen, which are somewhat dusky. O. brachyptera is usually intermediate in its colouring between the above-mentioned two species; its antennæ, thorax, elytra, and the base and apex of the abdomen, are ferruginous. Here the antennæ, if bent backwards, would nearly extend to the apex of the elytra (the same organs would fall considerably short of the same point in the other two species); the intermediate joints are moderately transverse, and the terminal joint is fully twice as long as broad. The elytra are rather longer, and the punctuation is more distinct and somewhat rugulose, which is not the case in O. misella and O. annularis.

"3. Of the specimens of Trechus obtusus which are exhibited, one is from the Continent, having been kindly sent to me by Dr. Schaum; the second is British, and stood in my collection for many years under the MS. name 'lævis,' it having been so named by me and separated from the T. minutus, chiefly in consequence of the almost total obliteration of the striæ of the elytra. In the fifth volume of Stephens' 'Illustrations' (Mandibulata), and in the 'Manual' by the same author, an insect is very briefly described under the name 'T. lævis, *Waterh.*'; whether the description was taken from this specimen I am not aware, but as there is no insect in Stephens' collection to represent the species, the exhibited specimen is probably the original of the description. However this may be, it will be seen by the members present that the British specimen agrees perfectly with the continental one, and differs from T. minutus chiefly in having the elytra shorter, more convex and of an ovate form, the broadest part being in the middle, whilst in T. minutus the elytra are broadest behind the middle, and the striæ of the elytra being all obliterated, or very nearly so, excepting the three nearest the suture. In T. minutus there are at least four distinct striæ on each elytron. The last-named insect, moreover, is provided with perfect wings, whilst in T. obtusus the wings are rudimentary.

"4. For Bembidium Mannerheimii, recently detected by Mr. Rye amongst

our British species, I have a new locality to record; the specimens exhibited were taken by me at Darenth Wood."

The Secretary read a letter from Dr. Hagen, of Königsberg, in which, after thanking the Society for having elected him one of its Honorary Members, he expressed a hope that British entomologists would assist him in rendering more perfect his recently-published 'Bibliotheca Entomologica'; if the entomologists of this country would communicate to this Society every error or omission, with respect either to the authors or their works, which they noticed in the 'Bibliotheca,' and such additions as from time to time became necessary, and the Society would communicate the same to him (Dr. H.), he trusted that, by the assistance and cooperation of this and other Societies, which had been requested to do likewise, a future edition of his recent work might be made a good foundation for a complete and perfect record of entomological bibliography.

The President mentioned that Professor Lacordaire, of Liège, in a letter returning thanks for his election as an Honorary Member, had enclosed a photograph of himself, in the belief that this Society, like that of France and other scientific bodies, was forming a collection of likenesses of its members. The Council had taken the subject into consideration, and having regard to the regret which was now felt at the absence of any such memorial of some of our distinguished entomologists (*e.g.*, the late James Francis Stephens), and to the interest which, after the lapse of a few years, would doubtless attach to such a collection, had determined to provide a proper book for the reception and preservation of photographs of such Members and Subscribers as would be kind enough to present their likenesses to the Society. He trusted that the existing Members of the body would readily respond to this invitation.

Special General Meeting.

The Secretary gave notice that a Special General Meeting would be held on Monday, the 1st of June, at 8 P.M. (or so soon thereafter as the business of the Ordinary Meeting should be concluded), to consider whether the Society's collection of British Insects should be retained or disposed of; and that at such Meeting Resolutions would be proposed with a view to carry into effect the recommendations to the Council, which were agreed to by the Library and Cabinet Committee at its meeting held on the 30th of March last.—*J. W. D.*

Clava multicornis.—Several clusters of this beautiful Polyp were brought to me on the 24th of March, attached to Fucus, which was found growing upon two pieces of rock at the Dingle. Mr. Byerley, in his 'Fauna of Liverpool,' speaks of it, on the authority of Mr. Price, as being "found on loose and floating Fuci washed into the Mersey." They were brought to me, with other specimens, by James Woods, a poor youth who is quite a genius in hunting for marine and freshwater specimens, by which he gains a precarious living, likewise many colds and much rheumatism.—*Thomas J. Moore, in 'Naturalist's Scrap Book,'* Part i. p. 5. [I am very much pleased to receive this useful and unassuming little journal, to which I wish every possible success: Liverpool entomologists should especially patronize it; to them it will be as useful as the 'Weekly Entomologist' to our entomological friends at Manchester.—*Edward Newman.*]

Notices of New Books.

'*The Birds of India; being a Natural History of all the Birds known to inhabit Continental India.*' By T. C. Jerdon. In two Volumes. Vol. I. Calcutta, 1862.

To the student of Indian Zoology it has long been felt most painfully that the researches of naturalists, however valuable, however profound, are so scattered, and so difficult of access, that a force comparable to that of the quartz-crushing machine must be applied to them before the pure gold can be eliminated and collected. To examine thoroughly the lists of Mr. Hodgson and the valuable papers by Mr. Blyth, scattered through twenty volumes of the 'Journal of the Asiatic Society' and various English periodicals, is a task of no ordinary toil; but when we add the works of Hartlaub, Temminck, Horsfield, M'Clelland, Hutton, Sykes, Tickell, Gould, Pennant, Jardine, Selby, Bonaparte, Gray, Royle, Franklin, Burgess, Adams, Tytler, Kelaart, and of Mr. Jerdon himself, the task becomes one of fearful and almost overwhelming magnitude, and certainly palliates many little imperfections, some of which the author has himself perceived, and amended in the list of errata. I feel disposed to be very lenient to printer's errors, on the principle that it is highly dangerous for those residing in glass houses to pelt their neighbours with stones; but we can scarcely charge on the printer such mistakes as calling the king of the vultures, Sarcoramphus Gryphus; or the condor, Sarcoramphus Papa, — mistakes by which the value of the work is certainly impaired. The captious critic might enlarge on this theme, and revel in a prolonged errata-list, dwelling especially on errors of punctuation, of which very curious examples might be cited;* but let those who undertake this task communicate direct with the author, and refrain from publishing what might damage the sale of a work the design of which is most excellent, and which will hereafter form, if completed, a foundation, a start-point, for all future writers on Indian Zoology.

The volume before me is only intended as the first of a series: the introductory page, after pointing out the advantage, or rather necessity, of such a series, proceeds thus:—

* For instance,—"It is also said to hurl chamois, or even on the Himalayas Ovis, Ammon off precipitous cliffs by a sudden swoop, to feed on the mangled carcases."—(P. 15).

"To meet this want it is proposed to publish a series of such manuals for all the vertebrated animals of India, containing characters of all the classes, orders, families and genera, and descriptions of all the species of all mammals, reptiles and fishes found in India."

This is indeed a vast and ambitious design; and the result will be invaluable if the work be executed in the same spirit in which it is conceived. The first volume, commencing with the vultures and ending with the thrushes, is now complete, and is prefaced by an introduction to the study of Ornithology, which contains a vast amount of useful and well-digested information; touching lightly on the views of Darwin as to the origin of species, on the fantastic arrangements of MacLeay and Vigors, and on the identity, parallelism or affinity of closely-resembling species inhabiting localities widely separated. There are also a few wholesome and sound paragraphs on the existence of a "special design" in creation, "a certain system" that may be studied with great advantage. The observations on arrangements are well and clearly written, the author entirely ignoring my binary arrangement of birds into Gymnogens and Hesthogens, yet making a separate order of the pigeons, because their gymnogenous character will not allow of their association with the hesthogenous game birds. But let the author speak for himself: as examples of his style I select the following detached and isolated passages:—

Falco peregrinator.—"The shahin falcon is found throughout the whole of India from the Himalayas to the extreme South, extending into Affghanistan and Western Asia. It is, however, far from being a common bird. Its habitual resorts are high rocky hills in the neighbourhood of jungle and forest-land, whether in a low or mountainous country, though the latter is always preferred. In the Carnatic, which is nearly devoid of forest, the shahin is but seldom met with, yet there are certain spots even there where individuals of the species resort to after the breeding-season, being chiefly young birds, and they are known to breed in various parts of the range of Eastern Ghauts. Its habits in a wild state vary somewhat according to the kind of country frequented. If a denizen of a forest, it watches on some lofty tree at the skirts of a glade, or hovers over it, ready to pounce on any unlucky bird that ventures to cross. In more open country it is necessitated to take a wider circuit in search of its prey, and is of course much more on the wing. Such birds are more highly prized for training than forest-bred birds, which are therefore seldom sought for. This falcon destroys large quantities of game, partridges, quails, &c., and is said to be very partial to paro-

quets. This assertion is corroborated by the fact of my having first obtained a specimen of the Alexandrine paroquet by the agency of a shahin, which pounced on a flock crossing a glade of a forest in Malabar, and carried one off, but dropped it on my firing at it. Very lately, too, one belonging to me having lost a partridge, at which it was flown, took a long though unsuccessful flight after some paroquets it spied high up in the air. One I shot in Travancore, just after sunset, was busily devouring a goatsucker it had captured. The shahin breeds on steep and inaccessible cliffs. I have seen three eyries, one on the Neilgherries, another at Untoor, and a third at the large waterfall at Mhow. It lays its eggs in March and April, and the young fly in May and June, when they are caught by the falconers. The royal falcon of the East (as its Indian name implies) is very highly prized by the natives for hawking, and it is esteemed the first of all the falcons, or black-eyed birds of prey (as they are called in native works on falconry), the large and powerful bhyri (the peregrine) even being considered only second to it. Although hawking is now comparatively at a low ebb in India, yet many individuals of this species are annually captured in various parts of the Peninsula, and taken for sale to Hydrabad and other places where the noble sport of falconry is yet carried on, and they sell for a considerable price. The shahin and other falcons are usually caught by what is called the Eerwan. This is a thin strip of cane, of a length about equal to the expanse of the wings of the bird sought for. The ends of the stick are smeared with bird-lime for several inches, and a living bird is tied to the centre of it. On observing the hawk, the bird, which has its eyes sewn up to make it soar, is let loose, and the falcon pounces on it and attempts to carry it off, when the ends of its wings strike the limed twig, and it falls to the ground. The birds usually selected for this purpose are doves, either Turtur risorius or T. humilis. The shahin is always trained for what, in the language of falconry, is called a standing gait, that is, is not slipped from the hand at the quarry, but made to hover and circle high in the air over the falconer and party; and when the game is started it then makes its swoop, which it does with amazing speed. It is indeed a beautiful sight to see this fine bird stoop on a partridge or florikin which has been flushed at some considerable distance from it, as it often makes a wide circuit round the party. As soon as the falcon observes the game which has been flushed, it makes two or three onward plunges in its direction, and then darts down obliquely, with half-closed wings, on the devoted quarry, with

more than the velocity of an arrow. This is of course a very sure and deadly way of hunting, but though infinitely more exciting than the flight of short-winged hawks, is certainly not to be compared in interest to the flight of a bhyri from the hand after the heron or the douk (*Tantalus leucocephalus*). The shahin is usually trained to stoop at partridges and florikin (*Otis aurita*), also occasionally at the stone plover (*Œdicnemus crepitans*) and the jungle fowl. It will not hover in the air so long as the laggar, which, being of a more docile and patient disposition, will stay up above an hour."—(P. 26).

Haliastur Indus.—"The Brahminy kite is found throughout all India; abundant on the sea-coasts and in the vicinity of lakes and wet cultivation; rare in the dry plains of Central India and the Deccan. Colonel Sykes says that it 'usually seizes whilst on the wing, but occasionally dips entirely under water, appearing to rise again with difficulty.' This I have never witnessed, nor has any one I have questioned on the subject, and their name is legion. He also says, 'It is quite a mistake to suppose it feeds on carrion.' Mr. Smith, as quoted in 'Notes on Indian Birds,' says, 'This bird is among the first objects which attract the eye of the stranger, for they swarm about the shipping at Calcutta, and are useful in removing any offal which may be thrown away; but though their usual food is carrion, yet they kill fish, and not unfrequently carry off a snipe which a sportsman has levelled.' Hodgson says it feeds chiefly on insects, and quests like a Circus. From my own observations it certainly prefers aquatic food, and is most numerous in the vicinity of sea-shores, large rivers, tanks, and rice cultivation. About large cities and towns where there is much shipping, it gets its chief food from garbage and offal thrown overboard, or occasionally from what is thrown out in the streets and roads. Near large rivers or lakes it manages to pick off the surface of the water small fishes or a prawn occasionally; but its chief food, away from towns and cantonments, is frogs and crabs, which abound in all rice fields, and the remains of which last, picked clean, may be found so abundantly along the little bunds that divide the fields from each other. It will also eat water insects, mice, shrews, and young or sickly birds; and many a wounded snipe I have seen carried off by the Brahminy kite. In wooded countries I have seen it questing over the woods and catching insects, especially large Cicadæ, and I have also seen it whip a locust off standing grain. Now and then it gives hot chase to a crow, or even to a common kite, and forces them to give up some coveted piece of garbage or dead fish: when thus employed it exhibits considerable speed and

great energy. It is much on the wing, soaring lazily about cantonments, or up and down rivers; but after a time seats itself on some palm or other tree, on the mast of a ship, and even on the ground. Near cities it is very tame and fearless, and I have often seen one catching fish thrown up to it by some pious Hindoo. It is said sometimes to carry off young chickens and pigeons, but I have not myself witnessed this. If the food it has seized be small, it devours it as it flies; but if large it generally sits down on the ground or the bund of a paddy field, or carries it off to a lofty tree."—(P. 102).

Milvus govinda.—"This is one of the most abundant and common birds in India, found at all elevations up to 8000 feet at least, especially near large towns and cantonments; and its vast numbers and fearlessness are among the first objects that strike the stranger from England, where birds of prey are so rare. Every large town, cantonment, and even village, has its colony of kites, which ply their busy vocation from before sunrise to some time after sunset. Every large camp, too, is followed by these useful scavengers, and the tent even of the single traveller is daily visited by one or more, according to the numbers in the neighbourhood. As is well known, kites pick up garbage of all kinds, fragments of meat and fish, and generally the refuse of man's food. When a basket of refuse or offal is thrown out in the streets to be carted away, the kites of the immediate neighbourhood, who appear to be quite cognizant of the usual time at which this is done, are all on the look-out, and dash down on it impetuously, some of them seizing the most tempting morsels by a rapid swoop, others deliberately sitting down on the heaps, along with crows and dogs, and selecting their scraps. On such an occasion, too, there is many a struggle to retain a larger fragment than usual; for the possessor no sooner emerges from its swoop than several empty-clawed spectators instantly pursue it eagerly, till the owner finds the chase too hot, and drops the bone of contention, which is generally picked up long before it reaches the ground, again and again to change owners, and perhaps finally to revert to its original proprietor. On such occasions there is a considerable amount of squealing going on. The vast numbers of these kites in large towns can hardly be realised by strangers. Captain Irby mentions having seen one hundred together, but in Calcutta and elsewhere two or three hundred may be seen at one time. They are excessively bold and fearless, often snatching morsels off a dish *en route* from kitchen to hall, and even, according to Adams, seizing a fragment from a man's very mouth; and several anecdotes illustrative of this are told

by different observers;—*vide* Blyth, Sykes, Adams and Burgess. At our sea-ports many kites find their daily sustenance among the shipping, perching freely on the rigging, and, in company with the Brahminy kite, which rarely enters towns, snatching scraps of refuse from the surface of the water. Away from the haunts of man, some seek their reptile or insect food over the fields and hedgerows, or, with the Brahminy kites, hunt the edges of tanks, rivers and marshes for frogs, crabs and fish. The flight of the Indian kite is bold, easy and graceful, when once mounted aloft, though somewhat heavy on first taking wing; and it soars slowly about, in greater or less numbers, in large circles. When in pursuit of another kite it is capable of considerable speed, and shows great dexterity in suddenly avoiding any obstacle and changing its course; in this its long tail is of course a great help. Occasionally one may be seen dropping down almost perpendicularly from the top of a house, on a piece of offal in a narrow street, but in general it reaches the ground from a height by a series of oblique plunges. Now and then one will seize a chicken, or wounded bird of any kind; and Mr. Blyth mentions that he once knew one to kill a full-grown hen. Mr. Phillips says it is 'a very cowardly bird; for though it will carry off parrots and chickens, it is yet afraid of the crows and sparrowhawks. It will allow crows to pull to pieces a bit of meat before it, which it is evidently desirous to obtain.' This hardly accords with my observation; for though it is generally on sufficiently good terms with the crows in company with it on a heap of garbage, yet I have frequently seen it pursue a crow, and force it to relinquish some coveted morsel. Blyth, too, mentions that he had been told, on good authority, that a kite will sometimes seize a crow. The crows, however, often tease a kite, apparently without any object but that of a little amusement to themselves. The food of the kite is usually devoured on the wing, or, if too large, carried to the nearest house or tree. Mr. Blyth notices their collecting in numbers without any apparent object, especially towards evening. This I have frequently observed at all large stations, where the whole kites of the neighbourhood, before retiring to roost, appear to hold conclave. They are said to leave Calcutta almost entirely for three or four months during the rains. I have not noticed this at other places. As remarked by Buchanan Hamilton, they may often be seen seated on the entablatures of buildings, with their breast to the wall, and wings spread out, exactly as represented in Egyptian monuments. The kite breeds from January to April, beginning to couple about Christmas; and great is the squealing going on at this time *more felino*.

Their cry is a prolonged tremulous squeal, whence the Indian name Chil (cheel). The nest is made of sticks, often lined with rags, and placed on trees, or on houses and other high buildings, more rarely on rocks; and the eggs, two or three in number, are generally dirty or greenish white, with or without a few pale brownish or rusty blotches."—(P. 105).

Spotted Owlet. — "The spotted owlet is one of the most common and universally-spread birds in India, from the Punjab to Burmah and Ceylon. It also extends to Persia and other parts of Asia. It is found everywhere, except in the dense forests; and it does not ascend the hills to any great height. Every clump of trees, and often a large single tree, especially near a village, is sure to be tenanted by a pair, or a small colony, of these noisy birds. It often takes up its abode, and roosts during the day, in the eaves of houses, or under the roof; and if anything disturbs its rest, comes forth with its noisy, chattering and disagreeable chorus. About sunset it is always on the alert, and soon after sunset it sallies forth to feed. It takes short flights, frequently seating itself on the ground, or a paling, or low branch, or outhouse; and thence captures beetles and other insects on the wing, or snatches one off the branch of a tree; now and then taking a low and undulating flight over the plain or garden, and dropping on any small mice, shrew, lizard or insect it may spy on the ground. I have seen it capturing white ants on the wing, along with bats, &c. Its usual call is a double note, which is frequently heard at all hours; and when there are several together they all take it up, appearing to be squabbling among themselves. It is a very familiar bird, not easily driven away from the quarters it has taken up. It breeds in holes of trees, or holes in walls, or old buildings, or in the eaves of houses occasionally. I got some eggs from the roof of my own house at Trichinopoly. It lays usually two to four eggs, which are white and round, from February to June. In Southern India it is regarded with aversion. It is used by some Shikarees for catching small birds. They snare one, or catch one with a rod and bird-lime, and, taking it to the jungle where the wished-for birds reside, tie it on the ground near a low bush, and smear most of the outer twigs of the shrub with bird-lime. The little owlet is soon espied by some bird, and as it is notoriously held in dislike by all small birds, a chatter of alarm is loudly given forth, and joined in by all new-comers, some of which perch on the well-limed branches; and when the Shikaree sees those he wishes caught, he runs from his place of concealment, and secures the captives. I am told that this mode of capturing

small birds is often resorted to in Italy and the South of Europe." — (P. 142).

Common Indian Swift. — "The Indian swifts breed always in company, in colonies of various numbers. Their nests are composed of feathers, grass, straw, cotton rags, sometimes pieces of paper, agglutinated firmly together by the secreted mucus of their salivary glands, occasionally, perhaps, mixed with mud and rubbish. The inside of the nest is hard, glistening and smooth, and feels, says Theobald, like 'coarse card-board.' They vary much in shape; sometimes a first year's nest is open at the top, but they are usually closed, and communicating by the side; at times of moderate size, at other times very large, and communicating by a sort of tubular neck. They are very solid and heavy, and often very closely packed together. They are built against the rafters or beams, under the roofs of huts and houses, in the corners of old stone buildings, and in verandahs, either inside or outside, if there is protection from sun and rain. Various observers describe the nest as somewhat differently constructed. Burgess says that he has seen their nests crowded together under the roofs of old buildings, choultries and temples; one nest, from a rock, was built of mud, lined with grass, and contained two white eggs. Layard states that in Ceylon they breed in great numbers on rocks, also under bridges; and that the nests, built in clusters, are composed of mud and grasses, with a small round entrance, precisely resembling those of the martin (*Hirundo urbica*); the eggs from two to four in number, pure white. Adams says that the nest is of mud mixed with wool and feathers. In some of these cases the great weight and solidity of the nests may have led the observer to conclude that they were made with mud. The nest has generally a slight hollow in one place for the reception of the eggs, which are usually two in number, sometimes three, and pure white. Several birds, occasionally seven or eight, occupy one nest for roosting. The birds are very watchful at night, on the least noise, commencing their monotonous pipe. They are said by some to breed repeatedly, generally, I think, twice a year. It is a permanent resident in India, but does not appear to be found out of our province. The flight of this swift is fluttering and irregular on first sallying from their nest in the early morning, and also at sunset just before they retire to roost; small parties at these times may be seen flying close together, rather high up in the air, and slowly, with much fluttering of their wings and a good deal of twittering talk; and after a short period of this intercourse, all of a sudden they separate at once, and take a

rapid downward plunge, again to unite after a longer or shorter interval. Their voice, remarks Mr. Blyth, is a sort of shivering scream rather than a twitter."—(P. 178).

Indian Edible-nest Swiftlet.—"In 1846 I paid a visit, in company with Mr. Ward, M.S.C., to Pigeon Island, some miles out at sea to the south of Honore, which was said to be a resort of these birds. We found a large cavern at one end of the island, with a few of the nests, but of the second make, and inferior to the first, being mixed with feathers and extraneous matter. There were no eggs at this season (the end of December), and we did not see any of the birds to identify the species. A native who had guided us to the cave said if we waited till 8 or 9 o'clock P.M. the birds would come. We instructed him to do so, and to catch some of them in a net he had with him for the purpose. Next day he returned to Honore, bringing several individuals alive of this species. He said they had not returned till 9 P.M. What a vast distance these birds must have come from, to have taken full three hours after sunset to reach their homes, and what powers of sustained flight are here shown! It is known to have other breeding places on the Malabar coast, *viz.*, the Vingorla rocks, where one hundred weight of nests is said to be produced annually; if so, this must be the largest breeding spot on the coast: also the Sacrifice Rock, twenty miles south of Tellicherry; besides, I dare say, others. I visited Sacrifice Rock in March, 1849. (It is so called because Hyder Ali was said to have left state prisoners, and others occasionally, on this perfectly bare rock to die of hunger and thirst). There is one cave here which had perhaps fifty to a hundred nests, and a few had eggs in them. Very few of the nests were of the first make, these being annually taken away by some moplahs from the mainland. The birds were at this time flying about, feeding on the flies which abounded at the edge of the rock. About twenty couples, perhaps, were present, not more. I doubt if all the places I have enumerated on the western coast would contain the nests of a quarter of the number of these swiftlets which I have seen at once in one locality. If so, where do the others breed? It has been suggested that they may nestle in inland caves, but all my inquiries have failed to discover any in India. Mr. Layard has, however, visited some caves in Ceylon where they breed."—(P. 183).

I have said that Mr. Jerdon touches lightly on the views of Darwin as to the origin of species, and on the identity or otherwise of closely-affined species inhabiting localities widely separated: the two paragraphs on these subjects are so well worthy of an attentive perusal

that I need make no apology for extracting them. The hypothesis that a race may so alter, under altered conditions, that its differences shall become specific or generic, is asserted and maintained by Mr. Darwin and his followers; and the imposing array of facts, exhibiting such differences in progress, does as great credit to the industry, as the candid method of reasoning does to the ingenuous character of the author. In such cases as that of the roller, to which Mr. Jerdon alludes, I admit it is very easy to take either side of the question: the different geographical types may be called, or may be proved to the perfect satisfaction of one or other disputant, races, varieties or species; but supposing that geographical conditions can thus establish communities of individuals which a competent ornithologist shall describe and name as species, what shall we infer from this? Or, admitting that man, carrying out this capability for variation, can breed greyhounds, pug-dogs, Newfoundlands and King Charleses, or among birds all the varieties of pigeons and poultry, what shall we infer from this? Will it be asserted that any type of roller, dog or pigeon, exhibits and maintains an intermediate position between rollers, dogs and pigeons as they are and the acknowledged species, to which they are respectively more nearly affined? Does not the very existence of geographical races prove the homogeneity of some group of higher value than that race? It has been said that all the allied rollers will interbreed just in the same manner as dogs or pigeons, and that their progeny will be equally fertile: the only conclusion I can draw from this is that we must extend the imaginary limits we have hitherto made for a species. It will be seen that Mr. Jerdon does not consider the fact of interbreeding freely to be any bar to the distinctness of species: where, then, are we to look for a boundary-line?

Nothing appears to me more certain than that the change of species into geographical sub-species, and the advance of these to real species, necessitates the constant and enormous numerical increase of species. Is this the case? Is this increase of species proved? There is another point of view. It does not follow that because a roller is called Coracias indica when inhabiting one district, and Coracias affinis when inhabiting another district,—it does not, I say, follow that either race is advancing towards or receding from a given type: there is no evidence supposed, much less adduced, that indica has not always been indica, and affinis always affinis. There is no evidence even of change, leaving advance or decadence out of the question; but there is evidence, positive evidence,

of the existence of every conceivable variety of plumage between the two extremes: the two birds have the same figure, the same habits, the same voice, and build similar nests; and let them vary as they may in colour, I can found no hypothesis on this variation farther than this, that I believe them to constitute but one species, which in colour is most inconstant.

This variability is an old acquaintance with a new face: let the entomologist study his series of Chelonia caia, Abraxas grossulariata or Peronea cristana: let him take extremes of each; and let him try to persuade some expert in the science that these extremes are new species. He will certainly be unsuccessful, simply because the expert would know better. May I venture to suggest that somewhat of the same practical knowledge would assist the ornithologist, and would preserve us from many of the long discussions we are now compelled to read on the non-permanence of species. Well do I recollect the time when we had dozens of these sub-species in Agrotis, in Sarrothripus, in Peronea, but increasing knowledge is sweeping them away: year after year they disappear from our catalogue, and not an advocate is ever found for their restoration. But the geographical sub-species or species of birds are not around our doors; we see them dimly through a vista of books and skins; and

"Distance lends enchantment to the view."

"Some naturalists believe that permanent varieties are common in the animal kingdom, and Kaup calls them sub-species. Such persons consider that their differences from other individuals of what they would term the typical form, do not entitle them to the full rank of a species. Others, again, deny that permanent varieties exist, and state their conviction that even slight differences of colour and size, if found to be constant, are sufficient to constitute such individuals a distinct race or species. When such differences are found to co-exist with a different geographical distribution, I certainly prefer the views of those who look on all permanent distinctions of colour, size, structure, &c., as distinct species; and I believe that no change of climate or food, or other external circumstances, will produce any alteration in them or in their descendants, if they remain true to each other; and as yet I know of no recorded instance where any well-marked race has produced offspring differing from their own, or tending to revert to a supposed original type. That various nearly-affined species will propagate, *inter se*, and produce fertile offspring, I fully believe; as in the cases of the green pigeons of Bengal and of

Southern India, in the Indian and the Burmese rollers, the small cuckoos of S. India and those of Bengal, and in several other instances: but that this fact militates against their being species, and in favour of their being varieties, I think is not supported by many recent experiments in crossing. Of late years many species have been universally admitted as such, which were formerly considered simple varieties; and although, perhaps, the tendency of late writers has been to multiply species, in some cases most unnecessarily, yet in previous years the other extreme was taken, more especially by Schlegel and his followers. Our best naturalists and ornithologists now fully recognize the distinctness of permanent races. If varieties are once allowed, it depends on individual judgment or caprice to what extent they may be carried. In this country, where there are many very closely allied species among genera characteristic of the country, many of the species of Malacocircus and Hæmatornis would be classed as simple varieties by some; whilst others would perhaps allow some of them, whose different notes they might have observed, to be distinct species, and the rest varieties. Lastly, it is, I think, more convenient in practice to give each race a distinct specific name, than to speak of them as var. A or var. B of such a species.

"It is beyond the scope of the present Introduction to enter into the question of the origin of affined species. They may originally have sprung from type species, as Darwin teaches, and remained permanent in such localities as suited them, and not in others; or they may at once have been created as distinct species, and their place on earth fixed for them. We rarely find one trespassing far on the limits of the other; but where they do so meet, hybrids are not uncommon; but such hybrids do not appear to spread beyond the district where the two meet. As far as our brief experience goes, geographic distribution is against Mr. Darwin's theory. To give one example,—Malacocircus striatus of Ceylon is more allied to M. bengalensis of Bengal than to M. malabaricus, which is spread throughout a vast region between those provinces. Other examples will occur to the Indian ornithologist. In a vast province like India we have numerous instances of very closely allied races or species, especially when we compare the birds of India proper with those of the countries to the east of the Bay of Bengal; and many representative species, as Mr. Blyth aptly calls them, are found in Northern and Southern India, and in the Burmese countries, in some cases extending to a fourth race in malayana."—(*Introduction*, p. xxvi.)

EDWARD NEWMAN.

'*Die Schmetterlinge Deutschlands und der Schweiz Systematisch Bearbeitet.*' Von H. v. HEINEMANN. Nebst analytischen Tabellen zum Bestimmen der Schmetterlinge. Zweite Abtheilung. Kleinschmetterlinge. Band I., Heft 1. Die Wickler. Braunschweig, in Commission bei C. A. Schwetschke und Sohn. 1863.

Here we have before us a volume of 248 pages on the Tortricina of Germany and Switzerland, from the pen of Von Heinemann. The work appears carefully and conscientiously written, and contains detailed descriptions of 436 species. As the number of species in Wilkinson's 'British Tortrices' is 298, there must be 138 species described by V. Heinemann which do not belong to the British list; and we thus get the numerical proportion that the Tortrices of Germany and Switzerland are to the British species as three to two. The proportion is probably a little greater, for in many instances we find that where two closely-allied species had been differentiated by the writers in this country, their existence as distinct species is ignored by the writers of Germany.

V. Heinemann divides the group into ten genera, *viz.*, Teras, Tortrix, Sciaphila, Cheimatophila, Exapate (which he removes from the Tineina, and places here, following Cheimatophila Tortricella), Olindia, Conchylis, Retinia, Grapholitha and Dicrorampha.

With so few genera a division into sub-genera becomes necessary; and we accordingly find that Teras is divided into two sub-genera, Rhacodia and Teras. Tortrix is divided into fourteen, Sciaphila into four, Conchylis into four, Grapholitha into twenty, and Dicrorampha into two. But if we thus count all these sub-divisions as genera we only get a total of fifty, whereas in Wilkinson's 'British Tortrices' there are seventy-two.

The arrangement and classification of the group must certainly be a matter of some difficulty, as all recent writers are agreed in differing from each other.

We should think that this compact volume would have a beneficial effect in Germany and Switzerland in attracting more attention to this perplexing group of insects; but whether it will meet with a large circle of readers in this country appears somewhat problematical.

H. T. S.

Fascination of Birds by Light. — I have just been reading your very interesting chapter on "Fascination," in the 'Romance of Natural History,' and venture to bring before you an instance of the effect of a light, at night, on birds, which afforded me what at the time I considered as fine a night's sport as any schoolboy could wish for. In 1851 my father was living at Rainthorpe Hall, a well-known old house in Norfolk, not far from Long Stratton. One dark evening I went out with a bull's-eye lantern into some rambling sheds at the back of the place, and without making any noise took up my position in the corner of one of them, with my face to the wall, and the lantern placed so that a bright disk of light shone on the boards opposite me. The servant, an old soldier, Poyntz by name, under whose directions I acted, then began to shout and beat among the rafters at the far end of the shed with a long pole. We knew that the thatch was a favourite roosting-place for sparrows, and soon we heard them stirring above. He began to increase his efforts, and in a minute or two a frightened bird fluttered over my shoulder, and stopped flapping against the glass of the lantern. Then came another and another. I had brought a cage or basket (I forget which) with me to receive my game, but they came so quickly and so many at a time that I threw it away, and, holding the light between my knees, began with both hands to collect the sparrows which were crowding round, and allowed me to catch them without the slightest attempt to get out of the way. Both the side-pockets of my great coat, which for want of better accommodation I converted into temporary prisons, were soon filled, and still the birds were coming; so I took the pole, and resigned the lantern to the servant. I forget how many we caught in the one shed, but my pockets were bulged out with the poor little half-smothered creatures, and my companion had a very considerable show by the time we had finished. I should not have thought of troubling you with this account of what is, I believe, a well-known plan of bird-catching, were it not that since then I have several times repeated the experiment without success, although apparently under circumstances equally favourable. I remember once returning from a signally unsuccessful attempt to catch cray-fish in a little stream between Bex and Aigle, in the Valley of the Rhone: I was assured by a Swiss that if I had gone with a torch by night, instead of by day, I might have taken them in quantities, as they would always *collect to a light*. I returned to England too soon to prove the truth of his account. — *T. Digby Pigot; Primer Wood House, Watford, Herts, May* 5, 1863. — *Addressed to and kindly communicated by Mr. Gosse.*

On the Nidification of Small Birds. — Waterton, in one of his Essays, speaks about small birds building their nests and rearing their young in contiguity; but I apprehend that this is not a very common occurrence. With the exception of those of the Hirundines, I have seldom found the nests of small birds very close together. Last year I observed a wren and a robin building close to each other, in fact the nests touched, in a thorn-hedge that grew against a wall. The wren, however, deserted its nest before completion, disliking either my inquisitiveness or the proximity of its neighbour the robin. The latter went on and reared its young. The wren, it is well known, is an exceedingly jealous and wary builder; while the blue tit, on the other hand, is one of the most fearless, being, in short, the very type of persistent immovability when sitting. Last year I found a blue tit's nest with nine eggs, in a hole in the rotten bole of a plum tree; and, being anxious to secure an egg or two, I sawed two cuts down longitudinally, covering the eggs with dust and bits of wood; yet the bird went on with incubation after I had taken three eggs and completely transformed the site. Before commencing she would not come out when I rapped the

hollow bole with the saw, and not till I began sawing and sending down bits of wood did she think proper to beat a retreat. She hatched the six remaining eggs buried in the chips and sawdust. I have often known eggs disappear very unaccountably. I have known thrush's and blackbird's eggs disappear from a nest in a night, when no human intruder has been near. I suppose these birds cannot remove their own eggs. I have found shells in nests, in places where no rats, weasels, polecats, snakes, magpies or crows frequented. Do birds sometimes eat their own eggs, or is the cuckoo the pilferer? The boys and keepers about here convict the cuckoo, and I am strongly inclined to agree with them. I do not remember to have found many shells before the arrival of the cuckoo. A correspondent of the 'Zoologist' (Zool. 8099) classes mice among the egg-destroyers; but is this an admitted and known fact? I should like to see a list of all the animals that destroy British birds' eggs, including of course birds; it would perhaps throw some light on the causes of the decrease of species. This April I found a brood of young robins starved to death, and the nest blown full of dead holly-leaves. The nest was pitched at the foot of a holly-bush on the north side, and a biting north wind had prevailed. — *G. Roberts; Lofthouse, Wakefield, May* 8, 1863.

Honey Buzzard (Falco apivorus) *in Shetland.*—I have lately obtained a very perfect specimen of the above, which was shot in the north of this island last winter. It appears to be an adult male, but only measures twenty-two inches in length.—*Henry L. Saxby; Baltasound, Shetland, April* 15, 1863.

Food of the Dipper (Cinclus aquaticus).—While this matter is still occupying so much of the attention of naturalists I beg to offer such small amount of evidence as I have been enabled to collect. During my residence in North Wales, some years ago, I paid particular attention to the habits of the dipper, chiefly with a view to determine the nature of its food. The gamekeepers in the neighbourhood being most determined in their efforts to exterminate this much-persecuted little bird, I was afforded an almost unlimited supply of specimens, and, although two-thirds at least of the numerous victims were examined by me, in not one solitary instance could even a trace of salmon ova be found in the stomach, although the spawning season was the very time at which the slaughter was most industriously carried on. In one instance only could ova of any kind of fish be detected, and these I have still preserved in spirit; certainly they do not belong either to salmon or to trout. The stomachs almost invariably contained water insects, but upon two occasions, much to my surprise, small fragments of trout in addition. I once saw my father shoot a dipper which, as it fell, dropped a living trout three inches in length. This also is preserved, and upon each side the deep mark caused by the bird's bill can very distinctly be seen. Among my notes for the same year in which this occurred I made the following entry. "Feb. 16th. This afternoon I saw three water ouzels at one time in the river, a little below the bridge. Two of them were feeding, and in a short time one appeared above the surface with a fish in its bill almost as long as itself. This was brought ashore, and all three birds, after having pecked at it for some time, left it. In the evening I saw them again at the same fish." Having in the first instance offered some exculpatory evidence with regard to the first and most serious charge, yet, while proving the culprit to be guilty of a minor offence, I most earnestly beg to add a strong "recommendation to mercy," upon the ground of the extreme rarity of that offence.—*Id.*

Blue Variety of Chaffinch's Egg.—At Zool. 8091 and again at Zool. 8035 were some remarks on the above colour of the chaffinch's egg. The other day I took a nest

with three eggs. They were of a whitish blue, with a shade of darker colour of a reddish tinge over the sides. Two years ago I took another with five, much of the same appearance, but having none of the reddish colour. Both nests were in low bushes, and about two and a half or three feet above the water of a marsh which these bushes overhang.—*J. A. Harvie Brown; Dunipace House, Stirlingshire, May* 6, 1863.

Magpies Breeding in Confinement.—Some of your readers may have noticed my account last year in the 'Zoologist' (Zool. 8162) of my tame magpies. They will be interested to hear that my four remaining birds have paired. Each pair has taken possession of a lignum-vita tree at each end of my garden, from which they most assiduously drive away rook, royston, jackdaw, or heron, whenever they approach. One pair—those in the tree nearest my house—have built a large, deep nest, and the female commenced sitting yesterday on five or six eggs. I believe such an occurrence is previously unrecorded. I will report further progress.—*C. R. Bree; Colchester, April* 22, 1863.

The Cuckoo.—We have an old tale throughout Sussex that the cuckoo is turned out on Heathfield (pronounced "Heffel") fair day, which is on the 14th of April. This year I distinctly saw and heard it on the 16th.—*Thomas Thorncroft; Brighton, April* 21, 1863.

[Some of these country sayings are close approximations to the truth, and are worthy of great respect. I have been astonished at the number of communications that have reached me this year as to the arrival of the cuckoo in February and March, many of them backed by the authority of country gentlemen, clergymen and gamekeepers, yet, I regret to say, totally unworthy of credit. I fear that a willingness to believe in unusual occurrences is a part of the English character. In these instances the bird seen must have been one of our smaller hawks; the cry of "cuckoo" must have emanated from some juvenile adept in the mimetic art.—*Edward Newman*].

Deposition of Eggs by the Cuckoo. — An anecdote was lately furnished me in corroboration of the above, while on a recent visit to Dover, by Mr. C. G. Gordon, the able and enterprising attendant at the Museum there. He clearly remembers that a friend of his, thirty years ago, when walking in the park at Waldershare, the seat of the Earl of Guildford, observed a cuckoo sitting on the ground in a ride under the lime trees along the edge of the wood: he knocked it over with a stick, and in squeezing it by the throat to expedite its dying struggles, the soft and fluid yolk of an egg, flowing freely forth from the base of the mandibles, caused him to exclaim, "Why, he's got an egg in his mouth!" I have no doubt that similar instances of this habit of the cuckoo have given rise to the prevailing notion that it sucks the eggs of other birds.—*Arthur W. Crichton;* 11, *Eaton Place, Belgrave Square, April* 13.

On the Diving of the Sandpiper. — Captain Hadfield, in speaking of the diving of the sandpiper for food (Zool. 8524), says:—"Undoubtedly it could, but whether it would, or rather has occasion to do so, is the question. That it is not the sandpiper's usual habit to seek for food at the bottom of streams or pools, there can be little reason to doubt; and as to its taking pleasure in it, I am inclined to believe that it only dives when winged and pursued, having no other way of escape." The sandpiper, when frequenting fresh water, feeds on very similar food to the dipper, *viz.*, shell-fish, water insects and their larvæ, &c., as I have proved from dissection. Now, as this kind of food lies on the bottom, and as the dipper has occasion to dive, or at all events does so, I do not think it at all strange that the sandpiper should also find it necessary to seek for food by diving, especially when coupled with the fact of its

having been seen diving by Mr. Leven, and that not "when winged and pursued." It is Captain Hadfield's belief that the sandpiper only dives when wounded, "having no other way of escape;" but as a naturalist I cannot believe that Nature has made a bird having the power of diving, and that power not to be exerted except when wounded. No gift is given without a purpose, and when a bird is formed for diving it has reasons for being so formed more cogent than escape "when winged and pursued." If Mr. Leven's statement of having seen sandpipers diving is not sufficient proof of their diving for food, I do not see what more is wanted, except the impossibility of seeing them take up food from the bottom when diving. I doubt if even the dipper has been seen to do this, though it will dive beside the flyfisher; whereas the sandpiper seldom permits an approach of twenty yards. Captain Hadfield makes a great mistake when he writes, "And if proof were wanting of its diving not being habitual or natural, it might be found in the fact that a man of Mr. Blake-Knox's experience of the species never yet saw a sandpiper dive except when wounded." I am not aware of having stated anywhere that I have had much experience of the common sandpiper (*Totanus hypoleucos*), for if I had had much experience of this bird's habits I am convinced I should have seen it dive when unwounded; but I stated (Zool. 8493) certainly no *other* species, to my knowledge, and I have had considerable experience, dive. As to my supposition being satisfactorily confirmed, I should like it to be well understood that I have written "seems to have been," not *has* been. I think there are very fair grounds for being satisfied as to the sandpiper diving for food — *First*, Mr. Leven's statement of having seen birds diving when unwounded; *secondly*, the Rev. G. C. Green's statement of having seen it run on the bottom, a habit of the phalaropes, gallinules and dipper; *thirdly*, the similarity of food to that of the dipper, a bird well known to dive; *fourthly*, its beautiful powers of diving, even when wounded, both from the surface and from the shore. As to land birds swimming, I maintain that they can propel themselves through water by their feet; I do not mean "flutter on for a time," but swim on for a time, of course not as well as a long-legged, broad-toed bird, like the oystercatcher. As to their plumage getting saturated, of course it will; so will that of a wounded gull.—*H. Blake-Knox; Dalkey, Co. Dublin, May* 11, 1863.

Eggs of the Blackheaded Bunting.—The other day I found a blackheaded bunting's nest with four eggs; three were of the ordinary colour, but the fourth was exactly like a yellow wagtail's, being grayish white, and minutely freckled at the large end. Is this an uncommon variety? If so, this note may be interesting to some readers of the 'Zoologist.'—*John A. H. Brown; Dunipace House, Falkirk, May* 16, 1863.

[Was it not a cuckoo's egg?—*E. Newman.*]

Notes on the Snowy Owl. By Henry L. Saxby, Esq., M.D.

In answer to repeated requests for information regarding the habits of the snowy owl, as observed in Shetland, it has been my custom to refer inquirers to the full and very accurate account of that bird published in 1822, by Dr. Edmondston, in the 'Transactions of the Wernerian Society of Edinburgh.' But this being now somewhat

difficult of access, and, moreover, as observations made at a later period seem to be required (and I am not aware of any such having appeared in a collected form within the last few years), some notes of more recent date may not be considered out of place in these pages, although they contain very little more than a mere repetition of the account above referred to.

It appears that the snowy owl was first observed in Britain by Dr. Edmondston, who, in 1811 shot an adult male in this island (Unst), and soon afterwards presented it to Mr. Bullock, accompanied by particulars respecting its habits. The specimen was then exhibited in Mr. Bullock's Museum, and described by him as a British bird. Although at that time the species was far from being numerous it has now become even less frequent, as well as rather irregular in its visits, two or three years sometimes elapsing without its appearance, while at other times several individuals occur almost simultaneously. Formerly it used to be met with among these islands, especially in Unst and Yell, at all seasons of the year, but of late it has been observed only between autumn and the end of spring, and then usually after a north-east or north-west wind. On referring to my note-books I find the earliest instance of its arrival dated October 17, the latest April 30, (1863). There can be but little doubt that it no longer remains to breed here, although that it was most probably in the habit of doing so formerly the following extract from Dr. Edmondston's paper will show.

"I have not heard of its nest having been found either there (Shetland) or in Orkney, though, from meeting with it at all seasons, and from its constantly, during summer, frequenting the same situations in perfect plumage and well developed sex, it is reasonable perhaps to conclude that it breeds in Zetland. Indeed, I remember an intelligent peasant of Unst, whose veracity and acquaintance with his native birds I had occasion to be satisfied with, assuring me of his having once met, in the month of August, with a pair of this species, having along with them two others, which he termed their young. One of these latter he shot, but unfortunately I was not aware of the circumstance till the specimen was destroyed. He described it as of the same size as the snowy owl; indeed, in every respect the same, but of much darker plumage; and this is all precisely what we should expect on the supposition of this species breeding in Zetland." Some years afterwards Dr. Edmondston received information that a nest containing three well-fledged young birds had been found in August,

on a low rocky ledge not far from Baltasound. The young were "of a brown colour, sprinkled with gray."

The food usually consists of rabbits and small birds, which are almost invariably swallowed whole. In the stomach of one I found an entire rabbit, so large that it was a matter of astonishment to me how it had passed the mouth of the bird, although most of the large bones were broken. While at rest during the day its favourite haunts are exposed hills covered with large stones, upon the shaded side of which it crouches, and although often difficult to approach on such occasions, its sense of hearing being very acute, it is nevertheless sometimes come upon unawares. A man in this island once crept up and knocked one over with his stick, injuring it so little that he carried it home and kept it alive for some time. Now and then, too, we hear of boys pelting one with stones. When an individual is known to have arrived in this island it is nearly sure to be discovered by any person who will carefully explore certain hills which have always been preferred before all other situations. These hills are strewn with large gray stones, intermixed with a few long-shaped white ones. I know several which have more than once been carefully stalked by the would-be owl slayer, and I could point out one of the latter in particular who has very often been thus deceived. But after all such an error may be in some degree excusable, for the bird is exceedingly difficult to discover while resting in such situations, so closely assimilating as it does in colour with the surrounding stones, and any person who resolved to walk up to everything bearing a resemblance to the object of his search, would require for his purpose a large amount of patience, a very long pair of legs, and a very long day indeed. In the immediate neighbourhood of its most frequented places of retirement large pellets of bones, skins and feathers may often be discovered. I have never heard of a single instance in which it has been met with upon the hills at night. It leaves them about sunset, and descends to the low grounds, returning next morning. In these islands the hill-tops are very frequently covered with snow, from which, in the day-time, a glare proceeds which is painful enough to human eyes, and, under such circumstances, more especially in climates still further north, the bird doubtless experiences no little benefit from the exceedingly perfct nictitating apparatus with which the eye is provided.

Much discussion has from time to time arisen concerning the feeding habits of this species, some observers maintaining that it seeks its prey by daylight only, while others as warmly contend that it is exclusively a night-feeder; but into this, as into most other arguments

of a similar nature, the celebrated story of the chameleon might be aptly introduced. If it be permitted to one of my comparatively slight experience in the matter to venture an opinion, I may state my impression that in Shetland at least the snowy owl feeds both by night and by day, although very seldom during the latter period. My reasons for this supposition are based upon two very simple facts; first, that when the bird is seen during the daytime it is nearly always in a state of repose; and, secondly, that those examples which are killed early in the morning or late in the evening always have food in the stomach, while those procured in the daytime have the stomach either perfectly empty or containing food in which the process of digestion is far advanced.

Although during the daytime the bird is usually sufficiently upon the alert to avoid its enemies, yet this is not always the case; sometimes its inactivity amounts almost to stupidity. Two years ago I met some men coming out of the island of Balta who assured me that one of their number had a short time previously snapped a cap five times at a snowy owl, which only then became sufficiently alarmed to make its escape from the island. It was shot early one morning soon afterwards, and in its stomach I found a young rabbit. The only record which I can find of this species having been seen "on the feed" in the daytime occurred to my own observation in 1860, and was noted at the time as follows. "Nov. 2. In Balta, as I suddenly looked over the wall which divides the island, I saw a snowy owl make a rapid stoop towards some rabbits, and rise again without touching them, at the same time uttering a strange, rapid, chirping noise, which must have been pretty loud, for I heard it distinctly, although at the distance of more than a hundred yards; the bird then flew straight off towards Unst. It was not so white as an adult. This occurred about noon." In favour of its claim to be ranked among the day owls I have noticed that it is able to see for a long distance, even at times when the sun is shining brightly; a flight of golden plovers, passing very high above one which was sitting upon my arm, immediately attracted its attention. Too much value has evidently been attached to the fact that this species is very frequently met with between sunrise and sunset, for this is doubtless owing chiefly to the exposed nature of the ground which it frequents at such times. When the snowy owl appears in the daytime gulls, hooded crows, and even starlings at once join in pursuit, but until the annoyance becomes absolutely unendurable he usually regards them with contempt, being perhaps conscious of his own power of wing and claw. The flight of this species is strong and

rapid, appearing to have a sturdiness about it which is not observed among the smaller owls.

I am not acquainted with the changes which take place in the plumage of those individuals which are kept in confinement, and even if I were changes occurring under such circumstances would be regarded with much caution. However, the examination of specimens of different ages and sexes, obtained at various times of the year, has enabled me to arrive at certain conclusions which I have recently had opportunities of confirming in my visits to museums and private collections.

It appears that the perfect plumage of the adult male is white, without spot, but that this state is not attained until after the lapse of several—perhaps many—years; and also that in younger birds the form, intensity and disposition of the markings are very little, if at all influenced by sex. I believe that the adult female also becomes white, having seen one very nearly in that state. Full growth is attained about the end of the first winter, after which size is a reliable indication of sex, a male seldom measuring more than twenty-three inches in length, while twenty-six inches is the usual length of a female. The younger the bird the more do the dark marks, especially upon the under surface of the body, partake of a barred appearance, the sharper are the edges and tips of the mandibles, and the broader and thinner, although no less keen, is the projecting inner edge of the middle claw. All of the claws are comparatively slender, and in colour resemble the bill, being of a bluish or grayish tinge, while in the adult those parts are black. Intensity of colouring has often been regarded as a mere indication of advanced age, but this, taken by itself, is no criterion, for at most times there is considerable variety of tint, even in the same individual, and very dark brown or black is nearly always present from the end of the first winter until some years afterwards. The truth seems to be that in old birds the dark tints merely predominate, and for this reason,—that as a general rule the lighter ones are the first to disappear. And yet this is not invariably the case, for specimens have been obtained which were perfectly white, with the exception of a few faint bars upon the wings or tail. Upon the body spots are usually darker than bars, and thus it is evident that the greater the abundance of bars upon the body the younger is the bird. The size of the spots probably decreases with age, and is said to be larger in females than in males, but of this I have never yet been able to satisfy myself. The parts in which the marks show the greatest inclination to linger are the occiput, scapulars, wing-coverts, tertials, and more

than all upon the tail. Although an immature specimen may appear to have the ground colour, so to speak, of the plumage perfectly white, comparison with an adult will at once show that it differs in several respects. The plumage of the younger bird then looks grayish and dingy, and in some parts, particularly about the legs and feet, there is often a distinct rusty hue, and the feathers in the latter situation are comparatively short; besides this the whole of the plumage is of a peculiarly loose and "fluffy" character, a condition easily recognised, although difficult to describe. The oldest specimen in my possession is white, with the exception of a very few marks upon the wings and tail; the shafts of the quills are shining and yellowish, almost resembling ivory, and the plumage dense in texture, compact and slightly glossy,—altogether very different from that of a younger bird. It is a male, and weighed nearly four pounds; probably it was very old, for the muscles were unusually strong, and some of the tendons could not be cut with a scalpel. In this specimen, as in all others which I have examined, most of the smaller feathers, especially those upon the back of the neck and upper part of the breast, are gray at the base.

From all accounts it appears that the snowy owl is easily tamed, and thrives well in captivity. In March last I saw one which, having been wounded a few days previously, had been brought home alive. As soon as I let it out of the room in which it was kept it raised its feathers and snapped loudly with its bill, but very soon allowed me to handle it as I pleased, and quietly submitted to the operations of weighing, measuring, &c., not even attempting to escape, although it might easily have done so. It seemed rather weakly, and this was attributed to its wounds, but upon my offering it some water it drank eagerly, and became quite lively, although still continuing gentle, and showing no disposition to regain its liberty. It would not of its own accord take the water, but upon my inserting the edge of the saucer between its mandibles it immediately began to swallow the contents with great apparent satisfaction. It would clutch a large stick or the back of a chair firmly with its feet, at the same time standing nearly erect, but when placed upon a level surface it made no attempt to stand, nor could I hear that it did so even once during the whole period of its captivity; it merely rested upon its breast, with its legs folded beneath, and claws firmly clenched. On witnessing this it occurred to me as being rather strange that this species is nearly always seen in a crouching position when upon the ground, and most frequently erect when upon an eminence. Indeed its habits seldom

require it to walk at all, but, nevertheless, Dr. Edmondston has from a distance observed it progressing by means of a series of awkward hopping movements. The unfortunate prisoner lived for about ten days, and then it was found that the shot had penetrated the lungs, but no other injury could be found. It was fed chiefly upon small birds, which it always swallowed whole, and it was very fond of fresh fish, but salted or dried food of any kind was invariably rejected. During the first few days it cast up no pellets, although it did so abundantly afterwards, and it was always more ready to take food in the evening than at any other time. The question of the disinclination of this species to stand upon level ground may be very easily decided by those who have had the opportunity of observing the specimen which was sent from this island some years ago, and which is still, I believe, in the gardens of the Zoological Society of London.

The snowy owl, or "kat-yogl" as it is here termed, is no favourite with the inhabitants of Shetland, its presence being regarded by them as productive of all kinds of evil both to man and beast. I shot one on the 25th of February last, about two hundred yards from Halligarth, and I heard an old servant remark, in reference to the event, "Well, what business had it about *this* house? ill thrift be till it!" It may serve to prevent some disappointment if I here warn visitors against being misled at any time by the statement that a "kat-yogl" has been seen in the neighbourhood, that term being applied indiscriminately to owls of all kinds, including the shorteared species which is not unfrequently met with upon the hills in autumn.

HENRY L. SAXBY.

Baltasound, Shetland,
May 8, 1863.

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*Claim for Lacerta viridis to be admitted as a British Species.** — The specimen now exhibited was caught by a labouring man on a bank by the side of the road a little way out of Dorking, on the road to Reigate, on Friday, April 3rd, 1863, and brought to me the same evening, when I purchased it for the Museum of the Holmesdale Natural History Club. This species, which is frequent in the islands of Jersey and Guernsey, and also in the South of Europe, has not been previously known to naturalists as an inhabitant of England, and is not included by Professsor Bell in his valuable work on the 'British Reptiles,' although he alludes to it as having been supposed to occur both in England and Ireland, but gives it as his opinion that green

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* Read before the Holmesdale Natural History Club, at Reigate, on Friday evening, April 24, 1863, when the specimen alluded to was exhibited.

varieties of a much smaller species, Lacerta agilis, have been mistaken for it. The occurrence of this solitary specimen is not sufficient in itself to establish it as a British species; but on showing it, a few days since, to Mr. John E. Daniel, a well-known naturalist, and who certainly would not have been likely to mistake this beautiful species, he informed me that a few years since he had observed three or four specimens of it on the heath about half a mile south of Wareham, in Dorsetshire, one of which he captured, and is quite certain of its identity with Lacerta viridis, a species which he is well acquainted with, having frequently seen it in Germany, and received specimens from the Channel Islands. The proof therefore of its occurrence in England is established; whether indigenous or as a naturalized species, remaining doubtful; but there can now be no reason why it should not be added to the British fauna. Gilbert White, in his 'Natural History of Selborne,' has the following remark, which probably applies to this species, "I remember well to have seen formerly several beautiful green Lacerti on the sunny sand-banks near Farnham, in Surrey; and Ray admits there are such in Ireland."—*J. A. Brewer; Holmesdale House, Reigate, April* 24, 1863.

[In connexion with this subject I take the liberty to cite the undermentioned passages on this subject, which have already appeared in the early volumes of the 'Zoologist':—

"I am told, on competent authority, that Lacerta viridis is quite frequent and even abundant in the neighbourhood of Herne Bay. I may add there can be no doubt about the species, and that it certainly is not the smaller green lizard of Poole, but identical with the species long known to inhabit Guernsey, as my friend Professor Bell has received a specimen from Herne Bay, but not in time to notice the discovery for the second edition of his 'British Reptiles.'"—(Dr. Bromfield, Zool. 2707).

"Seven or eight years ago a schoolfellow of mine at Eton, a native of Guernsey, assured me he had seen lizards in Devonshire precisely similar to the lizards of his own island, which latter, if I recollect right, he had often kept in confinement."—(John Wolley, Zool. 2707). "Nearly two years since a learned Professor of the University of Edinburgh mentioned that he had dissected a green lizard brought by a botanical party from the Clova mountains."—(John Wolley, Zool. 2708).

"On looking over the Reptilia of the Museum belonging to this city [Canterbury], I happily discovered a male and female Lacerta viridis. The particulars I obtained regarding the whereabouts the pair originally came from, the time, &c., are uncertain and dubious."—(Rev. W. H. Cordeaux, Zool. 2855).

On the other side, and as militating against the admission of this beautiful reptile into the British fauna, I may remind the readers that it has been repeatedly imported in large numbers from Guernsey, and turned out with a view to acclimation on our heaths and wilds.—*Edward Newman.*]

The Palmated Smooth Newt (Lissotriton palmipes).—This reptile has formed the subject of more than one communication to the 'Zoologist,' but the localities in which it has been found are so few that additional information on that point may be acceptable. I may mention, then, that five-and-twenty years ago, in company with other small boys, I used to catch black-footed newts in a pond near Dartmouth, in Devonshire; the means of capture being of the simplest kind, consisting of a bit of twine fastened to a small bent pin, and a worm for bait. When 'Bell's Reptiles' was published I discovered that I had been unconsciously amusing myself with rarities. I have since caught a great many of these newts, and three years ago they were abundant

in the same pond. That was my last visit to the locality. At the end of last month I spent a few days in Herefordshire, and near the village of Letton, about twelve miles from Hereford, I again had the satisfaction of seeing L. palmipes in abundance, although, so far as I could ascertain, they were confined to one pond. In this case, as well as at Dartmouth, L. palmipes was the only species to be found. I have sent a number of these little animals to the Zoological Gardens, and at the last meeting of the Zoological Society this species was exhibited in company with our L. punctatus and Triton cristatus, as well as with T. alpestris from Germany. The habits of L. palmipes do not apparently differ from those of L. punctatus. The males show the same lateral curvature of the tail, with a rapid vibration of its lash-like extremity during the love season. The females are now full of spawn. The slough of this species is cast entire, and, in most cases, at once swallowed by the owner.—*E. W. H. Holdsworth;* 18, *Osnaburgh Street.*

Toads in the Hole.—Sir A. P. Gordon Cumming writes to the 'Elgin Courier':—"In cutting the Inverness and Perth Railway through Lochnavandah Park, on Altyre, we have unceremoniously trespassed on the privacy and retirement of a numerous colony of ancient toads. The cutting is here from twenty to twenty-five feet deep, the lower part being through from ten to sixteen feet of freestone and red conglomerate. The interesting old residents are found in the red freestone about fifteen to twenty feet below the surface, where they certainly must have seen several nineteen years' leases out on the land above them. They are sometimes turned out by the heavy hand-pick or the great iron crowbar; but a blast of powder, of which a vast amount is here expended, seems to cause the greatest upset in the establishment, as a shot is sometimes the means of exposing as many as a dozen sleepy old fellows. They seem none the worse for their long repose, but after giving a few winks at the new light thus suddenly let in upon them, and taking several gasps of the unwonted air, they leisurely and deliberately proceed to hop and crawl down the line along the small watercourse towards the lower fields. I have seen them in numbers, and some of the men have counted above forty at once."—*Scotsman.*

Toads in a Hole.—A short time ago you quoted a letter written by me to the editor of the 'Elgin Courier,' in which I mentioned the discovery of living toads in making a railway cutting through rocks near Altyre. As many of my friends have questioned the authenticity of the signature, will you allow me to avow myself to be the writer, and in confirmation of my statements to forward the enclosed extract from the 'Forres Gazette'? The ground under which these living toads are found consists of two feet of black soil, from six to twelve feet of water-worn gravel, and four to eight feet of hard sandstone, all resting upon a bed of red conglomerate. While inspecting the railway works I have myself seen numbers of living toads taken out of the conglomerate at depths of from fifteen to twenty-four feet from the surface. An extensive and seemingly unbroken bed of rock covers the stratum in which these living toads are found. In sloping the sides of the cutting to one-and-a-half in one, we may anticipate a further release of prisoners. I shall be glad if any scientific person will account for the presence of living creatures in such a position.—*Alexander P. Gordon Cumming;* 7, *Park Street, May* 18.

"Toads in Rock.—The 'Forres Gazette,' referring to a letter from Sir Alexander Gordon Cumming, of Altyre, which appeared in the 'Courier' some time ago, regarding the discovery of a number of toads found in a rock on the estate of Altyre, says:—'This fact was further confirmed last week by an examination of the men

present at the blasting, who produced portions of the rock, showing the precise spots where some of the toads were imbedded. These were indentations on the stone of the size of a hen's egg cut lengthwise in half, but not so deep. When the shot went off the workmen ran to the spot, and found the toads scampering away. The nests, which became exposed in the solid rock by the blast, appeared to have a coating of soft black viscid stuff, in which the toads had lain. The rock is not sandstone, but a kind of conglomerate, very compact, but with open spaces, around which crystals of silica appear. That the toads were imbedded in the solid rock we have no doubt whatever, but to make assurance doubly sure the workmen are to carry large pieces of the rock to a given place, where they will be broken leisurely and carefully, in the presence of intelligent witnesses, who will be at no loss to verify the facts which may be presented.'"—'*Times' Newspaper*, *May* 25, 1863.

[The second or "confirmatory" account is but a weak and unsatisfactory one. In the first place, the toads *scampered* away: the term will not apply to the action of any toad with which I am acquainted. In the second place, the idea of breaking blocks of stone "in the presence of *intelligent* witnesses" seems to imply that this has not previously been the case; and I confess my distrust of the assertions of quarrymen who are rewarded for them by beer proportioned in quantity to the extravagance of their tales.—*Edward Newman.*]

Occurrence of the Lesser Forked Beard in Mount's Bay, Cornwall.—I have sent to you per parcel a fish which I believe to be the trifurcated hake, or lesser forked beard. I took it in Mount's Bay, on Friday last, the 17th inst., in six-fathom water, on rocky ground about a mile from the nearest land. I have kept it in reserve for my friend Mr. R. Q. Couch, who usually kindly takes charge of any specimens I take; but his indisposition renders it advisable that I should send the fish to some other scientific naturalist. As it is, I have had to take out a portion of the entrails and soak the fish in brine. I did this hurriedly last evening, on finding the fish rapidly decomposing, and too far gone to make spirits of wine available. The shape of the belly of the fish, which has been lost by gutting, corresponded with Yarrell's figure, but is more precisely represented by the belly-line given by Yarrell for the "unctuous sucker." The fish when alive had a perfectly smooth skin, and was marked with faint lines along its back. The lateral line was strongly marked, running straight from the tail to over the commencement of the anal fin, from thence arching high over the pectorals, being in this portion of its length raised, but having the elevated ridge perfectly soft; from just over the pectorals to the eye the lateral line ended in a broad shallow groove. The gill-covers were connected by a loose membrane. The grinding apparatus in the gullet was not visible without special examination when the fish was alive. I shall be happy to give any further particulars.—*Thomas Cornish; Penzance*, *April* 20, 1863.

[In connexion with this subject I have to mention the lamented death of Mr. Richard Quain Couch, a naturalist whose profound knowledge of fishes has rarely, if ever, been equalled in this country. His admirable papers in the earlier volumes of this journal are of no transitory interest, but will long endure as evidences of Mr. Couch's industry and great power of observation.

I regret that the fish was received in so advanced a state of decomposition that it was almost impossible to make a precise examination; but there is not the slightest

doubt as to the species: it is the Raniceps trifurcatus of Fleming, a fish which my late highly esteemed friend Mr. Yarrell appears never to have had an opportunity of examining, but of which I once possessed a specimen, found amongst sprats offered for sale, and which I somewhat carefully described in the thirteenth volume of the 'Zoologist' (Zool. 4673). The extreme length of that specimen was 5½ inches, of that now before me 8½; the circumference of the smaller specimen immediately behind the pectoral fin 4¼ inches, of the larger one 7, and this after the removal of the intestines. Mr. Cornish has subsequently captured a third specimen with hook and line, and this he kindly sent to me also, thus giving me a good opportunity of examining it had I been able to give up the necessary time, but I have only had the opportunity of making a few observations. The extreme length of this third specimen is 11¼ inches, and circumference behind the head 9 inches. The gape of the open mouth exactly equals the greatest circumference of the body. In the interior of the mouth are five clusters of fine and slightly recurved teeth, three on the roof and two below the opening of the gullet; the first of these clusters is reniform, the next two nearly circular and placed transversely, and the two below the gullet also placed transversely and somewhat pyriform, but the smaller extremity very acute and pointing outwards: both jaws are also armed with sharp slightly recurved teeth, somewhat resembling those of a shark. First dorsal fin composed of a single ray, which gradually tapers to a point as fine as a hair. Ventrals composed of six rays abruptly decreasing in length, the first an inch and a half long, perfectly white at the extremity, and ending in a fine point; pectorals with twenty-two rays, each composed of four soft rays.—*E. Newman.*]

Are not Shrimps nocturnal? — The habits of the prawns and shrimps differ materially. Put the former into an aquarium, and they swim about vigorously, and are always alert and vigilant, being as active, restless and inquisitive as monkeys in a menagerie. Shrimps, on the contrary, are dull and stupid, and if there be sand in the aquarium they immediately bury themselves up to the eyes, which alone remain barely visible; if there be no sand they speedily die. As so little is thus seen of them, they are not very attractive objects in the aquarium. Upon approaching, the other evening after dark, a vessel containing some specimens, which I had thought unprofitable subjects from their being so little seen, I was agreeably surprised to find them *above ground*, and still more so to observe that upon throwing the light of the lamp full upon them they immediately buried themselves in the sand, and this they did repeatedly on being ousted from their favourite retreat. This points unmistakeably to a nocturnal habit, and an extreme sensitiveness to light. — *Thomas J. Moore, in 'Naturalist's Scrap Book,'* Part I. p. 4.

A Sabella Building its Tube.

By Philip Henry Gosse, Esq., F.R.S., &c.*

The following particulars of a process of animal mechanics may possess interest for readers who study Marine Zoology under aquarian

* Reprinted from the 'Intellectual Observer' for March, 1863.

auspices, and I am not aware that they have been recorded before in detail. I give the *ipsissima verba* of my journal, written while the little mechanic was before my eyes. The account is an incidental testimony to the adequacy for aquarian purposes of the substitute for sea-water, the constituents of which I first made public in the 'Annals of Natural History' for 1854.

June 30. My large tank of artificial sea-water, made in August last, is now very rich in animal life. The stones and old shells are covered with a woolly down of (probably) ectocarpus, and the whole has the settled, old appearance of a natural pool bottom. Among the inhabitants is a Sabella, which answers in all particulars to Montagu's S. vesiculosa, except that it is much shorter than his specimen, being about one and a half inch long, and its tube, at least the free part, about two inches. The dark purple vesicles which he mentions, at the tip of the gill filaments, are in mine much more conspicuous than represented in his figure, that of the anterior filament on each side being much larger than the rest, and forming a stout, globose and nearly black ball; the others diminish to about one-twelfth on each side, where they disappear. These balls are placed on the inner or upper face of the filament stem, at the point where the pectination ceases, the stem itself being continued to a slender point beyond it—the "short hyaline appendage" of Montagu. From their great resemblance to the tentacled eyes of the Gasteropod mollusca I have little doubt that these are organs of vision; if so the protrusion with which the Sabella is furnished in this respect may account for its excessive vigilance, which is so great that not only will the intervention of any substance between it and the light cause it to retire, but very often it will dart back into its tube almost as soon as I enter the room, even while I am ten feet distant.

This morning I found my Sabella clean out of its tube, and lying on the muddy bottom below. I was afraid he was moribund, but he was actively wriggling, and his beautiful disk blossomed as widely as usual, though grovelling on the sand. Some six hours elapsed, when I perceived that his body was no longer naked, but enveloped in a new, loosely constructed but rather tightly-fitting tube, through the posterior part of which the naked tail was protruding, as yet unprotected. It was evident the Sabella was meeting the emergency of his situation by forming a new dwelling, and that he had commenced, though unseen by me, by making a ring of mud cemented with a gummy secretion around the neck, which ring as it increased in length

was continually pushed farther and farther downwards towards the tail.

The process of natural manufacture is always interesting. I removed my artificer from the tank, and put him alone into an ample cell of glass with parallel sides, giving him plenty of water and a bottom of sand, on which I allowed to fall through the water a little clay, rubbed to a paste between my fingers in the water. As soon as the turbidity had a little subsided, so that I could use a lens, I had the gratification of seeing how he proceeded.

In order to make this intelligible I must briefly describe the structure of the parts engaged. All that is ordinarily seen of the animal is a flower-like disk protruding from the tube. This disk is composed of two semicircular fans (the gills), the pair forming a complete circle, except that the points of juncture, behind and in front, are marked by a slight opening. Each fan consists of twenty-one feathers, regularly radiating, and curling outwards with a beautiful turning-over of the tip, so that the whole disk bears the closest resemblance to a trumpet-shaped flower. The filaments, which I have called feathers, consist each of a slender stem, beset on the sides with two rows of beards (pinnæ), whose direction is upwards and outwards from the stem, so as to make a groove, of which the face of the stem is the bottom. The beards are in constant active motion, some being thrown inwards every instant, striking and, as it were, feeling the water, every one quite independently, moved by an impulse of its own. Under a high power (500 diam.) all the beards, and the exterior face of the stem also, are seen to be clothed with minute but rapidly vibrating cilia.

In the centre of the flower-like disk is the mouth, which is guarded by a pair of little pointed tentacles, and on the outside of the disk, at the base, there runs round a thin, fleshy, very flexible collar of membrane, which at the posterior opening of the fans, or that which is opposite to the two principal eyes, is produced into a pair of moveable, soft, tactile flaps, which turn outward and hang over the edge of the tube in the course of house-building.

All this being premised, and the workman's tools being described, let us see how he works with them. Suppose him to be lying along on the bottom, near one corner of the square glass vessel, so that through one side a lens can be brought to bear on one side of the animal, and through the other on the disk.

We first glance at the disk, taking a front view of the creature. The filaments of the gill fans are so active, bending inward and outward, and perpetually crossing one another, and the pinnæ are jerking hither

and thither so incessantly, that we are for a while confused, and can make out nothing. We must fix our eye on some individual filament, and watch that heedless of all the rest. Now we perceive that the tip of this is bent over outwardly until the inner face is in contact with the bottom, the pinnæ expanding over the clay like the legs of the letter A. In an instant these close together, seizing, as with many opposed fingers, a little of the soft and impalpable clay, and at the same instant the filament is straightened from its recurved condition, and we perceive a minute pellet of clay lying between the pinnæ. The pellet takes a lengthened form, and presently glides quickly and equally along the groove of the pinnated filament towards the mouth carried along by means of the cilia with which every part is clothed. Glancing at other filaments on each side we see a similar pellet in each, at least of those which, as the disk lies, are in contact with the bottom. As we follow the tiny mud pellets to their destination we trace them to the mouth, where the two pointed tentacles stand guarding the entrance. These appear to guide the united pellets to the posterior orifice between the fans, through which we see the lump making its exit.

We can learn nothing more of its progress from this point of view, but let us now direct our lens to the side of the animal. Here we again see the soft lump emerging between the fans, and as it progresses the moveable fleshy flaps above described receive it and guide it to the edge of the tube, plastering it as if with trowels on the edge, regulating its thickness and smoothing it down. Meanwhile the animal slowly revolves on its long axis, by which means all of the filaments in turn are brought within reach of the ground, and thus the labour of feeding the trowels is fairly distributed, and also the deposit is made in succession upon every part of the edge of the tube.

The tube increases in length by means of this process with considerable rapidity, and it is not long before the animal is once more completely protected. Probably as the desertion of the tube was in this case voluntary, it is not unreasonable to infer that the formation of a new habitation is normal, and takes place at certain though probably irregular intervals through life. There seems to be an inner layer of gummy matter secreted from the collar on which the mud pellets are moulded; and often the lower portion of the tube—the first formed—is found in this class of worms firmly adherent to a stone, and consisting almost wholly of this gummy matter without any mud coating. The substance, which hardens in water and is insoluble, is of a horny texture and colour, a pellucid yellowish brown, and is pro-

bably composed of chitine. Perhaps in the case before me, if the animal had been reposing on a stone instead of soft mud and sand, the first formed portion of the tube would have been adherent.

I add Montagu's description (slightly condensed) of the species, the accuracy of which is proved by my specimen :—

"Sabella vesiculosa. Body with many segments, pale, dull orange, minutely speckled with white. Tentacles [gill fans] two, with about twenty-eight long ciliated fibres each, olive-green mottled with gray, partly in bands when expanded, not forming a circle but sub-convolute, the under part turning inward. At the points of each ray is a dark purple vesicle, most conspicuous on the anterior ray of each plume, terminated by a short hyaline appendage. Mouth gaping; lips whitish, with two slender cirrhi; behind the tentacles a scalloped membrane, surrounding the anterior end of the animal. Length six or seven inches. Tube coriaceous, but always coated with coarse sand and shells, ten or twelve inches in length."

Melitæa Cinxia.—As the time for the appearance of this local insect is close at hand, I send you the dates of its appearance for the last few years: — 1857, June 2; 1858, June 4; 1859, May 30; 1860, June 7; 1861, May 27; 1862, none. — *J. Pristo; Alverstone, Whippingham, Isle of Wight, May* 18, 1863.

Bombyx Callunæ: its Mode of Laying Eggs.—I have just been glancing over the 'Zoologist' for 1861, and in the paragraph "On the Habits of Bombyx Callunæ" (Zool. 7360), I find, "On depositing her eggs, which she lays around the stems of the food-plant," &c. Has not the writer of this observation mistaken the ova of Saturnia Carpini for those of this species, both of which occur in some abundance in the same locality? The former insect certainly deposits her eggs in clusters around the food-plant, the latter never. Having paid some attention to the habits of this species I submit the following note from my journal for 1861-2. "From one to two hours after copulation(which extends to about three hours) the female takes wing, and flies swiftly, in circles, over the food-plant (Calluna vulgaris), reminding one of the peculiar oscillating movement of the Hepialidæ, and dropping her eggs as she flies. The time thus occupied seldom exceeds from twenty to forty minutes; she then settles down, and rarely lives out the day." I shall have great pleasure in forwarding ova of this species to any gentleman desirous of breeding it, providing applications be sent not later than June 8th.—*George H. Porke; Halifax.*

Note on Amphydasis prodromaria.—From a large brood of this insect I have obtained thirty-four perfect specimens; a few were small, but most of them of the average size. The first, a small one, came out on the 27th of January, out of doors, when the thermometer was at 45° in the shade; but the greatest burst of them was on the 20th of March; thermometer nearly 50°. I had two out on the 16th of April, which were probably the last. With regard to the time of emerging, the earliest noticed was 11.45 A.M. and the latest about 2 P.M. On the 20th of March several

had their wings fully grown by 12.30. Copulation appears to last from the dusk of evening to about 5 the following evening: one male was seen *in cop.* with three separate females. Cramped females were generally, but not in every instance, avoided by the males. One perfect female that had remained a week single from necessity, altogether failed in obtaining a partner. None of the impregnated females laid eggs till two days after copulation. One remarkable habit I have observed in all, males and females, though more in the males, from their being more lively,—that of tumbling over and over several times when disturbed, throwing a complete summersault by pressing the points of their fore wings against the ground.—*E. Horton; Wick, Worcester, April* 21, 1863.

Description of the Larva of Eupithecia debiliata.—Two days ago I received from Dr. Breyer, of Brussels, a box of larvæ of E. debiliata, taken by him in the neighbourhood of Brussels. All had spun up but three. From these I took an accurate description, and then sent them off the same afternoon to Mr. Buckler, who has, I doubt not, ere this made a far more accurate and life-like drawing. I hasten to give the readers of the 'Zoologist' a description of this hitherto undescribed and almost unknown larva. Rather short and stout, in general appearance resembling the larva of E. rectangulata. Ground colour dull yellowish green. Whole body rather translucent, and more or less suffused with yellow. Central dorsal line darker green than rest of body. Subdorsal lines wanting. Spiracular lines dull yellow. Head dusky brown or blackish. Belly destitute of markings. Feeds on leaves of Vaccinium myrtillus. Full-fed the beginning to middle of May. It is a dull uninteresting-looking larva, with but four distinctive characteristics. When full-fed it spins a slight earthen cocoon. My larva have not yet assumed the pupa state.—*H. Harpur Crewe; The Rectory, Drayton Beauchamp, Tring, May* 14, 1863.

Mine of Lithocolletis Larvæ mounted as Transparent Objects on Card-board.—In the report of the proceedings of the Entomological Society in the 'Zoologist' for February (Zool. S348), I see that Professor Westwood exhibited leaves of various plants which had been mined, mounted on glass. A very good plan, no doubt, but rather too cumbrous for many collectors. I have found it a very neat way to take a piece of paper or card and cut a hole in it, then stick on the leaf, so that the mined portion of it shall be over the hole. By this means both sides of the mine can be looked at (a great advantage in Lithocolletis mines), and may be held up to the light to show the nature of the excrement, and the finer portions of the mine. I may be permitted to remark here that I consider that those who breed Micro-Lepidoptera would do well to preserve the leaves they have mined also.—*H. W. Kidd; Godalming, April* 11, 1863.

[This note was accompanied by a most beautiful example of a bramble leaf mined by a species of Lithocolletis, and exhibiting its course from the deposition of the egg to the exit of the imago. I hope the plan may meet with that favourable reception it deserves.—*Edward Newman.*]

Occurrence of Acrognathus mandibularis in Epping Forest.—I have great pleasure in announcing the capture of this very rare beetle in Epping Forest. As the locality is a new one, and I have taken more specimens than the total number ever taken before, the capture possesses considerable interest. I took it first on May 11th, and since then on several occasions.—*Thomas Blackburn; Woodford, Essex, May* 20, 1863.

Note on two British Species of Philonthus.—

Philonthus succicola, *Thomson*, *Skandinaviens*, *Col.*, ii. Tom., 157, 7.
P. carbonarius, *Erichs. Gen. et Spec. Staph.* 437, 15 (*nec var.*) *Kraatz*, *Ins. Deutschl.* ii. 577, 9 (*nec var.*) *Waterh. Cat. Brit. Col.*; *nec Gyll.*

The specific name succicola is given by Thomson (*loc. cit.*) to the Philonthus hitherto known in England and elsewhere as P. carbonarius, which appears not to be the species published with that name by Gyllenhal (Ins. Suec. ii. 319, 35): the above alterations must therefore be made in our lists. Our insect differs, according to Thomson, from the true P. carbonarius in the following points: — The head is less; the thorax punctuated on the sides; the penultimate joint of the antennæ is transverse, whilst in P. carbonarius it is not so broad as long; and, in addition to the emargination of the seventh abdominal segment beneath in the male, the *sixth* segment is widely (and gently) emarginate, the sixth segment in P. carbonarius, *Gyll.*, exhibiting no emargination whatever. In the latter species, moreover, the legs, margins of the abdominal segments beneath, and the terminal segment beneath entirely, are pitchy brown. Both Erichson and Kraatz considered the true P. carbonarius as merely a variety of the insect to which Thomson has applied the name succicola; but they appear to have overlooked the structural differences in the emargination of the male, and joints of the antennæ, &c., although the variations in colour did not escape their notice.

Philonthus agilis, *Grav. Mon.* 77, 70 (Staphylinus). *Kraatz*, *Ins. Deutschl.* ii. 603, 37.
P. varians, *var.* d., *Erichs. Gen. et Spec.* 470, 70.

I find this species (not hitherto recorded as British I believe) in my collection, and have also observed it in the cabinets of Mr. Douglas and Dr. Power. It is closely allied to P. varians, *Payk.* (which it must immediately follow in our list), being in the section with the thoracic striæ composed of five punctures, and having the anterior coxæ fusco-testaceous: it may, however, be distinguished from P. varians by its smaller size and different colour; the elytra not being, as in that species, black with a greenish reflection, and often bearing a red spot; but dull black, with the hinder margin at the extreme apex only subferruginous. The elytra also are narrower, with the punctuation rather more remote, and not exhibiting so much transverse rugulosity; the thorax is a little more contracted in front, and the antennæ especially are much shorter, with the penultimate joints transverse, being moreover deep black in colour. —*E. C. Rye*; 284, *King's Road*, *Chelsea*, *May* 22.

Capture of Ptilium affine, Omalium nigrum, O. brevicorne, O. testaceum, and a new Species of Omalium. By the Rev. A. Matthews, M.A.

I feel much pleasure in recording the addition of another well-marked species to the British list of the genus Ptilium. During a recent excursion to the fens of Norfolk with my friend Mr. G. R. Crotch, I met with a single specimen of Ptilium affine (Erichson, Nat. der Ins. Deuts. iii. p. 27); but although I perceived the value of my

capture at the time, and looked carefully for more, I did not succeed in taking any other specimen.

P. affine belongs to that section of the genus which is distinguished by the three impressed lines on the disk of the thorax, and may be known from its allies by the lateral lines appearing at first sight parallel for their whole length to the central channel, but when closely examined each line shows a faint curve at each end in contrary directions; it is also much more convex, and larger than any other of the same section, except P. cæsum, *Er.*

It appears to be extremely rare on the Continent.

Omalium nigrum (Grav. Mon. 212, 17) is closely allied to O. florale; it differs from that species in having longer antennæ, of which the first five joints are red and the remainder black; the thorax is also smaller and of a different form.

Taken in Oxfordshire.

O. brevicorne (Erichson, Gen. et Sp. Staph. ii. p. 884). This is an elongate-depressed species, allied to O. planum. The shortness of its antennæ will at once serve to point it out without detailing other characters.

O. testaceum (Erichson, *l. c.*, p. 885) is also one of the narrow species, and somewhat resembles O. concinnum, but is shorter than that insect, with the thorax much smaller and narrower, and is always of a paler colour.

Three specimens of this and one of the foregoing species were found by myself at different times during last summer, in rotten wood near this place.

The insect which I am about to describe under the name of Omalium crassicorne was taken by my brother, the Rev. H. Matthews, near Waddington, in Lincolnshire, about the year 1850; and as I have been unable to determine it by the descriptions contained in Erichson, Gyllenhal, or any other work to which I have had access, the species is probably unknown.

OMALIUM CRASSICORNE, *n. s.*

L. c. $1\frac{3}{4}$ lin. Rufo-castaneum, æneum, nitidum, antennis pedibusque læte rufis.

Caput piceo-nigrum, distincte sed remote punctatum, inter antennas elevatum, glabrum, nitidum deinde foveâ transversâ, rugosâ, curvatâ profunde impressum, fronte prominulâ, foveâ parvâ utrinque ante ocellos, oculis magnis, valde prominentibus.

Pronotum paulum longitudine latius, capite latius atque longius,

lateribus rotundatis, angulis posticis productis, acutioribus, angulis anticis obtusis, marginibus anticis et posticis fere rectis; glabrum, nitidum, punctis sat profundis, segregatis impressum, foveisque duabus ovalibus, planitie glabrâ interpositâ, pone medium; rufo-castaneum, marginibus dilutioribus.

Scutellum modicum, punctatum.

Elytra pronoto latiora, ac fere duplo longiora, punctis valde profundis, confluentibus rugose impressa, distincte striata, striis ad margines laterales atque apices evanescentibus.

Abdomen latum, depressum, alte marginatum, angulis segmentorum productis, glabrum nitidum, supra lævissime sed distincte punctatum.

Antennæ breves, robustæ, capite paullo longiores, ad apicem gradatim incrassatæ, articulis 6—10 transversis, apicali magno acuminato.

Pedes robusti, simul cum palpis atque antennis læte rufi.

Differt ab O. Salicis, cui proximum est, antennis brevissimis, pronoto minore, ac punctură totâ dissimillimâ.

Head pitchy black, distinctly and very remotely punctured, with an elevated smooth space between the antennæ, behind which is a deep, rugose, transverse fovea, somewhat curved towards the middle; forehead prominent, with a small fovea in front of the ocelli. Eyes large and very prominent.

Thorax rather wider than its length, wider than the head and somewhat longer, with the sides rounded, and the posterior angles produced and acute, the anterior angles obtuse, the posterior and anterior margins nearly straight; smooth and shining, distinctly and remotely punctured, with two slight oval depressions behind the middle, and a glabrous space between them; rufo-castaneous, with the margins pale.

Scutellum moderate, punctured.

Elytra about twice as long as the thorax and wider, rugosely and confusedly punctured, distinctly striate, with the striæ evanescent towards the sides and apex.

Abdomen broad, depressed, strongly margined, with the angles of the segments produced; smooth and shining, clearly and very finely punctured.

Antennæ short and stout, scarcely longer than the head, gradually incrassated towards the apex, with the 6—10 joints inclusive transverse, and the apical joint large, acuminate.

Legs robust. Antennæ, legs and palpi bright orange-red.

This species differs from O. Salicis in the shortness of its antennæ, smaller size of the thorax, and very dissimilar punctuation.

A. Matthews.

Gumley, Leicestershire,
May 22, 1863.

Capture of Bembidium Mannerheimii in the North of Scotland. — In September, 1857, I caught a specimen of a Bembidium at Tair, in Ross-shire, which I could not then determine; however, on the appearance of Dr. Schaum's book I made it out to be B. Mannerheimii, and my diagnosis has recently been confirmed by Mr. Waterhouse.—*Thomas John Bold; Angas' Court, Bigg Market, Newcastle-on-Tyne, May* 28.

Note on Trechus obtusus. — This recently-detected British insect appears to be not rare in the North of England, as on examining my series of T. minutus I find one-half of them to be T. obtusus, and taken in widely-separated localities.—*Id.*

Capture of Mycetoporus nanus in Northumberland. — In the early part of this month, and in April, I took four specimens of Mycetoporus nanus, *Grav.*, which are new to the British fauna. Of its habitat I can only say that it was found in depressions in the sand on the sea-shore near Hartley, and where it had apparently been blown by the wind. Mr. Waterhouse informs me that a single pale example of the same insect has been detected by Mr. E. C. Rye amongst insects taken near Croydon. —*Id.*

List of English Genera of Coleoptera taken in China.—

Drypta (very common)	Hydroporus
Brachinus	Haliplus
Clivina (2 species)	Falagria
Dyschirius (2)	Aleochara
Carabus	Homalota
Badister (like B. peltatus)	Leucoparyphus
Chlænius (5 or 6)	Tachinus
Oödes (1)	Conurus
Pogonus (2)	Heterothops
Agonum (3 or 4)	Quedius
Steropus (1)	Creophilus (maxillosus)
Argutor (1)	Leistotrophus (common home species)
Broscus (1)	Philonthus
Celia (1)	Othivus
Curtonotus (1)	Lithocharis (3 or 4)
Anisodactylus (2)	Sunius
Ophonus (1)	Pæderus (2 very common)
Harpalus (2)	Stenus (5 or 6 or more)
Stenolophus (4 or 5)	Bledius
Bradycellus (1)	Platystethus
Peryphus (2)	Oxytelus
Bembidium (7 or 8)	Trogophlœus
Cybister (1)	Megarthrus
Laccophilus	Scydmænus

Hister
Saprinus (nitidulus)
Epuræa
Carpophilus
Læmophlœus
Silvanus
Cryptophagus
Atomaria
Typhæa
Dermestes
Syncalypta
Simplocaria
Heterocerus
Helophorus
Ochthebius
Hydræna
Berosus
Cercyon
Cetonia (like C. aurata, *Linn.*, and others)
Onthophagus (many)
Copris (like C. lunaris)
Aphodius (a few species)
Agrilus
Trachys
Throscus
Athoüs (and others)
Cyphon
Scirtes
Lampyris (2)
Telephorus (a few just now out).—*George Lewis; Foochow, March* 16, 1863.

Opilus
Corynetes (ruficollis)
Anobium
Dinoderus (very common)
Scaphidema
Notoxus (2)
Mordellistena
Melöe (vulgaris? appeared in January)
Asclera
Bruchus
Apion (3 only)
Sitones
Polydrosus
Cleonus (3)
Errirhinus
Bagoüs (several)
Ceuthorhynchus (and allies)
Sitophilus (oryzæ, of course)
Tomicus
Gracilia
Crioceris (3)
Cryptocephalus
Chrysomela
Phædon
Phratora
Galeruca
Phyllotreta (and others)
Cassida (2)
Coccinella
Bryaxis.

Life-Histories of Sawflies. Translated from the Dutch of M. Snellen van Vollenhoven, by J. W. May, Esq.

(Continued from page 8476).

Allantus Scrophulariæ, *L.*

Hartig, Blatt. und Holzwespen, p. 186, No. 1. *Bouché, Naturgesch, der Insecten*, p. 138. *Brischke, Abbild. und Beschreib.*, p. 7, Plate 1, figs. 4 and 4 *a*.

Allantus niger, antenni, tibiis, tarsisque fulvis, prothoracis margine, scutello et linea sub illo, fasciisque abdominalibus segmentorum 1 ac 4—9 flavis.

I am indebted to the kindness of M. Van De Roo, Westmaas,

for my acquaintance with the larva of this sawfly. I had read the descriptions of this insect by Bouché and Hartig, and subsequently the account given by Brischke; but I had never actually seen the larva. Notwithstanding that I had carefully looked for it in the neighbourhood of the locality where I had found the imago, I had never been fortunate enough to meet with it; and I was obliged to content myself with what was given by the above-named authors. I was accordingly much pleased to receive from M. De Roo some individuals which he sent me on the 1st of October, 1858, and which he had met with at Velp, on the stems and leaves of Scrophularia nodosa. They were in various stages of growth; the smallest, as represented on plate 7, fig. 1, of a bluish very pale gray, with black spots; the largest, in size and colouring as represented at fig. 2, of a more ashy gray tint. The length of the smaller was 2 centimetres, that of the largest 2.5. In all the head was oval, depressed on the forehead, black to just below the eyes and just above the antennæ; thence to below the trophi obscure greenish gray; the parts of the mouth were of the same colour, with the exception of the sharp upper jaws, which were brown. Moreover, the whole head was beset with a pale gray velvety pubescence. Bouché says, "Der fast Kugliche Kopf hat hellbraune Augen," which is repeated by Hartig; this, however, is not the case. The eyes, which are very small, are shining black, as stated by Bouché, but are placed in an obscure greenish gray round spot.

The skin of the larva has a somewhat velvety appearance. The body is broadest at the second and third segments; but generally the larva can hardly be called attenuated. There are twenty-two legs, the fourth segment alone being apodal. The legs proper are yellowish pale gray, with a black base to the first joint, and brown claws; the claspers, as also the ventral surface, are immaculate yellowish white. The spiracles have pale brown margins; below them on each segment are two black spots in the centres of two dermal projections. Along the middle of the back is a row of eleven larger, round, dull black spots; thence to the stigmata are three waved lines of spots, of which there are six on either side of each segment, which is divided into five dermal folds. A triangular spot above the stigma is the largest of these six. In order to make this clearer we have given at fig. 3 a separate representation of one of the middle segments magnified: this is a more exact and clearer figure than that given by Brischke.

After the last moult the larva has an entirely different appearance, as we before observed in the case of another species of Allantus (tricinctus). It is then of an uniform reddish brown, with a darker dor-

sal stripe. The head has become very shining and of a reddish brown colour, with a darker crown; the eyes are inserted in black spots, and the upper jaws are of a deep brown; the hairs, which before entirely covered the head, have disappeared; the segments of the body seem to be more wrinkled, which may be attributed to the fact that the length of the body is somewhat lessened; lastly, the margins of the spiracles are darker.

Most of my larvæ moulted for the last time between the 1st and 5th of October.

According to an observation of M. De Roo, which that gentleman subsequently communicated to me, the larva, when very young, is more greenish in tint.

As already stated, these larvæ fed upon the leaves of Scrophularia nodosa; Bouché writes that they are also to be met with on the Verbascum, which appears not improbable, as this is likewise the case with the larvæ of some Cucullia which are found on both plants.

The larvæ of our sawfly were very inactive, remaining for the most part quite still, and rolled up spirally on the under sides of the leaves, as shown at figs 2 and 4. On feeding, which they appear mostly to do at night, they eat holes in the middle of the leaves.

Shortly after their last change of skin my larvæ buried themselves in the ground, and there constructed rounded cocoons of small grains of earth. About the end of May or beginning of June they change within the cocoon to pupæ, which are at first whitish and afterwards orange, but further do not appear to have any noteworthy peculiarities: one is represented at fig. 5.

The insects remain at rest in this state for about three weeks, when the imagos make their appearance. The perfect insect is very prettily coloured, and has something of the appearance of Allantus tricinctus, already described [Zool. 7718], but may be immediately distinguished from this latter by its ferruginous antennæ. They are about 13 mm. long; head and thorax beset with short hairs; abdomen entirely smooth. The general colour of the body is black. The subclavate antennæ have the third joint the longest, and are ferruginous or obscure orange. The clypeus and upper lip, as also a mark on the cheeks, are yellow; in the thorax the following are coloured yellow: — a spot above the first pair of coxæ, two lines on the prothorax running obliquely forward, the tegulæ, a spot beneath the anterior wings, the scutellum and a small line below it, and lastly a pretty large spot above the posterior coxæ. The femora are black, although in some examples the front of the first two pairs is of a greenish

yellow colour. The tibiæ and tarsi are ferruginous, like the antennæ; the claws, which are sharply bidentate, are more of a brown tint; in the interspace is a blackish pulvulus.

The posterior legs in the male are much broader and of stouter build, as shown in figures 8 and 9, in which the first represents the leg of the male, and the second that of the female. The wings are ferruginous or golden, the nervures being red in the basal half and dark brown at the apex; the stigma is brownish red; a blackish stain extends from the stigma across the inferior portion of the two marginal cells.

The abdomen has a yellow band on the first segment, divided by a line in the middle; the third segment has a yellow streak on either side,—in some female examples these are found on the second also; the fourth and ninth segments have yellow bands, which are much broader in the female than in the male, as shown in our figures 6 and 7, the latter representing the abdomen of the male. The male has only eight segments, and at the apex the organs of generation may be seen protruding between two cup-shaped valves. The ovipositor of the female is black.

M. De Roo writes me that he thinks there are two broods; however, considering the slow rate of growth of the larva, I cannot share his opinion. He grounds his supposition principally upon the fact that he observed imagos between the 11th and 14th of July, whilst young larvæ were in existence which moulted on the 17th. We must await the result of further observation to ascertain the fact on this point.

We have not reared any parasites from this sawfly.

The Lanthorn of Fulgora Laternaria.—Extract from a letter dated June 26, 1862, from Mr. R. J. Treffry, Honda, New Granada, to Mr. George Treffry, Exeter:—"I have sent to you by this packet, or it is sent to Carthagena to go by it, a small parcel containing several specimens of the great lanthorn-fly: these have been collected by a man who has taken refuge in the forests of the High Central Andes, near Mariquita, in New Granada, to avoid soldiering in these revolutionary times; and because I send so many you must not think them abundant. The so-called lanthorn appears to answer as a drum to reverberate its hum and as a 'buffer' to protect it, when, in its rapid flight, it strikes against an obstacle, as it is elastic and horny, and I have taken the live insect by the shoulders and pressed the end of the lanthorn until its end was reflected back against the hump behind, without any inconvenience to the insect. I think its use is what I have stated,—an instrument of sound and a 'buffer.' I cannot tell why it is called the 'lanthorn fly,' for it gives no light. I speak from my own experience, during a residence of more than thirty years in New Granada, and from the information of the men who catch them."—*Robert John Treffry; Honda, New Granada.*

Notes on Vespidæ in 1861. By Stephen Stone, Esq., F.S.A.

Although, from the observations I was enabled to make during the summer of 1860, I was led to conclude that there was not in reality so great a scarcity of social Vespidæ as there appeared to be, I by no means expected to meet with queen wasps the following spring in such immense numbers as, when that season arrived, were observed upon the wing.

Being anxious to have an opportunity of extending my observations upon the fertility of the workers, and of making the acquaintance of the larvæ of Ripiphorus paradoxus, as well as of ascertaining the real nature of the objects with which I have repeatedly found the nests of wasps to be studded, particularly about the crown, and which I had always thought must be the eggs of some parasitic insect, but which, on being exhibited at a meeting of the Entomological Society of London, were pronounced to be minute pupa cases, it was with more than usual interest I looked forward to the time the insects should begin building.

Before the end of May I discovered several nests, in some of which young wasps had been produced, thus showing that the insects had commenced their labours at an early period.

The first I took was a small one of Vespa rufa. It was removed early in June. The queen was taken with it, in the hope that when placed in a favourable situation she might be induced to continue the work; she, however, embraced the first opportunity of deserting that presented itself.

On the 10th of July I took out one of V. germanica, which I placed in the window of a room in an unoccupied house, where the work was resumed.

On the following evening I took out another of the same species, which was also removed to a room in the house above mentioned, in order that the insects might there continue the work, which they accordingly did. When this nest was removed from its original situation under ground a number of the workers were intentionally left behind: two small pieces of comb from a nest of V. vulgaris, obtained two years before, were suspended by a wire in the cavity, as the nucleus of a future nest, in case the insects should feel disposed to construct one, which, from the experience I had had in former years, I fully expected would have been the case; nor was I disappointed, for a few

days afterwards they were observed to be busily at work, when some boys amused themselves by turning up the sods and laying the nest bare: in this situation it remained two days and nights, exposed during a great part of the time to a drenching rain. On finding out what had occurred I replaced the sods, when the work again went on, but on visiting the spot on the 27th, I found that a mole had worked its way through the cavity in which the nest was situate, laying the latter completely in ruins: this proved to be the finishing stroke. All the wasps had either been destroyed or they had abandoned the place, except one, and that one was full of eggs, while all the cells contained either eggs or small larvæ.

On the 12th I took out a nest of V. vulgaris, and on the 13th another of that species; both were thoroughly examined, in the hope of finding larvæ of Ripiphorus, but no trace of the parasite could be discovered.

On the 15th I took a small nest of Vespa germanica, and on the 16th one of V. vulgaris; the latter was suspended from the thatch inside the roof of a cow-shed. The combs belonging to both nests were placed, after the covering had been removed, in situations in which the work could be resumed.

On the 17th I took out two nests of V. vulgaris; they were situated almost close together, under ground. Search was made in both for larvæ of Ripiphorus, but none could be discovered.

On the 20th another nest of V. vulgaris was obtained from under ground, and on the 23rd one of the same species was removed from the thatch of a cottage, in neither of which could larvæ of Ripiphorus be found.

On the 24th I took out a small nest of V. germanica; the queen wasp appeared to have perished some time previously. The combs, three in number, were barely three inches in diameter, one of the three not exceeding an inch: there were but about twenty workers belonging to the nest, the colony having evidently much decreased in number of late; twelve males had become developed, and by far the greater number of the cells appeared to contain males in an undeveloped state, but few containing larvæ or pupæ of workers. In no other instance have I met with males of this species till a far later period in the season.

On the 26th I took a nest of V. vulgaris, which was suspended from a rafter inside the roof of a forcing-house. No trace of Ripiphorus could be discovered in it.

Between the above date and the 1st of August I took out three

nests of V. vulgaris, in neither of which could traces of Ripiphorus be found. One contained three or four cocoons spun by larvæ of Anomalon Vesparum, from which the perfect insects emerged on the 19th.

On the 2nd of August I took out a large nest of V. germanica, which appeared to have been deprived of the queen some time before.

On the 3rd I took out a nest of V. vulgaris, which also appeared to have been deprived of the queen some time previously.

On the 5th I took another nest of V. vulgaris, which was destitute of a queen. The combs were found to be in a mouldy condition, and the nest appeared to be going rapidly to decay.

On the 6th a nest of V. vulgaris was obtained from inside the head of a felled willow; mouldiness had spread itself over the combs, which did not contain a single spun-up larva or pupa, and the workers appeared to have very much decreased in number of late.

On the 7th I took out a nest of V. sylvestris; it was situated in the side of a ditch, beyond the bank of which it projected, so that a great part of it was exposed to view as well as to the weather. A vast number, both of males and young queens, had become matured, and the labours of the colony were, in fact, about to cease, the work of the nest having been nearly completed. I am not aware that it has been observed by writers upon Natural History that colonies of this species, as well as of V. rufa and V. norvegica, bring their labours to a close full two months earlier than either V. germanica, V. vulgaris or V. Crabro, yet such I have invariably found to be the case, as it may also probably be with V. arborea, a species with whose habits I am unacquainted, never having met with a nest or with a living example of the perfect insect.

On the 8th I took out a large nest of V. vulgaris, and on the 13th another of V. sylvestris. The latter was situated in a rabbit-burrow. I had known of this nest, and had been watching the progress of the work for some time. All seemed to be going on well till towards the end of July, when I observed that the crown was covered with what I took to be spiders' webs, which gradually extended themselves over the entire nest, increasing in density, while the wasps composing the colony daily decreased in number, till, at the time I took the nest out, few were left. On removing it, it was found to have been entirely destroyed by larvæ of Ilythia sociella, which had reduced it to a tough, firm, compact mass, somewhat resembling a huge spider's nest. In the 'Proceedings of the Entomological Society of London,' as

reported in the 'Zoologist' (Zool. 7807), Professor Westwood is said to have remarked that I had detected the larvæ of Ilythia sociella in the nest of a Bombus. This is incorrect: it was the above-mentioned nest of Vespa sylvestris to which I drew the Professor's attention as containing lepidopterous larvæ, when he obligingly pointed out to me the name of the species. The larvæ of this insect are generally represented as feeding on the wax or honey contained in the nests of humble bees: such may possibly be their general habit, but the present instance shows that there is an occasional departure from it, and as wasps' nests do not contain either wax or honey it is clear the larvæ in question do not entirely depend upon a supply of those articles for support, but that they can subsist upon other substances, the larvæ and pupæ of the wasps contained in the nest above described having apparently formed the diet of the brood which had become domiciled in it.

The same evening I took out a nest of V. vulgaris, the combs in which were in a deplorably mouldy condition: a number of full-grown larvæ of apparently a large dipterous insect were found in it. It contained but few living wasp larvæ. This had been a very populous nest, but the same fatality had lately attended it that had attended all those of this species I had recently examined, and although, after having been carefully searched for larvæ of Ripiphorus, each nest was, with the insects belonging to it, placed in a suitable position for further work, and the workers belonging to each colony were liberally supplied with sugar, but little work was done, the insects in each case gradually becoming fewer in number till all had disappeared, while, under similar circumstances, and with the same kind of treatment, the colonies of Vespa germanica I had established increased rapidly in size and strength.

I also the same evening took out a nest of V. germanica, the crown of which was studded with small pearl-like objects identical with those alluded to at the commencement of this paper as having been pronounced at a meeting of the Entomological Society to be minute pupa-cases. They were of three distinct kinds, one much larger than the other two. By far the greater number were empty, but from several of the larger, and from a few of one of the smaller kinds, I obtained larvæ. On showing the larger objects, with the larvæ produced from them, to Professor Westwood, that gentleman at once identified them as the eggs of a Volucella.

On the 15th I took out a small nest of V. germanica, which appeared not to have increased in size or the colony in number for some weeks

past: a band of marauders in the shape of woodlice, had been allowed to penetrate the covering and domicile themselves in different parts, notwithstanding that the queen and working wasps appeared to be healthy and tolerably active.

On the 16th I took out a nest of V. germanica, the crown of which was covered with eggs of the same description as those observed on that procured on the 13th.

On the 17th I took out another nest of V. germanica, on which numbers of eggs similar to those above mentioned had been deposited. After divesting this nest of its covering, the combs with the colony were placed in a glazed box and removed to the window of a room in the house in which I reside, liberty being given to the insects to pass in and out through an opening in the window. They were not supplied with sugar, lest it should attract too great a crowd from other quarters, the consequence of which was that they, one and all, positively declined to have anything to do with nest-building, larva-feeding or any other kind of work, but remained crowded together day after day between the combs, or crawled listlessly about the box. Things went on in this way till the 25th, when, finding that both the larvæ and the perfect insects were rapidly approaching a state of starvation, I put two or three table-spoonfuls of sugar into the box: the effect it produced was almost incredible; in a moment, as if by magic, every wasp was transformed from a listless, inanimate object, into a being of animation, activity and energy: work was at once resolutely set about, and before the evening of the next day the combs were completely enclosed. On the 28th the nest had become so beautiful a specimen that I determined on preserving it in the state it then was; I therefore summarily ejected the inmates, took it away, and in its room supplied them with combs of the same number and about the same size from a nest I took on the 24th. Around these combs they immediately proceeded to construct a covering, which, in the course of three days, they worked up to as great a degree of perfection as the former one, the two specimens being almost exactly alike.

On the 19th I took out another nest of V. germanica, on which were groups of eggs of the same kinds as those previously noticed. The covering was removed, the combs separated, and the whole of the insects left behind. The combs were then strung on a wire and suspended in the window of a room near a nest I had had at work since the 11th of July, when numbers of workers from the latter attached themselves to the newly-placed combs, feeding the larvæ they

contained, and setting about the construction of a fresh covering. Being placed a little in advance of the other nest, or somewhat nearer the entrance through the window, the greater part of the workers on coming in, entered it and deposited their respective burdens, instead of continuing their march to the further one, the consequence of which was that it soon became far the more populous of the two, the work being carried on with great rapidity.

On the 23rd I took out a nest of V. vulgaris that had been going to decay for some time past; it did not contain a single pupa or spun-up larva, and but very few of any age, with scarcely an egg, though the queen was still attached to it and appeared to be healthy enough.

On the 24th I took out a nest of V. germanica, separating the combs and leaving the insects behind. To these combs, as already stated, another colony was introduced on the 28th.

On the 29th I took out another nest of V. germanica; it contained six combs, which were separated and all the wasps removed. Four of the combs were strung on a wire, while the other two were divided into eight parts: the pieces were strung upon four wires, two upon a wire, and the whole number suspended in front of the nest obtained on the 10th of July, which had now attained to a large size; from this nest a number of workers proceeded to fabricate a covering for each set of the combs above mentioned, and to feed the larvæ they severally contained.

On the 18th of September I took a small nest of V. Crabro that had gone to decay: the queen was found dead in it, and with the exception of one larva, about half-grown, the cells in the single comb it contained were empty. About thirty workers had apparently been produced, but not one, either dead or alive, was to be found. I had known of the nest for some weeks, and had observed a gradual falling off in the number of the workers, instead of an increase, so that it was obvious there was something amiss in the affairs of the colony. The nest was situated in the hollow trunk of a service-tree about ten feet from the ground, and was within a few yards of the spot in which the one I obtained the year before was situate. With reference to that nest I may remark that of all the young queens which left it in the autumn, numbering, I believe, upwards of two hundred, not one was seen upon wing the following spring; a single one was found by some workmen in grubbing up a tree in the depth of winter, which was lying in a torpid state under the roots, and this was the only example I could hear of as having been met with. I captured three when about to leave the nest, and detained them during the winter, keeping

them in a box in a cold situation. One of the three died at the commencement of spring, and about the middle of May I turned out the other two, which had by that time become remarkably lively, active and restless. One was released at the very place in which the nest above alluded to was afterwards found, while the other was taken some distance in the opposite direction, at which spot, towards the close of summer, a few workers were observed for a time, so that a nest must unquestionably have been formed there also, and there can be little doubt but that in both instances my released prisoners were the architects, which, having been captured before leaving the nest, could not have become impregnated: whether from that cause they were unable to go beyond a certain point in establishing a colony is a question which further observation or renewed experiment may perhaps in time solve.

On the 19th I took out a nest of V. germanica, which contained full-fed larvæ of a Volucella, and nearly full-grown ones of a smaller description of fly, the produce of two out of the three kinds of eggs to which allusion has repeatedly been made. Numbers of young queen wasps had been produced in this nest.

On the 23rd I took out one of V. germanica of small size; males had become developed, but no young queens; indeed, only a few cells for the reception of the latter had as yet been commenced, and none of these were more than half completed.

On the 2nd of November I took out a small nest of V. germanica. Though so late in the season, and although the day was a cold one, the workers, a considerable number of which were still attached to it, defended it most determinedly, making what use they could of their stings, but the poison contained in these, their weapons of defence, had evidently lost much of its power, for the amount of pain it caused was comparatively insignificant.

I must now revert to the six sets of combs strung together on the 19th and 20th of August respectively, and suspended, the one near a nest procured on the 11th of July, the remaining five near one obtained on the 10th of that month. These combs consisted, at the time they were put together, entirely of the cells of workers, and none but workers gained access to them. They were quickly, as already stated, covered in, and the nests increased so rapidly in size, from the large number of workers which attached themselves to them, that the largest measured upwards of fourteen inches in diameter by the middle of October, prior to which date numbers of males had for some time been making their appearance, and when a portion of the covering

was removed, so as to allow of an inspection of the interior, it was found that one comb, consisting of the cells of workers, had been constructed since the 19th of August, the day on which the original combs were strung together, in which a number of workers had become developed, and two consisting of the cells of males, from which males in abundance had been produced. In each of the other nests one or two combs, consisting of male cells, were found to have been formed, from all of which males were obtained, so that the question as regards the production of male wasps, as well as workers, from eggs deposited by workers, may be said to be fairly set at rest.

Then comes the question, whether, had the season not been so near its close, these fertile workers, after having deposited a certain number of male-producing eggs, would not have set about building cells of females or queens, and deposited therein female-producing eggs, or eggs which should produce queens? Facts may, perchance, at some future time be obtained, tending to show that beyond all question such would have been the case.

One would have thought that the opinion expressed in the 'Entomologist's Annual' for 1861, by one of the first Hymenopterists of the day, Mr. F. Smith, "that we are at present only on the threshold of the way leading to the discovery of the history of the Vespidæ," an opinion in which I fully concur, would have caused numbers of entomologists to turn their attention to the subject, with the view of endeavouring to dissipate, to some extent, the darkness and obscurity in which a portion of the history of wasps is at present shrouded. Such, however, does not appear to have been the case.

S. Stone.

Notes on Sea Anemones, Observations on the Tank, &c. — It may be interesting to aquariists to know that young anemones, born in the tank, may be preserved with much greater facility than when they are kept with those of larger growth, by transferring them to a separate vessel. A finger-bason makes an admirable extempore aquarium for the purpose, which should have a handful or two of shingle at the bottom, and the water be changed occasionally: the latter is indispensable. By this means the little ones obtain more of their natural food, and when fed artificially the process is easier, and none are neglected. Several rare and beautiful specimens treated in this manner have amply repaid me for a little extra trouble. The colour of choice species (rosea, miniata, Troglodytes, &c.), usually deteriorated by light, may be retained in its beauty for a lengthened period by placing a small bell-glass over the specimens. This glass should be of a dark sea-green colour, four inches high and about five in diameter. Some five or six small holes should be drilled round

the button at top, to permit of free circulation of water. It may rest on a bit of stone or rock-work, on one edge, to the height of an inch, opposite the light; and it should be withdrawn when the specimens are required to be seen. The vessel, when not otherwise needed, is very useful for aërating the water. It may be filled and held over the tank for a few minutes, as opportunity presents during the day, or it may be permanently fixed in a little wooden framework (as I have seen it done by a friend) a foot or so above the aquarium. The gentle trickling stream, similar to that from the rose of a watering-pot, seems to be vastly more agreeable to my living flowers than the more violent process of syringing, if we may judge from the free and healthy manner in which they expand after the operation. — I have several times been asked by friends the best means of ridding the glass sides of tanks and vases from confervoid growth,—that difficult and troublesome, though highly necessary, inhabitant of all aquaria. When not excessive, of course it contributes materially to the health of the animals; but, so far as my experience goes, even with the best and most approved tanks it is sometimes an intruder, if not very carefully watched. Sponge-sticks and brushes have all been unavailing in cleansing the sides, so closely does it adhere. The following simple and inexpensive plan answers admirably: — Procure a piece of hard wood, say ten inches long, strong enough to bear pressure. Get it shaped into a wedge-like form, with a cylindrical handle coming out from the central part. A gardener's spade is the best model I can think of to go upon. Twist some coarse cotton, such as that used for the wick of a spirit-lamp, tightly round the wedge. This little instrument will be found most effective, when smartly rubbed on the glass sides of the tank, in removing all opacity. Large masses of Conferva may readily be picked off the rock-work with the forceps; and it is a good plan to give the anemones these pieces as food before removing them from the tank. They are greedily seized by the tentacles, retained for some time in the stomach, and afterwards disgorged. On examination of the smallest portion of a fresh piece under the microscope it will be found to contain myriads of Infusoria, Rotifera, Entomostraca, &c., the natural food of the Actiniæ, which I suppose will account for the relish with which the Conferva is retained. — A magnificent Dianthus in my possession really deserves to be immortalised in the pages of the 'Zoologist.' It is by far the finest specimen I have ever seen or heard of. I suppose that eminent authority Mr. Gosse would assign it to the *var.* brunnea. The colour is of a beautiful pale orange, with the lip of a brilliant and darker tinge. The creature is comfortably located on the convex side of an immense oyster-shell, but has on one or two occasions endeavoured to change its quarters, to the detriment of sundry individuals of other species. As far as I can measure with accuracy, it is full 7 inches high, 4 in diameter across the disk and tentacles, and about 1¾ inch in diameter of column. The base covers an irregular outline of 8 inches in circumference. When closed it is the most insignificant creature one can conceive; but when fully expanded and perfectly erect it is a truly beautiful and graceful object. Seven lobes, bristled and frilled and indented with tentacles which baffle my perseverance to count, festoon around the summit of the column, and give it the appearance of a noble palm tree. This appearance is increased if we may fancy the undulating motion of the tentacles (which are a rarity to see perfectly at rest) to resemble the gentle breeze when playing through the leaves of a palm tree. The specimen was dredged from the middle of Weymouth Bay, in the month of September last, by a friend, who presented it to me. Since then it has produced some twenty young ones, by fission of small portions of the base. At one time eight of these, each less than an

inch in height, surrounded their noble parent, whose erect example they appeared to be desirous of emulating in a most amusing manner. So many friends have admired my pet that I crave this as an apology for this description, though the animal must be seen to be appreciated. — *W. R. Hughes ; The General Hospital, Birmingham, May* 23, 1863.

Proceedings of Societies.

Entomological Society.

June 1, 1863.—Frederick Smith, Esq., President in the chair.

Donations.

The following donations were announced, and thanks voted to the respective donors: —'The Transactions of the Entomological Society of New South Wales,' Vol. i. Part 1; presented by the Society. 'Journal of the Proceedings of the Linnean Society,' Vol. vii. No. 26; by the Society. 'The Intellectual Observer,' No. xvii.; by the publishers. 'The Zoologist' for June; by the Editor. 'The Journal of the Society of Arts' for May; by the Society. 'The Reader' for May; by the Editor. 'Stettiner Entomologische Zeitung,' Vol. 24, Nos. 4—6; by the Entomological Society of Stettin.

Election of Member.

A certificate in favour of Alfred R. Wallace, Esq., as a Member of the Society was read. On the proposition of Mr. Dunning, seconded by Mr. Stainton, it was unanimously resolved that, as a slight recognition of the vast services rendered to Science by this distinguished entomologist, zoologist and traveller (and following the precedents afforded by the election of Mrs. F. W. Hope, and that of Mr. Tweedy in 1850), the customary two-months' suspension of the certificate in the meeting-room, and the formal vote by ballot, be dispensed with; and Mr. Wallace was accordingly elected by acclamation.

Exhibitions, &c.

Mr. Stainton exhibited some young Lepidopterous larvæ mining the leaves of the hazel. The same larva had been found in the leaves of Ribes sanguineum, and in the North of England in birch leaves. It retained the mining habit only for a short time, and subsequently became an external feeder. The larva was that of an Incurvaria, and would probably prove to be I. pectinea.

Mr. Stainton exhibited some dead larvæ of Hyponomeuta padella on apple leaves. They had been transferred, when quite young, from their natural food, the hawthorn, to an apple tree, which was the usual food of a closely-allied form: the transferred larvæ had at first commenced eating the apple leaves, but soon ceased to do so, and died, apparently for no other reason than that the food did not agree with them. This fact was adduced not only as an instance of inability on the part of the larvæ to adapt themselves to circumstances, but also as having a material bearing upon the question of the specific distinctness of the hawthorn-feeding and apple-feeding forms of Hyponomeuta.

Mr. S. Stevens exhibited some twigs of lime trees, gathered at Kennington, which had been completely stripped of their leaves (whole trees having shared the same fate) by the larvæ of a Tortrix, apparently belonging to the genus Lozotænia.

Mr. Bond exhibited three varieties of the male of Anthocharis Cardamines, a species but little liable to variation, all captured near London; and a hermaphrodite of the same species, also captured near London, and having female characters on the right side and male characters on the left side.

Mr. Bond also exhibited a hermaphrodite Papilio Machaon, from Whittlesea Mere, in which again the right side was of the female form and the left of the male form.

The President exhibited drawings of two hermaphrodite honey bees. In the first specimen the right side partook of the male characters, the antenna, eye, anterior leg and intermediate leg being male, and the wing and posterior leg being female or worker; the left side was entirely worker. The second specimen was partly male, partly worker; the antenna, eye, wing and legs, on the left side were all of the true male form, and the abdomen was considerably enlarged on the same side.

The President also exhibited specimens of Braula cæca, an insect which had been found on the Continent to be very destructive to honey in hives; it had only recently been imported into this country along with the Apis Ligustica, from a hive of which species the exhibited specimens had been taken.

Mr. Waterhouse exhibited British specimens of a species of Homalota, which, being apparently undescribed, he named and characterized as follows:—

"Homalota planifrons, *n.s.*

"Hom. linearis, depressiuscula, parum nitida, fusco-nigra; elytris fusco-testaceis, basi fuscis; pedibus testaceis, femoribus fuscescentibus; capite subquadrato, fronte plano; thorace subquadrato, coleopteris angustiore, suprà leviter canaliculato, posticè latè foveolato; abdomine segmentis 4 primis crebrè punctulatis, segmento quinto parcius punctato, sexto fere lævigato. Long. 1¾ lin.

"*Mas.* Abdominis segmento sexto dorsali tuberculo compresso munito.

"In size, form, colouring, and in the structure of the antennæ, this species very closely resembles the Homalota gregaria; it, however, may be readily distinguished by the larger size of the head, and the subquadrate and depressed form of this part; the parts of the mouth being more produced, and the fifth abdominal segment being rather sparingly punctured. The male characters are moreover very different, nearly resembling those of H. sulcifrons, *Kirby* (H. pavens, *Erichs.*). From this insect H. platycephala differs in being smaller and narrower, in the form of the head, and in having the anterior abdominal segments rather less thickly punctured, and the fifth segment somewhat sparingly punctured.

"The head in bulk is very nearly equal to the thorax, and the part behind the antennæ is nearly square, but a trifle broader than long, and has the angles rounded; the upper surface is depressed, rather more so in the male than in the female, and has a faint longitudinal groove; the surface is most indistinctly punctured. The antennæ are uniformly fuscous, and when compared with those of H. gregaria present no appreciable difference. The thorax is nearly quadrate, but slightly contracted behind; it has a shallow transverse fovea behind, and a shallow longitudinal depression extends forwards from this to the middle of the thorax; in the male is a distinct dorsal

channel, extending to the front of the thorax; the surface is very thickly and finely punctured. The elytra are but little longer than the thorax, but nearly one-third broader; they present scarcely any gloss, being very thickly and finely punctured, and having a correspondingly fine and dense pubescence; they are fuscous at the base, and gradually assume a paler hue towards the apex. The abdomen is glossy, sometimes pale at the apex. The legs are slender, as in H. gregaria, but rather longer. The tarsi are elongate, and in those of the hinder legs the first joint is pretty distinctly longer than the following three joints, as in the insect last mentioned, and which no doubt induced Erichson to describe it as a member of the genus Tachyusa.

"The sixth abdominal segment in the male is furnished with a small laterally compressed tubercle, and the terminal segment has the middle portion of the upper plate produced and terminating in four denticles, of which the middle pair are approximated and most prominent; the external pair are slightly obtuse, and are separated by a deep nearly semicircular notch from a spine forming the outermost lateral boundary of the plate, and the apex of which terminates nearly on the same plane as the outer pair of denticles.

"I possess five specimens of this species, four of which were taken in the corridor of the Crystal Palace, and the fifth was found by one of my sons in the court yard of the British Museum. Two of these are males: in one of the males, and in one female, the thorax presents on its disk a large and tolerably deep oblong impression, as is frequently seen in H. gregaria and some other species. In one specimen both thorax and elytra are palish brown, perhaps from immaturity."

Mr. M'Lachlan exhibited three new British species of Trichoptera, on which he read the following notes:—

"1. Hydropsyche ophthalmica, *Rambur*. Taken by myself, I believe between Kew and Richmond, and by Mr. Wormald at the same place. Readily distinguishable from all other described species by the large size of the eyes in the male, the vertex from this cause being almost quadrangular. Kindly determined for me by Dr. Hagen, who has seen Rambur's types.

"2. Philopotamus? columbina, *Pictet*. Taken by Mr. Wormald at Llangollen, North Wales, in September, 1862, and by myself near Bickleigh, Devon, in the same month. This is not a true Philopotamus, belonging to the same group as Hydropsyche occipitalis, *Pict.* (Apelocheira subaurata, *Steph.*), and closely allied to that species, but differing in its slightly smaller size and darker colour, and by the structure of the last abdominal segment in the male, there being a deep notch in the middle of the upper margin, which is absent in H. occipitalis.

"3. Psychomia (Homoecerus) derelicta (*n.s.*). I propose this name for an insect belonging to a rather obscure group, and which I cannot make out to have been previously described; a specimen sent to Dr. Hagen last year was returned as unknown to him. It belongs to a group mentioned by Dr. Hagen in the 'Stettiner Entomologische Zeitung' for 1860, p. 279, differing from the true Psychomiæ in the broader and more obtuse wings, in the more widely dilated intermediate legs of the female, and especially in the possession by that sex of a rather long and curved ovipositor; nevertheless Dr. Hagen thinks that the proper place of the group is with Psychomia. Kolenati, in the second part of the 'Genera et Species Trichopterorum,' places it as a subgenus of Tinodes, which he calls Homoecerus, a position it can scarcely retain, as the females of Tinodes have undilated intermediate legs. Kolenati describes four species under

the names of (1) albipunctatus, *Steph.*, known to him only from description; the type of Stephens' species is a small Hydropsyche; (2) obscurus, *Steph.*, which cannot be Stephens' species, the type of which is a female of Glossosoma fimbriata, *Steph.*; (3) affinis, *Kolenati*, a new species, differing in the venation of the under wings; and (4) pusilla, *Fabricius*, of which I may say that what Fabricius' species really is must, I think, always remain conjectural: pusilla, *Stephens*, is a true Psychomia, and the same as his phæopa; pusilla, *Curtis*, is a small True Tinodes.

"I have drawn up the following diagnosis of the new species.

"PSYCHOMIA (HOMOECERUS) DERELICTA.

"Nigro-fusca; antennis saturate brunneis, testaceo annulatis; palpis brunneis; capite thorace abdomineque nigro-fuscis; oviducto testaceo-fusco, sursum incurvato; pedibus fuscis, vix testaceis; alis anticis fuligineo-fuscis, vix iridescentibus, dense pilosis; posticis fusco hyalinis. (*Fœm*).

"Long. corp. 1¾ lin.; exp. al. 5—6 lin.

"Of this I have seen five specimens, all of which are females. It has been taken by Mr. Parfitt near Exeter, by Mr. Fenn at Wallingford, by Mr. Barrett at Haslemere, in July, and by myself near Kew, in August. It is larger and darker than the other described species."

Mr. Stainton exhibited specimens of Tinea vivipara, *Scott*, and read the following notice of the habits of that species:—

"This insect has been described in the first part of the 'Transactions of the Entomological Society of New South Wales,' by the Hon. A. W. Scott, of Ash Island, Hexham, which is about seventy-five miles N.N.E. of Sydney. The specimens exhibited were captured by Mr. Diggles at Moreton Bay, which is three hundred miles further to the north. Its beauty is not the only interest which this elegant species possesses, for it appears from the observations of Mr. Scott that the females do not deposit eggs, but living larvæ.

"'It was after dark, in the early part of the month of October, 1861, that we first captured a specimen with the hand, being attracted at the moment by its elegant colouring, and wishing to secure it for the cabinet. Fearful that the plumage might be injured by the struggles of the moth while endeavouring to escape, it was gently compressed, and on opening the hand we observed numbers of minute but perfect larvæ being ejected from the abdomen in rapid succession, and moving about with considerable celerity, evidently in search of suitable shelter and food. This incident, so singular and new to us, required further confirmation, and consequently many more of a similar kind (of course all females) were caught and attached to corks previously covered with black paper, and subjected to the closest scrutiny. These moths shortly commenced to deposit their living progeny with rapidity, the small white fleshy larvæ being seen with great distinctness on the black surface of the paper, thus affording clear and satisfactory proof that this insect—the only one of its order at present known to be so—is unquestionably ovo-viviparous, and will represent in future this peculiarity among the Lepidoptera, similarly to those few species existing in the hemipterous and dipterous orders.

"'This fact having been ascertained our attention was incited to the care of the little strangers, and to procure suitable shelter and food for them, in the hope that we

should be able to rear them, and thus to supply a correct account of their metamorphoses. In this we were guided by the form of the perfect insect, and accordingly placed before them grains of maize, pieces of flannel and woollen cloth, shreds of partially decayed paper, some fungus and lichen, and other materials known to be the food of caterpillars belonging to the genus Tinea and neighbouring genera. Unfortunately they turned with distaste from all these supplies, with the exception of the cloth and flannel, and even to these they attached themselves with reluctance. We, however, persevered, and put them in a dark and roomy box, aware of the marked dislike to light of larvæ possessing depredatory habits, and left them undisturbed for a week, at the end of which we were pleased to find that small silken tunnels or tubes had been constructed on the surface of the brown cloth, and that the denuded appearance of several places exhibited signs of their ravages. From this cloth they shortly afterwards transferred themselves to the flannel, where they fabricated small portable cases, composed of two separate pieces of an irregular oval form, joined at the sides, but leaving apertures at each end, and being thus comfortably housed we entertained sanguine hopes of rearing them. These hopes, however, were not to be realized, for towards the end of November (nearly two months from their birth) they ceased to thrive, and eventually all perished. * * * *

" 'As we failed in affording proper nourishment to the larvæ, we think it probable that they exist in their natural state upon decaying animal or vegetable matter, as found to be the case with the Sarcophaga carnaria (or common blowfly) and some others which produce their young in a living state.'—(Trans. Entom. Soc. of N. S. W. Vol. i. Part 1).

" It will now be a problem for European Micro-lepidopterists to ascertain whether any of our European species of the genus Tinea have a similar habit. When Dr. Staudinger was in Spain he met with one larva of this genus (if I remember rightly) which fed on dry dung. Is it not possible that some species of the genus may feed on the freshly dropped dung of animals, and hence the larvæ require to be deposited in an active state? Many of the larvæ of the Tineæ of Europe are still unknown to us; possibly a clue is now furnished which may prove of service."

Mr. Stainton read the following:—

Notes on the 'Proceedings of the Entomological Society of Philadelphia.'

" I have before me the 'Proceedings of the Entomological Society of Philadelphia' from March, 1861, to the close of 1862, forming nine parts of variable bulk, and extending to 311 pages. These 'Proceedings' are well printed on good paper, and contain several memoirs of considerable importance, so that it is extremely desirable that the existence of an Entomological Society on the other side of the Atlantic should be generally known to the entomologists of Europe.

" It does not appear from these 'Proceedings' when the Entomological Society of Philadelphia was first started. In the Report of the Secretary for 1861 we read that 'the cabinet was commenced in January, 1860,' which is fourteen months before the earliest meeting recorded on the second page of the 'Proceedings,' at which 'the Committee appointed to revise the Constitution and By-Laws prior to procuring a Charter made their final Report.' However, it appears from the by-laws that the common seal of the Society was to bear the words 'Founded 1859.' It is interesting at the very time when we are called upon to decide the question of the dispersion of our own collection to notice how energetically this young Society is engaged in the

task of forming a collection. Thus we read that 'the contributions to the cabinet during the past year have been both numerous and valuable. In Coleoptera there is an increase of 520 species, 8885 specimens during the past year; in Lepidoptera an increase of 198 species, 2169 specimens; in Diptera an increase of 75 species, 235 specimens,' &c.; 'as a whole the interest manifested by the members in building up the collections of the Society has been exceedingly liberal and enthusiastic. The cabinet was commenced in January, 1860, and since then 3678 species have been presented.'

"The library of the Society, we are informed in the same Report, 'now contains 129 volumes and pamphlets,' and the Society numbered in December, 1861, '53 members and 27 correspondents.'

"In the report of the Recording Secretary for 1862 we find an increase to the collection of 1514 species, and an increase to the library of 344 volumes and pamphlets, including a number of rare and valuable works, and the Society numbered in December last 65 resident and 48 corresponding members.

"In the papers already published, 51 pages are devoted to Coleoptera, 4 to Neuroptera, 83 to Hymenoptera (45 of which are occupied with a paper by Osten-Sacken, on the Cynipidæ of the North-American Oaks), 53 to Lepidoptera, 22 to Hemiptera and 22 to Diptera.

"Amongst the coleopterous papers are two short papers on the habits of some coleopterous larvæ and pupæ, by G. H. Horn; one with descriptions of fourteen larvæ of North-American Coleoptera belonging to genera the preparatory states of which had not, to the knowledge of the writer (Baron R. Osten-Sacken), been made known before; one with descriptions of four new North-American Coleoptera, by Dr. Horn; and one with descriptions of nine supposed new species of Cerambycidæ, by J. H. B. Bland.

"Among the hymenopterous papers are the elaborate treatise (already mentioned) on the Cynipidæ of the North-American oaks and their galls, by Baron R. Osten-Sacken, and two with descriptions of (seven and six) new species of Tenthredinidæ, by E. Norton.

"Amongst the lepidopterous papers are four by Dr. Clemens, of which three are devoted to Micro-Lepidoptera, and one contains a Synopsis of the families of the Heterocera. The first paper on Micro-lepidopterous larvæ furnishes a good introduction to the successful study of those insects; a description is given of the modes of feeding of the larvæ of the genera Coleophora, Lithocolletis, Aspidisca, Nepticula, Ornix and Catastega, the number of species of which Dr. Clemens gives the habit of the larvæ in these genera being 7, 2, 2, 14, 1 and 3. The last-named genus is probably, however, as he suspects, allied to the Phycideæ, and not referable to the Tineina; the second Micro-lepidopterous paper contains descriptions of nine new species, including one of the curious genus Opostega; the third paper contains a notice of Bedellia somnulentella, bred from the leaves of Ipomæa purpurea, and of two new larvæ of the genus Nepticula in the leaves of the sycamore. Amongst the remaining papers on the order may be noticed Mr. Edwards' notes on Grapta Comma, *Harris*, and Grapta Faunus, *Edwards*, the latter species having been confounded by some authors with the European Grapta C-album; and Mr. Lintner's notes on the metamorphoses of Ceratomyia quadricornis, one of the Sphingidæ, in which we have a very detailed account of the whole process, from the egg to the pupa state, a change which is completed in six weeks. Mr. Edwards has given descriptions of four diurnal Lepidoptera occurring

in the United States, which are figured in Doubleday's 'Genera, but undescribed; they are Argynnis Astarte, Melitæa Chalcedon, M. Anicia and Timetes Coresia.

"The hemipterous papers are two in number; a short descriptive paper by P. R. Uhler on some new species, including a Capsus, which in some seasons is very plentiful on the Robinia Pseudacacia; and a highly philosophical paper on the genera of Aphidæ found in the United States, by Benjamin D. Walsh. In allusion to the probability of differences in the larval form of Aphides being correlated with the variation of the food-plant, and not necessarily implying that the two are specifically distinct, Mr. Walsh cites the case of the larvæ of Datana ministra (one of the Notodontidæ), which are always vittate with yellow, and with the upper surface of the first (second) segment yellow, when they feed on oak-apple, &c.; but when these larvæ feed on hickory or walnut they are entirely black, and yet between the moths produced from them there is no appreciable difference. Mr. Walsh in his summary tabulates the previously described species of Aphidæ in the United States as fifty-seven in number, and the new species described in this paper as thirteen, making a total of seventy.

"The only dipterous paper is on the characters of the larvæ of Mycetophilidæ, by Baron R. Osten-Sacken. This paper contains '1st. A comparative description of the external anatomy of the principal genera in their larval form. 2nd. A brief account of what is known about the habits of each genus. 3rd. A list of references, with a short notice on the importance of each.'

"The only neuropterous paper is a short one by Mr. Buckley, descriptive of two new species of Termites. Why the Neuroptera should have attracted so very little attention is not apparent, but probably some important contributions on that order will shortly appear, and then the students of all the principal Orders of insects will find matter to interest them in the 'Proceedings of the Entomological Society of Philadelphia.'

"I annex a classified list of the papers already published, with references to the pages where they will be found."

Coleoptera.

"Catalogue of the Cicindelidæ of North America," by E. T. Cresson. Pp. 7—20.

"Notes on the Habits of some Coleopterous Larvæ and Pupæ," by G. H. Horn. Pp. 28—30.

"Observations on the Habits of some Coleopterous Larvæ and Pupæ," by G. H. Horn. Pp. 43, 44.

"Catalogue of the Longicorn Coleoptera taken in the vicinity of Philadelphia," by J. H. B. Bland. Pp. 93—101.

"Descriptions of some Larvæ of North-American Coleoptera," by Baron R. Osten-Sacken (with a plate). Pp. 105—130.

"Descriptions of some new North-American Coleoptera," by G. H. Horn, M.D. Pp. 187—188.

"On Winter Collecting," by H. T. Fay. Pp. 194—198.

"Descriptions of several supposed new Species of Cerambycidæ in the Collection of the Entomological Society of Philadelphia, with Observations on some already Described," by J. H. B. Bland. Pp. 267—276.

Neuroptera.

"Descriptions of Two New Species of Termites from Texas," by S. B. Buckley. Pp. 212—215.

HYMENOPTERA.

"Catalogue of the Described Species of Tenthredinidæ and Uroceridæ inhabiting North America," by E. T. Cresson. Pp. 33—39.

"On the Cynipidæ of the North-American Oaks and their Galls," by Baron R. Osten-Sacken. Pp. 47—72.

"Additions and Corrections to the above Paper," by Baron R. Osten-Sacken. Pp. 241—259.

"The Tarantula (Mygale Hentzii, *Girard*) and its Destroyer (Pompilus formosus, *Say.*)," by S. B. Buckley. Pp. 138, 139.

"Notice of several New Species of Tenthredinidæ," by E. Norton. Pp. 143, 144.

"Descriptions of several New Hymenoptera," by E. Norton. Pp. 198—200.

"On the Synonyms of Cimbex Americana," by E. Norton. Pp. 201, 202.

"A Catalogue of the Described Species of several Families of Hymenoptera inhabiting North America," by E. T. Cresson. Pp. 202—211 and 227—238.

LEPIDOPTERA.

"Micro-Lepidopterous Larvæ—Notes on a few Species the Imagos of which are probably Undescribed," by Brackenridge Clemens, M.D. Pp. 75—87.

"New American Micro-Lepidoptera," by B. Clemens, M.D. Pp. 131—137.

"North-American Micro-Lepidoptera," by B. Clemens, M.D. Pp. 147—151.

"Synopsis of Families of Heterocera," by B. Clemens, M.D. Pp. 173—181.

"Notes upon Grapta Comma, *Harris*, and Grapta Faunus, *Edwards* (Grapta C-album of some Authors)," by W. H. Edwards. Pp. 182—184.

"Additions to the Catalogue of United States Lepidoptera," by A. R. Grote. Pp. 218, 219.

"Descriptions of Certain Species of Diurnal Lepidoptera found within the United States, figured in Doubleday's 'Genera,' but Undescribed," by W. H. Edwards. Pp. 221—224.

"Description of a supposed New Species of Ægeriidæ from Virginia, and Observations upon Papilio Damus, *Boisd.*" by James Ridings. Pp. 277, 278.

"Metamorphoses of Ceratomyia Quadricornis, *Harris*," by J. A. Lintner. Pp. 286—293.

HEMIPTERA.

"Descriptions of a few New Species of Hemiptera, and Observations upon some already Described," by P. R. Uhler. Pp. 21—24.

"On the Genera of Aphidæ found in the United States," by Benjamin D. Walsh, M.A. Pp. 294—311.

DIPTERA.

"Characters of the Larvæ of Mycetophilidæ," by Baron R. Osten-Sacken (with a plate). Pp. 151—172.

The Secretary read a letter from Mr. C. A. Wilson, a Corresponding Member of the Society, which bore date Adelaide, March 26, 1863, and contained a brief account of the natural-historical results of the exploring party under Stuart, which had recently succeeded in traversing the Australian Continent from the South to the North-West Coast and back again. About fifteen hundred specimens of insects had been obtained,

but none of the Orders Orthoptera, Neuroptera, Diptera or Lepidoptera; many Lepidoptera were seen, including some butterflies of singular form and beautiful colouring, but, owing to the accidental loss of all his entomological apparatus, Mr. F. G. Waterhouse, the naturalist attached to the expedition, had been unable to capture any. A few Hymenoptera had been obtained, and some Hemiptera, nearly all Scutelleridæ. In Coleoptera a new Cicindela, the first representative of that family in the South-Australian province: upwards of fifty specimens were knocked down one damp evening, about six hundred miles north of Adelaide; the species was of large size, smooth, and of a brilliant metallic green colour. There were a few new forms of Carabidæ, and many species of Dyticidæ and Gyrinidæ, evidently quite new. The South-Australian species were generally unicolorous, but these were spotted or banded with different colours. Of Staphylinidæ or Paussidæ none; of Lamellicorns but few; some of Copris?; a few Cetoniæ; some large and handsome Buprestidæ, probably new; and many additions to Agrilus and the allied genera. There were many new Heteromera, Curculionidæ both large and small, and several distinct species of a genus with long antennæ, which was either curculionideous or was intermediate between the Curculionidæ and the Longicorns. Of the last-mentioned tribe there were also a few representatives, principally Lamiæ, which did not occur in any of the South-Australian collections.

Special General Meeting.

June 1, 1863.—Frederick Smith, Esq., President, in the chair.

The Secretary read the notice by which the Special Meeting had been convened for the purpose of considering the following Resolution of the Library and Cabinets Committee, adopted at its Meeting of the 30th of March, 1863:—

"That the present income and the financial prospects of the Society do not warrant this Committee in believing that the Society is or will be able to provide the sums requisite for forming a Collection of British Insects which shall be worthy of the Society, and for maintaining the same in a satisfactory state.

"This Committee therefore recommends to the Council that the Society's Collection be discontinued, and that proper steps be taken for the disposal of the specimens and cabinets.

"The Committee, however, further recommends that the type-specimens be not dispersed, but be placed in some public Institution where they will be readily accessible and available for scientific purposes; and the Committee suggests the feasibility of some arrangement by which the specimens in question might be placed in the British Museum."

It was moved by Mr. Pascoe, and seconded by Dr. Baly:

"That the recommendations of the Library and Cabinets Committee, contained in their Report to the Council of the 30th of March, 1863, be carried into effect in such manner and at such time as the Council, in its discretion, shall think fit."

An Amendment was moved by Mr. J. W. May, and seconded by Mr. Edwin Shepherd:

"That the whole of the Society's Collection of Insects be sold, the type-specimens as well as the others."

The Meeting, having been also addressed by Mr. Francis, Mr. Waterhouse, Mr. Desvignes and Mr. Dunning, the Amendment was, on a show of hands, declared to be lost.

The President then put the original Resolution, when the numbers were—for the Resolution, 22; against, 0.—*J. W. D.*

A Bat eating Bacon.—At a farm-house near Guildford, in Surrey, when the bacon which had been placed up the kitchen chimney for the purpose of being smoked was taken down, it was found nibbled in several places, and in one flitch was a round hole, about the dimensions of an ordinary rat's hole; but the damage did not stop here, for on cutting the flitch through we found the whole of the best part had been devoured: it was hollowed out most carefully all under the rind, but the one hole above mentioned was the only orifice visible from outside. On making inquiries I was told that the mischief was done by the "flutter-mouse," or shorteared bat (*Vespertilio murinus*), which is very numerous in the neighbourhood; and one labourer assured me that he knew of an instance in which the decayed remains of a bat were found in a ham thus hollowed out. I was dubious at first, and attributed the robbery to rats, whose predilection for bacon is well known; but when I remembered that a turf fire had been burning on the hearth every day since the bacon was first placed in the chimney I was inclined to believe my informant.—*M. F. Coussmaker; 17, Charles Street, Milford, Pembrokeshire, May* 29, 1863.

A List of British Birds found in South Africa.

By J. H. Gurney, Esq., M.P.

I have personally examined South-African specimens of all the following species, except those which are marked with an asterisk, and which I have added to the list on such authority as appears to me to be fully reliable.

Egyptian Vulture (*Neophron percnopterus*). South Africa generally; rare in Natal.

Griffon Vulture (*Gyps fulvus*). South Africa generally.

Osprey (*Pandion haliætus*). Cape Colony, Natal.

Peregrine Falcon (*Falco peregrinus*). Natal. I have only seen one South-African specimen of this falcon. A nearly allied South-African

species (Falco minor of Bonaparte) has been sometimes erroneously confounded with the true F. peregrinus, but is undoubtedly distinct.

Orangelegged Hobby (*Erythropus vespertinus*). Damara Land.

Honey Buzzard (*Pernis apivorus*). Natal; rare.

Montagu's Harrier (*Circus cineraceus*). Damara Land.

Barn Owl (*Strix flammea*). Cape Colony. This owl, which is also found in the island of Madagascar, must not be confounded with Strix capensis of Smith, which is a very distinct South-African species.

Common Swift (*Cypselus apus*). Natal. This swift is found in the colony of Natal throughout the year, but is more numerous during the colonial "summer" than at other seasons.

Chimney Swallow (*Hirundo rustica*). Damara Land, Natal. The chimney swallow arrives in Natal in November, and leaves in March and April. The specimen examined by me (which was from Natal) was slightly more rufescent on the abdomen than is usual in British examples.

*European Roller (*Coracias garrula*). Natal.

*Woodchat Shrike (*Lanius rufus*). Cape Colony.

Redbacked Shrike (*L. collurio*). Damara Land, Great and Little Namagua Land, Cape Colony.

Spotted Flycatcher (*Muscicapa grisola*). Damara Land.

Stonechat (*Pratincola rubicola*). Cape Colony, Natal.

Willow Wren (*Sylvia trochilus*). Damara Land. The individual which I examined was barely so large as an ordinary English specimen, but appeared identical in other respects.

European Quail (*Coturnix dactylisonans*). Damara Land, Natal. These quails arrive in Natal during the months of April, May and June, and leave early in the colonial "spring."

Collared Pratincole (*Glareola torquata*). Natal.

*Gray Plover (*Squatarola helvetica*). Damara Land, also in Madagascar.

Ring Dotterell (*Ægialites hiaticula*). Natal.

*Turnstone (*Strepsilas interpres*). Damara Land, Cape Colony and Mosambique; also in Madagascar.

*European Oystercatcher (*Hæmatopus ostralegus*). Mosambique.

*Blackwinged Stilt (*Himantopus melanopterus*). Damara Land.

Ruff (*Machetes pugnax*). Damara Land, Cape Colony, Natal.

Curlew Sandpiper (*Tringa subarquata*). Damara Land, Cape Colony, Natal.

*Little Sandpiper (*T. minuta*). Damara Land.

Common Sandpiper (*Totanus hypoleucos*). Cape Colony, Natal; also in Madagascar.

Wood Sandpiper (*T. glareola*). Natal.

Greenshank (*T. glottis*). Damara Land, Mosambique, Natal.

Great Snipe (*Gallinago major*). Natal. The great snipes arrive in Natal in September and October, and leave in January or February.

*Whimbrel (*Numenius phæopus*). Mosambique; also in Madagascar.

Common Curlew (*N. arquata*). Mosambique, Natal.

White Stork (*Ciconia alba*). Natal.

Common Heron (*Ardea cinerea*). Mosambique, Natal; also in Madagascar and the Mauritius.

Purple Heron (*A. purpurea*). Mosambique, Natal; also in Madagascar.

Little Egret (*A. garzetta*). Mosambique, Natal.

Buffbacked Heron (*A. bubulcus*). Natal; also in Madagascar.

Squacco Heron (*A. comata*). Natal; also in Madagascar.

European Little Bittern (*Ardetta minuta*). Natal. This species must not be confounded with a nearly allied but distinct species of little bittern, which is also found at Natal, Ardetta podiceps of Bonaparte.

Water Rail (*Rallus aquaticus*). Damara Land, Natal.

Corn Crake (*Crex pratensis*). Natal. The corn crake is only found at Natal during the colonial "summer."

Baillon's Crake (*C. Baillonii*). Damara Land.

European Waterhen (*Gallinula chloropus*). Damara Land, Cape Colony, Mosambique, Natal; also Madagascar, Mauritius and Bourbon.

Little Grebe (*Podiceps minor*). Damara Land, Cape Colony, Natal; also Madagascar.

J. H. Gurney.

The Osprey in Shetland.—About a week ago a fine female osprey was brought to me by a lad who had just shot it upon the sands at Burrafirth, as it was sitting at the mouth of a burn, devouring a sea trout. The stomach contained nothing besides pieces of fish, and in the ovary I found eggs about the size of BB shot. Another bird, which from its small size is supposed to be a male, was frequently seen in company with it, and is still in this neighbourhood. Dr. Edmondstone informs me that he has very rarely observed this species in Shetland.—*Henry L. Saxby; Baltasound, Shetland, June* 10, 1863.

The Osprey near Bury St. Edmund's.—On Thursday, May 28th, a fine male osprey was caught by a labouring man in a tree near Bury St. Edmunds. When captured

it had a circular steel trap attached to its left foot, by which it had become entangled in the branches, and which it had evidently carried for some time, the wound caused by it having nearly healed, though the leg and foot were still much enlarged. It was purchased by Mr. Bilson, taxidermist, of Bury, from whom I obtained it on the 3rd of June.—*Thomas H. Allis; York, June* 25, 1863.

Correction of an Error.—In my paper on the occurrence of rare hawks (Zool. 8523) I have been informed of an error. Read "Greenland falcon (*F. grœnlandicus*)" instead of "Iceland falcon."—*H. Blake-Knox; Bartragh, Dalkey, Co. Dublin, May* 27, 1863.

The Jer Falcon and Orangelegged Hobby in Devonshire.—When I was at Devonport, a few days since, I took the opportunity of calling upon Mr. Pincombe, naturalist, to ascertain some particulars of the capture of the jer falcon at or near Port Eliot, St. Germau's, which took place several years since. He has still the bird in his possession, and in remarkably good preservation: it is a good example of a male bird three or four years old. The specimen which was killed at the Lizard some years since, and which passed into the hands of the late Mr. Humphrey Grylls, of Helston, was, I think from its larger size, a female bird. Both this and Mr. Pincombe's bird show symptoms of approaching maturity, from the brown spots being at the tip of the feathers, instead of the feathers having a general border or margin of this colour, which is the first change after the brown adolescent plumage. We thus can claim this fine Arctic falcon as having occurred in the eastern as well as the western part of Cornwall. Mr. Pincombe at the same time called my attention to an adult specimen of the orangelegged hobby, which was sent to him from the parish of Wembury, on the Devonshire side of Plymouth Sound, some years since. We may all but claim this species as an addition to the Cornish Fauna, as the exact spot where it occurred, although in Devonshire, is within two or three miles of Cornwall. This is the example of the bird which Mr. Yarrell refers to as having been in a Museum at Devonport, and killed not far off.—*Edward Hearle Rodd; Penzance, June* 12, 1863.

The Goshawk (Falco palumbarius) *Nesting in Yorkshire.*—This spring the nest of this rare bird was found in some ivy which surrounds an old oak tree which is situate in the boundary hedge of a plantation. I did not see the nest, but the three eggs were of a very pale blue. They were unfortunately broken by one of the possessor's children. —*J. Ranson; York.*

Abnormal Nests of Missel Thrush, &c.—I have sent you a few nests, and in doing so I have confined myself chiefly to common varieties not mentioned in 'Birdsnesting.' When the controversy arose on the nest of the missel thrush, several correspondents wrote in rather an acrimonious spirit, attributing an inaccuracy in your description, which, it will be found, did not wholly exist. Respecting the mud-lined nests, it is certain that they are much commoner in rainy seasons; but I am unable to account for this, except on my own hypothesis, which is this: the missel thrush is a well-known early breeder; the eggs would therefore, in a wet spring, run a great risk of being chilled did not the bird provide against such a catastrophe by lining its nest with mud, which, when thoroughly dry, would, comparatively speaking, be impervious to exterior dampness. I have been led to this conclusion from having, on more than one occasion, seen the old bird sitting in a mud-lined nest,—as I presume, to assist in drying the mud,—some few days before finally lining it with fine dried grass. I have enclosed two of these unfinished nests, Nos. 2 and 7, taken on the 20th of March, 1862. The nests forwarded may be thus described:—

Missel Thrush.—No. 1. Coarse grass, a few feathers, with a little mud, and lined with fine dried grass. I think this is the only nest of the missel thrush I have ever seen without Ramalina, more or less. No. 2. A few dead sticks, dried stalks, moss and lichen; lined with mud. No. 3. A quantity of Ramalina fraxinea, *var.* farinacea, &c., and a few dead twigs; and lined with fine grass. No. 4. Dead twigs, coarse vegetable stalks, moss, wool and Ramalina; lined with fine dried grass. No. 5. Entirely of Ramalina and a few dead twigs outside; lined with fine grass. No. 6. Ramalina, dried vegetable stalks and a little mud; lined with fine grass. No. 7. Dead fir twigs, moss, wool, lichen and grass; lined with mud.

Linnet.—No. 1. Fibrous roots and moss; lined with wool and horse-hair. This is certainly the normal type of linnets' nests. No. 2. Roots of Triticum; lined with fibrous roots. No. 3. Grass and fibrous roots; lined with wool and horse-hair. No. 4. Dried stalks of herbaceous plants, moss and fibrous roots; lined with wool, a few feathers and horse-hair.

Greenfinch.—No. 1. Coarse grass, a little moss; lined with wool and horse-hair. No. 2. Dead fir twigs, moss and bark of Clematis vitalba; lined with wool, hair and feathers. No. 3. Roots and moss; lined with grass, wool and a few feathers. No. 4. Roots and moss; lined with fibrous roots, wool and feathers. No. 5. Roots, wool and moss; lined with fibrous roots, wool and a little horse-hair.

Colonel Montagu's description of the nest of the cirl bunting appears to me incorrect, in that it differs not from the normal type of yellowhammers' nests, as you will see by the two specimens of the latter enclosed. I have taken several nests of the cirl bunting, but never found one lined with fibrous roots. The nest sent may, I think, be safely taken for the usual type. I have also inclosed you the two varieties of the eggs of Regulus cristatus: it is difficult to say which should be described as the typical colour; they are equally common.—*Henry Reeks; Thruxton.*

[The nests so kindly transmitted to me are most interesting, and speak for themselves; but, as my readers cannot examine and handle them, I publish my correspondent's notes, which are very explicit. With regard to the "acrimonious spirit" exhibited by some of my critics, I believe that Mr. Reeks does not allude to anything in the 'Zoologist,' but to the lucubrations of a beginner in another journal: experience will undoubtedly convince the critic both of his mistake as to matter of fact, and also as to the impropriety of acrimonious writing on this or any other subject connected with Science.—*Edward Newman.*]

Blackbird Nest-building.—A blackbird built her nest this spring in my garden, in a white currant bush. On the Saturday there was not a straw laid, but the nest was finished and lined on the Tuesday night following, and the first egg was laid on Thursday. From long observation on birds and their habits I have every reason to believe that the male bird gives very little, if any, assistance to the hen in the construction of their nest.—*J. Ranson; York.*

Blackbirds' and Treecreepers' Nests on the Ground.—On the 10th of May I found in Methven Woods two blackbird's nests built on the ground, as if the birds had scooped out a place for their nest. One contained three eggs, bright blue with scarcely any spots on them. The nests were quite unsheltered, although there were plenty of bushes suitable for them to build in. The second was made at the side of a ditch, at a short distance from the other, and contained four eggs. I likewise know of a tree creeper's nest on the ground, under shelter of the stump of an old tree. The nest contains six eggs hard set. On the 1st of May I watched the birds carrying material for

their nest, which was composed of the inside of the old tree with hay, and lined with feathers. The nest is about three yards from the edge of a pond, measures two inches across, and one and a half inch in depth.—*T. Brunton; Methven Castle, Perth, May* 23, 1863.

Value of the Redstart in a Garden.—A pair of redstarts, who have a nest in my garden, have done me great service by devouring those pests of the garden, the gooseberry grub. From frequent observations I am convinced that a pair of redstarts (during the time their young require their attention) will destroy at least six hundred grubs and caterpillars in a day. I am glad to say that in our neighbourhood these pretty, interesting and useful birds are on the increase.—*J. Ranson; York.*

[I am very glad to receive this information: I have never had ocular demonstration of any bird, excepting the cuckoo, actually eating the gooseberry grub.—*Edward Newman*].

Snow Bunting in June.—This morning I was much surprised to observe a snow bunting, apparently in full summer plumage, upon a heap of loose stones in the corn-yard at Halligarth. It took wing as I approached, and, uttering its well-known ringing notes, fluttered wildly above the neighbouring fields for a short time, and then disappeared in the direction of the hills. I have lately seen two pairs about the cliffs at Burrafirth, from which I obtained a nest and three eggs on a previous occasion. (Zool. 7709).—*Henry L. Saxby; Baltasound, Shetland, June* 13, 1863.

The Hawfinch Breeding in Yorkshire.—On the 13th of June a nest of the hawfinch was found in a wood at Hardcastle Crags, near Hebden Bridge, in the West Riding of Yorkshire. The nest contained five eggs, and was placed in an oak tree, at a height of about nine yards from the ground, and corresponds in every particular to the description given by Hewitson. A good view of both birds was obtained, the female not exhibiting that extreme shyness spoken of by most authors. When first discovered she flew from tree to tree, uttering a note very much like that of the spotted flycatcher. She then settled on the nest, the observers remaining at a distance of about twenty yards. On being afterwards disturbed she flew away, and was not seen again. The nest and eggs are in possession of the discoverer, Mr. James Crossley, New Road Bottom, Hebden Bridge.—*H. W. Horsfall; Hebden Bridge, June* 22, 1863.

Nests of the Common Wren and the Goldcrest.—One of my boys found a goldcrest's nest a few weeks since high up in a larch. It was not, as is so often the case with this little bird's nest, suspended to the under side of a pendulous spray of the fir tree, but built upon (or supported by) a small branch near the point of its emergence from the trunk, and immediately beneath an old ring dove's nest. So close, indeed, was it to the latter that, though not in immediate contact, still there was scarcely more than room for the little architect to enter or depart from its neatly built nest-home. The same party of nest-hunters, a few days afterwards, asked me to go and see a nest they had found in a small plantation near the house,—a small, oval, moss-made nest, suspended nearly at the very end of a branch of a young Austrian pine, and at a height of about three feet from the ground. It was beautifully concealed, very compact, and much smaller than the wren's nest frequently is; but there could have been no doubt what it was, even if I had not seen one of the owners leave it. The suspension was a little out of the common rule, but what I have to add was more so. By some means the nest became dislodged, one or more of the eggs broken, and another or two ejected from the nest; the finder of the nest, who regarded it as a special object of interest, on discovering the mishap, replaced the sound eggs and refixed the nest as well as he

could in its original position; whereupon the little wren again took possession, and proceeded to incubate the remaining eggs. This continued for four or five days, when again, unhappily, the nest was by some means displaced, and both it and its contents hopelessly destroyed.—*J. C. Atkinson; Danby-in-Cleveland.*

Does the Cuckoo partially Incubate?—Has the cuckoo the power of partially incubating its own eggs before depositing them in the nests of other birds? The above query is promulgated from the following fact. On the 2nd of June I found a hedge-sparrow's nest with two eggs. Happening to pass that way the next day I again looked into the nest, and found that it contained four eggs, *viz.*, one cuckoo's and three hedgesparrow's. Upon blowing the eggs I was surprised to find the cuckoo's partly incubated; so much so that the eyes of the embryo were fully developed, while the eggs of the hedgesparrow were quite fresh. I am perfectly satisfied that the cuckoo's egg had been deposited in the nest within twenty-four hours of my blowing it. How, then, I ask, comes it partly incubated?—*Henry Reeks; Thruxton, June* 9, 1863.

[This fact, from such an observer as Mr. Reeks, is extremely valuable: it leads me, however, to offer a different hypothesis from that which my correspondent suggests. In the first place I imagine the cuckoo's egg to have been originally laid in some other nest, there partially incubated by the legitimate owner of that nest, and then removed by the parent cuckoo herself to the nest in which it was subsequently found. We possess reliable evidence, in the first place, that the female cuckoo maintains a kind of surveillance over her egg, and even over her young; and, in the second place, that she can convey her egg into a locality where it is impossible to introduce her entire body. Records, moreover, are not wanting of cuckoos having been shot with an egg actually in their mouth, so that the transfer of the egg from one nest to another after partial incubation seems not merely possible, but probable.—*Edward Newman*].

Eggs of the Cuckoo: Nests of Water Rail, Hawfinch and Tree Creeper.—On the 8th of June I had the nest of the wood warbler (*Sylvia sylvicola*) brought me. It contained four eggs of the wood warbler and one of the cuckoo. I never knew the cuckoo to choose this nest before. I have the eggs now in my cabinet. I have in two instances taken the egg of the cuckoo from the reed warbler's nest, once in 1847, and the other this present season. In both instances the nests were slung between three reeds, in a patch by the Thames side. I this year found the nest of the water rail with eggs; it was built amongst sedge, and composed of the dead leaves of the sedge; I thought it not so coarse a structure as that of the moorhen. I have also had three nests of the hawfinch this season with eggs; they are not so much a *rara avis* with us as with some. I rather like the nest, the stag's horn moss gives it a good appearance, quite different from any other that I am acquainted with. I get the eggs every season. I also had a very pretty nest of the tree creeper brought. It was built between the stem of an elm and a piece of loose bark, and very closely resembled the pretty vignette in Yarrell's 'British Birds,' vol. ii. It was composed externally of pieces of touch-wood, dried twigs, a few straws and a few roots, lined with feathers, chiefly those metallic glossy ones of the starling. It contained four eggs.—*C. Stubbs.*

Irregular Appearance of the Swallow.—I have been very much struck with the irregular appearance of the swallows this year. On the 10th of April four swallows were seen at Alne Cross; on the 18th two more at Youlton, a mile and a half from Alne; on the 21st five more were seen at Linton-on-Ouse; and on the 27th a flock was seen at Kirby Hall. Between these dates none were seen in the localities mentioned. The village has long been noted for the number of swallows breeding in it; yet it was the

5th of May before one was seen in the village itself. White, in his 'Natural History of Selborne,' has noted this irregular appearance and sudden withdrawal of the swallow, and tries to press it into the list of reasons for supposing swallows to remain here all winter, which I think a physical impossibility.—*J. Ranson; York.*

Pallas' Sand Grouse at the Scilly Islands.—A male specimen of this oriental grouse was picked up dead at St. Agnes, one of the islands of Scilly, on the 23rd inst., and it has been preserved by Mr. Vingoe, who ascertained that it was in a highly developed form, tending to show that, with the fact of my specimen having eggs in a very forward state, the chances are pretty much in favour of the calls of Nature resulting in the laying and hatching of eggs. The head of this male bird was plain stone-yellow, without any gular collar. My principal reason for writing is to enable you to record the Scilly islands as one of the localities of the settlement of this species in the United Kingdom.—*Edward Hearle Rodd; Penzance, June* 27, 1863.

Pallas' Sand Grouse in Cornwall.—I have examined a specimen of this remarkable bird in the flesh, which was shot a day or two since close by the Land's End, and sent for preservation to Mr. Vingoe, who at once submitted it to my inspection. I have taken care to examine the bird as to sex, food, &c., on dissection, and I find it is a female, with the ovary containing a bunch of eggs varying in size from rape seed to swan shot; the gizzard contained gravel and grass seeds, but no insects; the body was well furnished with puffy, soft flesh, without any fat, and the plumage appears rather worn on the edges; the first quills only show an attenuation toward the extremities, but the filamental feathers in the centre of the tail are extended about two inches beyond the tail, and appear ragged and worn. The general tone of its plumage is sienna-yellow, with the feathers on the back and scapularies bordered with dark brown; the belly-band well defined and dark brown; the under parts dull buff-yellow; the throat, chin and sides of the face sienna-yellow, separated under the eyes by an ash-coloured blotch. You will observe, on reference to Gray and Mitchell's 'Genera of Birds,' vol. iii., that there is a well-executed figure of this bird: the specimen now under notice is very like this figure, but instead of the throat having a band of deeper yellow, as represented by Mr. Mitchell, the bright yellow chin and throat of my bird is separated from the dull buff colour of the breast and under parts by a narrow well-defined black line running across the throat: I thought at first that this might be indicative of the male sex, but the result of my examination proves it to be of the other sex; but it may possibly be a character in the summer plumage of both male and female.—*Id.; June* 15, 1863.

Pallas' Sand Grouse in Sussex.—A splendid specimen of Pallas' sand grouse (*Syrrhaptes paradoxus*) is in my possession for preservation: it was shot on Friday last by Mr. Pickard, of Woodard's Farm, on the estate of Mr. J. A. Hankey, Balcombe. The feet appear very extraordinary, being rough and horny, without any division in the claws,—a provision of nature to counteract the great heat of the hot sands. What it subsists on in that clime does not appear: from the crop of this one I took a spoonful of small seeds, the name of which my agricultural friends cannot determine.—*Frederick Russell, in the 'Sussex Express' of June* 13*th*, 1863.

Pallas' Sand Grouse in Sussex.—A friend of mine has obtained in this neighbourhood a good specimen of what we believe to be the sand grouse. It is of a sandy colour, with black bars on the back, marked very similar to the female kestrel hawk, with pointed wings and rather long tail, which ends in a fine point; legs feathered to the toes, the bottom of the foot very rough; in good plumage. We believe it to be a

female bird. There were about seven or eight together.—*Charles S. Wille; Eastbourne.*—'*Field.*'

Pallas' Sand Grouse in Sussex.—A beautiful specimen of the above rare bird was killed at Box Hill, in this county, on the 29th of May last, by coming in contact with the telegraph wires, and was purchased by Mr. Albert Vidler, of Pevensey, who was returning from Hastings at the time. It appears that a covey of eight were seen in the road near Mr. Vidler's house, at Pevensey, the day before, by one of Mr. Vidler's men, named Edward Bunney, dusting themselves like partridges; but before Mr. Vidler could get out with his gun they had disappeared. They appeared to be travelling eastward. Box Hill being but a few miles from Pevensey, the chances are that it was one of the same flock. The man, being a good observer, had said that they were very different from partridges. On dissection the specimen proved to be a female: one of the long caudal feathers was wanting, supposed by coming in contact with the telegraph wires. The curious rat-like feet and toes were very peculiar. In the crop there was a little of that peculiar grass that grows by the salt water "palls," as they are called in this part.—*John Dutton; 51, Terminus Road, Eastbourne, June 15, 1863.*

Pallas' Sand Grouse in Hampshire. — I have recently had the pleasure of examining, in the flesh, and dissecting a beautiful example of Pallas' sand grouse. On the 26th of May my brother was told by the major of his regiment that he had disturbed a brace of sand grouse that morning while riding on the heath, at no great distance from the camp at Aldershot. My brother at once went to the spot where the birds had been seen: they were still there, but rose wild and out of shot. They were marked down, and this time my brother had a long shot and killed one of them: the other escaped. My brother at once despatched to me the bird he had killed. When I handled it I was struck by the fitness of its specific name of "paradoxus," for to look upon this little sand grouse is something of a puzzle. The beak and the horse-shoe markings on the breast remind one of a partridge; but the head and neck remind one of a dove; the wings are like a swift's, or perhaps more closely resemble those of a shearwater, but have a peculiarity of their own in the pinnated first primaries; the pinnated tail-feathers put one in mind of the mallard pintail; while the feet, with the exception of wanting a hind spur, resemble those of a grouse. The plumage (dissection proved the bird a female) is of an uniform isabelline colour, prettily barred with umber-brown; on either side of the head, and extending a little beyond the ear-coverts, is a patch of beautiful orange-yellow: the horse-shoe marking on the breast is of a very dark chestnut, almost black. The bird was extremely plump, and so fat that it was not easy to skin it. The crop was full to distention of the seeds of a species of grass which grows commonly on heaths; these, a few small pebbles, and one or two tops of grass-blades, were all I could discover. There were no traces of insect remains. I was much struck by the great depth of the keel of the sternum in proportion to the other bones of the bird; I did not measure it, but am confident that it must exceed an inch or even an inch and an eighth in depth. The shape of the wings, their very powerful muscles, and the depth of the sternum, would indicate that the bird is possessed of great powers of flight. My brother noticed the great rapidity with which the birds he saw flew. In the bird I dissected I found eggs larger than peas in the ovary. There seems no reason why this pretty species should not be naturalized in this country. From several notices which have recently appeared in the 'Times,' it is evident that a considerable flight of this little grouse has been driven by some cause or other to visit England. The birds appear to have no difficulty

in finding an abundance of congenial food on our heaths. Although smaller in appearance, I should say they would weigh nearly as much as a partridge, and their plumpness would render them a delicious bird for the table. I noticed that the flesh on the breast, like that of some of our most favourably known game birds, is of two colours, dark and white, the whitest flesh being closest to the bone. I take it that this is a very good sign of the bird's fitness to form a delicacy for the table. I may observe that there is an excellent figure of the bird, from the pencil of Mr. Wolf, in the second volume of the 'Ibis.'—*Murray A. Mathews; Weston-super-Mare, May* 29, 1863.

PS. Since writing about the specimen of Pallas' sand grouse which was shot at Aldershot, I have received another, also a hen bird, and also shot by my brother near the camp. On the occasion when this last bird was killed a covey of nine were seen. The birds were very wild, and only allowed one long shot to be obtained at them. Among the feathers of the first bird my brother sent me, and clinging to the skin, I noticed a very singular tick, of large size, the body of a leaden blue colour, with lighter veins; the legs and sucking apparatus of a bright lake colour. Another singular thing about Pallas' sand grouse I omitted to mention in my first communication is the under surface of the feet. This is covered with a rough serrated skin, which may well be described by comparing it to the surface of a large rasp: it is an admirable provision for enabling the bird to run with ease upon the hot desert sands. Mr. Bree, in his 'Birds of Europe,' vol. iii., does not mention this peculiarity of the under skin of the foot as pertaining to the genus Pterocles. I should be glad to know if it is confined to Pallas' bird alone of the different species of sand grouse. My brother writes to me that the birds he saw ran with great rapidity upon the ground, and that they skulked very low, seeming at a distance to be more like rats than birds.—*Id.; May* 30, 1863.

Pallas' Sand Grouse near London.—I killed last evening a very fine specimen of the Pallas' sand grouse in this neighbourhood. It was alone, and seemed tired, as I got within a few yards of it before it took wing. It runs like a golden plover, and resembles the grouse in getting up, uttering a plaintive note. It is in the hands of Mr. Argent for preserving.—*J. Withers; Forest Gate, Essex.*

[This example has but one elongated feather in the tail, and none in the wings.—*Edward Newman*].

Pallas' Sand Grouse in Essex.—Mr. Cater, the birdstuffer of this town, has just shown me three specimens, one male and two females, of Syrrhaptes paradoxus, which were shot on the 29th ult., on our Essex coast, at Mersea. They appeared very tame, and allowed three hours to elapse while the gun was brought. The following is an extract from a letter from the slayer of them:—"I shot the three birds in a ploughed field on my farm, about a quarter of a mile from the sea shore. They seemed to come direct across the German Ocean. I only saw the three. They pitched down within thirty yards of myself and five men. They kept constantly running about, picking up insects. I directly sent for my gun. They let me get within forty yards, when I killed one with the first barrel and two with the second." They are in very good condition.—*C. R. Bree; Colchester.*—'*Field.*'

Pallas' Sand Grouse in Essex.—Two very fine specimens, male and female, of this bird were shot on the 7th inst. by a labourer, on a farm occupied by Mr. Nutten, about two miles from this town. They are now in the possession of Mr. Travis, naturalist, who informs me that the crops of these birds contained nothing but tares, and that the

flesh, both in appearance and flavour, was very like that of the common pigeon.—*Edward Taylor; Saffron Walden.*—'*Field.*'

Pallas' Sand Grouse in Hertfordshire.—Mr. Cooper, the well-known and able naturalist, of 28, Radnor Street, St. Luke's, has most obligingly placed in my hands, in the flesh, two specimens, which were killed only three days back, at a double shot, by Mr. John Read, at Dugdale Hill, South Mimms, near Barnet. Both the specimens were males; both were in the most perfect plumage, except that in one specimen one of the elongated tail-feathers had been shot away: they were excessively plump, without much appearance of fat, and their crops were stuffed to repletion with the seeds of the red clover and the common plantain; in their gizzards were the same two kinds of seeds in a semi-comminuted state and mixed with an abundance of small semi-transparent gravel-stones, scarcely larger than the seeds.—*Edward Newman.*

Pallas' Sand Grouse in Suffolk.—Four specimens of Pallas' sand grouse have been killed at Thorpe, near Aldborough: two killed on the 11th and one on the 12th were females: I have not ascertained the sex of the first procured, which is in the possession of Mr. Hele, of Aldborough. It appears by a local paper that two other specimens have been killed at Walberswick, near Southwold: they are now in the possession of J. N. Spalding, of Westleton, near Yoxford: sex not given.—*Edward Neave; Leiston, Suffolk, June* 16, 1863.

Pallas' Sand Grouse in Suffolk.—I have received four specimens of Pallas' sand grouse: the first two were males, and were killed at Horsey: yesterday morning a female was sent from Leiston, and another in the evening. They are singular and very pretty birds; the feet more like an animal's than a bird's, and very small. The person who sent me the first two called them a pair, but they are both males. The crops were quite full of small seeds.—*Thomas Dix; Ipswich, June* 14, 1863.

Pallas' Sand Grouse in Suffolk.—On Friday, the 28th of May, a covey of seven of these rare birds made their appearance at Thorpe. They were observed to come from seaboard to eastward, and apparently were compelled to alight on the first landing-place, the beach, through fatigue. A fine female specimen was shot and brought to me. I have since examined the body, and found many immature eggs in it. The crop was distended with the seeds of what appear to me to be either plantain or a Rumex. I have planted them, in the hope that they may germinate, and so perhaps throw light in regard to any locality they may have recently left.—*N. F. Hele; Aldborough, Suffolk.*—'*Field.*'

Pallas' Sand Grouse in Norfolk.—Another specimen of Pallas' sand grouse has been killed in this county, and been received by Mr. Ward, sen., of Vere Street, for preservation. This bird (a female, with large eggs in the ovarium) was shot on rising from a sand-hill a few miles from Yarmouth. In last week's 'Field' a writer wishes to know if the female possesses long centre tail-feathers similar to the male. I have the pleasure of informing him that the specimen I have above alluded to possessed (as is always the case with this species) long centre feathers in the tail. On measuring some foreign skins of this species, I find the length of the tail of the male to be 7½ inches, and that of the female 6 inches.—'*Field.*'

Pallas' Sand Grouse in Norfolk.—In concurrence with the various instances which have this season been recorded of the arrival of these distant foreigners in different parts of our island, I feel bound to inform you that I this morning (Saturday, June 12) received a fine pair, in the flesh, killed at Horsey, near Yarmouth, and that I have had precautions taken to preserve their bodies to be discussed at the forthcoming

dinner of the Acclimatisation Society, which is announced to take place on July 1st. —*Arthur W. Crichton ; Oxford and Cambridge Club, June* 12.—'*Times.*'

Pallas' Sand Grouse in Norfolk. — I have just obtained a brace of sand grouse, shot this morning on this beach. They are male and female. The forked tail-feathers are found in both. The feet are not unlike those of a hedgehog. The birds are in the hands of Mr. Drewett, of Fakenham, to be stuffed, and can be seen there by any of your correspondents in this locality who may be desirous of doing so.—*M. Dodman ; Titchwell, Norfolk, June* 10, 1863.—'*Field.*'

Pallas' Sand Grouse in Norfolk.— Since my last receipts as to the brace of Pallas' sand grouse that were procured on this coast, I obtained, on the day following my advice to you, two brace more, in fine condition and good plumage, but one brace too much shot to be preserved ; the other brace has been forwarded to an eminent bird-preserver in Norwich.—*M. Dodman ; Titchwell, near Lynn, June* 13, 1863.—'*Field.*'

Pallas' Sand Grouse in Norfolk.—The sand grouse have been found to have eggs in them. Can you or any of your correspondents inform me whether, if they hatched their young in this country, they would remain here, and whether, as natives of a warmer climate, they would be likely to survive our winter? A covey of sixteen was seen here on Sunday.—*W. Dodman ; Titchwell, Norfolk.*—'*Field.*'

Pallas' Sand Grouse in Norfolk.—I have just seen three specimens of the beautiful little sand grouse (*Syrrhaptes paradoxus*), which were shot last week on the sands near this place. They are exquisite little birds, resembling the pigeon family about the head and neck, but decidedly grouse-like in the legs and feet. The latter are of the most diminutive proportions, and clothed with feathers to the extremities of the toes. I hear this morning that nine more have been seen on the beach, but were too wild to be got at.—*F. Tearle ; Hunstanton, June* 30, 1863.—'*Field.*'

Pallas' Sand Grouse in Norfolk.—I have just received for preservation another of those inhospitably treated birds, the Pallas' sand grouse (*Syrrhaptes paradoxus*), killed in Norfolk. I found on examination this bird had laid all its eggs but two, and these were about the size of a hazel nut. This bird, I am told, was alone when killed, and no other could be found. I think it probable, therefore, that the cock bird may be amongst the many received by my father during this last week, killed in an adjoining locality. Having had the opportunity of dealing with several specimens, I am enabled to assert with confidence that this persecuted bird is possessed of considerable gastronomic virtues. This fact I think unfortunate, as I fear it may form a double incentive to their destruction. It must, however, be the wish of all, as there are several flocks known to exist here at present, that this foreign and remarkable visitor be spared, or at least during the present period of nidification.—*Edwin Ward ;* 11, *Thayer Street, Manchester Square.*—'*Field.*'

Pallas' Sand Grouse in Norfolk. — Several specimens of sand grouse have been obtained on the coast of Norfolk, between Lynn and Yarmouth, within the last two or three weeks. To-day (June 13) I saw five birds in the shop of Mr. Sayer, bird-preserver, of Norwich. He says he has had no less than eleven specimens through his hands during the last few weeks. A gentleman who shot a brace of these birds told Mr. Sayer that there were no less than fifteen or twenty birds in the pack. —'*Field.*'

Pallas' Sand Grouse in Norfolk.—Many more coveys of Pallas' sand grouse have visited this locality since my last note on the subject, and I have procured a very handsome male specimen. On Thursday, the 11th instant, a covey of fifteen passed

towards the south, along shore, and yesterday twenty were seen near Thorpe.—*N. Fenwick Hele; Aldeburgh, June* 14, 1863.—'*Field.*'

Pallas' Sand Grouse in Norfolk.—To your already long list of notices of the appearance of Syrrhaptes paradoxus in various counties in England, I am now able to add the record of some twenty-six specimens having been obtained in Norfolk between the 4th and 11th of this month. I have only time this week to give you a brief notice of their occurrence, but hope by your next publication to forward more detailed particulars, having had the pleasure of inspecting fifteen birds, six males and nine females. On the 4th of June a flock of eight or nine was observed in a grass field at Wraxham, about fourteen miles from Yarmouth, and four were shot, three females and one male. On the 8th a male bird was killed on the Denes at Yarmouth, and two others were seen at the same time. On the following day (the 9th) a large flock of about forty was flushed once or twice on the beach at Horsey, near Yarmouth, returning each time to the same spot, a sort of hollow in the sands. From this number no less than fifteen were shot the next morning and evening (10th), and on the 11th two more, and five or six others were seen; and I have seen another pair from near Hunstanton, obtained on the 10th. In all cases these grouse have been found either on the sea-shore or in grass fields immediately in the vicinity of the coast. The birds are in fine condition, their crops filled with grass-seed, sand and minute pebbles; and the stomach, a true gizzard, is particularly hard and muscular. *H. Stevenson; Norwich.*—'*Field.*'

Pallas' Sand Grouse in Nottinghamshire.—On Tuesday, the 2nd of June, Mr. T. Jackson, Allamoor Farm, near Farnsfield, Notts, on crossing a clover seed field, noticed four peculiarly strange-looking birds. They allowed him to approach within forty yards of them, and having his gun with him he fired and killed a brace, male and female, and they answer exactly to the description given of them by Mr. E. J. Schollick in the 'Times.' They are in the hands of a naturalist for preservation. The weight of the male bird was eight ounces, and the female ten ounces. The eggs in the ovarium of the latter were about the size of small peas. They have been feeding on two or three varieties of grass seeds and the leaf of clover. The hen bird was mouthed by a dog, and her tail was minus the forked feathers.—*Southwell, Nottinghamshire.*—'*Field.*'

Pallas' Sand Grouse in Lincolnshire.—Some very rare and scarce birds have, unfortunately, been shot on this coast a few miles north of this place; I say "unfortunately" shot, for had they been left alone they might have multiplied. I see that mention is made of the sand grouse in the 'Field' of the 30th of May, and from that description they are of the same kind. They are now at a taxidermist's in this town, and I have compared them with Jardine's 'Ornithology,' and have no doubt they are Pallas' sand grouse.—*C. G. Holland; Boston.*—'*Field.*'

Pallas' Sand Grouse in Lancashire.—A covey (about fourteen) of that very rare bird, described by Sir William Jardine as Pallas' sand grouse, was seen yesterday in the Isle of Walney. My informant, who had just shot a beautiful brace,—a cock and a hen,—told me they were very tame, and allowed him to approach quite near to them while feeding in a field of corn, when they rose with a peculiar cry, but did not fly far. The bird is about the size of the golden plover, the cock much smaller than the hen; plumage of a brownish yellow colour, spotted and pencilled with black and dark brown. The tips of the wings are adorned with a dark-coloured long pointed feather, and the tail has two similar ones, giving the bird the appearance, when standing at a little distance, of having two long forked tails. The legs and feet are covered with thick

down; both are short, and the latter very curious, having soles of thick scaly armour. The toes are exceedingly short, making the footprint almost resemble that of a rat. The cock has a blaze of bright orange on each side of the head, a band of pencilled feathers across the crop, and a dark patch on the belly. This bird is said to be an inhabitant of Chinese Tartary. How came it in the Isle of Walney? If for the purpose of breeding surely it ought not to be disturbed. It is, of course, illegal to kill at this season, and I trust the people of Walney will protect and encourage this singular bird. They found a great loss in the expulsion of the sea gull from its breeding ground there. It is now returning, and probably will be protected. Let us hope that Pallas sand grouse may also find in the island a safe breeding ground.—*E. J. Schollick; Aldingham Hall, Ulverstone.*—'*Times.*'

Pallas' Sand Grouse in Yorkshire.—At the end of last month a flock of sand grouse was seen on the moors near Sheffield, and four specimens were shot, two of which have been preserved.—*Charles Doncaster; Sheffield, June* 24, 1863.

[My correspondent adds a minute description, which leaves no doubt as to the species.—*Edward Newman*].

African Sand Grouse in Yorkshire.—I have seen a brace of those beautiful birds, the African sand grouse (*Pterocles setarius*), in fine plumage. They were male and female, and were shot the other day within a mile of the Sheffield Moors. A covey of twelve or fourteen were observed feeding in a grass field, and my neighbour, not having the slightest idea that they were grouse, shot a brace. They are a light cream colour and spotted, with pinnated tails about the size of a pigeon, with very remarkable feet, not unlike a rat's hind feet. Are they not rare visitants to these moors? and are the remaining ten or twelve birds likely to breed here? as they will be preserved if they remain in the same locality, now that they are known to be grouse.—*C. Rawson; Sheffield.*—'*Field.*'

[The name is doubtless a mistake.—*Edward Newman*].

Pallas' Sand Grouse in Yorkshire.—A covey of nineteen of these grouse was found last week near Scarborough. On Tuesday, Mr. J. Wilson, of Hotmanby, shot two brace and a half out of the covey above named, a brace of which has been presented to the Mayor of Scarborough for his museum.—'*Times*,' *June* 19, 1863.

Pallas' Sand Grouse in Yorkshire.—Five specimens of this bird have been shot near Scarborough out of a covey of nineteen, and one about three miles from York out of a covey of four.—*Edward Wright; Fengate, York, June* 22, 1863.

Pallas' Sand Grouse in Yorkshire.—Two of these birds were shot out of a covey of fourteen, at Farsley, near Leeds, on Wednesday last. From the circumstance of some of the females having been found full of eggs, and in good condition, it is pretty evident that the migration has been for the purpose of breeding, and it is to be hoped that those under whose notice they may fall will prevent a ruthless slaughter, and endeavour to ascertain something more of the interesting visitors' habits.—*York Paper.*

[I must take exception to all the omitted portion of the long article from which the preceding paragraph is cut. The sand grouse found in the shores of the Mediterranean is of a distinct genus and species, Pterocles alchata; and those of Asia are probably also distinct; our lists have twenty species of Pterocles and two of Syrrhaptes. The observations in question will not apply to any genus or species; some of them refer to previously published accounts of Pterocles, others to Syrrhaptes.—*Edward Newman.*

Pintailed Sand Grouse (Pterocles setarius) *in Yorkshire.*—Mr. William Emmett, of Pudsey, shot on the 10th of June, out of a covey of fourteen, two specimens of the pintailed sand grouse, at Farsley. He has mounted them, and they are now in his possession.—*William Liversedge; 35, Stansfield Row, Burley, near Leeds.*

[Will Mr. Liversedge kindly examine these specimens, and state whether there is not a mistake in the name? if the toes are united and the hind toe absent they are Syrrhaptes paradoxus, like the others recorded in this number.—*Edward Newman*].

Pallas' Sand Grouse in Durham.—The flight of this Tartar stranger to our shores has been more extensive than Dr. Sclater and Mr. Moore anticipated. A flock of sixteen or seventeen Pallas' sand grouse has remained in the salt marshes near Teesmouth for several weeks, and only quitted us last week. Three birds were shot on the 13th of May, by a working man in Messrs. Bell's foundry, at Port Clarence, who, unaware of their interest, gave them to a carpenter, to whose house an intelligent local naturalist fortunately directed me. A fortnight later the flock had not been further diminished, till another bird was shot by Mr. Walker of Hartlepool; and last week the covey, about thirteen in number, being put up on some high ground in the neighbourhood, took a distant westward flight. Possibly, if unmolested, they may yet remain to breed on some of our moorlands. They showed every disposition to settle here, but only owe their temporary security to their being taken by our gunners for golden plover, which, on the wing, they somewhat resemble. All the specimens obtained were males. —*H. B. Tristram.*—'*Times.*'

Pallas' Sand Grouse in Northumberland.—Three birds, answering in every particular to the very excellent description of Pallas' sand grouse given in the letter of Mr. E. J. Schollick to the 'Times,' were shot at Thropton, near Rothbury, in Northumberland, by a mason named George Rennison, a few days before Mr. Schollick's letter appeared. The birds, being entirely different in appearance from any known in this country, proved a complete puzzle to all who saw them. They were sent by Mr. W. Reay, of Thropton Cottage, to Mr. Hancock, of Newcastle-upon-Tyne, for preservation. I saw them as they passed through Morpeth, and a day or two after saw in the 'Times' the description of Pallas' sand grouse, given by Mr. Schollick, which agreed most exactly with the appearance of these birds. I understand Mr. Reay intends to present a pair of them to the Museum at Newcastle-on-Tyne.—*W. Wilkinson; Morpeth, June 6, 1863.*—'*Field.*'

Pallas' Sand Grouse in Scotland.—Another specimen of this remarkable bird has met its death on British soil, and narrowly escaped passing into oblivion unhonoured and unknown. Shot by some unknown person, the precise locality also as yet unknown, it was received on the 1st inst. from Perth, in a basket of leverets, rabbits and pigeons, forwarded to Mr. A. Ruthven, wholesale game dealer of this town, for sale in the ordinary way of business, without note or comment of any kind! By Mr. Ruthven it was kindly given to Mr. Thomas Littler, who presented it, still in the flesh, to this museum. It was a very fine adult male, and had apparently been dead a day or two. It has since been skinned and stuffed, and will be placed in company with the equally fine specimen from Tremadoc, also in the museum, and mentioned in Dr. Sclater's letter, published in the 'Times' of the 29th ult. Scottish naturalists can now, for the first time, add this species (*Syrrhaptes paradoxus*) to the list of birds killed north of the Tweed.—*Thomas J. Moore; Curator to the Derby Museum.*—'*Liverpool Times.*'

Pallas' Sand Grouse in Scotland.—A covey of ten or twelve Pallas' sand grouse

was discovered on the 8th inst. on the farm of Westerseat, near Wick. A single specimen, a male, was shot by a boy, who observed the grouse feeding among the young braird in a field of oats. They were subsequently seen on the neighbouring farm of Noss, but no more specimens have up to this time been procured. Their immunity in this respect is to be ascribed to the circumstance that those who first observed the birds supposed them to be either partridges or plovers, the former of which they somewhat resemble while on the ground, while their flight bears a close resemblance to that of the golden plover. The specimen referred to, which excited much interest among the curious in this quarter, has been preserved by Dr. Sinclair, and added to a very fine collection of Caithness birds possessed by that gentleman.—*H. Osborne, jun.; Wick, Caithness, June* 23, 1863.—'*Field.*'

Pallas' Sand Grouse in Ireland.—It will be interesting to your readers to know that the sand grouse, which have been seen in so many parts of Great Britain, have appeared on the north-west coast of Ireland. Walking in a rabbit warren by the seaside one evening I came suddenly on a covey of thirteen or fourteen birds, which got up, and, making a circle of three or four hundred yards, flew almost over my head, and dropped on the sands close under the bent hills. They then allowed me to come within about thirty yards of them, and flew inland.—*W. Sinclair; Drugoobe, Donegal.* —'*Field.*'

PS. After writing on Tuesday last I formed a closer acquaintance with the covey of sand grouse which I mentioned in my letter of that day—one bird, a male, having been killed, and another, a female, wounded and made prisoner, on Wednesday. The captive seems quite contented, was curiously familiar from the first, feeds freely on grits, canary seed, groundsel, &c., and is fond of washing and splashing in a pan of water. The male bird had in his crop small seeds and tops of grass. They were both remarkably plump and sound on the breast. Before firing at them on Wednesday I had a good opportunity of observing them as they ran feeding along a road in the warren. In pace and action, more resembling pigeons than grouse, they fly something like plover, appear very strong on the wing, and carry a great deal of shot. The figure of Pallas' sand grouse in Sir W. Jardine's book, which a correspondent quotes, is good, but the colouring quite outrageous. I see many people exclaim against shooting these birds, or similar wanderers, under the idea that they might become naturalised in this country. I confess I do not agree with them, or think it at all likely that natives of lands in every way differing from ours should be likely to settle or flourish under circumstances so opposed to their previous habits. It appears to me much more advisable to make them available for scientific purposes, in cabinets of Natural History, where they will be seen by thousands. Very strange, indeed, is the impulse which has impelled the sand grouse to such an unprecedented flight, and a very curious and interesting subject (very little known, too), the general and partial migrations of the feathered tribes.—*W. Sinclair; June* 19, 1863.

Pallas' Sand Grouse in Ireland.—A brace of sand grouse were shot on the coast at Nairn, near here lately. I obtained both specimens (male and female), and have preserved them.—*M. B. Cox; The Glebes, Glenties, Co. Donegal.*

Pallas' Sand Grouse in Hanover.—In the 'Field' of May 30 I read an account of a covey of sand grouse having been seen in the Isle of Walney. It is a remarkable coincidence that during the last month a winged bird of the same species was picked up in this neighbourhood, having broken his wing by flying against a telegraph wire —probably a thing unknown in his native steppes. About a week ago a covey of eight

was also found not far from Hanover, and one was shot by a peasant. The winged bird was kept alive for some days, but has since died, and will be stuffed, but, I fear, not very skilfully.—'*Field.*'

The Sandpiper a Diver.—The sandpiper I alluded to (Zool. 8237) was Actitis hypoleucos. I came some time ago upon six or eight of them on the banks of the Ore, near here, and succeeded, by keeping under cover of some bushes, in approaching unseen near enough to watch their motions. They were running about on the mud and gravel, and occasionally chasing one another. The water became a foot and a half or two feet deep a very short distance from the edge, and twice I saw a bird, when chased, rush into the deeper water. It might have been accident, or at least unintentional on its part, to go out of its depth, or it might be to avoid being deprived of a morsel of food. It was on one of these occasions that I saw the bird go down under the water and reappear, and immediately try to regain the shore as fast as it could. I think it is likely it had dropped a worm or piece of food, and tried to recover it: I cannot say whether it did so or not. The opportunity I had of observing their motions while swimming under water was while in a boat endeavouring to capture a wounded bird. Owing to a rifle-range being erected on the banks of the Leven at Cameron Bridge, most of the birds have deserted the immediate vicinity, and I have not seen a sandpiper for about a year. If any one has leisure to do so, and is where sandpipers are common, he might by watching ascertain more fully if diving is so very unusual amongst them. I remarked above that most of the birds had deserted the vicinity of the range: it is curious that one of our shyest birds still remains. A pair of kingfishers, which for some years have frequented an old quarry-pond near the river, and within fifty yards of one of the ranges, are again breeding there this summer; and only a few days ago, while I and a few others were firing, the birds were coming and going about the place, seemingly not much alarmed. The kingfisher is a rare bird with us.—*Robert H. Leven; Kenaway, Burns, Windygates, May* 29, 1863.

Five Eggs in the Nest of a Common Snipe.—On a large marshy piece of ground, where snipe are now breeding in some abundance, I have discovered one nest containing the unusual number of five eggs. No other has since been added, and although one bird only performs the task of incubation, I still incline to Mr. Hewitson's belief that the number of eggs laid by this species never exceeds four. In the present instance four of the eggs are very much alike, but the fifth, although it closely resembles them in form, differs considerably in colour.—*Henry L. Saxby; Baltasound, Shetland, June* 10, 1863.

Occurrence of Spoonbills on the Suffolk Coast.—On the 1st of May two spoonbills were killed at one shot, by Mr. M. Johnson, of Bevarre Hall, between Lowestoft and Southwold, on the sea-coast. These birds, which were sent to a Norwich birdstuffer to be preserved, were in full adult plumage, and might naturally have been taken for male and female, one having a longer and fuller crest, and the buffy tints on the fore part of the neck and crest somewhat brighter. On dissection, however, I found them both females, each bird having a fine cluster of eggs, the largest about the size of small hemp-seeds; but these occurred in the specimen with the long crest, &c., and which I presume was the older bird of the two. The stomachs, with the exception of one or two small pebbles, were perfectly empty, as if the birds had been killed immediately after a long flight; they were, however, in fine condition, being very fat, both internally and externally.—*H. Stevenson; Norwich, May* 24, 1863.

The Numidian Crane in Orkney.—A rare and beautiful bird, which, from all that we can learn, has never before been found in a wild state in the British Isles, has been secured by an enthusiastic ornithologist in Orkney, to whom we are indebted for the following brief notice, which will be read with interest by naturalists:—"A fine male bird, in beautiful plumage, the demoiselle or Numidian crane (*Anthropoides Virgo*), was shot on Thursday last, the 14th of May, 1863, at Deerness, east mainland, Orkney, and has since been preserved for Mr. Reid, bookseller, of Kirkwall. Two of the birds were seen at Deerness for some days, and were pursued and shot at several times. When the one was killed, the other flew over to the neighbouring island of Copinshay, and was not afterwards seen by the Deerness folks, who describe the flight and walking of this remarkable bird as something very graceful, and such as they had never witnessed before. Although these birds (which are natives of Africa) feed on aquatic animals, small fish, frogs, &c., in their native haunts, nothing was found in the stomach of this one but oats, several grains of which were also found adherent on its tongue. It was not starved-like, weighing about five pounds, being considerably heavier than our herons. The gulls and lapwings continually attacked the two strangers whenever they walked or winged their way over the grass and oat fields, and they were heard frequently to utter a hoarse scream when thus persecuted by their tormentors. The demoiselle is quite new to Orkney, and is a valuable addition to our large list of birds. As far as I can find in any work on British birds, it is new to Britain in a wild state. It has been imported, however, and may be seen in a domestic state in the Garden of the Zoological Society." Since the above was written, we learn that a day or two after the first had been shot the other demoiselle returned to Deerness from Copinshay, and was again seen in the fields, most probably in search of its mate. Several parties endeavoured to stalk it, but without success. It is described by some of the country folk who have watched it as a very large bird, "looking nearly as big as a sheep," which of course must be taken with a considerable limitation, as the birds are both most likely about the same size. We believe the extreme height of the specimen in Mr. Reid's possession is about three feet, and the spread of the wings about five feet, but the exact measurement has not been given.—*John o'Groat's Journal.*

The Little Gull and Sabine's Gull at Weston-super-Mare. — On a late visit to the house of Mr. Stone, the birdstuffer, of this place, I saw a specimen of that pretty little forktailed gull which constitutes so good a link between the terns and the gulls, and which is known by the name of Sabine's xeme, or Sabine's gull. It is in the plumage of the first year, which not a little resembles that of a tarrock or young kittiwake. The specimen of the little gull is also in immature plumage. Both these birds were killed on the Weston sands a year or two since.—*Murray A. Mathews; Weston-super-Mare, May* 29, 1863.

The Arctic Skua feeding on Worms near Newry.—On the 6th of this month (June) an adult bird of the species Lestris parasiticus of Jenyns, Gould, &c. (the arctic skua of authors), was shot, while picking up worms when following a plough at work, in the parish of Jonesborough, about five miles from Newry, and about three miles from the nearest part of the sea-coast. It was alone, and had been observed flying high, coming from the coast. The plumage is very perfect, and the colours bright. These skuas have generally appeared in these countries much later in the year. The occupation of the skua, when shot at, was not in accordance with its specific name; however, we are not bound to believe that it does not sometimes procure its food in a peaceable way.—*Clermont; Ravensdale Park, Newry, June* 13, 1863.

The Land Tortoise breeding in Cornwall. — As the fact of the land tortoise having bred in Cornwall, in the instance you have been good enough to record (Zool. 8333), at the residence of Mr. W. Williams, of Tregullow, appears to have afforded some interest, I feel gratified at being able to furnish you with some additional information bearing upon the same subject, which has been afforded me by the widow of my friend, your lamented correspondent, the late Mr. R. Q. Couch. I do so with greater readiness because in all probability he would have himself communicated the circumstance, and still more likely would have added many particulars which he might have observed respecting the anatomical structure of the ovarium of this reptile. I cannot do better than allow you to publish Mrs. Couch's own words in reference to her own tortoise:—"I have been reading in the 'Cornwall Gazette' an account of the tortoises bred at Tregullow; and this has reminded me of a circumstance that it was my intention to have communicated to you before, but owing to my dear husband's illness and death had quite escaped me. A tortoise in our possession did not this spring make its appearance, and we at last conjectured what turned out to be true, that it must have been buried (too deep for extricating itself), by the workmen employed on these premises, underneath rubbish, &c. On the 29th of April our gardener, on turning up some ground, turned up the tortoise, which was quite dead; and his tool striking the shell it fell in pieces; but there were four eggs in it, which I have now quite perfect. My husband thought the Natural History Society might be glad to have them. I have not sent the eggs to you now, fearful of any accident, but I suppose they are valuable."—*Edward Hearle Rodd; Penzance, June* 12, 1863.

Fish Ova not eaten by the Water Ouzel. — I was glad to see in an article in the 'Zoologist' (Zool. 8631), the water ouzel alluded to as not feeding on or destroying the ova of fish. I have been a close watcher of this bird for many years, during which time I have resided in Shropshire, Herefordshire and Radnorshire, and was constantly shooting and fishing on the rivers near where I was living, and where the water ouzel was a common bird. I never would allow my keeper to kill one or take its nest, though he had frequent opportunities of doing so. I have often when fishing closely watched the bird feeding, by being concealed from its sight, and never found an instance of that food being the ova of fish which it had brought out of the water and was eating on the gravelly shore by the side of the river, nor have I ever discovered any fish ova in those that I have examined. A friend of mine, a good naturalist, when fishing one day in the month of April, in which month the grayling are spawning, watched a water ouzel on one of the spawning beds. It was constantly flying backwards and forwards and pecking at something in the gravel, when he naturally concluded that it must be eating the ova of the grayling. He happened to have a gun with him, and shot the bird, which he took home and examined, and found in the stomach nothing but the larvæ of aquatic insects. No doubt this is the reason why the water ouzel is so much destroyed by the keepers on the rivers. Often when fishing, and the sport has been dull, while sitting on the banks of the river, admiring the beautiful wild scenery around me, have I listened with much pleasure to the pretty note of the water ouzel, which is much like that of the thrush.—*J. W. Clutterbuck; 9, Queen's Gate Gardens, June* 25, 1863.

Physa fontinalis in Brackish Water. — During a short tour in Lincolnshire last season, I met with this species abundantly in decidedly brackish water. It occurred near Burton Stather, on the banks of the river Trent, in a dyke at one time closed by a natural embankment, but at the time of my visit open at one end to the river, which obtained free ingress at high water (the tide flows as far as Gainsborough). The bed of the dyke being lower than the mouth, there appeared to be always a sufficient supply of water to sustain life. The specimens collected at the time were quite as large as the typical form, but the animal much darker, and in some specimens quite black. No other molluscan form was visible, although it was quite evident—from the fact of a large number of larva-cases of Limnephilus pellucidus, of which there was an abundant supply, being composed of fine examples of Pisidium nitidum, Bythinia Leachii, Valvata cristata, Planorbis carinatus, P. glaber, and Limnea pereger—that many species had existed, within a very recent date, in the same water-course; and that life had been suddenly extinguished, probably at the first influx of salt water, was manifest from the non-appearance of those peculiar aberrant forms which characterize the results of gradual change. How are we to account for the Physa, a mollusk possessing very delicate habits, surviving the inroad of the salt water, whilst the other species had succumbed to its overpowering influence? — *George H. Parke; Halifax, June* 6, 1863.

Capture of Deilephila livornica in a Boat.—On Thursday, the 18th of June, as I was returning in a boat from a visit to Mr. Edgecombe, my attention was called to a fine specimen of D. livornica pinned at the back of the boat. The boatman told me he had found it in his boat that day when he returned from dinner, and had pinned it there at once. The insect was alive, and in beautiful preservation, and now forms one of the gems of my cabinet.—*G. C. Green; Modbury Vicarage, Devon, June* 24, 1863.

Occurrence of Clostera anachoreta at Folkestone.—I met with a single larva of Clostera anachoreta on a poplar tree at Folkestone, very near the place pointed out to me some time ago by my friend Dr. Knaggs as the spot where he re-discovered the long-lost species. The larva was nearly full-grown.—*Joseph Sidebotham; Manchester, June* 26, 1863.

Description of the Larva of Ino Geryon. — The eggs, which are of a pale yellow colour, are laid at the beginning of July in confinement, and are scattered at intervals in the box or cage in which the imago has been kept: the young larvæ emerge in a few days; the full-fed larvæ were found in April by the Rev. E. Horton, to whom I am indebted for a supply: they were feeding on Helianthemum vulgare (sun cistus) on the Malvern Hills; and the fact of their feeding in July, and again in April, leads to the conclusion that they hybernate, although this has not been established by actual observation. Unable to supply my larvæ with their proper food-plant, I gave them Rumex acetosella (sorrel), on which they fed freely and arrived at maturity; but Mr. Horton informs me that although he offered them the sorrel they would not touch it while the supply of Cistus lasted. The full-fed larva, when disturbed, falls off its food plant, and lies on its side in a crescentic form, the two extremities approaching but not touching. Head very small, entirely retractile within the 2nd segment; body obese, almost onisciform, gradually decreasing in size towards

both extremities; the incisions between the segments are well marked, the segments being distinctly divided; on each segment are six warts, neither of them conspicuous, but each emitting a thin fascicle of short radiating bristles, among which are interspersed a few longer silky hairs: every part of the dorsal surface, the warts alone excepted, is covered with minute papilliform black dots. Head black, shining: 2nd segment dingy yellow in front, black and rather shining on the disk, purplish flesh-coloured beneath; median line of the back dingy white, narrowly bordered with very dark reddish purple; exterior to these narrow borders is a broad dingy yellow stripe on each side, swelling on each segment into a rounded lobe; the sinuous exterior margin of the yellow stripes is bordered with black, which is gradually shaded off into reddish purple in the spiracular region; belly and claspers dingy flesh-colour: legs black. The larvæ were full-fed early in May, and spun a thin white silken cocoon among the leaves of the food-plant, in which they turned to pupæ. Pupa brown, smooth, obese, the anterior extremity acute, the posterior remarkably obtuse: the dorsal surface incised at the segments as in the larva, and the posterior margin of each projecting over the anterior margin of the next; the wing-cases ample and clearly defined; the leg-cases extending to the extremity of the abdomen; the colour brown, with longitudinal series of darker dots, those in the middle approximate, the others more distant. The imago appeared at the end of May and beginning of June, sixteen days elapsing between the first and last.—*Edward Newman.*

Description of the Larva of Orgyia cœnosa.—The females, which are very sluggish, lay their eggs on the stems or blades of Cladium Mariscus or Arundo Phragmites, in a single row, sometimes more than twenty together: they hatch in about fourteen days, and the young larva hybernates when very small; no date can be given with any precision, since the egg, newly-hatched larva, full-grown larva, pupa and imago have often been found on the same day during the summer. The full-grown larva rests in a nearly straight position on the stems or leaves of its food-plant: head prone, quite as wide as the body and hairy, the hairs directed forwards: body of nearly uniform substance throughout; 2nd segment emitting two long slender fascicles of hair, directed forwards and projecting over the head, and slightly divaricating; the 5th, 6th, 7th and 8th segments have severally a dense median dorsal brush of stiff erect hairs; the 10th and 11th segments have each a median ovate dorsal valvular opening; the 12th segment emits a single fascicle of long hair which is directed backwards, and the 13th segment has a great number of long hairs directed backwards; the 3rd, 4th, 9th, 10th, 11th and 12th segments have each eight wart-like protuberances, each of which emits a fascicle of radiating hairs; the 5th, 6th, 7th and 8th segments have each three such wart-like protuberances and fascicles on each side. Head pale reddish brown, with white labrum, and a black blotch on each side of it, bordering the mouth: the long fascicles on the 2nd and 12th segments are black; those composing the dorsal brushes, as well as those on the sides, golden yellow; hairs on the head black; those on the 13th segment are for the most part black, some few being yellow; ground colour of a median dorsal stripe intense velvety black; sides paler, somewhat smoke-coloured: a pale yellow stripe, interrupted at each wart of the third lateral series, on the 6th, 7th, 8th, 9th, 10th, 11th and 12th segments; all the warts, as well as the legs and claspers, are pale obscure wainscot-brown. Arrived at maturity the larva spins a long, yellow and rather shuttle-shaped cocoon, in which are interspersed a great number of its hairs; this cocoon is slightly open at the upper end, and is also fastened longitudinally on the stem or leaf of its food-plant. The imago emerges

in about a fortnight, the male flying with activity, the female rarely leaving the place where it emerges; it never flies to any considerable distance. I am indebted to Mr. Brown, of Cambridge, for this larva, and for a knowledge of the economy of the species.—*Edward Newman.*

Description of the Larva of Orgyia gonostigma. — We know but little of the economy of this insect in a state of nature, and therefore I can only record its habits in confinement. The female lays her eggs in June, on a web which formed the covering of the pupa, without any regularity, and sometimes even piled on each other; and they are not always confined to the web, but sometimes scattered over other parts of the breeding-cage; the young larvæ emerge from the egg in about three weeks, and change their skin several times without appearing to increase much in size: they hybernate early in October, spinning a slight web, and secreting themselves under the leaves on which they have been feeding: from this retirement they emerge about the middle of March, long before there is any appearance of the oak-buds bursting; but if supplied with the opening buds of the whitethorn they will feed on them until the oak-leaves have made their appearance; they feed chiefly on Quercus Robur (oak), always preferring stunted bushes, and not frequenting grown trees; but also on Cratægus oxyacantha (whitethorn), Betula alba (birch), and Salix Caprea (sallow): they continue to feed until the end of May. When full-fed, which is usually early in June, the larva rests in nearly a straight posture on its food-plant. Head prone, nearly of the same width as the body; body of nearly uniform substance throughout; 2nd segment emitting two long tufted fascicles of hairs, which project over the head, and have exactly the appearance of the pedunculated eyes of snails; the 5th, 6th, 7th and 8th segments severally bear a dense dorsal transverse brush, composed of erect stiff hairs; the 12th segment bears a single fascicle of long hairs directed backwards at an angle of 45 degrees, and the 13th segment emits a great number of hairs of different lengths directed backwards; the 3rd, 4th, 9th, 10th, 11th and 12th segments have severally two transversely placed dorsal warts, emitting a fascicle of radiating hairs of two kinds, the outer and longer ones being simple bristles, the inner and shorter ones beautifully plumose or clothed with minute hairs; in addition to these ornaments each segment has on each side three warts, each bearing a radiating fascicle of stiff bristles. Head black and glabrous; the fascicles of the 2nd and 12th segments black, the four dorsal brushes brown; the plumose dorsal fascicles whitish tinged with a golden lustre; the lateral fascicles dingy brown; ground colour of the body intense velvety black, with four rows of somewhat amorphous bright orange spots; the upper row on each side alternate with the dorsal series of fasciculated warts; the lower row on each side form an interrupted stripe, which passes through the middle lateral series of warts; the protuberances which emit the long anterior fascicles are decorated with a large bright orange spot. The larva spins a slight web, thickly interspersed with its hairs, the colour of the whole being dingy ochreous; in this it changes to a shining pupa, intensely black, but having three pale abdominal rings, and also a rather dense dorsal clothing of pale delicate hairs, commencing on the head and continuing down the back to the caudal extremity, which is very pointed and furnished with minute hooks, by which it is attached to the interior of its web. The chrysalis state lasts for a fortnight or three weeks; in the present year the males were on the wing by the middle of June, but the time of emerging usually lasts for three weeks, *viz.*, from the 16th of June to the 3rd or 4th of July. I am indebted to Mr. Blackmore for the opportunity of describing this beautiful larva.—*Id.*

Description of the Larva of Epione vespertaria. — The eggs are laid in July or August, two, three or four together, on any object the female may find at hand; they are flattened and depressed in the centre, smooth and of a pale yellow colour when just laid, changing in a few days, if fertile, to a bright deep pink, which colour they retain until the following May, when the time for hatching approaches; they then become deeper in colour, and finally lead-coloured: the larva lives on the leaves of Salix phylicifolia, and feeds for about three weeks: when full fed it rests in a slightly bent position, but if annoyed it falls off its food-plant, attached by a thread, and remains perfectly motionless on the earth, bent nearly double and feigning death. Head semiporrect, quite as wide as the body, and emitting numerous scattered hairs: body very uneven; the 5th segment appears restricted, it is evidently of less circumference than the rest; the divisions of the segments are deeply incised; there are no humps that will admit of a description. Head purple-brown, mottled on the crown; the clypeus, and frequently also a spot on each side of it, pure white; the base of the antennal papillæ is also white: body purplish brown, variegated with both darker and lighter markings; there is a dark but indistinct narrow median dorsal stripe, traversed throughout by a pale thread-like stripe, and bordered on its side by another narrow pale line; all these lines are indistinct and inconspicuous; exterior to them, on the 5th segment, are two white subdorsal lines, each composed of several white dots: between the 5th and 6th segments is a lozenge-shaped mark, rather paler than the rest of the dorsal surface; the 6th segment has four dorsal white dots, disposed in a quadrangle; the 7th, 8th, 9th, 10th, 11th and 12th segments have each a pair of such dorsal white dots placed transversely; on the 6th segment is a transverse series of four blackish blotches, the outer or lower of which on each side includes a black spiracle in a pale ring; on each side of the larva are a few white dots, in addition to those I have mentioned: belly rather paler than the back, but each segment has two transversely-placed black dots, and in the incisions between the segments are also three other longitudinal dark markings; the dark dots on the belly and other parts of the body are minute warts, and each emits a short black bristle; legs and claspers, as well as the ventral surface between the ventral and anal surface, purplish brown. It spins a very slight web on the surface of the earth near the end of June, and the imago appears in July: the females are difficult to find, being of retiring habits and very sluggish: the males fly freely. I am indebted to Mr. Birks, of York, for specimens of this larva.—*Edward Newman.*

Description of the Larva of Nyssia zonaria. — The female lays her eggs in April, inside the sheath of the commoner grasses that occur on the sand-hills on the Cheshire coast: this singular habit is also that of the moths in captivity, or they will avail themselves of any kind of straw provided for them, always depositing the eggs within the sheath: the eggs are closely packed together, but without much regularity; at first they are of a pale pea-green, but soon change to a dark lead-colour, and afterwards to a dull brown, and the young larva emerges the first week in May: the infant larva differs but little from the adult, except that the lateral stripe is pale and inconspicuous: as the larva increases in size it generally rests with the back arched, both legs and claspers being attached to the food-plant: on being annoyed it is apt to fall from the food-plant, always, however, attaching itself by a thread; when on the ground it remains perfectly quiescent and bent double. Head about as wide as the body, not notched on the crown: body uniformly cylindrical, without warts or excrescences. Head gray, irrorated with black; dorsal surface of the body gray, tinged with ochreous, and delicately marked with black dots, which are arranged in short and very irregular

longitudinal series: on each side is a moderately broad stripe, which includes the spiracles, of a clear bright yellow; it commences immediately behind the head, and terminates on the 12th segment; ventral surface black, with a yellow lunule above each of the legs, and two approximate, inconspicuous and sinuous narrow median stripes of a dusky gray: legs and claspers dingy black: it feeds during the summer months chiefly on Achillea Millefolium (yarrow), but also on grasses; indeed it does not seem very fastidious about its food-plant: when full-fed it buries itself in the loose sand, sometimes to the depth of four inches, but generally not so deep: there is no perceptible web or cocoon. The pupæ remain in the sand throughout the winter, and the perfect insects begin to emerge at the end of February, and continue to come out until the end of March. I am indebted to the Rev. Percy Andrews, who received them from Mr. Birchall, for specimens of this larva, and to Mr. Birchall for information respecting its economy.—*Edward Newman.*

Description of the Larva of Abraxas grossulariata.—I have seen the females of this species busily engaged in oviposition, not only in the evening, but even in the middle of a warm summer's day, depositing a single egg on a leaf of gooseberry or black currant, and then flying off to another. I once counted ten females simultaneously occupied in this manner along a garden wall less than eighty yards in length. Like the eggs of diurnal Lepidoptera, they remain but a short time before hatching: the young larva feeds for two, three or four weeks, rarely longer, and then spins together the edges of a gooseberry-leaf, having first taken the precaution of making the leaf fast to its twig by numerous silken cables, which prevent the possibility of its falling when dehiscence takes place in the autumn: in the little cradle thus fabricated the infant larva feeds as securely and as fearlessly as the sailor in his hammock; snow storms and wintry winds are matters of indifference to him; but no sooner have the gooseberry-bushes begun to assume their livery of green in the spring, than instinct informs him that food is prepared to satisfy his appetite; so he cuts an opening in his pensile cradle, emerges, and begins to eat. The larva commonly rests in a straight posture, lying parallel with the branch; but when annoyed it elevates its back, and tucks in its head until it is brought into contact with the abdominal claspers; if the annoyance be continued it falls from its food, hanging by a thread, rarely falling to the ground; but when this is the case it is bent double, and remains a long time in that posture. Head rather small, prone, partially retractile into the 2nd segment, scarcely notched on the crown; body of uniform thickness, without excrescences. Head emitting a few strong black hairs, intense black, with the exception of the clypeus and base of the antennal papillæ, which are white: body cream-coloured, with a reddish orange lateral stripe below the spiracles; this is conspicuous on the 5th, 6th, 7th, 8th and 9th segments, less so at each extremity: the whole of the 2nd segment, and the ventral surface of the 3rd, 4th, 10th, 11th, 12th and 13th segments, is of the same orange-red colour as the lateral stripe; along the middle of the back is a series of large but irregular black spots; these are generally three in number—two amorphous, transversely placed and small, the third trapezoid, much larger, and quite as broad as the other two; they assume an altered form on the 10th, 11th and 12th segments; below these is a series of small streak-like black spots, and again below these, but above the lateral orange stripe, is an irregular series of rather larger amorphous black spots; below the orange stripe is an interrupted black stripe on each side, and on the belly are two distinct and continuous black stripes: legs black: claspers blotched with black. Feeds in gardens on Ribes grossularia and R. nigrum (gooseberry and black currant), and more rarely

on R. rubrum (red currant), greatly preferring those trees of all three species when trained against a wall; in woods and hedges on Prunus spinosus (blackthorn), which I believe to be its natural food: it is full-fed in May, when it spins a very slight and perfectly transparent cocoon, in which it fastens itself by the tail and changes to a pupa, the web or cocoon in no way hiding the pupa, which at first is entirely yellow, but soon becomes black and glabrous, with seven yellow bands, three of which, the 1st, 2nd and 3rd, are dorsal only; the others are complete circles; the tail terminates in three or more very distinct hooks, which constitute its means of attachment to the interior of the cocoon. The imago appears on the wing about Midsummer.—*Edward Newman.*

Description of the Larva of Hybernia aurantiaria. — These larvæ, when first hatched, are of a deep ochreous colour, which gradually darkens until nearly black, with the dorsal line light ochreous; subdorsal lines grayish white, and the anal segment light brown. When about three weeks old they are the same uniform ground colour, but with the subdorsal lines more indistinct, and the dorsal one brighter than when younger. When full-fed they are dusky greenish black, with the subdorsal lines (generally) invisible, and the dorsal line light brown. I found them liable to great variation (but chose typical ones to describe); one was pale greenish brown; another light yellow, with only a narrow black stripe to separate the dorsal from the subdorsal lines. I fed them on Cratægus oxyacantha (whitethorn), and found they fed well on it, chiefly by night. They go to earth when changing to pupæ, and spin a slight cocoon. The pupa is about a quarter of an inch long, reddish brown in colour, with a dark line down the back.—*W. S. Hornby; Clifton, York.*

Description of the Larva of Cheimatobia brumata. — The apterous female of this very common species lays its eggs in the crevices of the bark of various trees and shrubs during November and December: the larvæ make their appearance early in the spring, and commence their destructive career by eating into the young unexpanded buds: at this time of the year the bullfinches and titmice render the most important service to the gardener by their activity in devouring this little garden pest: when the leaves have begun to expand each larva draws two or three together, and unites them by a silken web, coming partially out to feed, and retiring again within its domicile when satisfied. When full-fed it rests with its head on one side, and curled round so as to touch the middle of its body. Head scarcely so wide as the body, scarcely notched on the crown: body rather obese, decreasing in size towards each extremity. Head pale green, semitransparent, the cheeks often blotched with smoky brown on each side just in the region of the ocelli: body glaucous-green, with a narrow median blackish stripe on the back, and three narrow white stripes at equal intervals on each side; the third or lowest one on each side includes the spiracles; the first of these three stripes is the most distinct; the second least so, being interrupted and irregular; the third or lowest stripe includes the spiracles: legs and claspers transparent green: it is a variable larva, the colour sometimes green, sometimes smoky brown, approaching to blackish; the stripes in different individuals differ greatly in distinctness; the median dorsal stripe is apparently in great measure due to the food in the alimentary canal being visible through a very transparent skin; it is sometimes bordered on each side by an obscure white stripe, thus making eight in all. It is almost useless to specify any tree as the food-plant of this ubiquitous larva: I have beaten it by thousands from Carpinus Betulus (hornbeam) in Epping Forest, and I am unable to mention a tree the leaves of which it does not

devour: it is full-fed in May, and then descends to the earth and changes to a pupa near the surface.—*Edward Newman.*

Description of the Larva of Larentia salicata.—The female lays her eggs on Galium verum, Galium saxatile, and probably other species of bedstraw; in confinement it not only feeds on bedstraw, but thrives equally well on Asperula odorata, a plant much to be recommended as growing luxuriantly in London gardens, and as furnishing an acceptable food to nearly all those larvæ which in a state of nature feed on the different species of bedstraw. The larvæ of Larentia salicata, when full-fed, rest with the claspers attached tightly to the food-plant, and from the abdominal pair the body ascends at a right angle, the anterior segments being bent gracefully over: when annoyed the peculiarities of this posture become intensified, the anterior segments assuming the form of an Ionic volute, of which the tightly-tucked-in head is the centre; this figure becomes more and more rigid as the annoyance continues, until the larva abandons its hold on the food-plant, rolls itself in a compact ring, and, feigning death, falls to the ground. Head rather small, semiporrect, not notched on the crown, beset with a few hairs: body of uniform thickness throughout, without humps or warts, but beset with scattered hairs, and having a rather remarkably conspicuous tuberculated double skinfold along each side below the spiracles. Head pale, semitransparent umber-brown, spotted with dark umber-brown: body umber-brown, with four narrow approximate parallel whitish stripes, extending the entire length of the back; on each side below the spiracles, and comprising the skinfold already noticed, is a broad pale somewhat flesh-coloured stripe; the ventral surface is rather pale along the middle, but darker on the side where it touches the pale lateral stripe; it also exhibits traces of four parallel narrow stripes, of which the inner pair are very obscure; feet and claspers similar in colour to the darker parts of the body. Feeds on Galium verum and Galium saxatile. I am indebted to Mr. Doubleday for specimens of this larva, which he received from Mr. Robinson, of Cockermouth. They were full-fed on the 18th of May, and spun together the leaves of the Asperula, incorporating particles of cocoa-nut husk, and forming tough cocoons. This species is regularly double-brooded.—*Id.*

Description of the Larva of Lobophora lobulata.—The egg is laid in the spring, on Lonicera periclymenum (honeysuckle), and perhaps also on Salix caprea (sallow), on which shrubs, as well as Salix viminalis, it feeds freely in confinement. When full-fed, which is towards the end of June, it rests in a nearly straight position, the anterior extremity being slightly raised, and the middle of the back slightly arched. Head prone, hidden from above by the anterior margin of the 2nd segment, not perceptibly notched on the crown: body rather obese, rather depressed, with a conspicuous dilated skinfold on each side just below the spiracles, and two short points directed backwards just below the anal flap. Head dull green, with intensely black ocelli: body dull opaque green above, and a narrow white stripe on each side, including the dilated skinfold; this white stripe extends from the head to the apex of the anal flap; anal points slightly tinged with pink; belly with a broad median glaucous stripe, between which and the white lateral stripe the belly is nearly concolorous with the back; legs semitransparent pale green; claspers green, slightly tipped with pink. It spins a slight web on the surface of the ground, and, changing to a pupa, remains in that state throughout the winter. I am indebted for a supply of this larva to Mr. Nicholas Cooke, of Liscard.—*Id.*

Description of the Larva of Leucania Phragmitidis. — The eggs are laid in July,

on the stems of Arundo Phragmites (the common reed), and are soon hatched, enter the stem and begin feeding; about the end of the following May they may be found in the stem, in the first or second internode from the top. When full-grown the larva has a very maggot-like appearance; if removed from the interior of the reed it does not feign death or roll itself in a ring, but is restless, and crawls incessantly, but not with great activity. Head very small, extremely glabrous, porrected in crawling: body obese, slightly attenuated towards both extremities; on the dorsal surface of the 2nd segment is a semicircular corneous plate, the convex margin of which is behind; the dorsal surface of the 13th segment is entirely covered by a similar plate; the incisions of the segments are clearly marked. Head intensely black: body dingy white, with a large amorphous ill-defined purplish patch on each side of each segment, except the 2nd and 13th; the corneous plate on the 2nd segment is glabrous and brown; below it on each side are three black dots: on the 3rd and 4th segments is a transverse dorsal series of ten black dots; on each of the following segments are four such dorsal dots; the anterior pair on all the segments, excepting the 11th, rather nearer together than the posterior pair; on the 12th segment they form an exact quadrangle; on the sides are two series of similar dots; every one of these dots emits a black bristle; ventral surface of the 5th and 6th segments purplish, of the others dingy white; legs rather long, glabrous, corneous, dark brown; claspers dingy semi-transparent white, slightly restricted at the base, a peculiarity which gives them an elongate-linear and peculiar appearance About the middle or towards the end of June the larva gnaws a perfectly circular hole in the stem of the reed, and, descending to the ground, changes to a pupa amongst damp moss; the perfect insect emerges in July. I am indebted to Mr. Brown, of Cambridge, for this larva: he informs me it is plentiful in Wicken Fen.—*Edward Newman.*

Description of the Larva of Noctua Augur. — The egg is laid in June, is hatched in June or July, and hybernates early; in the spring it again begins to feed on Cratægus oxyacantha (whitethorn), Salix caprea (sallow), and other shrubs. When full-fed, which is usually at the end of May, it rests in a straight position, but falls off its food-plant and rolls in a ring when disturbed. Head of much less circumference than the body, semiporrected, and slightly notched on the crown; in moving the head it stretches forward, and moves about in a very leech-like manner: body cylindrical, slightly attenuated towards the head, and slightly incrassated dorsally on the 12th segment. Head very shining, pale pellucid brown, reticulated and variegated with darker: body excessively smooth, dull purplish brown, with several darker markings, more particularly a narrow waved rich brown stripe along each side, including the spiracles; a transverse mark of the same colour, and dilated at each extremity, on the 12th segment; on various parts of the back there are also small round white spots, two on the anterior part of each segment, beginning with the 3rd, and two rather less distinct on the posterior part: belly, claspers and legs pale and semitransparent. It changes to a pupa on or near the surface of the ground, and the perfect insect emerges from the beginning to the middle of June. I am indebted to Mr. Thomas Huckett for this larva.—*Id.*

Description of the Larva of Tæniocampa gothica. — The egg is laid in the spring, and the larva feeds on Salix caprea (sallow), Cratægus oxyacantha (whitethorn), Quercus Robur (oak), and many other trees and shrubs: Mr. Doubleday has observed it feeding on laurel in his own garden. When full-fed, which is usually in June, it falls off the food-plant if annoyed, and feigns death, rolling itself in a compact ring,

with the head on one side. Head glabrous, narrower than the body: body obese, uniformly cylindrical, quite smooth. Head pale transparent apple-green, with black ocelli; body delicate apple-green, with a broad and very conspicuous stripe on each side, of a pale glaucous-green, approaching to white; this stripe commences immediately behind the head, and terminates in the anal claspers; it passes below the 1st and the 9th spiracles, but includes all the rest, and is gradually attenuated towards both extremities: there is a very narrow pale yellow median dorsal stripe, and exactly intermediate between this and the broad lateral stripe is another very narrow pale yellow stripe, less continuous and less distinct; there are numerous minute yellow markings throughout the dorsal surface, in addition to the three narrow stripes I have mentioned, and along the upper margin of the brown lateral stripe the green is tinged with smoky black: belly, legs and claspers pale semitransparent green. Buries itself in the earth and changes to a pupa about the middle of June: the moth appears in July and August, and hybernates. I am indebted to Mr. Wright for this larva.—*Edward Newman.*

Description of the Larva of Dianthœcia capsophila. — The egg is laid on the seed-pods of Silene maritima, and the young larva enters the capsule and feeds on the seed; as it increases in size it devours the walls of the capsules, and even the calyx. When full-fed it rolls itself into a ring, and feigns death if removed from its food. Head small, porrected in crawling, glabrous, beset with scattered hairs: body obese, smooth, cylindrical, slightly attenuated towards each extremity. Head pale semitransparent brown; ocelli black, and a black dot at the base of each hair: body pale wainscot-brown, with fine paler longitudinal stripes; the most conspicuous of these is median and dorsal; the widest is lateral, and includes the spiracles, which are pale in the centre, but bordered with black; exactly intermediate between the median dorsal and the spiracular lateral stripe, is one less conspicuous and rather narrower than either; the dorsal surface of the 2nd segment is glabrous, subcorneous, and darker brown, but the median dorsal stripe passes distinctly through this darker portion; the belly, legs and claspers are very pale. These larvæ were full-fed on Midsummer Day. I am indebted to Mr. Birchall for a supply, which I fed on Silene inflata, in the absence of their proper food-plant: they became pale brown pupæ on the 11th of July. The hill of Howth, near Dublin, is the only known British locality.—*Id.*

Notes on Ino Geryon.— On the 22nd of May last I and my friend Mr. Bibbs took a trip in search of Ino Geryon, and succeeded in taking upwards of one hundred pupæ. Each of us took the larvæ, pupæ and imagos on the same day. The pupæ appear to be entirely confined to a particular species of moss, Hypnum triquetrum (a very common kind), in which they lie concealed. There is another peculiarity: we could not discover any pupæ where the moss was either long or short; the medium length or growth alone contained them. We searched other mosses diligently on the very spot, and adjoining the species already mentioned, but not one cocoon were we able to find therein. Only about one-half of the pupæ we had taken produced the perfect insects; some had been stung, and others appear to have been old cocoons. Mr. Bibbs has obtained eggs from the insects bred at home, which were of a dullish yellow colour; these are hatched, and the larvæ are feeding on Helianthemum vulgare (common rock-rose), which I procured for them from a distance, as the plant does not grow anywhere near our residences. This without doubt is its proper food, and is very abundant on the limestone hills where the insect is found. Rumex acetosa (sorrel) was placed with the Helianthemum vulgare, but the larvæ rejected it, and would eat the

latter, even though in a faded condition, rather than attack the former when freshly procured. I have not been able to find any sorrel at or near to the locality where the insect breeds. When I captured it several years ago, I believed it to be a distinct species from Ino Statices. Now, as the larvæ hybernate, and from the foregoing facts and peculiarities in its history, I am the more confirmed in my former belief that it is totally distinct from Ino Statices. — *Abraham Edmunds; The Tything, Worcester, July* 18, 1863.

[Received just after the preceding sheet was printed (see Zool. 8694), or I should have been very glad to have availed myself of the information it contains. — *Edward Newman.*]

Dyschirius elongatulus at Deal.— I have the pleasure of recording the capture, at Deal, towards the end of May last, of a fine pair of Dyschirius elongatulus, *Dawson.* This rarity I discovered while digging up the burrows of the conspicuous and abundant Bledius tricornis, in the immediate neighbourhood of Sandown Castle. My other captures were few and unimportant.—*H. Montague; Stockwell, July* 15.

Captures of Coleoptera near Wickham.—I have taken the following species (amongst many others) in the sand pits at Shirley, during the past spring :—

Aleochara bisignata	Stilicus geniculatus
Ilyobates propinqua	Scopæus sulcicollis (abundant)
I. forticornis	Bledius longulus
Callicerus rigidicornis	Platystethus capito
C. obscurus (both not uncommon)	Anisotoma (*nov. spec.?*)
Calodera umbrosa	Colon brunneus
Tachyusa scitula	Scydmænus angulatus
Oxypoda exigua	S. pusillus
O. præcox (*Wat. Cat.*)	Sibynes primitus
O. rufula	Gronops lunatus (plentiful)
O. annularis	Ceuthorhynchus Crux
O. brachyptera	Gymnetron Veronicæ
O. misella	Orthochætes setiger
Homalota divisa	Crepidodera ventralis
H. occulta	Phyllotreta Lepidii
H. scapularis	Thyamis Lycopi
Lamprinus saginatus	T. Nasturtii
Mycetoporus longicornis	T. atricapilla
Philonthus procerulus	Psylliodes Hyoscyami

—*E. C. Rye;* 284, *King's Road, Chelsea, S.W.*

Proceedings of Societies.

Entomological Society.

July 6, 1863.—Frederick Smith, Esq., President, in the chair.

Donations.

The following donations to the library were announced, and thanks returned to the several donors:—'Transactions of the Zoological Society of London, Vol. iv. Part 7,

Section 2; Vol. v. Parts 1 and 2. 'Proceedings of the Scientific Meetings of the Zoological Society of London,' 1861, Part 3; 1862, Parts 1—3; presented by the Society. 'Schriften der Königlichen Physikalisch-ökonomischen Gesellschaft zu Königsberg,' 1862, Parts 1 and 2; by the Society. 'Exotic Butterflies,' Part 47; by W. W. Saunders, Esq. 'Illustrations of Diurnal Lepidoptera,' Part 1 (Lycænidæ); by the Author, W. C. Hewitson, Esq. 'Verhandlungen der Kaiserlich-Koniglichen Zoologisch-Botanischen Gesellschaft in Wien,' Vol. xii.; by the Society. 'Personen, Orts und Sach-Register der zweiten fünfjährigen Reihe (1856—1860) der Sitzungsberichte und Abhandlungen der Wiener Kais. Konigl. Zoologisch-Botanischen Gesellschaft;' by the Society. 'Neue Crustaceen, gesammelt während der Weltumseglung der K.K. Fregatte Novara, zweiter vorlänfiger Bericht;' by the Author, Dr. Cam. Heller. 'Sitzungsberichte der Konigl. bayer. Akademie der Wissenschaften zu München,' 1862, ii. Parts 3 and 4; 1863, i. Parts 1 and 2; by the Academy. 'Proceedings of the Royal Society,' Vol. xii. No 55; by the Society. 'The Intellectual Observer,' No. 18; by the Publishers. 'The Zoologist' for July; by the Editor. 'Fifty-six Memoirs by M. le Dr. Léon Dufour, from various scientific Periodicals and Transactions;' by the Author. 'The Journal of the Society of Arts' for June; by the Society. 'The Reader' for June; by the Editor. 'A List of the Butterflies of New England;' by the Author, Samuel H. Scudder, Esq.

Special Vote of Thanks.

On the proposition of Mr. Dunning, seconded by Mr. S. Stevens, a special vote was unanimously passed, returning thanks to Mr. W. W. Saunders for his hospitable reception of the Society at Reigate, on the 20th ult.

Exhibitions, &c.

Professor Westwood, referring to the exhibition by the President, at the June meeting, of some hermaphrodite hive-bees, made some remarks as to the bearing of that exhibition upon the question of parthenogenesis in bees. He considered that the fact of the existence of a hermaphrodite was inconsistent with the truth of the theory of parthenogenesis. The President, on the contrary, did not think the fact necessarily inconsistent with the theory, but probably explicable by and referable to some imperfection of the organs of the queen bee from which the hermaphrodite was born.

Mr. S. Stevens exhibited a large collection of South-Australian insects, principally Coleoptera, and containing many novelties; they had been collected by Mr. George French Angus, who had recently returned to this country from Australia.

Mr. Waterhouse exhibited Carabus auratus, captured on the coast of Kent: four specimens had been taken by Mr. Brewer, running about in the hot sunshine; the locality was between Dover and Hythe, but was not more precisely stated.

The President mentioned that about twenty years ago Mr. Walton had brought thirty living specimens of C. auratus from France, and had turned them loose on the coast between Dover and Deal.

Mr. Stainton exhibited specimens of Elachista apicipunctella bred by Herr Albarda, by whom the larva had been first observed two years ago. The following note, communicated by the Dutch entomologist, was read:—

Habits of Elachista apicipunctella.

"These larvæ mine the leaves of Holcus Lanatus and sometimes of Festuca pratensis and F. elatior, from November to March. They mine downwards from the

point of the leaf, occupying the entire breadth; the mine is not conspicuous. On the upper side of the leaf the epidermis remains flat, and is but slightly discoloured (especially in the Festucæ), the under side being more puckered and yellowish. The grayish excrements are irregularly scattered throughout the mine. The larva seems to prefer those leaves which lie flat on the ground and are covered by the others, and may thus have escaped observation. In mild winters, like the past, the larvæ feed continuously, and are full-fed in February, but when the cold is more intense they remain motionless until the frost is over, and then continue the same mine, notwithstanding that the leaf may be somewhat withered. When nearly full-fed they remove to a fresh leaf.

"When full-fed the larva seeks a convenient corner, commonly the base of the leaf, to undergo its change, and spins a very slight web of parallel threads, surrounding the middle of the body with a silken girth. They remain one or two weeks before they change to the pupa state, after which the perfect insect appears in about five or six weeks, according to the weather.

"The imago is seldom seen on the wing, but can easily be captured in the afternoon, when they are sitting on the leaves of the food-plant, the females having commonly their wings erected perpendicularly, as it seems to attract the males.

"This insect is not at all uncommon here (at Leeuwarden). On sandy localities, where Holcus lanatus abounds, the larvæ are probably more scattered, but along the roads in clayey localities, where that plant occurs here and there, a single tuft is often tenanted by more than thirty larvæ.

"A summer brood, though very probable, has not yet been observed."

Professor Westwood mentioned that, during a recent trip in the Italian portion of the Tyrol, he had observed the leaves of the walnut trees to be blackened throughout the distal half, and apparently scorched; on examination they were found to be rolled up by the larvæ of one of the Tineidæ, which had proved to be Gracilaria rufipennella, a species which ordinarily fed on the plane tree. The pupæ were of singular form, the antenna case in the males extending beyond the extremity of the abdomen.

Professor Westwood exhibited drawings of the larvæ and pupæ of the genera Coronis and Castnia: those of Coronis were taken from the collection of Dr. Kaden at Dresden, which was very rich in illustrations of the transformations of the Lepidoptera of Granada, which had been formed by Moritz; the larva was supplied with spines on its back, like some of the Notodontidæ. The larva of Castnia burrowed in the stems of trees, and was a long fleshy grub, like that of a Longicorn beetle, whilst the pupa had its abdomen furnished with two rows of reflexed spines, which enabled it to work its way along the burrows, after the manner of Cossus.

Professor Westwood exhibited specimens and photographs of Papilio Castor and P. Pollux. In the 'Arcana Entomologica' he had described those forms as distinct species, but Mr. George Gray, conceiving them to be the sexes of one species, had given P. Pollux as a synonym of P. Castor; the Professor, however, exhibited males of both forms and females of P. Pollux, and he exhibited a specimen of P. Castor from the collection of Mr. Semper, of Altona, one of the wings of which was partly of the ordinary form of the male, whilst the remainder of the wing had the markings and coloration which (judging from analogy) the female of P. Castor would possess. From a consideration of these circumstances the Professor was still disposed to maintain the specific distinctness of the two forms. Apart from its bearing on this question, Mr. Semper's specimen of P. Castor was extremely interesting, as exhibiting a new phase

in hermaphroditism; all the hermaphrodites with which he was previously acquainted had some of their members of the form peculiar to one sex, and some of the form peculiar to the other sex, but each limb was completely of one sexual form; here, on the other hand, the wing was partly male and partly female; the wing itself was hermaphrodite, the limb was gynandromorphous. It was to be noticed, moreover, that this gynandromorphism did not extend through equal and corresponding portions of the upper and lower surfaces of the wing, but the sexual variation in marking and colour was spread over a larger space on one surface than on the other; if he might so speak, the gynandromorphism was in the plane of the wing, not perpendicular to that plane, and the surface of contact between the male and female portions of the limb could not be traced out by the motion of a straight line kept constantly perpendicular to the wing-plane.

Professor Westwood exhibited the imago of Eucheira socialis, a Mexican species whose larvæ were gregarious, and the family-cocoon of which had been described by him in an early volume of the Society's 'Transactions.'

Mr. Miller exhibited a specimen of Œcophora Lambdella, taken by Mr. Butters, near Grays, Essex.

Mr. Stainton exhibited some hazel leaves which had been mined by the young larvæ of Micropteryx fastuosella, and which he had recently gathered in the neighbourhood of Marlborough; there were numerous leaves bearing traces of the former presence of the larvæ, but in one leaf only did he find a larva actually present; careful search at an earlier period of the year would doubtless lead to the breeding of the species in this country, and to a corroboration of the observations of Herr Kaltenbach.

Mr. Stainton mentioned that during his visit to Marlborough he had had the pleasure of awarding a prize which had been offered by one of the masters at the College for the best collection of insects formed during the previous year. There were seven competitors, each of whom, in addition to the production of his collection, was put through an examination in the elementary parts of the Science; and the result was so satisfactory that Mr. Stainton was led to hope that something similar would be done at other public schools, which would thus serve as nurseries for the Entomological Societies of the Universities.

Mr. Stainton exhibited his collection of original drawings of the larvæ of Tineina, a portion of which, with descriptions, had already appeared in the 'Natural History of the Tineina,' whilst the remainder were intended for publication in the future volumes of that work.

Mr. Moore exhibited some elm leaves which had been attacked by a species of Aphis; and leaves of Veronica Chamædrys bearing galls produced by a dipterous larva.

The President, on behalf of Mr. Marshall, exhibited Platyrhinus latirostris, numerous specimens of which were sent for distribution amongst the members.

Mr. E. Shepherd exhibited Ilyobates propinqua, Scopæus sulcicollis and Platystethus capito, all captured by himself near Reigate, on the occasion of the Society's visit to Mr. Saunders on the 20th ult.

Mr. Dunning read the following extract from a letter from Mr. Edwin Birchall, dated Birkenhead, June 7, 1863:—

"I have bred three specimens of Dianthæcia capsophila during the last few days; the bred specimens have not a trace of brown or yellow, they are pure black and white;

in fact they look nearer to D. conspersa than to D. carpophaga, of which some will have them to be the Irish representative. It seems to me that our English species ought to be arranged thus—conspersa, capsophila, carpophaga, capsincola, Cucubali; the two last only have the prolonged ovipositor."

The Secretary exhibited some white silky matter, resembling delicate tissue-paper, which had been sent to the Society by Mr. R. Thomson, of Alderney Road, Mile End, and described by him as having been "taken off a plank that formed part of a bin in which raw chichory had been stowed, apparently the deposit of insects, as numbers flew away when the goods were disturbed."

It was suggested by Mr. Stainton that the silken web had probably been made by the larvæ of Tinea granella, though he was not aware of an instance of that species having attacked chichory.

It was announced that Mr. B. T. Lowne (who was present as a visitor) was about to proceed to Bahia on an entomological excursion of some duration, and that Mr. S. Stevens would act as his agent in this country for the reception of his captures.

A communication from Dr. Dohrn and Dr. Behm, of Stettin, was read, stating that the Thirty-eighth Assemblage of German Naturalists and Physicians would be held at Stettin, from the 18th to the 24th of September, 1863, requesting the attendance of naturalists of other countries, and assuring the members of the Entomological Society of London that they would meet with a hearty welcome.

Professor Westwood entered into some details of the arrangements contemplated at Stettin for the reception of foreigners, and mentioned also that a meeting of Scandinavian naturalists would be held at Stockholm a few days before the Stettin meeting.

Papers read.

Mr. Pascoe read some "Notes on Australian Longicorn Beetles, with Descriptions of Sixty new Species."

Mr. Walker read two papers, entitled "Descriptions of some new Ægeriidæ" and "Descriptions of some new Sphingidæ."

Sale of the Society's Collection of Insects.

It was announced that the sale of the Society's Cabinets and Collections of Insects (except the type-specimens, part of which had been presented, and part sold, to the British Museum) would take place on Wednesday, the 8th of July.

New Part of the 'Transactions.'

A new part of the 'Transactions' (Entom. Trans. Third Series, Vol. i. Part 6), being the second quarterly Part for 1863, was on the table.

Entomology and the British Museum.

The chair having been vacated by the President, and taken by Mr. Pascoe, V.P.:

Professor Westwood rose to call the attention of the Meeting to the threatened appointment of a successor to Mr. Adam White at the British Museum. After referring to the circumstances under which the vacancy at the Museum had arisen, and the large additions to the entomological collections which had recently been made, the Professor insisted that a good staff of practical entomologists was requisite to keep the collections in proper order and continue the work of classification which had been so successfully begun. The two entomologists upon whom this task had devolved were Mr. Frederick Smith and Mr. Adam White: the latter was removed, so that Mr.

Smith remained alone. To fill the post vacated by Mr. White there were numerous candidates, including several good working entomologists who were in every respect eligible. It would naturally be supposed that some one of these competent persons would have been selected to supply Mr. White's place and carry on his work, but so far from this natural supposition being likely to prove correct, the facts were, that during the ill-health and consequent absence for several months of the Principal Librarian, an officer whose sway did not appear to be limited to the Library, but to extend over all the departments of the Museum, no appointment at all was made, and now that that functionary had returned there had been nominated (though fortunately not yet appointed) to the vacancy a gentleman whose previous employment had been that of a transcriber in the Book Department, who was entirely ignorant of Entomology, and did not know a butterfly from a moth or a beetle from a bug. Professor Westwood thought this was a matter which concerned the Society, and he asked its aid to assist in preventing, if possible, so injudicious a nomination from being perfected into an appointment. After a commendatory allusion to the temporary resignation of the chair by the President, lest his personal interest in the question and his position at the Museum might seem in any way to have been made to influence or interfere with the independent judgment of the Meeting, the Professor concluded by proposing the following Resolution :—

"Considering the state of the Entomological Collection in the British Museum, and the vast accessions, still unarranged, which it has recently received, and which render it the most valuable collection in the world : considering, also, that the proper classification of that collection requires the services of more than one person skilled in the Science of Entomology—

"Resolved, that the nomination, in the place of Mr. Adam White, of a gentleman previously employed as a transcriber in the Printed Book Department of the Museum, and entirely unknown as an entomologist, cannot but prove a great detriment to the progress of the classification of the collection, and is virtually a waste of the public money. Such nomination is the more objectionable as several competent entomologists were candidates for the post."

The Resolution was seconded by Mr. Stainton ; and after much consideration and a long conversation, in which Professor Westwood, Dr. Baly, Mr. A. R. Wallace and others took part, the same was put to the meeting and was carried *nem. con.*

Professor Westwood moved "That a copy of the above Resolution be sent to the Trustees of the British Museum, to the Principal Librarian, and also to J. Aspinall Turner, Esq., M.P."

This was seconded by Mr. S. Stevens, and carried unanimously.—*J. W. D.*

Pallas' Sand Grouse in Norfolk and Suffolk.

By Henry Stevenson, Esq.

The general interest which has been excited, during the last two months, by the appearance in such large numbers on our coast of these rare wanderers from the steppes of Tartary, has not rendered

the task of collecting particulars of the specimens obtained less difficult; but on the contrary, every one having something to say respecting them, the tangled skein of evidence has required much careful investigation to prevent confusion in numbers, dates and localities. Thanks to the kindness of various correspondents—amongst whom my thanks are especially due to Captain Longe, of Yarmouth; Mr. Rising, of Horsey; Mr. Southwell, of Fakenham; Mr. Dix, of Ipswich; and Mr. Spalding, of Westleton—I am enabled to give the fullest particulars respecting no less than sixty-three specimens obtained in Norfolk and Suffolk; though at the same time I doubt not that some few others may have passed unnoticed, either not being preserved when shot, from ignorance of their value, or kept "quiet" in the hands of certain individuals, whose title to possession, or method of procuring them, may be equally questionable. It is most probable that the birds which have appeared so simultaneously on our eastern coast are members of one large flock, which has become scattered by repeated alarms. I shall therefore arrange my notes of the various individuals killed up to the present time according to the dates of their capture, in whatever county procured.

May 23.—One female found dead on Yarmouth beach. "The first intimation," writes Captain Longe, "of the Syrrhaptes paradoxus in this county was, as is often the case, totally unheeded. On the 23rd of May, Mr. Youell, the well-known nursery gardener, was walking by the sea near the North Battery, when he saw a small bird washed up and down in the foam: its beautiful markings attracted his attention, and he brought it home, but, being very much knocked about and slightly decomposed, he did not think it worth keeping. One of his men, however, by name Hunt, skinned it and preserved the skin, and it proved to be a female. There were no signs of shot-marks about it, and I do not doubt it dropped in the sea from exhaustion, and was washed ashore by the tide." It is particularly worthy of note that this bird was first seen the day following the capture of the pair recorded in the 'Times' by Mr. E. J. Schollick, which were killed in the Isle of Walney on the 22nd of May,—the earliest record, on this occasion, of the appearance of these birds in England. This one example, so accidentally observed, marks in all probability the date of arrival, on the Norfolk coast, of the large numbers subsequently met with, and which no doubt remained unnoticed, and therefore undisturbed, till the first week in June.

May 28.—A female at Thorpe, near Aldborough. A notice of this,

the first specimen procured in Suffolk, was inserted by Mr. Hele in the 'Field' of June 13th.

June 4.—One male and three females killed at Waxham, Norfolk. Just twelve days from the appearance of the first specimen, no others apparently having been seen in the meantime, a small flock of eight or nine birds were found by the Rev. Mr. Wheeler and Mr. Gibbs, of Waxham, feeding in a grass-field near that village, which is situated on the coast about fourteen miles from Yarmouth. Four birds were shot, of which two females were presented to the Norwich Museum by Mr. Wheeler. These birds, singularly enough, are the only females out of all that I have examined that exhibit any indication of a band across the breast as in the males. In one it is very distinct; in the other, visible on each side close to the wings, and indistinctly traceable across the chest. This may probably denote the fully adult plumage of the female, as the ovaries in each case were largely developed, some eggs being about the size of a common hemp-seed.

June 5 and 6.—Two males and one female killed at Walberswick, near Southwold, Suffolk. The first of these birds (female), as I learn from Mr. Spalding, of Westleton, was shot from a small flock by a labouring man on the shingle close by the sea. A male winged at the same time was afterwards caught; and the third was secured by the gamekeeper to Sir J. Blois. Mr. Spalding also adds, "I took my gun, and had a walk over the extensive heath of Walberswick, when I saw a covey of about eighteen birds. They flew exactly like the golden plover, but I had no chance of a shot at them; another parcel contained seven, and another three birds.

June 6.—A male taken alive at Elveden, near Thetford, Suffolk. Of the capture of this bird on the Elveden estate Mr. Alfred Newton has sent me the following notes: it is also the only specimen I have yet heard of as procured so far inland in either Norfolk or Suffolk, Elveden being situate on the borders of both counties:—"It was brought to me," says Mr. Newton, "by a stable lad, who found it as he was exercising a horse in the morning. He thought it had been drenched by the previous night's rain, and so rendered incapable of flight. But on inquiry I found that a strange bird had been shot at and hit two days before, by a man in the employ of our clergyman; and this was doubtless the cause of its being unable to get away from the lad. From another source I learn that several sand grouse, or at least unknown birds, were seen, and some of them killed, about the same time on Wangford Warren. The tenant sent them at once to London, saying nothing about them to any one. These last were

probably some of those that found their way to the shop-boards of Mr. Baily and the other London poulterers." This bird, being only slightly injured, was sent by Mr. Newton to the Zoological Gardens in London, to be turned off with others of its species, obtained some time since from China.

June 6.—One male shot on the beach at Yarmouth. This bird, a fine old male, now in the possession of Mr. J. H. Gurney, was killed by a man named Nudd, who was working on the north beach at Yarmouth, and observed nine birds together, which he mistook for plovers.

June 8.—A female on Breydon wall, near Yarmouth. "Two sergeants of the Militia Artillery," writes Captain Longe, "were shooting on Breydon, when they marked down about nine gray plovers (*Squatarola cinerea*), which alighted on the stone wall of the embankment. It was nearly nine o'clock in the evening, and Sergeant Crowther got on to the bank and managed to get a shot into them; he noticed one bird larger than the rest, and singularly enough this bird was the only one that fell to the gun. He brought it to me, and it proved to be a female sand grouse in very good condition. It did not, however, possess the long tail-feathers which all the other specimens I have seen have done."

June 10 and 11.—Eighteen birds, male and female, shot on Horsey beach, near Yarmouth. Of this, the largest flock observed in our eastern counties, Mr. Rising has kindly supplied me with the following particulars: — "On the 9th, while out walking on the beach here, I saw a large flock of birds, more than forty, which I mistook for golden plovers. They rose within fifty yards, and flew seawards, returning back over my head at about twenty yards high, quietly calling out 'click, click,' and returned to the spot whence they rose. I felt strongly impressed from their cry that they were a kind I had never seen before, although I had not noticed then their peculiar tail-feathers. On my way home the birds again rose, took a quiet circuit round, making the same easy cry, and returned to the same spot." On the following morning Mr. Rising went over to Yarmouth, where he heard of the sand grouse just killed there, and felt sure that the Horsey birds were of the same kind. Later in the day his son, Captain Rising, went down to the beach, where he found the covey in the same locality, and succeeded in bagging ten, of which six fell to his second barrel, and two other winged birds were afterwards found. On the same evening three more were secured, and three on the following morning (11th), making in all eighteen specimens, males and females in nearly equal numbers. Of this fine series all but four

or five passed into the hands of a game-dealer at Yarmouth, by whom they were sold to various collectors, both here and at a distance, which accounts for the different notices of these Horsey birds which have appeared in the 'Times' and 'Field;' and the female noticed in the latter journal (June 13th), by Mr. Ward, as "killed on a sand hill a few miles from Yarmouth," is, I believe, one of them.

June 10 and 15.—Six brace, males and females, all shot at Holme, near Hunstanton, Norfolk. The first pair of these birds were noticed by Mr. M. Dodman, in the 'Field' (June 13th), as killed at Titchwell; but they were actually shot on the sand hills at Holme, an adjoining village. In a subsequent letter to Mr. Southwell, of Fakenham, Mr. Dodman says:—"Two brace more have since come into my possession, one of which I gave to a friend (sent to Norwich on the 12th for preservation); the other pair were too much shot for stuffing. There have been as many as six brace or six brace and a half shot at the same time and at the same spot. A pair are gone to the Wisbech Museum, and the others have passed into private hands. A pair were also seen on the sand hills at Brancaster on Sunday last (June 7th)." In the 'Field' of June 27th Mr. Dodman states, "A covey of sixteen were seen here (Titchwell) on Sunday," the 21st instant; and those referred to by Mr. F. Tearle (Hunstanton), in the 'Field' of July 4th, are evidently some of the specimens above described.

June 11 and 13.—Four females and one male killed at Thorpe, near Alborough, Suffolk. Mr. Hele, of Alborough, has noticed these, as well as the first Suffolk bird, in the 'Field' (June 13th and 20th); and Mr. Dix, of Ipswich, has also sent me further particulars, a pair of them having come into his possession. As many as fifteen or sixteen appear to have been seen in this locality up to the 13th of June.

June 17.—One male killed at Winterton, Norfolk. This bird is no doubt one of the Horsey covey, which, I had previously heard, had been seen since the 10th on Winterton Warren, situated close to the sea between Horsey and Yarmouth, and where, I believe, some few of these birds still remain.

June 20. One female from Yarmouth, in the possession of Mr. C. Newcome, of Feltwell.

June 22 ?—One male shot at Morston, near Blakeney. Of this bird Mr. Woods, of Morston, has kindly sent me the following particulars:—"I shot a sand grouse in one of my ploughed fields, about three weeks since. There were nine when I first saw them. I thought from their habits and appearance they were golden plovers in their summer plumage. When I saw the description in the papers of the

sand grouse, I took my gun to look for these strange birds, but found the covey had dwindled to three, out of which I was lucky enough to shoot one, which is now being stuffed at Mr. Alcock's of Blakeney."

June 24.—One male killed at Waxham, where four of the earlier specimens were obtained. Mr. Harvey, of Waxham, who shot it himself, says, "This bird was killed in a turnip field near the sea-banks; another was seen the same day about the same place, supposed to be a hen. On Friday (26th), about 10 A.M., a flock of from twelve to fifteen flew over the sea-banks in a south-east direction. They fly in the same order as wild-fowl, and frequently utter a peculiar clicking noise."

June 24.—One female at Kessingland, Suffolk. This bird was sent up to Norwich to be stuffed for Mr. Crowfoot, of Kessingland, who in answer to my inquiries informs me that it was killed on that part of the coast, by a labouring man, out of a flock of twelve or fourteen which had frequented Mr. Bean's farm, near the cliff, for a fortnight previously. About a week since a flock of fifty or sixty strange birds were seen flying to the southward in one flock, by some men ploughing near the marshes adjacent to the sea.

June 25.—A male killed somewhere in Suffolk, on the authority of Mr. Spalding, of Westleton.

June 26.—Four females from Blakeney, Norfolk. These birds were sent up to Norwich to be stuffed on the 27th, and on examination I found the ovaries, in all but one, more developed than in any previous specimens—some eggs as large as hemp-seeds; and several of the quill-feathers in the wings had been recently moulted.

June ?—In the 'Field' of June 27th, Mr. Ward, taxidermist, of Vere Street, London, speaks of a female from Norfolk which had just come into his hands, and adds that this bird appeared to have laid "all its eggs but two, and these were about the size of hazel-nuts." This announcement seems rather extraordinary, since none of those examined by myself, or by any one of whom I have made inquiries, have contained eggs larger than hemp-seeds; others not half the size, and the main cluster extremely minute. In one bird I counted between fifty and sixty eggs of all sizes, and yet these were not all the ovaries contained; the largest, and therefore those which would form the first sittings, numbering about six or eight. Surely, then, we cannot imagine that this one female had already been so robbed as to have exhausted all her store but two. May we not rather suppose that in some way or other a mistake has arisen, and, the skin having

been removed from the carcase, the testes of an adult male have been taken for the two last eggs of an incubating female? as these parts in some old males have been found nearly half an inch in diameter, and, as usual, ovate in form and pure white.

July 1.—One female at Holme, near Hunstanton. This bird, which also came into the possession of Mr. Dodman, of Titchwell, was, as Mr. Southwell informs me, found dead upon the beach at Holme. "Its death was caused by a shot wound. The contents of crop and gizzard were precisely the same as in others from the same locality; and judging from its full and healthy appearance, its food must have agreed well with it." Mr. Southwell gives the weight of the first pair killed in this locality as $9\frac{3}{4}$ ounces each, male and female. I have no doubt whatever that while staying myself at Hunstanton, in the beginning of June, I saw more than once a small flight of these birds on the beach at Holme. On one occasion I tried to get near about four or five birds which at a distance I took for gray plovers. They rose wild, however, and came over my head out of shot; and their flight and cry—the latter quite new to me—made me wonder at the time if they could be anything I had ever met with before.

July 8.—Male and female from Yarmouth. These birds, which are in the possession of Mr. Owles, of Yarmouth, are supposed to have been killed near Caister. They were sent up to Norwich on the 9th for preservation, when I examined them in the flesh. They were neither of them in such good condition as most of the earlier specimens, the keel of the breast-bone being sharper to the touch; nor were they so fat internally, though perfectly healthy. The colours of the plumage, in both male and female, looked dull, and exhibited no signs of moulting. In the former the tail-feathers were half an inch shorter than usual; but both the tail and wings in the latter were an average length. The gizzards presented the same class of small seeds as in others, with white flinty particles, but these both smaller and less numerous than in many I have dissected. The female, probably a young bird, contained a large cluster of very small eggs, none larger than a common rape-seed. The male was evidently an adult specimen.

July 9.—Male and female. I am not able to state the exact locality where this pair were shot, but I have reason to believe it was on the Norfolk coast. Neither the crops nor gizzards presented any variation from former specimens.

With the exception only of the Elveden specimen, these birds have been found in the above-mentioned counties, either close to the sea (on the sand hills and shingle) or in the immediate

vicinity, feeding in grass-fields or on open waste lands. In all cases they have been in good condition, the internal parts exhibiting signs of perfect health, and the crops in most cases filled with green food; some few, however, have had empty crops, but their gizzards (extremely muscular) filled with the *débris* of seeds and small fragments of flint. No trace of animal or insect food has been found in any of them, either in our eastern counties or in other parts of England. Of the first female killed at Yarmouth, Captain Longe says, "The gizzard contained an enormous quantity of small stones and sand (some of the stones were nearly twice the size of mustard-seeds), and weighed three-quarters of a dram." This I have found the case in most of them myself, but in some much more sand than flints. The contents of the crops (in one case filling two table-spoons) are various, consisting, in the opinion of several local botanists, chiefly of small yellow grass-seeds, mixed with the seeds and cases of Medicago lupulina (black medick or nonsuch), Carex (sedge), Rumex (dock), Stellaria and Cerastium (chickweed), and in some instances small sprigs of Sedum acre (biting stonecrop), so abundant on the sand hills of our eastern coast. Those taken from one of the Yarmouth birds, being of six different kinds, have been sown in pots under the care of Mr. Youell, at his nursery-grounds, and will thus, I hope, decide satisfactorily the plants to which they belong. Mr. Southwell, of Fakenham, who has most kindly placed his own notes on this species at my disposal, has taken great pains to ascertain accurately the plants on which such birds as have come under his own personal observation had been feeding. The following statement was received by Mr. Southwell from no less an authority than Mr. C. C. Babington, of Cambridge, after an examination of the different seeds from the crop of one of the Holme specimens:— "Most are the fruit and seeds of Arenaria, or rather Lepigonum rubrum, numbered 1 on the paper; 2 is a seed of Polygonum; 3, the tip of a moss; 4, seeds of another kind of Polygonum (they must have been some time in the bird's crop, for they have commenced growing); 5 appear to be fruiting flowers of Poa; 6, I fancy belong to Sagina or Arenaria, but I have not succeeded in naming them to my own satisfaction. All these names are of course quite open to alteration, but I quite think that they are correct." Besides the above, Mr. Southwell has also distinguished the seeds of Lepigonum marinum, of which there appear to have been none in the crop submitted to Mr. Babington; and in a letter to myself he adds, "I think we may conclude that their food in this country consists entirely of the seeds of plants

proper to the sandy coast upon which they were found. The fact of the seeds being all those of British plants probably shows them to have been on the coast some days." Mr. Alfred Newton, to whom the carcases of two of the Holme specimens were sent by Mr. Southwell for the purpose of dissection, suggested a careful examination of the small flinty substances found so abundantly in the gizzards, shrewdly suggesting that some mineralogist might recognize in them "fragments washed down into the Kirghish Steppes from the Altai mountains; or the birds might have renewed their stock of grindstones as they crossed the Ural." Acting upon this hint, Mr. Southwell submitted some of them to a geological friend, who writes as follows:—"As to the stones found in the gizzard, I do not think they were got on the Norfolk coast. I doubt whether the sand there would afford such large grains. They may have been picked up on their native steppes, and probably the same stones may remain in the gizzard for an indefinite length of time. The stones, so far as one can see, seem to be fragments of quartz and feldspar, and are therefore probably granitic. I have shown them to one of our best geologists, an F.G.S., who concurs with me, and thinks that nothing decisive can be predicated from them. They could all be easily matched in England." I may here add that the later specimens dissected by myself have had fewer flinty particles in their gizzards, and those much smaller in size and more mixed with sand. In the early examples the size and peculiarly angular appearance of these white fragments would attract the notice of any one accustomed to examine the internal economy of granivorous birds; and as it is generally understood that such stones are retained in the gizzard so long as their triturating powers remain unimpaired by the action of the stomach, it is most likely that on their first arrival our Tartar visitants contained their native grindstones.

Having examined a series of just five-and-twenty, consisting of ten males and fifteen females, I have been struck with the general similarity of the specimens according to sex. The less matured males differ only from those more adult (judging from the largely developed state of the testes) in having the ground colour of the plumage somewhat duller, and their darker markings less clearly defined; but the extremely dark tints of some old males, especially in the deep gray of the breast and more clouded appearance of the wing-coverts, are, I imagine, attributable to old and somewhat soiled feathers, which in a few weeks would have been replaced by others. In one or two fine old males very recently killed (for the brighter portion of the plumage

soon fades in the stuffed specimens) the reddish orange of the head and neck, the delicate pencil-markings across the breast, the rich buffy colouring of the wing-coverts, bordered by a reddish bar above the secondary quills, and the broad abdominal band of blackish brown mingled with buff, were all extremely vivid, as also the bars and spots on the back and wings; but I did not find that such specimens had in all cases the longest tail- or wing-feathers, which are doubtless much subject to accident. Amongst the females the same degree of difference exists, the young birds having a more mottled appearance on the upper parts, the kestrel-like bars on the back and wings being less clear. In old females the black ring round the throat and the yellow tints of the neck are extremely bright. In two only, as before observed, have I seen the slightest trace of the pencilled lines across the breast, so marked a feature in all males. These probably are very old hens, but they are not more brilliant in plumage than others, and the one with the pectoral band most distinct has the gular ring very faint, the yellow tints less vivid, and the first quill of the wings scarcely elongated at all. In some examples the quill-feathers have been recently moulted, as in the last four females from Sherringham; and Mr. Dix informs me that in two he received from Horsey he found the secondaries and tail-feathers full of blood and about three-parts developed, and some of the back feathers were brighter and evidently new. The following are the variations in length of the tail- and wing-feathers in both sexes, as far as I have been able to take them; but the difference in length of the first primary quill is owing more to the size of the bird (the wing itself being larger or smaller) than to the elongation of the filaments; thus in one female the wing from the carpal joint measured nine inches, yet the primary shaft projected but very little. The females have the same bright reddish hue above the secondary quills as in the males, and the abdominal band is in some even deeper in colour and less mixed with buff. All but one female I have seen have had elongated tail-feathers, and in this case they had been shot away:—

Tail-feathers in males, $6\frac{1}{2}$, 7, to $7\frac{1}{2}$ inches.
First primary of wing, measured from the carpal joint, $8\frac{1}{2}$, 9, $9\frac{3}{8}$, $9\frac{1}{2}$, to 10 inches.
Tail-feathers in females, $3\frac{1}{2}$, 4, $4\frac{3}{4}$, 5, $5\frac{1}{2}$, to 6 inches.
Wings measured as above, 8, $8\frac{3}{8}$, $8\frac{5}{8}$, to 9 inches.

The above list comprises no less than sixty-three specimens, killed in the counties of Norfolk and Suffolk, *viz.*:—

Norfolk,	51	Males,	23
		Females,	28
Suffolk,	12	Males,	5
		Females,	7
	63		63

Tastes seem to vary much respecting the edible qualities of these strange birds, which, as far as my own experience goes, are in this respect as much entitled to their specific name of paradoxus as for any of their external peculiarities. Served up as "a delicious salmi" at the dinner of the Acclimatisation Society, they are said to have been pronounced "admirable"; but here at least they were tried under the most favourable circumstances, being cooked to perfection by a master of the culinary art. Without all these advantages, and with the great drawback of wanting their natural skins, the first brace I tried were undoubtedly dry eating and somewhat tasteless, but presented, from the great depth of the sternum, a "breast" fine at least in quantity if not in quality. On the next occasion I had them baked, with the addition of a beef-steak to assist in preserving their natural juices, and found them much more tender and palatable, the flesh suggesting the flavour of many things, though scarcely one in particular. I should say, however, that they resemble the French partridge as much as any other game bird, as they want the pungency of the quail, to which they have been likened by some who have eaten them. Their only resemblance to grouse consists in the two colours of the flesh, the outer portion being very dark, and that nearest to the bone white. It must be remembered, however, that these birds are not "in season:" what they might become in autumn, after a corn diet, with their game flavour excited by "keeping" (a thing impossible this hot weather), is a point which perhaps the Acclimatisation Society will decide for us at some future day.

HENRY STEVENSON.

Snowy Owl (Strix nyctea).—Mr. Saxby, in his notes on this owl (Zool. 8635) says, "These hills [Balta] are strewn with large gray stones, intermixed with a few long-shaped white ones; the bird is exceedingly difficult to discover while resting in such situations, so closely assimilating as it does in colour with the surrounding stones." There is evident design in this; an instinctive knowledge that the stone, wood, soil, &c., assimilating with the plumage, secures it from observation. This was pointed out in my Canada notes (Zool. 6702), showing how one managed to escape notice, though perched within a few yards of me. Many birds are endowed with this faculty,

the rock pigeon, or sand grouse, of Southern India, for instance; see my note at Zool. 5748, where, in remarking on the plumage, it is said—"harmonizing well with the arid, sandy and rocky character of the desert-like tracts where alone they are to be met with, and where they lie crouched and concealed amidst the chaotic masses of granite, as well as rocks and stones with which these vast and boundless plains are strewn and dotted," &c. I have only to remark that what has been more recently noticed by Mr. Saxby, in Shetland, tends to confirm my observations on the snowy owl. I need not quote them, as they can be referred to if required, but the following passage occurs: "I was surprised and somewhat startled at seeing one of these noble-looking birds suddenly rise from off the snake-fence within a few yards of me, where it had sat secure and unobserved, its plumage assimilating with the bleached and weather-beaten palings." There are two ways of accounting for its having permitted this near approach; the owl was either sleeping or resting in fancied security; but if diurnal in habit it could hardly at noonday have been so soporiferous as not to have heard me trudging incautiously along through the snow. Its being immediately attacked by crows (as recorded at the time) tends to show that, like other owls, it is a nocturnal bird, for if habitually on the wing by day it would not be so molested and persecuted. Besides, neither in plumage nor organization does it differ from other owls. Its eyes, too, are those of a nocturnal bird, and ill adapted for sustaining the full glare of a bright Canadian sun, or the reflected rays from fields of snow. It probably preys by night on the hare, which is of the size of a rabbit, and weighs three and a half pounds. Their being able to swallow a rabbit entire is a wonderful proof of the expansibility of the gullet and stomach, but the swallowing of an auk or two by the glaucous gull, as recorded by Dr. Richardson, is not much less so. Whether the stomach of the owl be full or empty makes all the difference, and would account for the apparent discrepancy of authors. Audubon, after remarking that the "stomach is capable of great extension," informs his readers that it can swallow a rat—not entire—but "in pieces of considerable size, the head and tail almost entire."—*Henry Hadfield; Ventnor, Isle of Wight, July* 4, 1863.

Two Wheatears Nests together.—At the edge of a deep burn upon the hill-side, a long strip of turf has given way, and resting against the steep bank has thus formed a small kind of tunnel, about a yard in length. So tempting a situation for a nest attracted the notice of two pairs of wheatears, who, instead of settling the question of ownership "sparrow-fashion," peaceably built their nests side by side within six inches of each other. Each nest contained six eggs, all of which were hatched within the same week; and in due time both broods were fledged. Although one brood left the nest some days earlier than the other, it remained in the immediate neighbourhood long afterwards, accompanied by the parents, who fed them industriously for at least twenty hours out of the twenty-four. The younger brood soon rejoined its former neighbours, and at about eleven o'clock every night the whole party, numbering sixteen individuals, retired to crevices beneath large stones,—at least, I suppose so, for although I was never able to discover the young birds in their retreat, the slightest noise was sufficient to call forth the old ones. But after this had occurred three or four times they were never to be taken by surprise, and were always to be seen flitting restlessly about as soon as I approached sufficiently near to distinguish them. Both ends of the tunnel were used for the purposes of entrance and exit, but I had no means of ascertaining whether each pair of birds kept to their own nest. Wheatears are very abundant here. There is scarcely a wall in this neighbourhood which has not to my own knowledge

contained one nest or more. It is remarkable that nearly one-fourth of the whole number of the eggs of this species which I have seen this season have been of the spotted variety; this is an unusually high average.—*Henry L. Saxby; Baltasound, Shetland, July* 29, 1863.

The Chaffinch and the Gooseberry Grub.—I have read with interest Mr. Ranson's remarks at Zool. 8680. I am happy to add another bird to the list of those few known to be inimical to that most noxious pest the larva of Nematus ventricosus. I have a few gooseberry bushes under my study window which are and have been swarming with it. A week or two since I was delighted to see an old cock chaffinch busily engaged in collecting them in his bill, and carrying them off in bundles to feed his young ones in an adjoining tree. My friend Mr. Doubleday had previously mentioned this fact to me, but I had never been fortunate enough to witness it with my own eyes.—*H. Harpur Crewe; Rectory, Drayton-Beauchamp, Tring, August* 5, 1863.

Frequent Occurrence of the Eggs and Young of the Cuckoo in Nests of the Rock Pipit.—On the 7th inst., while hunting for nests over some cliffs near here, I observed a rock pipit in the act of leaving her nest, which I found to be occupied by a lusty young cuckoo. I identify the nest by a good view of the bird and by an egg which I found just outside of it, excluded, I presume, by the broad back of the intruder. This is the fourth nest I have found of this species in two seasons, *viz.*, the present one and that of 1861, each containing either an egg or a young one of the "vagrant" cuckoo as Gilbert White well describes it.—*C. E. Seaman, Northwood, Isle of Wight, July* 21, 1863.

Cuckoo's Egg in a Linnet's Nest.—I do not remember ever having seen an instance of a cuckoo's egg being found in a linnet's nest recorded in any book or periodical. I found one in June, 1857, the linnet sitting on it and five of her own eggs. The nest was in a close furze bush, within fifty yards of a boy's cricket ground near this place, and as there was little chance of the foster bird being permitted to hatch I took the egg and preserved it. It is a large one and a strange contrast in size with the eggs by which it was surrounded.—*Charles Bridger; Witley, Surrey, July* 7, 1863.

Nests of the Creeper.—Two nests of the creeper have come under my notice this season, both mainly constructed of bark, and both unusually placed. One occupied a small hole in a dilapidated out-building belonging to an uninhabited house, and this I was not able to examine for some time, until the young ones had taken leave of their birthplace, when I found it unfit to keep. The other was in the fork of a large juniper tree, a remarkably pretty nest, built, I believe, chiefly of the bark of the juniper, and lined with feathers. I have preserved it.—*Id.*

Nest of the Jay built in Common Ling.—In one of my evening walks over Witley Common, in May last, a pair of jays and some other birds uttering cries of distress drew my attention to a dense mass of young Scotch fir trees, in the midst of which I found a jay's nest, in what seemed to me a very unusual place, *viz.*, in a fine plant of common ling, and within a foot of the ground. There was one young one in the nest alive and one on the ground dead. An enemy, perhaps a weazel, had evidently found the nest and abstracted one of the young ones,—hence the trouble of the parent birds. —*Id.*

Variety of Hooded Crow.—Yesterday, as I was walking along the edge of a low sea-cliff in the island of Yell, a pair of hooded crows flew out from their nest, and one of them, which appeared to be the male, had the whole of the wing-coverts perfectly

white. I was unable to obtain a view of the nestlings.—*Henry L. Saxby; Baltasound, Shetland, July* 5, 1863.

Garrulous Roller in Suffolk.—A very perfect and handsome specimen of this bird was killed by Mr. R. Pratt in this neighbourhood, on Tuesday, June 23rd. It has been sent to Mr. J. Cooper, the taxidermist, of 28, Radnor Street, St. Luke's, for preservation, where it can be seen, together with some very well mounted specimens of fish, &c. It is well worth any naturalist's inspection.—*N. Fenwick Hele; Aldeburgh, Suffolk, July* 19, 1863.

Note on Pallas' Sand Grouse.—Observing letters in your columns ('Times') relating to the recent occurrence of Pallas' three-toed sand grouse in this country, I think it may not be uninteresting to your readers to learn that this is not the first occasion on which this curious inhabitant of the Kirghiz steppes of Tartary has paid us a visit. In the summer of 1859 a small flock of these birds traversed England from west to east. One of them was shot in the parish of Walpole St. Peter's, in Norfolk, in the early part of July of that year, and a second near Tremadoc, in Wales, on the 9th of the same month. About the same time, as we learn from the scientific journals of the Continent, birds of the same species were obtained from Hobro, in Jutland, and on the dunes of Holland, near Leyden, where their presence was quite as unexpected (and, I may add, the reception these unfortunate pilgrims met with as little hospitable) as it appears to have been in England. A detailed record of all these occurrences, together with a full description and coloured figure of this bird, is given in the second volume of the Natural-History periodical called the 'Ibis,' to which I beg to refer such of your readers as may wish to know further particulars. I may remark that there are living specimens of this sand grouse in the Zoological Society's aviary. These birds were obtained by officers and other members of the recent British expedition to Pekin (where, in winter time, they are sold in the market for food), and brought to this country in 1861.—*P. L. Sclater; Zoological Society of London*, 11, *Hanover Square, May* 28, 1863.—'*Times.*'

Pallas' Sand Grouse in Devonshire.—I last week received a pair of the sand grouse which were shot from a flock of thirteen birds, by a friend of mine on the sands at Slapton Ley, near this place. They were in good condition, and had been feeding on a sort of grass seed. These birds seem to be larger than the specimens mentioned by Sir William Jardine, their length being nine and eleven inches: my specimens are thirteen inches, the old male having the pointed feathers in the tail four inches longer, which makes nearly seventeen inches; weight, seven and a half ounces.—*Henry Nicholls, jun.; Kingsbridge, South Devon.*—'*Field*' *of July* 4, 1863.

Pallas' Sand Grouse in Kent.—I have two specimens of this rare bird (male and female) shot, on the 7th of June, at Elmley, Sheppey, from a covey of six, and to my knowledge four have been shot out of that number.—*E. Young; Sittingbourne, Kent, July* 1, 1863.

Pallas' Sand Grouse in Norfolk.—Several coveys of these rare and remarkable birds have made their appearance on this coast during the last six weeks. The first specimen was shot at Thorpe and brought to me. It proved to be an adult female, and contained upwards of a score immature eggs. Altogether seven birds have been shot, and I have secured a handsome pair, which I have stuffed and mounted. I planted the seed which I found in the crop, which has germinated and flowered, and proves itself to be the Trifolium minus. From further experience I find this constitutes the usual food of these birds, and a field which has been much frequented by

the sand grouse, abounds with this plant. The coveys generally number from seven to twenty.—*N. Fenwick Hele; Aldeburgh, Suffolk, July* 19, 1863.

Sand Grouse: Correction of an Error.—The two birds mentioned by Mr. W. Liversedge (Zool. 8689) are now in my collection. They were killed, as stated, by Mr. W. Emmett, in a field in my brother's manor in the parish of Calverley. The name given by Mr. Liversedge is a mistake: they are not the pintailed sand grouse (*Pterocles setarius*) but Pallas' sand grouse (*Syrrhaptes paradoxus*). They are both in fine plumage, and exhibit the curious pin feathers in the tail in a marked degree.—*W. Christy Horsfall; Horsforth Low Hall, near Leeds.*

Pallas' Sand Grouse in Lincolnshire and Yorkshire.—In the early part of June I had a fine specimen of Pallas' sand grouse brought in to be preserved. It was shot out of a covey at Floatmanby near here. A fortnight after I had another sent in, which was shot from a brace by Admiral Mitford's gamekeeper. They were both males, and in fine condition. The plants enclosed are grown from seeds obtained from the first bird's crop: the seeds sent I took from the second bird. We have had a brace (male and female) presented to our museum, which were shot at Saltfleet, on the Lincolnshire Coast. I understand one person shot ten brace of these curious birds. *Alfred Roberts; King Street, Scarborough, July* 5, 1863.

[The seeds are of various kinds, already mentioned as occurring in the crops of these birds; the young plants are Chenopodium Bonus-Henricus and Stellaria media. Knowing how very commonly these two species occur in gardens without any intentional sowing, I should decline to express any decided opinion as to their seeds having been eaten by the sand grouse.—*Edward Newman*].

Pallas' Sand Grouse in Cambridgeshire.—In addition to the many localities in which this hitherto rare visitant has recently made its appearance, it has shown itself in considerable numbers in the eastern counties; a large flock settled in the neighbourhood of Cottenham, a village about eight miles from Cambridge, where they were constantly running as in search of food. Though they are remarkably shy, and fly with great swiftness, several specimens have been obtained. In dissecting some I found the crops full of a small black seed very much resembling the seed of the willow weed, which grows plentifully in this district: in a female I found several eggs the size of a large pea, and by the healthy appearance of the bird have no doubt they would breed in this country if unmolested.—*John Baker; Trumpington Street, Cambridge.*

Pallas' Sand Grouse in Cambridgeshire.—Several have been captured in this county during the last three weeks; four or five at Cottenham, one at Oakington, one at Swaffham Prior Lane, I don't know how many at Barrington, and I hear several around Royston. There was a flock at Cottenham—upwards of forty—but the last time seen there they had dwindled down to five. As Oakington is only about three miles west or north-west of Cottenham, and Swaffham much about the same distance east of Cottenham, it is not impossible that those captured in these three parishes were of the same flock. They have appeared also at Little Wilbraham, but no specimens have been taken there that I have heard of. I have three in my possession—a male and female shot at Cottenham, the former only winged and now alive, and a male shot at Swaffham Prior. I hear the birdstuffer at Royston has several in his possession, but whether his own property or not I do not know.—*Kindly communicated by Mr. F. Bond.*

The Sand Grouse in Cambridgeshire.—The sand grouse made their appearance in

this county about the third week in June, and, singular to say, only two spots appeared to prove attractive, those places being Royston Heath (by-the-by in days past rather a noted place or resort of departed rarities) and Cottenham and its immediate neighbourhood. I am not cognizant of a single specimen having been seen or shot except in the vicinity of these two places. These birds always appeared to prefer fallow lands to those in cultivation, and their food in every case, as far as I could discover, consisted of the seeds of (what we call here) the lamb's tongue, and, of many I had the gratification of dissecting, the crops contained some few leaves of that plant. Each flock consisted of between thirty and forty. While feeding they kept in a straight line, running with great ease and grace, keeping nearly close to the ground; the wings were slightly apart from the body; the tail carried in a horizontal line with the body, and closed, the two long or elongated feathers forming in appearance one pointed feather; the feet were scarcely perceptible, and while in the act of running were kept in rapid motion; in short, their actions upon the ground reminded one much of rats. They have a singular trait of elevating both wings and bringing them up over the back, the tips of each quite touching. I have observed several in each flock practise this peculiar action; their body is carried lower in front than behind, and the neck very short. When flushed or disturbed they rise rather high, and at once take a straight and rapid flight, the while repeating a plaintive whistle, if once heard not easily mistaken. I would here briefly endeavour to describe the distinctive features presented by each sex. The male is in his general appearance a finer-looking bird; his head on each side is marked with much brighter ochre-yellow; the crown of head without spots; a large patch of an oval form upon the pinions of his wings are also quite destitute of spots, being plain stone-colour, but the feature which at a glance pronounces him a male is a crescent-shaped band of scale-like feathers which encircles the breast of the male bird, these feathers being edged with buff; and the horse-shoe markings upon the lower portions of its body, instead of being darkish brown, as in the female, are black, some of them being edged with buff. The two outer or greater quill-feathers, as are also the two middle tail-feathers, are much more elongated than those in the opposite sex. The spots and markings are less dense, and more thinly dispersed over the entire plumage than in the hen bird. The bluish white bare space round each eye is deeper in the male. The eyes are very dark hazel, approaching to black. The beak is of a beautiful bluish pearl gray, slightly larger than that of the female. The female is at once known by having a ring of darkish feathers running round the under part of its throat, and by the absence of the patch of plain feathers upon each wing, the horse-shoe upon the lower part being dark chesnut in place of black, as in the male, and its general darker markings and shortness of elongated feathers. Many of the specimens differ materially from each other, some being very much more thickly and more closely spotted than others. The annexed is a list of the occurrences:—Two females shot at Cottenham, on the 30th of June. Male and female captured at Oakington, some time in the end of June or early in July. Male and female shot at Cottenham, in the early part of July, by Mr. A. Cross, farmer. Mr. Norman, taxidermist, of Royston, very obligingly informed me that no fewer than nine had been shot upon Royston Heath and vicinity, and had been confided to his care for preservation. I believe these were all females. The last occurrence I shall notice, but certainly not the least, is that of three taken alive at Cottenham. One, the male, is now alive and doing well, in the possession of Mr. F. Barlow, a very enthusiastic ornithologist of this town, who, with his well-known kindness, in the most courteous manner has offered

me every facility of visiting his museum and watching this most interesting little stranger. At some future time I may send to the 'Zoologist' some further notes thereon.—*S. P. Saville; Dover House, Cambridge, August* 11, 1863.

Pallas' Sand Grouse in Lancashire, Lincolnshire, Yorkshire and Cambridgeshire.—In addition to the captures of this grouse recorded in the August number of the 'Zoologist' the following have come under my observation. One shot near Penrith, several near Lancaster on Morecambe Bay, one at Whitby, one at Bridlington, thirteen on the north-east coast of Lincolnshire, near Louth and Alford, one or two near Peterborough, eight near Cambridge, and five specimens were offered for sale to a game dealer in York and refused by him, but when shot or what became of them I have not been able to ascertain. As I have not seen any in the flesh I can add but little information to what is already recorded. I believe the numbers of the sexes have been nearly equal, though not always equally distributed. The crops of several that were examined contained small black seeds, and the ovaries of the females contained eggs in various stages of development. All were obtained from the last week in May to the end of June.—*T. H. Allis; York, August* 5, 1863.

Pallas' Sand Grouse in the East Riding of Yorkshire.—I added to my collection the other day a fine male specimen of Pallas' sand grouse in very perfect plumage. It was shot by a labouring man, in the first week of June, at North Burton, a village situated near Bridlington, in the East Riding. This bird was accompanied by another, probably a female. The man who shot it stated that "it was making a great noise at the time." No other specimen that I am aware of has occurred so near Beverley, although several have been seen, and a few captured, in the neighbourhood both of Scarborough and Whitby.—*W. W. Boulton; Beverley, August* 4, 1863.

The Sand Grouse at Heligoland.—This very beautiful and interesting stranger was first observed and shot here on the 21st of May, the weather being very fine, with a moderate easterly breeze. Each successive day, up to the earlier part of June, it was seen here in flocks varying from about three, five, fifteen to fifty, and in one or two instances even to a hundred. Out of these nearly thirty have been shot; the earlier birds being, with two exceptions, all very fine male specimens, the later nearly all female birds—every one of them in the most perfect plumage. After a lapse of a fortnight, *viz.*, on the 22nd of June, six sand grouse again made their appearance: out of these five were shot—all female birds—whose plumage no longer had that fresh and tidy appearance of the earlier instances; so that all through this abnormal and mysterious excursion of this species they still adhered to the rules of birds on a regular spring migration—that is, the males forming the van, the finest old specimens coming first, after which the females make their appearance, and the rear being invariably brought up by weak, badly-developed or injured individuals of a shabby appearance. I was so fortunate as to obtain two living specimens of this sand grouse, a male and a female, both of which for awhile went on very well; but yesterday, to my great regret, I discovered that the female had died. The abdomen of this bird had the appearance as if containing a developed egg, which on examination, however, proved to be a solid accumulation of a gritty calcareous substance of the size of a large walnut. It would be very interesting if these birds were to breed on the English moors. Although I have little doubt that, if at convenient localities they are left undisturbed, such will be the result, it also is my opinion that in autumn the offspring, together with the parent birds, will depart for their original fatherland never to return. But a future different result would perhaps be attained if such young birds were to be procured

before fully fledged, kept well during the winter, and set at liberty the following spring near such localities as their parents had chosen for nidification. If during this season any young sand grouse are reared in England or on the Continent, I am sure one or other of them will turn up on Heligoland.—*H. Gatke; Heligoland, July*, 1863.

Colour of the Eggs of the Golden Plover.—I have long observed, with no little perplexity, the remarkable variety of colour which occurs among the eggs of the golden plover, and the regularity with which each colour in its turn predominates according to the advancement of the season. Every year I see large numbers of the eggs, and the general rule appears to be that those which are laid early in the season have a dingy hue, the ground colour being strongly tinged with dull olive-green, and that a little later this commences gradually to become less frequent, giving place to creamy white, sometimes richly tinged with warm yellowish brown: the latter colour is deepest and most common in June and July, when the breeding season is drawing to its close. At this time, also, the spots and blotches are very abundant, and more of a reddish brown.—*Henry L. Saxby; Baltasound, Shetland, July* 14, 1863.

Green Variety of the Oystercatcher's Egg.—A very uncommon variety of the oystercatcher's egg has just been brought to me, its general hue being pale grayish green, a colour which I have never before observed in the egg of this species. The spots are unusually small, and chiefly confined to the broad end. Two other eggs found in the same nest are of the usual colour.—*Id.*

Redshank breeding in Shetland.—The redshank is very frequently described as breeding regularly in Shetland, but, whatever the case may have been in former times, it is very certain that the nest is now very seldom met with here. During the last six years I have only twice seen the nest, although I have heard of its discovery upon two other occasions. The eggs are very rarely to be seen in the collections of the Shetland dealers.—*Id.*

The Squacco Heron (Ardea comata) *in Norfolk.*—A magnificent adult male of this beautiful species was killed on Surlingham Broad, near Norwich, on the 26th of June. Being from home at the time I unfortunately did not see it in the flesh, and can therefore say nothing as to the contents of the stomach or the true colours of the bill, legs, &c., which I much regret, as the bird is so rarely met with in England. This species has occurred in Norfolk before in two or three well-authenticated instances, but not within the last thirty years.—*H. Stevenson; Norwich, August* 2, 1863.

Note on the Orangelegged Hobby in Suffolk.—I have recently purchased a young male of this species, which was killed at Somerleyton station, near Lowestoft, on the 12th of July, 1862. The bird had been seen and shot at once or twice by the station-master, but was secured at last by a gamekeeper on the Somerleyton estate, who sold it to a birdstuffer in this city. The bird is somewhat rough in plumage, having but just commenced moulting its adult feathers. The last specimen observed in the eastern counties was killed near Norwich in 1843,—a fine old male, now in our Museum. —*Id.*

Capture of the Black Swan near Beverley.—Early in the morning of the 1st inst. a labouring man observed a strange bird on the river Hull, near to a hamlet called Baswick, situated between six and seven miles above Beverley, and about the same distance from the sea, as the crow flies. He succeeded in stalking and securing it, and it was brought to me for sale. This bird proved to be a fine male specimen of the black swan (*Cygnus atratus*). It is at present in the hands of Mr. R. Richardson, taxidermist, &c., Beverley, who has been entrusted with the charge of mounting it.

I have just seen the skin removed, and took that opportunity of partially dissecting the body. Its total weight in the flesh was eleven pounds. There was no fat, but the sternum was pretty well clothed with powerful muscle. Its measurements were as follows:—Extreme length from tip of bill to tip of tail, four feet five inches; from the end of the third feather of one wing (this being the longest feather) to the same point on the opposite wing, extended, six feet five inches. The bill brilliant scarlet to within an inch of tip, at which point a band of a pink or roseate hue extends across from side to side, about half an inch wide in the broadest part. Between this band and the nail is a second narrow line of brilliant scarlet, the same as on the greater part of bill. The nail itself is of the same rosy hue as the broad band above it. Iris pearly, but tinged with a roseate blush. Colour of head, breast and belly dark sooty slate or ash-colour, rather lighter on the belly. The neck and back several shades darker. Primaries, secondaries and some of the tertiaries on either side pure white. Scapularies and some of the wing-coverts glossy black, several of the latter on each side being curled outwards, upwards and backwards. Legs dark sooty gray. Webs sooty black. Toes sooty gray. The gizzard contained a considerable quantity of vegetable matter,—grasses and seeds of grasses, mixed up with innumerable fragments of very small flinty gravel. The organ itself was large and immensely muscular and powerful, the inner grinding surfaces feeling like rough bony plates. The testes were about an inch or rather more in length, and of a creamy white colour. Both the wings were perfect and unpinioned, the number of feathers on either side corresponding. The plumage generally was very fine and unsullied, although the bird had slightly commenced moulting. I am unaware of the black swan having been kept or bred in a state of captivity in this Riding, and my specimen has every appearance of being an undoubtedly wild bird, which the unpinioned wings (although the bird is mature) and the state of its plumage would tend to corroborate.—*W. W. Boulton; Beverley, August* 4, 1863.

Richardson's Skua in Kent.—I had a beautiful specimen of this bird brought me this morning.—*E. Young; Sittingbourne, July* 1, 1863.

Scarcity of Summer Migratory Birds in the East Riding of Yorkshire.—I have only observed a single specimen of the common swift, usually very abundant here. It was flying to and fro in an agitated and unusual manner, as though frightened or lost, at a great height over some corn-fields, and in the company of common swallows. Swallows and house martins have also been unusually scarce. Whitethroats and the common warblers, generally very abundant in this locality, have been quite occasional during the present summer. The whinchat and pipits occur also in very small numbers. Indeed all our summer visitants have appeared more sparingly this year than I ever recollect.—*W. W. Boulton; Beverley, August* 4, 1863.

Toads in Stone.—Your animadversions (Zool. 8642) on the statements of Sir A. P. Gordon Cumming concerning toads found in rock do not appear to me to have been written with your usual candour and philosophic spirit. You object to the term "scampering away" as inapplicable to the action of toads. I am in the habit of keeping several toads in my plant-houses, and I certainly should not hesitate to use the term "scamper" to describe the uncouth hurry with which they jump and shuffle off when my footstep comes suddenly behind them. But granting that a better term

might have been selected, is the choice of an unsuitable word in a composition a sufficient reason for rejecting a statement of a fact? Must not a cause be feeble which rests on such an objection as one of its twin pillars? But let us try the strength of the other pillar. A certain "idea" (Is this word any better than "scampering"? Is an intention an idea?) "seems to imply" that no intelligent person has been present at the affirmed exhumation. A gentleman of position affirms, "I have myself seen numbers of living toads taken out of the conglomerate at depths of from fifteen to twenty-four feet from the surface." Is Sir Alexander Gordon Cumming not an intelligent person? You distrust the assertions of quarrymen who are rewarded for their tales by beer; but you have not stated any evidence that these quarrymen were so remunerated. Have you any such evidence? I do not think that this is the way in which we should seek to arrive at truth on a mooted question in Science.—*P. H. Gosse; Torquay, July* 18, 1863.

Occurrence of the Dory (Zeus faber) *at Banff.*—A specimen of the above curious-looking, and at this place rare, fish was taken in our bay in a salmon net, on the 8th inst.—*Thomas Edward; Banff, July* 10, 1863.

New Genus of Fishes.—In May last a few specimens of a new genus of fishes were taken here. The species is to be named in honour of the late Mr. Thompson, of Belfast. A figure and description will appear in Mr. Couch's new work on our British Fishes, now in course of publication. It is a very small species, but vies with the beautiful argentine in the brilliancy of its colours.—*Id.*

The Great Sea Serpent.—The following is a copy of a letter from an officer of the African mail steamer 'Athenian,' addressed to a gentleman in this town:—"African Royal Mail Screw Steamer 'Athenian,' Cape Palmas, May 16, 1863.—My dear Sir,—All doubts may now be set at rest about the great sea serpent. On the 6th of May the African Royal Mail steamship 'Athenian,' on her passage from Teneriffe to Bathurst, fell in with one. At about 7 A.M. John Chapple, quartermaster, at the wheel, saw something floating towards the ship. He called the attention of the Rev. Mr. Smith and another passenger, who were on deck at the time, to it. On nearing the steamer it was discovered to be a large snake about 100 feet long, of a dark brown colour, head and tail out of water, the body slightly under. On its head was something like a mane or sea-weed. The body was about the size round of our mainmast. You are at liberty to publish this."

Irish Notes on Entomology. By Edwin Birchall, Esq.

*Cœnonympha Typhon, *Kirby's Manual*, 70. I captured this insect on the boggy moors of the south-west of Ireland, at the end of June. It is closely allied to C. Davus, but is a larger insect, and the eyes on

the under side of hind wings are very faintly indicated, in some specimens they are entirely absent. Mr. Doubleday has kindly examined specimens of the Irish insect, and agrees with me in considering them identical with Kirby's C. Typhon, which he informs me is the typical C. Davus of the Continent, the specimens taken on the Lancashire Mosses being the C. Rothliebii of some of the German authors. They are abundant all round the lakes of Killarney, but do not seem to ascend much above their level. In the woods which clothe the base of the surrounding hills Satyrus Ægeria and S. Hyperanthus flit about in great numbers. On the mountain slopes above I saw only C. Pamphilus and an occasional Lycæna Alexis. I shall be glad to send specimens of C. Typhon to any entomologist who wishes for them.

*Zygæna Minos. This insect did not make its appearance until the 1st of July, ten days later than usual. The spring and early summer were cold in the West of Ireland. The insect was as abundant as in former years.

*Hepialus Hectus. At Torc Waterfall, near Killarney. When their flight is over they conceal themselves on the under side of the fronds of the brake fern (*Pteris aquilina*). The posterior tibia in the males of H. Hectus is dilated into a regular club foot, the tarsus being entirely wanting. None of the other British Hepialidæ appear to possess this singular structure, and I am quite ignorant what end it serves. Possibly a too exclusive search for what we deem a use in the works of Nature sometimes diverts our attention from the true explanation of abnormal forms, and there may be wisdom as well as wit in Sydney Smith's remark on the toucan, "What is the use of a bird with a beak a foot and a half long, looking for insects all over South America, and barking like a puppy dog?"

*Dianthœcia capsophila. Flying over flowers in the middle of June. I also obtained a number of the larvæ, of which I hope Mr. Newman will supply a detailed description. The insect is either double-brooded or appears throughout the summer, as I have taken it on the wing in June, and again in August, quite fresh.

D. conysta, *Fab.* A pair of this species exist in the collection of Trinity College, Dublin. They were originally in the collection of the late Mr. Tardy, and there appears no reason to doubt were captured by him in Ireland.

*Aspilates strigillaria. Very abundant among Myrica Gale. They are larger and more suffused in colour than the English type. I have duplicates for all who care for them.

I took the following twelve species of Eupithecia in the west of Ireland, from the 18th to the 27th of June :—E. venosata, subumbrata, plumbeolata, satyrata, castigata, constrictata, nanata, vulgata, absynthiata, pumilata, rectangulata and *debiliata. The last named in some numbers among holly trees, which, however, it appears to frequent only for concealment. It prefers old trees, settling on the stems and branches, and is then extremely difficult to see, although it may have been observed to alight.

*Eubolia lineolata. Several taken on Mangerton, at an elevation of about eight hundred feet above the sea. This appears a singular locality for a coast insect, and it has not been previously recorded as occurring in Ireland at all. Perhaps it is a straggler from the coast fauna of a time when the lakes of Killarney were like Glengariffe, an inlet of the ocean ; and that they were so at no very remote geological period there is the further evidence that a thoroughly sea-side fern, Asplenium marinum, still clings to the cliffs of the upper lake, though in a very stunted condition.

*Hypena crassalis. This insect is not uncommon in the south of Ireland. It flies along the roads in the sunshine, resembling Plusia Gamma in its mode of flight. It may also be beaten from holly trees.

Bombyx Quercus. Well-marked specimens of the variety Callunæ occurred on the moors of the south of Ireland.

*Emmelesia tæniata. A fine series beaten from holly from the 18th to the 27th of June. I have heard the larvæ spoken of as a hazel feeder, but am not aware whether this has been really observed. There is very little hazel in the locality where I obtained E. tæniata, and although diligently beaten it produced no moths. The habit of the other British species of Emmelesia would lead one to expect E. tæniata to feed in the capsules of a Lychnis or Silene.

Lithosia aureola. Full-fed larvæ taken June 20th ; moths emerged July 15th.

Lithosia caniola. Larvæ taken June 24th, sunning themselves on stones ; spun up July 10th.

Setina irrorella. Frequent on West Coast.

I also met with the following species whilst in Ireland this summer, and have duplicates of those marked with an asterisk :—P. lacertula, P. falcula, H. contigua, P. festucæ, V. aureum, *E. fuscula, *B. argentula, *H. unca, M. hastata, *A. viretata, C. temeraria, C. taminata, M. notata, A. fumata, S. Belgiaria, E. scutulana, E. trigeminana, *S.

littorana, *S. amænana, *E. albicapitana, *Ent. Ann.* 1862, 111, P. leacheana, P. ochromelana, P. annulatella, C. pinetellus, C. margaritellus.

*Cossonus tardii. This insect was in profusion in the timber on the islands in the lakes of Killarney. I could not find the insect on the mainland: no doubt it exists there also, but has been able to spread itself widely in one case and not in the other.

An Ungallant Irishman.—The driver of the mail car from Kenmare amused me by his explanation of the constant rain through which he performs his journey for the greater part of the year: "All de old women in Kerry tink dey'd be broke and get no grass for de cow if dere was a month of fine weather, and dey do be always prayin' for rain."

Limneus involutus. From a little town near the summit of Cromaghlan Mountain I obtained a number of this curious and fragile shell. I believe there is no other known locality. The animals attach themselves to stones about six inches below the surface of the water, and great care is required in detaching them, as the shell breaks with the slightest pressure.

On my way home through Wales I met with the following Noctuæ at sugar:—*Agrotis corticea, *A. porphyrea, *A. lucernea, *A. Ashworthii, *Cerigo cytherea, *Mamestra furva. A. lucernea and M. furva especially were in great profusion.

EDWIN BIRCHALL.

Oakfield Villa, Birkenhead,
July 24, 1863.

Note on an unobserved peculiarity in the Larvæ of Liparidæ.—When describing the larvæ of Liparis auriflua and Orgyia fascelina I was particularly struck with an anatomical character which I have seen nowhere described. I have, in the published descriptions, spoken of it as a valvular opening on the back of the tenth and eleventh segments. These openings are very conspicuous, and occur also in the larvæ of Liparis chrysorrhæa, L. Salicis, L. monacha, Orgyia cænosa, O. gonostigma and O. antiqua; and in all probability in every other species of the family, although I will only speak of it in those species to which I have given especial attention. I need scarcely mention to a company of entomologists how remarkably the Liparidæ differ from the other Nocturni in having the pupa clothed with hair; but the distinction I have now pointed out renders them still more separate, and leads to the consideration, What can be the object of this singular provision of Nature? We are well aware that the larvæ of Lepidoptera have on each side nine valvular openings through which the creature

breathes, and the connection of these with the tracheæ, which are in truth the lungs of an insect, has been fully proved by Herold, Straus-Durckheim and Lyonnet; but no one has ever indicated the presence of breathing holes or spiracles in the back. Yet what else can we call these openings? as the larva breathes the action of these openings becomes very obvious; they appear to open and close with great regularity, reminding one very forcibly of the rhythmical breathing of fishes, in which we see the gills open and close in the most methodical manner. The point still to be ascertained is this, Are the dorsal valvular openings connected with the tracheæ? It is not for me to prosecute the enquiry; I leave it to younger heads and abler hands, and I am well aware that there are those among the members of the Haggerstone Society who have not merely the talent, but the perseverance and assiduity, to conduct the inquiry to a successful issue.—*Edward Newman.*—*Read before the Haggerstone Entomological Society.*

The York Moth Trap.—As the most prolific period of the season to search the gas lamps for moths is fast approaching, I will endeavour to explain a contrivance to facilitate their capture in such positions without having each time to climb the lamp-post, an accomplishment for the trouble of which the only reward so often is a species "abundant everywhere," and which not seldom deters one from making an ascent when the reward would be of greater value. To remove this drawback I have adopted the following expedient. Take a number of smooth, round turned wooden boxes, say two and a quarter inches in diameter, and have a rectangular tin frame then made, near two and a half inches long, and open at each end, into which any one of these boxes without the lid will slide on the application of a slight pressure. Each box must have on the side a small loop of wire for a swivel and band to be attached to when used. On each side of the tin frame is soldered a piece of watch-spring about a quarter of an inch in width, extending an inch beyond the open end, bent inwards to grasp the wooden box and hold it in a steady position outside the tin frame, and also to allow it to be easily drawn within. At the opposite end is a small stop or projection to top and bottom, to keep the wooden box when used from moving in that direction beyond the tin case. Midway on each side of the frame a small punched piece of tin with a hole in the middle must be placed, into one of which will fit a pin and in the other a screw belonging to the two extremities of a pair of brass arms permanently attached to a socket of the same material, into which can be placed the end of a rod. The tin frame, with a box within it, is now placed between the brass arms, and by means of the screw and pin, upon which the frame works as on a centre, and adapts itself to the position of the lamp or object on which the moth is sitting. When in use the wooden box held by the springs must be upwards, and the loop on the box will be downwards. The rod must of course be long enough to reach the usual height of the lamps, for which two or three sections of a fishing-rod may be made available. Now attach a cord (nearly the same length as the rod) to a small swivel or hook, and the swivel to the loop on the box, the string coming through that end of the frame where the stops are. After placing the rod in the socket push the box out so as to be held by the springs, and by aid of the rod place the box over the insect at rest, then steadily draw the box within the frame by means of the string, which will effectually secure the moth. Now bring down the rod and disengage the swivel from the loop, then gently push the box out, at the same time carefully putting on the lid, and substitute another box prepared in the same manner as the previous one,

repeating the operation as before.—*Robert Anderson; Coney Street, York, August* 12, 1863.

Note on Procris Geryon.—The Rev. E. Horton, of Wick, near Worcester, discovered the larvæ of Procris Geryon feeding upon the yellow Cistus (*Helianthemum vulgare*) in the early part of last May, and kindly forwarded a portion of them to me, and also some cocoons which were found in the moss at the roots of the Cistus. This interesting discovery has satisfactorily proved that P. Geryon is quite distinct from P. Statices, the larva of which, although it bears a general resemblance to that of P. Geryon, can be easily separated from it, and I believe P. Statices is seldom, if ever, found upon the dry limestone soil on which P. Geryon occurs. My valued friend M. Guenée found this species in great profusion on the Pyrenees last summer, and kindly sent specimens to me, which are identical with ours. I have also received some captured near Vienna, from Dr. Staudinger, and within the last few days a male from Herr Zeller. My friend Mr. Buckler kindly sent me two beautiful drawings of the larva of P. Geryon, which I have forwarded to M. Guenée, who, I am sure, will be much pleased to hear that Mr. Horton's perseverance has been rewarded by the discovery of this previously unknown larva.—*Henry Doubleday; Epping, August* 14, 1863.

Description of the Larva of Acidalia subsericeata.—Last summer, when staying with my friend the Rev. O. Pickard-Cambridge, at Bloxworth, I captured a female specimen of Acidalia subsericeata, which deposited a few eggs. These hatched in about a fortnight. The young larvæ fed freely till the end of October upon Leontodon taraxicum (dandelion), Solidago virgaurea (golden rod) and plum. They then became somewhat torpid and inactive, but continued to feed sparingly throughout the winter upon dandelion. In March they again began to take kindly to their food, and grew apace. They were full-fed towards the end of April, and the perfect insects appeared in June. As this larva has not, I believe, been previously described, the following description may prove interesting to the readers of the 'Zoologist' and the entomological world in general. Slender, tapers considerably towards the head. Ground colour dull whitish gray. Back reddish. Central dorsal line black, very slender and indistinct. Subdorsal line same colour, but broader and more distinct upon the capital and anal segments. Spiracular lines dull yellowish white, puckered. On each side of the tenth segment, which is slightly enlarged, a dull yellowish spot. Centre of belly whitish; on each segmental division a black oval spot slightly edged with white. Ventral segmental division black. Head whitish, with a central black line. Anal segments whitish. Whole body rough, wrinkled, minutely studded with whitish tubercular spots, and sprinkled with a few short bristly hairs. Pupa mahogany-brown, enclosed in a slight web among dead leaves.—*H. Harpur Crewe; The Rectory, Drayton-Beauchamp, Tring, August* 5, 1863.

Emmelesia Blomeri in Derbyshire.—Yesterday (July 24th) I went to a wood, about a mile and a half from my house, to look for the larvæ of Eupithecia valerianata. While doing so I disturbed a small Geometra, which, as I had no net, I knocked down with my hat. To my unbounded astonishment I found it to be a specimen of the above insect. It was of course very much wasted. I was in hopes that it might be a female, but unfortunately it is not. I should suppose that the larva is now feeding, and if any of your readers can give me any information about it and its food I shall feel greatly obliged. I regard the discovery of this species here as very interesting. It is, as is well known, extremely local. Upon referring to the 'Manual,' I find the following localities, widely apart, *viz.*, Bristol, Cotswolds (commonly), Newnham, Newcastle-on-

Tyne, Scarborough (commonly), Castle Eden Dene and Preston. I am myself the authority for the Cotswolds. The insect occurred there not uncommonly in June, resting upon the trunks of trees. The wood consisted chiefly of alder, birch and wych elm. The same trees prevail here, and I should imagine, therefore, that if the larva feeds on trees it must probably be one of these. I should be glad if any of your Scarborough readers could tell me where E. Blomeri is commonly taken in that neighbourhood, as I collected there for two years but never saw the insect. This, however, might easily happen, as, though I have every summer for the last five years carefully searched the wood already alluded to, it was only yesterday I discovered that the insect was to be found in it. I trust this communication may strike the eye of some entomologist able and willing to give me information about the larva.—*Joseph Greene; Cubley Rectory; Doveridge, Derby.*

Description of the Larva of Emmelesia alchemillata.—Short, stout and stumpy. Ground colour dull red, suffused with yellowish green, or *vice versâ*. Central dorsal line broad, yellowish green, with a slender dark green line in the centre. Subdorsal lines red, edged with yellow. Head flattened, dark reddish brown. Spiracular line greenish yellow. Belly greenish yellow, with two darker green subventral lines. Back and sides studded with a few very short whitish hairs. I found this larva feeding somewhat abundantly in August and September, 1862; it was feeding on the leaves, flowers and unripe seeds of Galeopsis tetrahit, and somewhat more sparingly on those of G. ladanum. Pupa enclosed in a tightly-spun earthen cocoon, yellowish green slightly tinged with red.—*H. Harpur Crewe; The Rectory, Drayton-Beauchamp, Tring, August* 5, 1863.

Eupithecia succenturiata.—During the last two years I have reared this larva from the egg, and from their food-plant (Artemisia vulgaris) taken many larvæ. I must have bred nearly two hundred specimens, and not the slightest approach to E. subfulvata in the whole lot. The distinction between the two species in the larva state is exceedingly well described by the Rev. H. Harpur Crewe. I have bred both species from the egg.—*R. S. Edleston; Bowdon, near Manchester, August* 14, 1863.

Capture of Acronycta Alni near Manchester.—I found a larva of this insect on a beech tree by Hale Moss, near Altrincham, on Thursday last, August 20th.—*E. M. Geldart; Rose Hill, Bowdon, Cheshire, August* 22, 1863.

Economy of Cataclysta Lemnalis.—I have bred a good many of this species this season from larvæ collected in April and May. These came out in July, and even up to now some have come out. I also got some pupæ at the same time as I collected the larvæ, which came out in May and June; and about a week ago I saw some cases under the leaves of Hydrocharis Morsus-Ranæ, with larvæ nearly full-fed: these will, I presume, remain in pupæ until next May or June. The larva of this species is sooty brown or brown-black, paler between the rings. Head yellow-piceous, the latter half velvety-black; mouth ferruginous; the apex of the jaws blackish. Prolegs black. Body sparsely covered with hairs. These larvæ are very active, and run out of their cases when alarmed, and in general appearance so much like Tortrix larvæ that, divested of their cases, it would be difficult to distinguish them from that group. Under water these larvæ appear as if coated with silver, from the air which invests their bodies, and which supplies them with oxygen while immersed in the denser medium of the two gases combined. Generally speaking these larvæ construct cases of Lemnæ and bits of grass, which float about in a submerged form, the upper part of the cases

floating at or very near the surface, the larvæ being partly submerged; and again, as mentioned above, they sometimes select a floating leaf and construct a case under it. In most instances they undergo their metamorphoses in the same case in which they lived; but in some they leave it, and select a bit of the leaf of Sparganium, &c., about an inch long. In this they eat a hole, and then attach the piece to a living leaf by a few silken threads, when it is prepared to undergo the wonderful change.—*Edward Parfitt; Devon and Exeter Institution.*

Economy of Galleria Mellonella, Lin.—I have lately bred a good many of this species from a mass of cocoons that were forwarded to Mr. Woodbury, the apiarian, from Norfolk. This gentleman handed them to me for identification. The mass of cocoons, which was about the size of one's fist and very firmly spun together, was of a rather dull white colour, and was not put together with any degree of regularity, although, generally speaking, the ends from whence the moths would escape were left free. The silk of which the cocoon was made is very fine and exceedingly tough, so that they are with difficulty separated from each other. The end from which the insects would escape, or rather have escaped, is closed by a double covering somewhat similar to that of Saturnia Carpini, so that nothing could intrude itself upon the sleeping pupæ; at the same time an easy exit was provided for the moths. The cocoons were given to me on the 6th of March, and the moths began to come out on the 30th of July, and continued coming out until the 20th of August, so that they remain in pupæ from five to six months. Two larvæ had not spun up when I received them, so that I was able to make a description, of which I give a transcript. Larva tapering from the head towards the tail, dull grayish yellow. Head and second segment reddish testaceous, shining; this segment is divided in the centre by a pale line, which is continued along the back; beneath pale dull white. The abdominal segment is divided into two lobes; spiracles dusky. The whole larva sparsely scattered with long hairs. Pupa reddish brown, the antennæ and wing-cases very distinctly showing; a sharp serrated dorsal ridge runs as far as the fourth segment from the tail, and is continued interruptedly to the apex, where it ends in four hooks directed downwards; the anterior portion of this ridge is double. There are four stiff setæ in each segment directed downwards, apparently to assist the pupæ in moving. —*Id.*

Remarks on Mr. Kidd's Note on Mounting Mines of Micro-Lepidoptera on Cardboard.—In the July 'Zoologist' (Zool. 8648) is a note by Mr. Kidd on a new method of mounting the mines of small larvæ on cardboard, which plan he considers superior to that of Mr. Stone, who mounts them on glass, as exhibited by Professor Westwood. Mr. Newman kindly showed me the specimen, and I must take exception to the supposition that it is less cumbrous than those on glass. If the specimen I saw was a fair sample I can only say that it was more cumbrous; and as to being able to see both sides of the mine, is it not generally considered that glass is transparent? Mr. Kidd will, I am sure, excuse me for calling his attention to a most important error in his note. He alludes especially to Lithocolletis mines and to a Lithocolletis mine in bramble. Now a mine of this genus is usually no very beautiful object, being a mere inflated blotch, but I must confess that a bramble-leaf with such a mine would be particularly interesting, as no species of the genus is known to affect this plant. A little further attention to the note, and especially to Mr. Newman's postscript, convinced me that all hopes of a novelty were premature, and that the mine in reality was a gallery of the common Nepticula aurella, a conclusion at once confirmed by a

sight of the leaf. A little more care in making statements of this kind is absolutely necessary in writing on scientific matters. Errors once in print are very liable to be perpetuated. To those who have paid much attention to the subject the one above mentioned is obvious enough, but those unacquainted with the habits of Micros might be easily misled, and it is a true saying that "first impressions are the strongest," and most difficult to shake off.—*R. M'Lachlan;* 1, *Park Road Terrace, Forest Hill, August* 6, 1863.

Coleophora artemisicolella, Bruand.—I have bred this species from the cases feeding on the seeds of Artemisia vulgaris.—*R. S. Edleston; Bowdon, near Manchester, August* 14, 1863.

Description of a New British Zeugophora.—I send a brief description of what I conceive to be an insect hitherto undescribed, recently taken by Mr. Charles Turner in Scotland. I can find nothing answering to it in Gyllenhal or Reichtenbacher, nor in any of the books to which I have access, and it certainly is not enumerated in the Stettin Catalogue. I therefore venture to call it Zeugophora Turneri, after the indefatigable and unrivalled collector who discovered it, and who richly deserves some such acknowledgment of his exertions in the cause of British Entomology.

ZEUGOPHORA TURNERI, *Power.*

Has the facies, general appearance, puncturing and pubescence of an immature specimen of the common Z. subspinosa, but is somewhat larger and a little more elongate. It is the only European species that I am acquainted with in which the elytra, thorax, head, antennæ and legs are uniformly testaceous-yellow. The abdomen, mesosternum, metasternum and eyes are alone deep black. The apex of the mandibles is slightly pitchy. When compared with Z. subspinosa the head is more rugose and less polished, less suddenly constricted behind, and the eyes are less prominent, causing the form of the head to appear less triangular; but the most remarkable structural distinction is in the thorax, which differs from that of Z. subspinosa in being decidedly broader, and the characteristic lateral projection is more prominent and more abruptly produced, and instead of gradually sloping off towards the anterior margin of the thorax, which exhibits a very slight angular projection on each side, it is continuous, with a large angular process, giving the appearance of a kind of sinuous "outrigger," and causing the anterior thoracic margin to appear very broad and level with the outer third of the eye, whereas in the other species it extends little beyond the inner border of it. I have examined a very fine series of the insect, and find no variation whatever. It feeds, I believe, on the birch. In the collection of the British Museum I find two specimens of an unnamed Zeugophora very like this insect (if not identical with it), collected by Mr. Barnston in the neighbourhood of Hudson's Bay. They are awkwardly pinned, and appear somewhat shorter, with the antennæ a little stouter, and the abdomen is testaceous, but with a tendency to be pitchy towards the base. They may be immature. Mr. Turner has also, amongst other rare insects, obtained a few most magnificent specimens of the beautiful Athous undulatus, which he discovered at Rannock about three years since, but of which, until the present time, we were acquainted only with one broken specimen in the collection of the British Museum, and a pair of elytra in that of the Rev. A. Matthews.—*John A. Power;* 52, *Burton Crescent; August* 18, 1863.

Monohammus dentator: Is it British?—In April last I had two larvæ of this species brought to me feeding on English larch: one was damaged, and consequently

died, the other I have bred, and it came out on the 17th of this month, a fine female. About a dozen years ago I bred a male from larvæ obtained at the Liverpool Railway Works, whilst cutting timber for sleepers. During the past thirty years a year has seldom past but I have either received this species or known it to have occurred in this neighbourhood; in fact, I think it has naturalised itself a few miles from here, but I do not like to publish the locality, for fear it should share the same fate as Sesia Scoliæformis, although I have not the slightest objection to give the information to any gentleman in whom I may have confidence, so as not to destroy its breeding.—*S. Carter;* 20, *Lower Mosley Street, Manchester.*

Serpula contortuplicata throwing off its Operculum.—On the 2nd of August a very fine Serpula contortuplicata in my tank threw off its operculum, and from all I had read on the subject I expected nothing but its death as the result. For six days I watched, each morning supposing I should find it stretched helpless on the pebbles. But no! On the 7th I noticed that the tiny secondary trumpet had so enlarged as to become somewhat conspicuous, while the animal continued in apparently first-rate health. It is now three weeks since the loss of the first operculum. The new one has assumed perfection as to shape, size and use. The only falling short in the present organ is that it does not quite enclose the tips of the gills when the Serpula retreats into its tube. The fans, too, have contracted rather a ruffled look from the temporary loss of their protection.—*Edith Acraman; Ilminster, Somersetshire, August* 24, 1863.

Remarks on Planorbis corneus.—About five years ago I introduced two specimens of Planorbis corneus into a fresh-water aquarium situated in a southerly aspect. The aquarium was previously tenanted by specimens of Paludina Listeri from Southport ditches, which increased rapidly; also by Dreissina polymorpha, Bithynia tentaculata and a few golden carp (*Cyprinus auratus*). The aquatic plants were Hottonia palustris, Hydrocharis Morsus-Ranæ, &c. The lively habits of the Planorbis contrasted favourably with the sluggish Paludina, and I soon took a special interest in watching them. At any approaching change of weather they range themselves, as do also the Paludinæ, at the edge of the water. A slight touch of the finger and they drop instantly to the bottom of the vase, from whence they rise by an almost imperceptible motion. They have the power of floating shell downwards at the top of the water, the mouth being at the surface, which at such times is rapidly moving, as though it used it as a means of locomotion. When travelling at the sides of the aquarium a considerable portion of the body of the animal is sometimes exposed, a tempting tit-bit to a hungry fish, whose attempts at scraping an acquaintance are rejected unceremoniously by presenting his shell for acceptance, which being tolerably hard and too large for Mr. Carp, is at once declined. Smaller specimens are, however, occasionally taken into the fishes' mouths, but speedily ejected with considerable force. One of the two specimens of Planorbis died a few months after I received it, and the fish having also, one after another, followed its example, I placed the aquarium outside the house for the winter. Some months after the death of the first Planorbis I found that the survivor had deposited several patches of a gelatinous matter at the sides of the glass, and also on the under sides of the Hydrocharis.—'*Naturalists' Scrap Book*,' Part 6, p. 94.

The Ornithology of Formosa, or Taiwan.

By Robert Swinhoe, Esq., F.Z.S., F.G.S., &c.*

I will pass at once to the birds. In this, my favourite class, I spared no pains or expense during my comparatively short stay in Formosa, but endeavoured to make as large a collection and gain as much information as possible. I employed a vast number of native hunters and stuffers, and collected very large series of every available species and its eggs. I am, therefore, enabled to offer a very fine list of the avifauna of this hitherto unknown island. I do not, of course, presume to say that Formosa has been thoroughly explored; this would be impossible for one man during so short a stay to accomplish; but I cannot help arrogating to myself the credit of having taken off the cream of novelty in this branch of Science. A great deal yet remains to be learned of the habits of particular species; and doubtless numbers of fine things still blossom unseen for the discovery of future investigators, and I trust not a few of them may fall to my researches on my speedy return to that scene of my consular labours. I cannot, however, help expressing my regret that Ornithology, as a science, is so little cultivated, and that I myself have received much less encouragement than I naturally expected after all my earnest endeavours to bring to light the natural productions of a country hitherto almost entirely unknown to civilized men.

Let me now take a glance at the following list, and make a few remarks that have suggested themselves to me. First in order come the Raptores diurni. These are all also Chinese, with the exception of Spizaëtus orientalis, which later research will doubtless discover on the main. Of the owls the Ninox is also Chinese and Japanese, the Scops semitorques of general distribution throughout continental Asia, whereas the other two are peculiar to Formosa. I cannot undertake to discuss each group separately; my remarks must be more cursory. As in the Mammalia, so among the birds, two facts appear pretty patent—that the animals of the plains and low country are, for the most part, identical with the Chinese species, while those from the mountains of the interior are more of a Himalayan type, and in some cases too similar to be separated. In some of the birds of the plains isolation has worked variation more or less marked. In the Lanius

* Reprinted from the 'Ibis' of April, 1863, and kindly communicated by the Author. I have given the list entire, but have omitted numerous technical descriptions and critical details.—*Edward Newman.*

shah, for example, it is perhaps at its minimum; in Drymoica extensicauda it is a little stronger; in Phasianus torquatus it is noticeable, and that is all; in Budytes flava it causes a curious reversion to what may be considered the typical colour, that of the British variety B. Rayi; in Leucodiophron taivanum it has worked out a distinct species, which, nevertheless, occasionally in the old, but more frequently in the young plumage, shows indications of one common origin with the Chinese bird; in the Pomatorhinus musicus we have a greater advance still, if we can suppose it to be descended from the much smaller P. stridulus of China.*

Among the birds of the lower hills we have the Bambusicola sonorivox, which isolation has varied in distribution of tints, but not in voice or habits, from its near ally, the B. sphenura of China. In the mountain avifauna we have a long series only slightly connected with Chinese forms, with a strong tendency to the Himalayan, and in some cases either identical or so closely related as scarcely to justify separation. This fact is, I think, less singular than would at first appear, simply because we know next to nothing of the Ornithology of the Chinese mountain-ranges of corresponding height to those in Formosa. Of Himalayan type there are no less than seventeen species, one of which (the Herpornis xantholeuca) is, in my opinion, identical with the Nepalese bird, and another (Alcippe Morrisonia) has barely separable characters. The relation of Formosa ornithologically with Japan is comparatively almost at zero. I only discovered one bird (the Parus castaneiventris) that looks as if it had a common origin with the P. varius of Japan; for the Treron Formosæ is perhaps as nearly allied to many others of that group as to the Vinago Sieboldii. Many Japanese birds do occur in Formosa, but only as visitants, and in that capacity they also show themselves on the coasts of China. I fully expected, from the geological relation that Formosa is said to bear to the Philippines on the south and to Japan on the north, that the fauna of that island would be more or less connected with those countries; but in this my investigations have decidedly proved me mistaken. The fauna is, instead, of an almost entirely Himalayo-Chinese type.

I have been blamed by some naturalists for allowing Mr. Gould to reap the fruits of my labours, in having the privilege of describing most of my novelties. I must briefly state, in explanation, that I returned to England elate with the fine new species I had discovered, and was particularly anxious that they should comprise one entire

* P. ruficollis, *Hodgs.*, appears to be more nearly related to the Formosan bird.—*R. S.*

part of Mr. Gould's fine work on the Birds of Asia, still in progress. On an interview with Mr. Gould I found that the only way to achieve this was to consent to his describing the entire series to be figured, as he would include none in the part but novelties which he should himself name and describe. I somewhat reluctantly complied; but as he has done me the honour to name the most important species after me, I suppose I have no right to complain.

I have much pleasure in taking this opportunity to record my thanks to Messrs. G. R. Gray, Sclater and Gould, as also to Mr. Leadbeater, for the kind assistance they have afforded me in lending me specimens and books required for the satisfactory completion of this paper.

1. Pandion haliaëtus, *L.*; Chinese, He-pew (Fish-panther). Ospreys are unusually common about the harbour of Tamsuy, and I have frequently seen no less than five at the same time scattered over the sand-spit that divides the mouth of the river. We disturbed one with a particularly large fish in his claws, with which he had great difficulty in soaring into the air. They were very shy of approach; but by a fortunate shot my constable managed to put a bullet into one with an ordinary fowling-piece, at a distance of something like three hundred yards. This specimen, which was a male, measured 21 inches; wing 17½ inches; expanse 56 inches; tail 8 inches; iris clear bright yellow, with a black line round it; bill black; basal edge of upper, basal half of lower, and cere bluish gray; inside of mouth light pinkish purple, with bluish white tongue; legs pale yellowish gray, tinged with blue; claws black; ear-covert small, round, scarce 3-tenths of an inch in diameter, the bone depressed below, with an oval slit occupying the centre. This male specimen was somewhat larger than a male from the coast of China; but in both sexes I have found the Chinese birds smaller in every case than European examples.

2. Buteo japonicus, *Schleg. Faun. Japon.*

3. Milvus govinda, *Sykes.* Mr. Gurney considers our kite to be the true M. govinda of Sykes, which occurs in India and its archipelago, together with a cognate form, the M. affinis, *Gould;* and he is of opinion that the two forms from these localities have been confounded together by naturalists. As in China, so in Formosa, from the south to the north this species abounds, seeking its food more on the water and marshy grounds than on the land. It hovers for hours over the shipping in harbour, watching for any offal or refuse that may be thrown overboard. It is a very foul feeder, is generally impregnated

with a disgusting odour, and swarms with lice, and is therefore not a very enticing bird to any one possessed of ordinary sensibilities.

4. Falco peregrinus, *L.* A fine male of this species was brought to me at Tamsuy, on the 20th March. It was quite fresh, only just having been killed by a native some miles up the river. I had much difficulty in inducing him to part with it, as he wanted the quill-feathers for a fan, and was particularly anxious to make "chow-chow" of its flesh. This specimen measured 16 inches; wing $12\frac{1}{4}$ inches; tail 6 inches. Apical third of bill blackish indigo, fading and blending with the yellowish on the basal portion of the bill; cere and skin round the eye chrome-yellow; iris deep brown; legs bright chrome-yellow, with black claws. Stomach empty. In the membranes that enclosed the air-cavities over the kidneys were two or three long and a few small whitish ascarides; the largest measured about 11 inches long by 1-twelfth of an inch broad. This bird, like the Amoy variety, is rather darker on the upper parts than the generality of European peregrines; but its under parts are very pale, and only scantily spotted and barred with black. Mr. Gurney considers ours identical with the European bird.

5. Tinnunculus japonicus, *Schleg.* Almost every country has its kestrel; and where it occurs it is generally the commonest of all falcons. In Formosa this rule also obtains. One could seldom take a long walk without observing a windhover or two, so frequently true to its provincial name. At Tamsuy, on the top of the old square-built Dutch fort, which has stood the wreck of time for the last two centuries, a pair of kestrels made their home. Wandering about the face of the country during the day, in the evening they were regular in their return; and we were sure to see them, just as it began to grow dark, drop carelessly into one of the banyan-bushes that spring from the sides of the fort, and quietly disappear for the night.

6. Spizaëtus orientalis, *Temm. & Schleg. Faun. Japon.* pl. 3.

7. Micronisus gularis, *Schleg. Faun. Jap.*

8. Circus spilonotus, *Kaup.* I observed a pair of harriers beating over the rush-grown delta of the Tamsuy River, above the gorge, in March. I watched them for some time, but was unable to get within shot of them. The male appeared of a pied plumage, but the female was brown. I concluded, therefore, that it must have been the species that prevails in the neighbourhood of Amoy, rather than the true C. melanoleucos, *Gmel.*, which ranges in Asia from India to Peking, and which I have also seen from the Philippines. On the rush-grown sand-flats at the mouth of the Changchow River, near Amoy, these

birds are particularly common during winter, but they are nearly always females. I do not know for what reason, but in this locality the adult male is peculiarly rare until the spring, when a few may occasionally be met with. In many points of habit this bird seems to connect the harriers with the Govinda kites, feeding largely on offal and carrion, as well as on Batrachians and small mammals. All these objects I have found in the stomachs of those I have dissected, but remains of birds never. In its heavy-sailing flight this species also more resembles kites than a harrier. They were such offensive birds that I did not care to preserve more than a few for identification.

9. Ninox japonicus. An individual of this species used to come regularly every evening to my garden at Tamsuy, in the dusk of evening, during winter, and, perching always on the same branch of one particular tree, devour its meal, which generally consisted of some small murine mammal. I think I can be sure it was a Ninox, though I procured no specimens. In my former papers I have always set down the Chinese species as identical with the Indian bird; but since my return to England, Mr. Gurney has pointed out to me that ours is rather the Japanese species; and I now find, on comparison with Indian specimens, that the Chinese bird is larger, much deeper coloured, and differs in the shape of the wing.

10. Athene pardalota, *Swinhoe.*

11. Scops semitorques, *Schleg. Faun. Japon.* t. 8. A fine female example of this bird, and the only one I procured in Formosa, was brought to me on the 1st of April from the interior hills. It also occurs at Foochow, whence I have received numerous examples. The Foochow bird has been identified by Mr. Blyth as Scops Lempiji, *Horsf.*; but then that gentleman had probably only compared it with Himalayan specimens; and Professor Schlegel assures me that all the skins he has seen from Hindostan are referable to S. semitorques, and not to S. Lempiji, which is confined to Java and the Indian Archipelago. On a trip into the interior, near Tamsuy, I observed one of this species in the dusk of the evening. It flew out of a pine tree on to the roof of a low native house, and then, ruffling up its feathers, kept stretching forth its head and hooting. Its cries resembled the syllables hoó-hoûat, the first pronounced sharp and quick, the latter hoarsely and with more stress. In the dead silence of the night these sounds were rather startling, and might easily be understood to have a portent of evil by the unsophisticated mind. The Chinese, as most other partially civilized people, regard the owl as a bird of ill omen, and dread its approach to their houses; but they also connect unclean

animals with their ideas of sorcery and the healing art; hence large prices are often given for the bodies of owls for the cure of various diseases. One common medicinal property attributed to owls is that of curing pulmonary affections; and for this reason consumptive patients and old people troubled with rheum are often recommended by their medical advisers to indulge in owl-soup; but in most cases the young of Bubo maximus (a common bird in some parts of China) are preferred for this purpose.

12. Bubo caligatus, *Swinhoe;* native name, Ham-hay ("enduring vacancy"). This species is found in the dark caverns that abound in the mountains of the interior, wherein it lies securely at rest during day, issuing out at night in pursuit of partridges, hares and young deer. Such is the account given of it by the natives. I only once met with it, and that was in the dusk of evening, when we were marching rather rapidly over a mountain defile, some three thousand feet above the sea-level. I was first attracted by hearing a loud deep hoot proceeding out of a hollow between two large rocks on a prominence over our heads. On looking in the direction whence the noise came, I observed a large owl fly out. It was getting late, and we could not tarry; so that I was not able to procure the specimen. I had not at that time handled an example, and therefore set it down as the Bubo maximus, noting, however, that the bird seen was much smaller and had a different hoot. This took place in June, 1857, when I was assisting the officers of H.M.S. 'Inflexible' in their search for certain Europeans supposed to be held captives at the sulphur-mines near Kelung. It was not till May, 1862, that I first procured a specimen. This bird is not more uncommon than the majority of large Raptores, but, owing to its shyness and the inaccessibility of its retreats, is particularly difficult to procure.

13. Caprimulgus stictomus, *Swinhoe.* This species has the naked tarse of C. monticola of Franklin (C. gymnopus of Hodgson), and has, like it, also, in the male, the external lateral tail-feather white. I first made its acquaintance in a copse on the Changchow River, near Amoy, where I have found it several consecutive years at the end of September and beginning of October. It is at that season always moulting, and its prescribed time of stay is as nearly a month as possible. The small party that annually visit this wood appear to come from the interior to recruit their strength and recover their feathers, and then to pass southwards. In Hongkong and Macao I found the same species as a summer resident only. In Formosa it occurred as an abundant summer resident on the plains about Taiwanfoo; but

both specimens I procured were females. Unfortunately the only male I procured at Amoy was so shattered that I threw it away, and I have reserved no note of it; but I have adult females and immature birds from that locality, which in most respects agree with those procured in Formosa. The Formosan bird is, however, smaller, much paler, and less distinctly spotted, and may perhaps be ranked as a variety.

In the spring, at Tamsuy, N.W. Formosa, I witnessed the arrival of large numbers of Caprimulgidæ, which I took for this species. Like most of the goatsucker group, they skulked about the roots of the bushes on the hill-sides during the day, and then required almost to be trodden upon before they would spring. When they rose they dashed away with uncertain flight for a short distance and then fell, sometimes among bushes, but often on the bare ground, flapping and running awkwardly under the nearest cover of a stone or tuft of grass. On their first arrival, while the weather was still fresh, they frequented the banks of a hot sulphur-spring, where the steaming exhalations heightened the temperature, and imparted to the atmosphere a disagreeable sulphurous odour. The birds, though in good condition, seemed to shrink from the cold, and sought the friendly warmth of the ravine, regardless of the deleterious smell, thus proving that they had sought these latitudes from a warmer climate.

14. Cypselus vittatus, *Jard. & Selb. Ill. Orn.*, *Swinhoe*, t. 39. This species, which I have noted all along the coast of China, from Amoy to Talien Bay, was also seen in S.W. Formosa in summer, where, I suspect, a few nidificate, as is the case on many islands off the Chinese coast. It is everywhere in China only a summer visitant, arriving in early spring. Possessed of very long wings, and consequently of extensive powers of flight, it may be seen at all hours of the day soaring at a great height, apparently never resting till the shades of evening compel it to take refuge from the darkness. In damp foggy weather, however, it descends to nearer the earth, darting, with quick flight and screams, round hills and other prominences. Like all the species of swifts I have observed, it copulates in the air, the female arresting herself and hovering while the male performs his offices. It builds in the holes of houses, often under eaves, and in many places in the crevices of rocks. The Cypselus australis of Gould, the Hirundo pacifica of Latham, is a closely related species from Australia; but I cannot think it the same, as ours migrates in summer in a south-westerly direction, and probably finds winter quarters, as is the case with many other species of birds, in the plains of Hindostan. It is

true that Australia does render us one species of swift, the Chætura caudacuta of Latham, Hirundo ciris of Pallas, differing chiefly from its Himalayan ally, C. nudipes of Hodgson, in its white forehead; but its movements are by no means regular. The Chætura I never saw but once at Amoy, and that was after heavy, stormy weather, when a pair were seen, one afternoon, in company with numbers of the present species, and one of them was procured. The C. caudacuta, in its wanderings, seems sometimes to range into Amoorland, as noted by Von Schrenck, and thence even to England [see Zool. 1492]; but these instances must, I think, at present, until more facts are ascertained, be looked upon as certain vagaries that long-winged birds are guilty of, which "no fellow can understand," rather than as regular migrations ordained to occur year after year.

15. Cypselus subfurcatus, *Blyth*. This swift is larger, much blacker, and with less furcate tail than its near ally, C. affinis of J. E. Gray, from continental India. Mr. Blyth has identified it as his Malayan species. It is locally distributed about South China, being generally resident in places where it occurs. It builds a nest under the eaves and rafters of houses much in the form of the house martin (*Chelidon urbica*), but the exterior coating of it differs in being composed of thin layers of wool, hair and dried grass, glued one above the other with the saliva of the bird, and lined internally with feathers. These nests serve the owners for a house all the winter through. In them they rear their young (only one brood in the year), in them they roost every night, and to them they frequently return during the day for rest after their long-sustained flights. The pairs keep together all the year, mingling, however, in small parties with others of the species from the same neighbourhood. These parties never seem to wander far, but seek their Dipterous food close to their homes, regulating the altitudes of their flight according to the state of the atmosphere; and when a pair are anxious for rest they leave the flock and fly down to their nests for repose, in which they remain twittering for half an hour at a time, and then dart out, pursuing and screaming after one another. In the spring they patch up the same nest, and use it as before till the close of the year. They seem to be very gentle birds, and greatly attached to one another. A pair built a nest under the beam of a verandah in my house at Amoy, and occupied the same for three years. I had thus ample opportunities of watching their habits. At Apes' Hill, Formosa, I met with this species again. Here it was nesting, not, however, under the roofs of houses, but in its primitive state under the ledges of rocks, building the same martin-like nest. It was

only in S.W. Formosa that I observed this bird; and I may here remark that I have never been able to trace it further north on the Chinese coast than Amoy, which is a trifle higher latitude than its position in Formosa.

16. Hirundo gutturalis, *Scop.*

17. H. daürica, *L.* Pallas, with his usual minuteness, has well described this bird and its nesting peculiarities. It is found in the extreme north of China as a summer resident only; but in the south, where the winter climate is more genial, it stays all the year, roaming about in small parties during the cool weather, and merely shifting its haunts from exposed to sheltered localities according to the severity of the season. In Southern China it is by no means so common as the chimney swallow, and far more locally distributed; but in Formosa, both north and south, it abounds in almost every homestead. Being a resident bird, and not subject to distant migrations, we should naturally expect, according to recent theories, to find it subject to some variation through its insular position; and this we do observe in the larger form, longer wing, and almost entire absence of the red nuchal collar in our bird. The same facts are observed and indirectly admitted, in the variety prevalent at Japan, by a thorough anti-Darwinian, Professor Schlegel, who is so struck with the differences offered by the Japanese bird as to make of it a subspecies under the term H. alpestris japonica. The variations in the Formosan bird are, however, too trifling to found on them a new species; and were not the triple nomenclature held in such objection by the majority of modern naturalists, we could not do better than employ it in this instance. On taking possession of our native house at Tamsuy, I observed a nest of this swallow under the rafters in the central hall. It was exteriorly built of specks of mud, like the nests of the martin, but had a neck-like entrance, giving the whole the form of a French flask, flattened against the roof; the inside was lined amply with feathers. Pallas's figure gives a very good idea of its structure. The mouth, however, does not always point upwards, but is adapted in form and direction to the shape of the spot against which it is placed. At the close of March the pair to which the nest belonged returned, and in April began to repair the old nest. Towards the close of this month the female was sitting on three white, unspotted eggs. The male and female share the duties of incubation, the female usually taking the longest spell. For the sake of Science we let the birds have their own way, though they made a

great mess about our small house, and nearly drove us wild with their loud, discordant twittering. In a ramble one spring morning, at dawn, I saw large numbers of these swallows perching on some high bamboos. The sun was fast dispelling the thick night-fog that still hung low and heavy, and the birds seemed in high spirits at the return of fine weather. They fluttered from branch to branch, and as they regained a footing rocked backwards and forwards before recovering their balance. It was in April, and they were all paired, the male being always distinguishable by his larger size and longer tail. In pairs they sang, or rather twittered, their notes kee-wee-keé, like sounds that might be produced by some metal instrument sadly out of tune. The male loudly sang his bar, and the female followed on a lower key. The male then fluttered his wings and began again; the female followed suit. In this manner the whole clump of tall, graceful bamboos looked alive with these birds, and resounded with their strange notes. Some pairs would start away and pursue one another, at first with a smooth, skimming flight; then in an excited manner they would stagger along, and, fluttering their wings, sing lustily their notes of love.

18. Cotyle sinensis, *J. E. Gray, Ill. Ind. Zool.* t. 35, fig. 3. This small, gray-breasted, short-tailed species is a summer visitant to all suitable localities in the South of China, and is also found in all parts of Formosa, frequenting the steep sandy banks of rivers, into which it bores long galleries, constructing at the end of these its cup-shaped nest, and depositing therein three white eggs. Its winter migrations extend to the plains of Hindostan, where, curiously enough, it is reported by observers to nest again in the heart of winter (see Horsfield and Moore's 'List of Birds in the East Indian Museum,' i. p. 96). This is, I believe, the only well-authenticated fact recorded of this long-suspected habit in migratory birds. It visits Formosa in April, and leaves again in October. Some fifteen miles up the Tamsuy River, in a long sand-bank, I found several rows of perforations made by this bird. The birds were flying in and out of them in great numbers, so we stopped to examine them. Most of the holes were out of arm's reach; and as the bank was very steep, and composed of loose mud, we had great difficulty in establishing a footing. We managed, however, after much trouble, to insert our arms into several of them. The holes were in all stages of progress, some only just begun, others scarcely a foot deep; in some the eggs were hard-set, in others quite freshly laid. The holes ran into the bank with only a slight inclination from the horizontal. In all instances they turned a little to the

right, extending in depth to about two feet, their diameter being from two to three inches, which is enlarged to a cavity about six or eight inches broad at the bottom. In its cup-shaped base was placed the nest, composed of light straw and dried grasses, and lined with feathers. One nest, however, had no feathers; but as it had no eggs I concluded it was unfinished. The eggs in every case were only three in number, of a pinkish white, without spot or stain. On our disturbing the birds they rushed in consternation from their nesting-site, and, after flying about low in the air at some distance in great agitation, they would meet together for some seconds as if in consultation. They would then again hurry off in different directions, and again meet. Finding we were in no hurry to leave their ground, they began to scatter and soar away to a considerable height. As soon, however, as we withdrew for a space, they returned, many diving at once into their burrows, others rushing backwards and forwards close past the holes, as if bewildered and afraid to enter. They were so numerous, and looked so small in the bright quivering light of a hot Formosan day, that they seemed to me at times more like dragon-flies than birds.

19. Halcyon coromandelianus, *Scop.*

20. Alcedo bengalensis, *Gmel.*; Chinese, To-he-ang (Little Fisher).

21. Tchitrea principalis, *Temm.*

22. Myiagra azurea, *Bodd.* About Taiwanfoo and Apes' Hill this species is specially abundant, frequenting the numerous plantations of tall graceful bamboos. Among the thickest and shadiest boughs of these trees it loves to sit, uttering its harsh grating note, and quarrelling with every other bird that comes within its reach. Its flights after insects are short, and usually merely a skip from one bough to another. It nidificates much in the manner of the common flycatcher (*Muscicapa grisola*) at home, building a deep purse-like nest of spider's web and catkins in the forks of tree-branches, usually preferring a branch that leans against a tree or wall. The eggs, numbering from four to five, and rarely to seven, are, when fresh, pinky white, spotted, especially at the larger end, with deep madder-pink spots and light pinkish gray. They vary somewhat in size, the largest egg measuring ·6 by ·48.

23. Hemichelidon latirostris, *Raffles.*

24. H. griseisticta, *Swinhoe*, *Ibis*, 1861, p. 330.

25. Pericrocotus cinereus, *Lafresn.*

26. P. griseigularis, *Gould*, *Proc. Zool. Soc.* 1862, p. 282; native name, Hee-ah (Little Gem). In the hilly country of N.W. Formosa

the Hee-ah is an abundant species, found all the year through. In the winter it associates in large flocks, many of these consisting almost entirely of males, and ranges about from wood to wood and tree to tree in the lower country. The females generally prefer remaining in the denser shelter of the mountain jungle, and do not evince such roving spirits as their lords; hence the small number of this sex that I was enabled to procure as compared with males. When on the wing, and in fact wherever they are, the Pericrocoti soon made their presence known by their peculiar trilling note, which has some resemblance to that of a canary, but yet differs from that of any other bird I know. All the species that I have met with in a wild state have the same style of note, though disagreeing in many other respects, and by practice can easily be distinguished. On a bright sunny day to witness a party of these birds fly across a wooded glen is a magnificent sight, the brilliancy of their tints contrasting well with the sombre hue of the surrounding foliage. But it is a still more beautiful sight to watch a group of these pretty creatures, male and female, examining an evergreen tree for insects. They frisk and flutter about the leaves, throwing themselves into all sorts of positions, and assuming the most difficult attitudes, as if delighting, in the ordinary business of feeding, to show to the greatest advantage those charms with which Nature has so amply endowed them. In summer they retire into the depths of the highest forests, whither it was impossible for me to follow them.

27. Graucalus rex-pineti, *Swinhoe.*

28. Dicrurus macrocercus, *Lath.* Mr. Blyth has identified our Chinese black drongo with the Indian bird that bears the above name. It is found throughout China, as far as the Amoor; but nowhere on the main did I observe it so specially common as at Formosa. Here, in all parts, both north and south, almost every bird you meet with is a black drongo, sometimes perched on the top of a tall bamboo, uttering its loud discordant metallic notes, at others skimming with long undulating flight across the country, chasing with quick turns an insect or small bird, or again seated demurely on the back of a lazy buffalo, waiting to snap the flies that swarm to torment his hide. In fact you fancy yourself in the country of the drongos. They may often be seen in large parties, though they never exactly flock together. A field may contain a dozen of them, perched on every available prominence; yet when they are alarmed each individual thinks of himself alone, and rarely follows the direction of his companions. Some continue all the year through, but in March their numbers are greatly increased by fresh arrivals. They soon commence pursuing

one another, and in April construct their nests in the shape of an oval cup, formed of fine twigs and grasses, and lined with finer dried grass and fibres. These they build on the waving branches of the bamboo, high up, so that it rests on the curving top, and sways with the tree to and fro to the lightest breeze. They are, however, firmly bound to their places; and I have often watched the female sitting quietly on the nest with only her long tail visible, while with each gust the tree-top nearly swept the ground. They lay from three to five eggs, white, with a few purplish red specks, and usually have three broods in the year. During the season of incubation they become regular little tyrants, chasing all larger birds away from the locality. They seem at this time to have a particular aversion to kites, crows and magpies, all of which they pursue to a considerable distance, repeatedly striking at them with claws and bill, until the enemy is too far to be feared. Throughout the plains and lower hills of Formosa these birds abound, having a special partiality for bamboo-groves; but in China they are somewhat locally distributed. At Foochow, in the valley in particular, you find only a smaller gray species, but about the hilly ranges round this bird again occurs.

29. Chaptia brauniana, *Swinhoe.*

30. Lanius schach (*Gm.*), *var.* formosæ. I have traced our species from Canton to the banks of the Yangtze on the main, and within this area it is everywhere a common resident species. It has never been recorded from North China, nor yet from Japan; but throughout Formosa it is quite as abundant as in China. It is noticeable for its loud, screaming note; but when quietly perched on the bough of some tree, I have heard it sing, its song being a strange mixture of harsh discordant notes with others soft and melodious. When in a playful mood it can mimic with great success the wail of the kite, or the bark of a dog, and the cries of many other animals. It loves to perch on prominent places. It preys on mice and small birds, but more frequently on grasshoppers, cockroaches and dragon-flies. Its nest is usually placed in the centre of a bush, six or seven feet from the ground, formed of flexible twigs, and lined with hair or wool, fine grass and fibres. The eggs vary from five to seven, and are yellowish gray, spotted with yellowish brown and light gray, chiefly at the larger end. I have often taken a nest of this bird in which all the eggs were of a clear pinkish white ground-colour and spotted as usual; but I have never seen them girdled with a brown ring, as is the case with some of those of L. collurio, *L.* In this large butcher-bird we have an apparent confirmation of the modern theory of

development. I have a large series of skins from Amoy, many of which show a strong tendency to lapse away into other closely affined species. Some have the frontal band reaching almost to the occiput, and lean towards L. nigriceps; others have the head nearly gray, and incline towards L. caniceps; others have the tertiaries broadly margined with buff-white, thus approaching L. erythronotus. Many of the smaller species seem to be descendants from, or, at least, of the same origin as, the Chinese type, and, though varying among themselves, always carry characters sufficient to distinguish them. These Indian and Malayan forms are mostly smaller; but in Formosa we have a bird of the same size and habits, and indeed singularly identical in every respect with the Chinese bird, except in a few of its hues. From my large series of Chinese skins I can produce one example or two undistinguishable from the Formosan variety, and from my Formosan skins I find an occasional specimen entirely like the Chinese bird, and yet, taken as series, they might by some be separated as of different species.

31. Lanius lucionensis, *Linn.* This species of the red-tailed group of shrikes, of which L. phœnicurus, *L.*, is the type, is a summer visitor to Northern China, I having myself met with it as far north as Talien Bay. In spring and fall it abounds at Amoy for a few days, and then disappears, on its vernal migration into the interior and North of China; and in autumn across the sea to the Philippines, where it hybernates. In its line of migration it touches S.W. Formosa, and there we had its company for a few days in the early part of September. Its chattering note is very different from that of the preceding large species; and it is of more skulking habits, seldom showing itself in any conspicuous place. It possesses a melodious song of no mean capacity, but it is generally uttered in a subdued tone. It feeds on large insects, especially Libellulæ, but oftener, I think, on small birds, more particularly of the Phylloscopus group. The migration of P. sylvicultrix, unfortunately for that bird, takes the same route as that of this butcher, and consequently the latter always has its food at hand. The arrival of the one bird is slightly in advance of the other. My specimens from Formosa are identical with those procured from Amoy, whence I have an immense series of skins, varying in numerous instances, with strong tendencies in colouring to its congeners of the same group; but my remarks on them I must reserve for another paper, which I have in preparation, on the birds of China.

32. Cinclus pallasi, *Temm.* This bird is usually met with on the mountains some 2000 or more feet above the sea, frequenting

the sides of solitary cascades, which abound in the hilly parts. There, like the rest of its tribe, it feeds on freshwater insects, Crustacea and Mollusca. I met with it on one of my rambles into the hills. It was perched on a large slab of rock that stood in a running stream. It kept throwing up its tail like a wren, and, hopping to the edge of the stone, dashed into the water; in a few seconds it reappeared at the surface and regained the rock. Till then I was not quite sure what bird it was; there was no longer any mistake. My time was short, and I could watch no longer, so I secured my specimen and went my way. It was a likely place and season for its nest, but in my hurried search I could not detect it.

33. Petrocincla manilensis (*Bodd.*) This bird is partial to rocky hills near the sea. Its song is very sweet, and is often uttered on the wing. It builds its nest in the hollows and clefts of rocks and walls, adapting it to the shape of the chosen locality, and constructing it of fine flexible twigs, lined with fine grass, wool, and occasionally a few feathers. These are loosely put together, without much art. It lays from three to five pale greenish blue eggs. In autumn, after the first moult, the young leave the hills and frequent the housetops of the town, about which they are constantly to be seen chasing one another, and singing their agreeable notes.

34. Oreocincla Hancii, *Swinhoe.*

35. Turdus chrysolaus, *Temm. Pl. Col.* 537, *and Faun. Japon.*

36. Turdus pallidus, *Gm.* One of this species paid frequent visits, in January, 1862, to our garden at Tamsuy, and I had then opportunities of closely watching its habits. He used to hop about over the weeds with a stately movement. He stands upright, and turning his head on one side with a knowing look, as if something caught his eye, makes a bob forward and grapples the head of a worm, which he extricates from its hole by repeated hops backwards. The worm is in his bill. He stops for a second, as if to take breath, then hammers it against the ground, shaking it at times like a terrier shakes a rat—then gulp, and the worm disappears. But its size was large, and its moribund wriggling down the œsophagus seems to produce a little inconvenience to its destroyer, for he ruffles his feathers and appears discomposed. It is only for a second; he stoops his head and runs forward, with hurried step, under an archway of tangled grass, and emerging further on, continues his inspection of the rain-moistened mould, chuckling to himself in a half-subdued tone, as if rejoicing at his luck in having selected such a well-stocked beat. He stops and raises his head; he hears a noise. The intruder alarms him, and with a louder chuckle,

preceded by a long sibilant "see," he wings into an adjoining tree, opening his tail in flight sufficient to display the white spots that ornament its lateral feathers. In his retreat he keeps on muttering a chuckle at intervals. At last his impatience gets the better of him; with a loud cry, resembling the syllables "quack, quack," he flies right away.

37. Turdus obscurus, *Gm.*

38. T. fuscatus, *Pall.*

39. T. naumanni, *Temm.*

40. Myiophonus insularis, *Gould, Proc. Zool. Soc.* 1862, p. 180.

M. insularis, *var.* M. Horsfieldii, *Vigors* (*Gould's 'Century,'* pl. 20). The Formosan cavern-bird haunts the dark wooded ravines in the interior mountains, seldom descending below the level of 2000 feet. Like the Chinese species, its favourite position is on a large boulder of rock on the side of some torrent, whereon it stands, expanding and shutting its tail like a fan, and occasionally throwing it slightly up. It is easily startled, running, rather than hopping over the surface of the rock, and flying off with a loud screaming note. It possesses a short, somewhat pleasant song. In its manners and habits it seems to connect the thrushes and Petrocinclæ with the Pittæ, which also love the neighbourhood of mountain streams. The shape of its ear is most peculiar, and almost exactly similar to that of the Henicuri, which are also cascade-loving birds. The birds dissected contained usually remains of Coleoptera and their larvæ.

41. Garrulax taivanus. The Hwa-mei (Flowered Eyebrow) or song thrush of the Chinese, is so universally met with as a cage-bird in China that every European possessed of ordinary observation that has visited the Celestial realm must be acquainted with it. The Formosan Hwa-mei (or Hoe-be, as the word is there pronounced) is both a hill-bird and a frequenter of the plains. In the hills, however, it is not common; and I do not think it there ranges to a greater altitude than 2000 feet. On the plains it is everywhere excessively common, being found in the bamboo plantations, hopping, with curved back and rounded tail, from bough to bough, fluttering its short distances from tree to tree or bush to bush, and frequently singing out lustily its loud notes. Its song is rich and powerful, abounding in a great variety of notes, many of which have a strong resemblance to those of the blackbird and thrush (*T. merula* and *T. musicus*); but, unless heard at a moderate distance, the noise almost deafens you. I think the notes of the Formosan bird rather finer than those of the Chinese; but in this the Chinese settlers, naturally preferring the products of the mother country,

do not agree with me. The Hoe-be is not particular in the choice of its nesting-site; it sometimes builds in a bush close to the ground, often at various heights, and at others on the bough of a tree. The nest is small and compact, rather flattened, cup-shaped, and formed of coarse grasses and fibres exteriorly, lined with fine dried grass. The eggs vary from three to five, and are of a deep greenish blue colour, without spot or stain. The range of this species in Formosa appears to extend throughout the entire champaign country and lower hills. I have seen and procured it from Sawo, on the eastern coast; Kelung, north; Tamsuy, north-west; Taiwanfoo and Apes' Hill, south-west. It feeds on almost every creeping thing of the great insect family, and occasionally on birds of the Prinia group. I have frequently taken entire birds' eggs out of its stomach. It searches throughout the bushes more diligently than any schoolboy for the nests of small birds, and ruthlessly sucks the eggs and devours the young. In this character, as well as in some others, it approaches the jays; but I think its affinities are more decidedly Turdine.

42. Garrulax ruficeps, *Gould, Proc. Zool. Soc*, 1862, p. 281.

43. G. pœcilorhynchus, *Gould, Proc. Zool. Soc.* 1862, p. 281. This is a commoner bird than the last in the forest-ranges near Tamsuy, but, like it, never descends to the lower unsheltered hills. It is a noisy, chattering species, assembling several together in the underwood, and keeping up an incessant jabbering, with frequent loud, discordant cries interspersed. It is sly and vigilant, and tries to elude observation, generally escaping from the opposite side of the bush it is in, with short flights to the next, and so retreating from approach.

44. Pomatorhinus musicus, *Swinhoe, Journ. As. Soc. of Shanghai*, vol. ii. p. 228 (plate VI.) In 1857, in my voyage round Formosa in H.M.S. 'Inflexible,' I first came across this species, and described it under the above name at a meeting of the North China Branch of the Asiatic Society, at Shanghai. It is a very abundant species throughout all the flat country and lower hills of Formosa. In every grove and plantation you are sure to find some of this species in small parties or in pairs, and frequently in company with the common Garrulax taivanus. They have also much the habits of that group, collecting in a bush and chattering loudly together, or hopping from bough to bough, with rounded back and rounded partially expanded tail. They have also the same affectionate manners towards one another, sidling together on a bough, and rubbing and pecking one another coaxingly. Like G. taivanus, they breed twice, and some-

times thrice, during the summer, building in the same sort of places and of similar materials, but making larger nests of a rounded form. Their eggs are of a somewhat glossy white, and are generally three in number; they measured ·9 by ·62. Their food consists of Coleopterous and other insects; but they have a great partiality for the large Cicadæ and their larvæ, thus rendering a great service by thinning the number of these noisy pests. I have never found remains of birds in their stomach; and indeed, judging from their bills, I do not well see how they could destroy birds. Like others of the Garrulax group, if their food is too large they hold it down under their claws while they peck it to pieces with their bill. Some species of Garrulax, I am told, attach they prey to thorns, like the Laniidæ, but this I have never observed. This bird occasionally throws its tail from side to side, but never at right angles like some of the smaller Australian Pomatorhini and the little P. stridulus of Foochow. There is not much music in its ordinary call-note; but when two or three are met together, and vie with one another in their strains, the effect is pleasing, though their melody is not to be compared to that of the Hwa-mei. When at rest in the middle of the day, hidden in some sombre hill-side wood, they keep on uttering at intervals a series of very liquid notes in regular cadence. These have an indescribably hollow and unnatural sound, and at first puzzle the listener to know whether they are produced by beast, bird or insect.

45. Pomatorhinus erythrocnemis, *Gould, Proc. Zool. Soc.* 1862, p. 281.

46. Hypsipetes nigerrimus, *Gould, Proc. Zool. Soc.* 1862, p. 282.

47. Ixos sinensis. These birds subsist partly on insects, and partly on berries and small wild figs. In habits they connect the Fringillæ and the Muscicapæ, assembling, like the former, in large flocks, and flying from tree to tree in noisy concert in search of berries, and, like the latter, pursuing insects in the air. They have no habits in common with the skulking Garrulax, preferring rather to show themselves tame and conspicuous; no creeping from bush to bush, and chattering in low and coaxing whisper, in their case; but, perching on the tops or exposed parts of bushes and trees, they assemble and utter loud notes; often, when so engaged, ruffling their crests, rounding the back and tail, and making the tips of their wings meet over their heads. Their notes are very varied, but strikingly peculiar, and I would try to syllable them if there was any chance of conveying to the reader an idea of their natural sounds. In April they commence nesting, but still keeping together in parties, which

meet after the business of the day is over and amuse themselves till nightfall. They mostly build three nests in the course of the season, occasionally four, laying in the first nest usually five eggs, in the others that succeed three. In the interior the nest is large and deep for the size of the bird; it is usually made of grasses, lined with finer samples; but in the materials these birds are by no means particular, almost anything they can gather, such as scraps of paper, cotton, cloths, leaves and feathers, being added. In the site too they are not regular; any bush or tree, of almost any height from the ground, will serve their purpose; and in the usual choice of their position they show as little discernment as the hedge sparrow (*Accentor modularis*) at home, frequently placing their nests in most exposed situations. They generally nestle in gardens close to the habitations of Chinese, and, being familiar birds, are protected. When their nest is approached, they make a great chattering; but they have far less to fear from man than from magpies and Garrulaces. Their eggs are of a purplish white ground-colour, spotted closely and often confusedly with dark shades of brownish purple-gray.

48. Spizixos semitorques, *Swinhoe*, *Ibis*, 1861, p. 266.

49. Oriolus chinensis, *L.*

50. Psaropholus ardens, *Swinhoe*, *Ibis*, 1862, p. 363, pl. 13.

51. Herpornis xanthochlora, *Hodgs.*

52. Zosterops simplex, *Swinhoe*, *Proc. Zool. Soc.* 1862, p. 317. The Formosan bird is identical with that found throughout Southern China, from Canton to Foochow. In winter it roams about in small parties, like the tits, from tree to tree, searching every tree for Aphides and other small insects. When engaged in the pursuit of its food, it hangs in all manner of attitudes, uttering the while a peculiar call-note. In spring it utters a short, sweet song. It is a bird very easily tamed in confinement, even when kept several together; and in most towns in South China it may be seen as a cage-bird. At feeding time they are particularly lively; but when satiated settle on their perch, sidling up to their companions, and, after caressing one another for a short time, all ruffle their feathers and dip their heads under their wings. The siesta they take is not long. They all wake up suddenly and feed again, the males often putting forward the head and singing their soft melodious notes. This habit of taking mid-day siestas I have also observed in the Parus caudatus in confinement. The Zosterops is very fond of bathing; and for food, besides insects, is partial to fruit, showing an especial fondness for plantains or bananas, on which it may be almost entirely sustained.

53. Parus castaneiventris, *Gould, Proc. Zool. Soc.* 1862, p. 280.
54. Alcippe Morrisonia, *Swinhoe.*
55. A. brunnea, *Gould, Proc. Zool. Soc.* 1862, p. 280.
56. Pratincola indica, *Blyth.*
57. Ianthia cyanura, *Temm. & Schl.*
58. Calliope kamtschatkensis, *Gmel.*
59. Ruticilla fuliginosa, *Vigors.*
60. R. aurorea, *Pall.*

61. Drymœca extensicauda, *Swinhoe, Ibis*, 1860, p. 50. They are found throughout all the low country of Formosa, affecting places covered with coarse long grass, about the tops of which they flit and twitter, throwing their tails up and from side to side as they spring up the long grass-blade. Their song is merely a quick repetition of their usual twittering call-note. They feed on small Dipterous caterpillars and other insects. Their nests are very elegant little pieces of workmanship, consisting of a deep cup with a canopy, entirely composed of fine grass. When first made they are quite green, and elude well the eye of search as they stand sustained between the stems of long grasses. The bird lays from three to seven eggs, of a light greenish blue, spotted, blotched and waved, chiefly at the larger end, with various shades of chocolate-brown. They average ·55 by ·48, but vary in size and shape, and the distribution of the chocolate markings assumes all manner of fanciful forms. I have a very large series, and they are, I think, the prettiest eggs I have ever seen.

62. Drymœca flavirostris, *Swinhoe.*

63. Suya striata, *Swinhoe, Journ. N. China Branch As. Soc. Shang.* 1858.

64. Prinia sonitans, *Swinhoe, Ibis*, 1860, p. 50. This bird, found in all gardens and hedgerows throughout the plains of Formosa, is identical with that found on the Chinese main, from Canton to Foochow. It has only ten feathers in the tail, and two stiff black bristles on each side of the base of the upper mandible, together with several shorter ones under the eye and on the chin. It creeps about the bushes and long grass, making a cracking noise, I think with the tail, as it springs from stem to stem. It has a long, trilling call-note, and a short, sweet song, which the male gives forth as it stands perched on some prominent twig. It has also a curious alarm-note, resembling something the mew of a kitten. It is fond of frisking its tail about and throwing it up. It feeds on small insects, chiefly Diptera and caterpillars. It attaches its nest usually between the stalks of long grasses; at other times it places it in bushes. The nest is

composed of dried grasses, fibres and leaves, cup-shaped, covered with a broad-domed canopy, and lined with feathers and hair. It builds three nests in the course of the season; laying in the first, seven small round, maroon-coloured eggs; in the two next, five a-piece, seldom less. The birds of the year are olive-green on the upper parts, with none of the blackish gray on the crown that adorns the adult bird. In the moult of the following spring the transformation into the adult plumage is complete.

65. Cisticola schœnicola, *Bp.*

66. C. volitans, *Swinhoe, Journ. N. China Branch As. Soc. Shang.* 1858. In habits it much resembles the common species, dropping, when pursued, into the thickest grass, about the roots of which it creeps, and whence it is hard to flush it. It frequently perches on the summit of grass-stalks, and is then at once recognizable by its white head. It has a short flitting flight, and frequently springs into the air some twenty or thirty feet, uttering its well-marked notes, tee-tee-teup-teup. In June, 1857, when circumnavigating Formosa in H.M.S. 'Inflexible,' I first made the acquaintance of this species at Sawo, and afterwards at Kelung. It was then its breeding-season, and the numbers that abounded about the long grass were uncommonly lively; but its very diminutive size and activity precluded my obtaining more than one specimen of it. This I described the same year, at a meeting of the North China Branch of the Asiatic Society, under the above name. In Tamsuy I found it very locally distributed, and much rarer than C. cursitans. It was only after great difficulty that, through the aid of my constable, I was enabled to add another example to my collection, and the high and remote localities it inhabited prevented my obtaining any facts as to its nesting or other habits. I think I am right in laying down its habitat in Formosa as restricted to the hills on the eastern and northern portion of the island, Tamsuy being probably its most southerly range on the western side.

67. Calamoherpe orientalis, *Bp. Consp.* p. 285.

68. C. canturians.

69. C. minuta.

70. Phyllopneuste fuscata.

71. P. coronata.

72. P. sylvicultrix.

73. Reguloides superciliosus, *Gmel.* I always understood this species, which is identical with Mr. Gould's Dalmatian goldcrest, to be the Motacilla proregulus of Pallas, until the other day, at Leyden, Prof. Schlegel told me that he thought Pallas's description applied

rather to the R. chloronotus of Hodgson; and on carefully perusing the 'Zoographie Rosso-Asiatique' (p. 499) I certainly find this to be the case. Pallas there tells you that he observed his bird in the beginning of May, in Daüria; and in the description that follows distinctly says, "Dorsum cinereo-flavum vel virescens, ut et tectrices caudæ; *sed zona lata uropygii albido-flava*." (Mark the words in italics). This whitish yellow rump-band never occurs in the R. modestus, but always in the R. chloronotus of Hodgson. I found both species common at Peking in summer, and they doubtless also pass that season in Siberia. In winter both species spread down the coast of China, and away even to the plains of India. The R. modestus is generally met with singly; the R. chloronotus in pairs. In the note to his article on Motacilla proregulus, Pallas also alludes to the R. modestus, doubting whether a bird of this last species received from the banks of the Lena, and which he had referred to Motacilla acredula, *L.*, might not be the female of his M. proregulus. Such a doubt has probably entered the head of every field-naturalist on first encountering the two species, but a careful study of the two birds soon dispels it. Let us turn to page 497, under the head "Motacilla acredula"—*i. e.* probably the chiffchaff (*Sylvia rufa*, Lath.) We find, in a note, mention made of the birds observed by M. Schmid on the Lena, which he had briefly described in a MS. as "*Reguli non cristati, omnium forte minimi*." These were doubtless the R. modestus; but as no name was there suggested for them, we must look elsewhere for a title for our interesting little friend. In winter it is not uncommon about woods and groves in Formosa, its loud single call-note, "sweet," always attracting attention to its presence. It is very rarely in company with others, is lively and constantly in motion in pursuit of its insect-food, and seems to be entirely happy in its own resources. A comparison of skins has amply proved that the birds from China, Formosa and India are one and the same, and identical with the little Dalmatian (so-called) stranger procured on the coast of Yorkshire.

74. Motacilla luzoniensis, *Scop.*

75. M. lugubris, *Pall.*

76. M. ocularis, *Swinhoe, Ibis*, 1860, p. 55.

77. M. boarula, *L.* A common resident. A male, with the black on the throat just showing itself, used to visit every morning, in January, 1862, a drain under my window. The wagging up and down of his hind quarters seemed incessant, even while the bird itself was standing still. While preening its feathers, still the tail wagged,

not stopping even while the little fellow drew between his mandibles the feathers that form its coverts. The only moment of cessation I observed was when the bird stretched its wing and leg. It used to engage itself in catching the flies among a pile of stones, perching on the top, stamping its little feet, shaking its tail, and constantly turning round and round in the same place.

78. Budytes flava, *L.*, *var.* Rayi. Our South China form of yellow wagtail is the true Motacilla flava, *L.*, having in full dress a gray head, and white chin and eyebrow. From North China (Tientsin) I have seen specimens not to be distinguished from the European B. cinereocapilla, with the entire head dark gray. In the island of Formosa the Budytes has the head uniform in colour with the back, and a yellow eyestreak in the adult plumage, being (except perhaps in the rather darker ear-coverts) barely distinguishable from the form peculiar to the British Islands. Indeed, so similar are the birds from these two widely separated localities, that I can scarcely do otherwise than regard them merely as varieties of the B. flava, their aberrancy from the typical colour and their cosimilarity being due to some insular and climatal causes which we cannot just now, with any certainty, fathom. The peculiar greenness of the head is constant in all my adult specimens, with one or two exceptions, which have more or less gray on the forehead, and an inclination of the eyebrow and chin to be white instead of yellow. This would doubtless likewise be found if a large series of British skins were examined. This apparent desire of nature to revert to the typical colour, and the absolute identity of the two forms in immature and undress plumage, resolve me in setting down the Formosan as a variety; for if we are to regard species as special creations, how can we reconcile the fact of two islands, separated by an entire hemisphere, producing the same form almost entirely restricted to themselves, and represented on their opposite mains and throughout the intervening vast tract of land by a single species, of which specimens procured from the extreme east and extreme west are positively identical? The yellow wagtail is with us, in Formosa, a constant resident, assembling in winter in large parties and remaining about the fields. In spring it pairs, and scatters itself about the country, resorting chiefly to the hill-side streams for the purposes of nidification. I suspect also that a good many repair to Japan for the summer.

79. Anthus agilis, *Sykes.*

80. A. cervinus, *Pall.*

81. A. Richardi, *Vieill.* A very rare straggler to Formosa, though a common winter bird to South China.

Food of Small Birds. By Edward Newman.

In the International Exhibition of last year there was a series of objects which attracted no attention whatever, and which would certainly have escaped my notice had not Mr. Gould, whom I met accidentally, especially pointed it out to me as worthy of examination. This was the contents of the stomachs of eighteen different species of birds, prepared and exhibited with the benevolent object of proving that our common birds are useful rather than injurious to man, and therefore worthy of protection rather than destruction. Not only was the food of each species kept distinct, but also of each species at different seasons of the year. The series was prepared and exhibited by M. Florent Prevost, and the obvious teaching is, that birds—the common and most persecuted birds—render incalculable service to man by the devouring of those smaller creatures which destroy or greatly damage his crops. The slaughter of birds has at last arrested the attention of the legislature in France, and although I believe that this slaughter did not proceed from the same hereditary prejudice and ignorance as in England, but rather from what our better instructed neighbours consider a love of sport; yet, sorrowful to say, the result was even more disastrous than here, and the fruitful fields were in many instances reduced to a barren desert by the wanton destruction of their natural protectors.

The sportsman, the farmer and the gardener too often turn into ridicule, or utterly reject, the idea of sparing the lives of this interesting portion of the creation on the ground of humanity: for them the question is only worthy of consideration in an utilitarian point of view; and therefore the utilitarian aspect is the one in which the matter should be brought under their notice. We hear of a churchwarden offering so much a dozen for the heads of sparrows, and we instantly exclaim, "How cruel!" and we urge on him the cruelty of his proceedings. It is waste of words. But if churchwardens could be brought to see that the labours of those sparrows, if allowed to live, would pay their income tax, of which fact I do not entertain the slightest doubt, then, I think, the most ignorant, the most bigoted parish-officer may be convinced; not by hot controversy, not by subtle

reasoning, but by placing before him in the simplest form a series of facts which he could neither "gainsay nor resist." "Facts are the most unassuming yet the most convincing of all arguments; they walk through preconceived opinions, long-cherished conclusions, and favourite hypotheses: they offer a less ostentatious but a far sterner resistance, a far more invulnerable bulwark than any other form of defence that truth can adopt; regarded as arguments, they have the transcendant merit of convincing without irritating."

In the 'Field' newspaper of August 15th, Mr. Edward Wilson, to whom be all the honour such an attempt deserves, has endeavoured to bring this subject before a large circle of the most intelligent sportsmen, farmers and gardeners of our country, by a lucid and admirable summary of M. Prevost's labours; in which summary he has been most kindly assisted by M. Prevost himself.

After a few pertinent observations on the important conclusion deducible from the following facts, Mr. Wilson recommends that the list be "cut out of the columns of the newspaper, and placed in some conspicuous situation, in order to impress thoroughly upon the young mind how valuable a friend we have in the little bird." Heartily concurring as I do in this proposition, I would go even farther: I would advise that the list be reprinted in clear and legible type, and a copy supplied to every school in the United Kingdom; that it then be pasted on a board and used as a reading lesson: it would thus confer an incalculable benefit on society at large; it would inspire a love of scientific study; it would teach a lesson of mercy; and it would be the ultimate source whence riches must eventually flow through every channel in which the cultivation of the soil is concerned. May I venture to hope that my readers will give the subject their earnest and immediate attention. I have grown old and gray while pleading the cause of the bird, and it is with the most sincere pleasure that I see stronger and abler hands than mine undertaking a task in which I have been able to make so little progress.

Contents of the Stomachs of Birds during each Month of the Year.

Longeared Owl. January, mice; February, the same; March, the same; April, cockchafers; May, rats, squirrels and cockchafers; June, meal-worms, beetles and shrew mice; July, mice, ground and other beetles; August, shrew and other mice; September, mice; October, the same; November, the same.

Shorteared Owl. January, mice; February, harvest mice; March, mice; April, crickets and field mice; May, shrew mice and cockchafers; June, beetles; July, field mice and birds; August, field mice and shrews; September, field mice and beetles; October, the same; November, common and field mice; December, mice, spiders and woodlice.

Barn Owl. January, mice; February, the same; March, field mice; April, the same; May, the same; June, the same; July, mice; August, the same; September, field mice and shrews; October, the same; November, mice and black rats; December, mice.

Rook. January, field mice and grubs of cockchafer; February, the same and red worms; March, larvæ and chrysalids; April, slugs, worms and chrysalids; May, beetles, larvæ, prawns and wire worms; June, cockchafers, eggs of birds and wood-boring beetles; July, young birds, beetles, &c.; August, birds, field mice, weevils, grasshoppers, crickets, &c.; September, grubs and worms; October, grasshoppers, ground beetles and young animals; November, young rabbits, different insects and grubs; December, different animals and decaying substances.

Magpie. January, grubs of cockchafers, beetles and different corn and seeds; February, the same and berries; March, the same; April, moles, crickets, water rats and field mice; May, cockchafers, glow-worms and fruit; June, the same and weevils; July, beetles and field mice; August, birds' eggs and weevils; September, beetles, worms, barley and grasshoppers; October, grasshoppers, carrion beetles and green locusts; November, grasshoppers and kernels of fruit; December, grubs of cockchafer, young rabbits and berries.

Jay. January, grubs of cockchafer, acorns and berries; February, chrysalids and different grains and seeds; March, grubs, insects, wheat and barley; April, grubs, beetles and snails; May, cockchafers and locusts; June, eggs of birds, cockchafers and beetles; July, young birds, flies and beetles; August, the same, acorns, grubs and dragon-flies; September, the same and fruits; October, beetles, slugs, snails and grain; November, the same; December, the same and haws and hips.

Starling. January, worms, grubs of cockchafer and grubs in dung; February, grubs, snails and slugs; March, grubs of cockchafer and snails; April, the same; May, the same and grasshoppers; June, flies and grubs of various flies; July, grubs and freshwater shell-fish; August, flies, glow-worms and various beetles; September, green locusts, grubs of carrion beetles and worms; October, worms and

beetles; November, snails, slugs and grubs. In summer it adds fruit, and in winter hips, haws and buds of trees.

Golden Oriole. January, various chrysalids; February, chrysalids and worms; March, grubs and beetles; April, ground beetles and weevils; May, beetles, moths, butterflies and grubs; June, grubs, grasshoppers, bees and cherries; July, cherries and various beetles; August, weevils, chrysalids, fruits and worms; September, beetles, grubs, worms and fruits; October, grubs, green herbs, chrysalids, berries and barley; November, ants and worms.

Crested Hoopoe. January, worms, grubs and snails; February, the same; March, the same; April, the same; May, flies, dragon-flies and grubs of May-fly; June, water and land snails, flies, &c.; July, the same and woodlice; August, the same; September, the same; October, snails, flies and spiders; November, the same; December, the same and worms.

Green Woodpecker. January, ants; February, worms and grubs of ants; March, slugs, beetles and grubs of ants; April, ants and worms; May, red ants and grubs of wasps; June, bees and ants; July, red ants; August, red ants and worms; September, ants and worms; October, grubs of ants; November, grubs of ants and bees; December, ants.

Reed Thrush. March, grubs and insects; April, aquatic grubs; May, grubs of house-fly and dragon-fly; June, worms, grubs, flies and May-flies; July, beetles and dragon-flies; August, worms, eggs of insects and beetles; September, aquatic insects.

Blackbird. January, seeds, spiders and chrysalids; February, the same; March, worms, buds of trees and grubs; April, insects, worms and grubs; May, cockchafers and worms; June, worms, grubs and fruits; July, all sorts of insects, worms and fruit; August, the same; September, the same; October, worms, chrysalids and grubs of butterflies; November, seeds, corn and chrysalids; December, the same.

Great Titmouse. January, beetles and eggs of insects; February, grubs; March, water snails, beetles and grubs; April, cockchafers, beetles and bees; May, the same; June, cockchafers, flies and other insects; July, the same; August, insects and fruits; September, seeds, grasshoppers and crickets; October, berries; November, seeds.

Skylark. January, seeds of wild plants; February, seeds and corn; March, various insects, worms, seeds and corn; April, insects, beetles and corn; May, beetles; June, flies and various insects; July, grasshoppers, worms and corn; August, crickets and grasshoppers; September, insects, corn and seeds of weeds; October, seeds, worms and

barley; November, seeds, corn and berries; December, seeds of wild plants.

Robin. January, insects, worms and chrysalids; February, insects, worms and woodlice; March, chrysalids and worms; April, moths, eggs of insects and cockchafers; May, grubs and beetles; June, flies, moths, spiders and worms; July, moths, butterflies and woodlice; August, the same and worms; September, the same; October, eggs of insects and aquatic insects; November, worms and chrysalids; December, chrysalids, grubs and eggs of moths.

Nightingale. February, grubs and worms; March, the same, and chrysalids and ground beetles; April, flies, meal-worms, beetles and red worms; May, butterflies, weevils, cockchafers and grubs; June, spiders and wood-boring beetles; July, worms, grubs, eggs of locusts, grasshoppers, moths and flies; August, locusts, glow-worms, weevils and grubs; September, locusts, beetles, worms and dragon-flies; October, grubs, worms and beetles; November, flies and worms.

Linnet. January, seeds and berries; February, the same; March, the same; April, the same; May the same and insects; June, the same; July, the same; August, the same; September, the same; October, berries, seeds, buds and fruit; November, the same; December, the same.

Chaffinch. January, seeds, berries and kernels of fruits; February, the same and corn; March, the same and insects; April, moths, flies and insects of various kinds; May, cockchafers, grubs and eggs of insects; June, the same and wild fruits; July, the same and grubs of beetles; August, moths and butterflies; September, eggs of insects, worms and seeds; October, wood-boring beetles, seeds and insects; November, seeds; December, seeds and buds.

Greenfinch. January, seeds, berries, wild fruit and worms; February, the same; March, the same; April, the same and insects; May, the same; June, the same; July, the same; August, the same; September, seeds, berries, worms and wild fruit; October, the same; November, the same; December, the same.

Sparrow. The sparrow only lives near the habitation of man. It varies its food according to circumstances. In a wood it lives on insects and seeds; in a village it eats seeds, grain, grubs of butterflies, &c.; in a city it lives on all kinds of *débris*; but it prefers cockchafers and some other insects to all other food.

It must, however, be remarked, and Mr. Wilson himself directs attention to the fact, that this list by no means places the case in the

strongest light, because in every instance only that food finds its way into the bird's stomach on which that individual has to subsist. The young of birds are fed almost exclusively on insects injurious to man, and this cannot be detected in the stomachs of the parents; indeed it would be extremely difficult to demonstrate the enormous amount of the benefits man derives from birds during the protacted period when they are feeding their little ones. No one but the naturalist knows the insatiable craving of the callow young; no one but he is aware of the unwearying assiduity of the parents while they perform this labour of love; but how shall we place before the general reader the facts of the case so as to secure his attention? Calculations and figures are very unimpressive, and the fact that a certain number of millions of insects are consumed every year by nestling birds does not seem very imposing; it is more simple and more to the purpose to state the well-ascertained fact, that in order to keep a nestling bird in health and strength it must be supplied every day with an amount of wheat-destroying, or vegetable-destroying, or fruit-destroying caterpillars, equal to rather more than a third of its own weight.

To expect any sudden reaction in public sentiment is out of the question, but when the incontrovertible facts now adduced are deliberately considered,—when we know they will be confirmed by anyone who, with honesty of purpose, sets himself to disprove them,—there can, I think, be no doubt they will eventually make an impression destined to be as lasting as it must be beneficial to man.

EDWARD NEWMAN.

Marsh and Montagu's Harriers in Norfolk.—I had five specimens of the above birds forwarded to preserve. They were shot on the estate of Mr. E. C. Newcombe. *John Baker; 3, Trumpington Street, Cambridge, September* 2, 1863.

"*Hooting*" *of the Barn Owl.*—I have always understood that the "hooting" of this owl was doubted by many, and altogether denied by some, ornithologists. I have in my possession a tame specimen of the barn owl, which I have reared almost from the nest. I have now had it upwards of fifteen months, and have closely observed its habits. It does "hoot" exactly like the longeared owl (*Strix otus*), but not so frequently. I use the term "hoot" in contradistinction to "screech," which it often does when irritated.—*W. W. Boulton; Beverley, Yorkshire, August* 31, 1863.

Occurrence of the Snowy Owl in Sutherlandshire, and of the Honey Buzzard in Inverness-shire.—I have just received a letter from a friend living in Inverness, who has sent me word of the capture of the snowy owl in Sutherlandshire last month (July); also of three fine examples of the honey buzzard having been killed in Inverness-shire. —*S. P. Saville; Dover House, Cambridge, August*, 1862.

The Redwing singing in England. — I see in one of your interesting chapters on British Birds, inserted in 'Young England' for July last, page 106, that you have committed an error in stating that the redwing is not known to sing in England. Last February I heard a bird singing near the top of a larch fir in this neighbourhood, which I supposed was a thrush; but on shooting it (in the act of singing) I found, to my surprise, that it was a redwing. Soon afterwards I heard another singing among the topmost branches of a beech tree, which I shot, and it proved to be a redwing also. I heard several others singing that same evening, and in fact all throughout the month, but I had always taken them for thrushes, until curiosity prompted me to shoot two of them, and then it was that I found out my mistake. I am quite sure of both skins—one of which I have still in my possession—being redwings; and if you have any doubt on the subject I shall be most happy to send you the skin for examination.—*Joseph J. Armistead; Queenwood College, Stockbridge, Hants, August* 20.

[I shall be pleased to see the skin when opportunity offers.—*Edward Newman.*]

Occurrence of the Alpine Accentor in Yorkshire. — On the 22nd of August, at Mr. Roberts', birdstuffer, Scarborough, I saw a fine female specimen of the Alpine accentor, which had been shot near Scarborough. Last winter (1862—3) a poor man offered for sale to Mr. Roberts a string of larks and small birds he had shot. Mr. R. bought them, and found this bird amongst the number. I purchased it, and it is now in my collection.—*W. W. Boulton; Beverley, Yorkshire, August* 31, 1863.

Remarks on the Fringilla incerta of Risso. — Mr. George Dawson Rowley has entrusted to me, for exhibition to the Society, a little bird which was brought to him alive at Brighton on the 13th of March last, having been caught in a net in that neighbourhood. It was ascertained by dissection to be a female; and after examining it I cannot but suspect that it may have been from specimens similar to it that the descriptions of the female of the so-called Fringilla incerta of Risso and other Continental writers have been drawn up. I have never before seen a specimen which agrees with these accounts, nor have I had access to the original authorities; but the compilation from them published by Dr. Degland so accurately describes the present example that I do not hesitate to quote it. "*Femelle.*—Dessus de la tête, derrière du cou, scapulaires, dos et sus-caudales d'un brun olivâtre, plus clair à la tête, nuancé de gris sur les côtés du cou et sur le haut du dos; poitrine et flancs d'un gris olivâtre, avec des taches longitudinales plus foncées; abdomen et sous-caudales d'un blanc sale; rectrices et rémiges, d'un noir olivâtre, avec le bord externe liséré de vert grisâtre, les premières terminées de gris sale, ce qui forme deux bandes sur les ailes; rectrices de la couleur des rémiges; pieds d'un brun fauve." At the time of his writing the above passage Dr. Degland states that the Chlorospiza incerta was unknown to him; but he subsequently says that he had obtained a male, taken in a net near Lille, in September, 1849, and adds that he was previously wrong in calling the species a Chlorospiza, for it was evidently a true Pyrrhula. This last assertion awakened the ire or the ridicule of Prince Bonaparte, who persists in his former assignment of the bird to Chlorospiza,* as he also does later, though subsequently he refers to it as the

* There is apparently a misprint of 1852 for 1832, as the date of the establishment of this genus, in Mr. G. R. Gray's most useful 'Catalogue of the Genera and Subgenera of Birds,' p. 77. In the 'List of the Specimens of British Animals,' &c., Part III. Birds, p. 100, the latter date is given, with the reference 'Pr. Bonap. Sagg. Distr. Met. Anim. Vert.'; but I have been unable to consult the original work.

young of Carpodacus erythrinus. Mr. Rowley's specimen, which I now offer for your inspection, seems to me without doubt to be a female of the common greenfinch, but is distinguished from the ordinary type by an entire absence of yellow colouring, which is replaced by nearly pure white, and the whole bird is generally of a paler hue. One or two friends to whom I have shown it are inclined to suppose it a hybrid between the greenfinch and the common linnet; but of such an origin I perceive no indication either in the plumage or structure. Now Dr. Jaubert, who is without doubt a naturalist peculiarly fitted to form an opinion on the subject, has stated—I may almost say proved—that at least the male of the so-called Fringilla incerta is a curious variety—probably caused by confinement—of Carpodacus erythrinus; and his view of the case has been endorsed by Dr. Gloger. It is certainly not for me, who know very little about the matter, to question his solution; but Prince Bonaparte is also no mean authority, and his so long referring the Fringilla incerta to the group Chlorospiza, rather than to Carpodacus, must not be forgotten. It appears, then, to me that the only way of reconciling these conflicting opinions is by the supposition that this Fringilla incerta, which has caused so much perplexity to ornithologists, has been made up of the abnormal plumages of *two* species; the male being founded, as Dr. Jaubert says on *flavescent*, if I may coin a word wanted to express a variation not uncommon in many classes of animals, examples of Carpodacus erythrinus; and the female, as I have here suggested, on under-coloured specimens of Chlorospiza chloris. P.S. 5th May, 1862. — If uncertainty of opinion be ever allowed to a naturalist, perhaps it is pardonable in the case of Fringilla incerta. Since I communicated the foregoing conjecture to the Society, I have had an opportunity of examining Prince Bonaparte's great work the 'Fauna Italica.' I must honestly confess that the bills of *both* the birds represented in plate 38 have the convex character peculiar to the genus Carpodacus. Under these circumstances I can only say that my supposition must go for what it is worth, which I fear may be very little; and I trust to the ornithologists of the South of Europe to clear up the matter more fully, by examining any specimens that may be contained in Prince Bonaparte's collection. — *Alfred Newton, in 'Proceedings of the Zoological Society,' April* 8, 1862.

Alleged Scarcity of Swifts and Swallows. — I have just read the communication from Mr. Boulton (Zool. 8726) respecting the scarcity of swifts and swallows at Beverley. This has caused me much surprise, for, living as I do only about eight miles from Beverley, I have several times during the past summer noticed what I considered an unusual number of these birds flying about. Certainly of swifts I have seen as many as twenty together flying over our garden in the evening. I cannot therefore account for the scarcity at Beverley, only so short a way distant. — *George Norman; Hull, September* 2, 1863.

The Sapsucker.— Mr. E. A. Samuels, in the 'Wisconsin Farmer,'—probably misled by some blundering newspaper report of the remarks (not lecture) of the Rev. P. R. Hoy, of Racine, Wisconsin, on the habits, &c., of the sapsucker, made before the Illinois Horticultural Society, — has done that careful, accurate and scientific naturalist much injustice, accusing him of things of which he is not guilty. Dr. J. P. Kirtland, of Ohio, was the first naturalist who expressed his belief in the "popular opinion" on this subject, but unfortunately he did not investigate the matter. Dr. Hoy has recently ascertained that the food of the sapsucker is the juice and inner bark of trees, and has presented the facts verbally, as indicated above. This little bird differs so much from the true woodpeckers that Professor S. F. Baird very properly made it

the type of a new genus: it is now known as Sphyrapicus varius, *Baird*, and is the only bird properly entitled to the name of sapsucker. The tongue cannot be protruded much beyond the extremity of the bill; at the tip or horny portion it is broad, flat and rounded, and especially adapted to the work of scooping out the tender inner bark of trees. It differs in these particulars from the tongue of the woodpeckers proper, which may be extended two or two and a half inches beyond the beak; the tip is narrow, sharp and beset with strong barbs, especially adapted to the work of extracting grubs and insects. The contents of the stomach, examined in numerous cases, at different seasons of the year, indicated only vegetable substances. Fresh specimens were sent to Dr. Joseph Leidy, of Philadelphia, whose dissections fully confirmed the observations and deductions of Dr. Hoy. The punctures made by the Sphyrapicus are usually arranged in several rows around the tree, and are so numerous as often to girdle the tree, and, especially in tender kinds, destroy its vitality. The damage done to young trees in and about Milwaukie and Racine is very considerable. The trees punctured are the maple, mountain ash, pine, spruce, pear, apple, cherry, ironwood, basswood, silver poplar, and perhaps others. While Dr. Hoy advises the destruction of this bird, he pleads as earnestly as Mr. Samuels for the protection of the Picus villosus and all other harmless creatures. — *From* '*Proceedings of Boston Society of Natural History*,' Vol. ix. p. 55.

Occurrence of the Calandra Lark in Devon. — A short time since, when looking over the collection of Mr. Pincombe, taxidermist, of Devonport, I recognized a specimen of the calandra lark (*Alauda calandra*), which he assured me had been killed in the neighbourhood, but that he had hitherto considered it to have been a specimen of the shore lark (*A. alpestris*). Now, as the calandra lark is said to be common in the South of Europe, I do not see why it should not be occasionally found on our coasts. But notwithstanding this the above is, I believe, the first recorded instance of its capture in the British Isles.—*John Gatcombe; Plymouth, Devon, August* 15, 1863.

Occurrence of the Ortolan Bunting at Guisborough. — Two days since I had the pleasure of making the acquaintance of this rare bunting. I was walking with two friends on a hill-side below the Guisborough moors (a short distance only from the rifle-range), when the note of a bird from the direction of some largish patches of whin fell on my ear with an unfamiliar sound. In a minute or so I succeeded in detecting the utterer sitting on the upper part of a projecting bramble stem. I was able to approach within seven or eight yards; and when disturbed by my attempts at a still nearer inspection the bird only circled once or twice round the whins and settled again, and always so as to afford excellent opportunities of examination. In this way I had it under view for ten or fifteen minutes, and from its tameness it seemed as if I might have continued my notice as long as I had liked. I had consequently the fullest means, short of actual handling, of satisfying myself of its identity, and I had no hesitation whatever about it; only I could not of course decide whether it were a female or a young bird of the year; I believe the latter. My companion, who at once pronounced it a bird he had never seen before, took down Morris's 'Birds' on returning home, and was fully satisfied, on comparing the plate and the description accompanying it, that the stranger really was the ortolan. Its flight resembled that of the common linnet rather more than of the greenfinch, blackheaded bunting, or yellowhammer, and its note was one low metallic chirp,—a sound graduating between the call-notes of the greenfinch and the yellowhammer.—*J. C. Atkinson; Danby in Cleveland, August* 18, 1863.

Silver Pheasant living and thriving after the loss of half her Lower Mandible.— I have a common silver pheasant hen which had the misfortune, eight or nine months ago, to lose, by accident, half of her lower mandible. No one expected that she could live long in that state ; she was, however, allowed, almost as an experiment, to run as usual with the other poultry ; and to my great surprise she has not diminished in size, and lays like the rest. She can peck nothing off a hard surface. — *George Roberts ; Lofthouse, Wakefield, August* 17, 1863.

Pallas' Sand Grouse near Beverley.—On the 29th instant I added to my collection a richly-plumaged male specimen of this interesting bird, which had been caught alive within three miles of Beverley. I bought it of Mr. J. P. Martin, gamekeeper, of Cottingham, near Beverley ; and his account of its capture was as follows : — " Five weeks ago, or during the last week of July, Mr. John Stephenson, farmer, of Skidby, near Beverley, brought to me a living specimen of this rare bird. He stated that he had caught it on his own farm at Skidby, for it was so emaciated and weak that it could not fly. It was alone when found. When brought to me it was so wasted that I could feel no flesh on the breast-bone. There was no mark of gunshot or other injury. I kept it alive for a day or two, but as it would not take food I killed and stuffed it." Mr. T. Ferguson, of Cottingham, was present when Stephenson brought the living bird to Martin, and he corroborates all that Martin stated to me. — *W. W. Boulton ; Beverley, Yorkshire, August* 31, 1863.

Pallas' Sand Grouse near Beverley.—Mr. Ferguson, of Cottingham, near Beverley, informs me that his brother, Captain J. Ferguson, has just had a pair of these birds mounted. They can now be seen at his residence at Walkington, near Beverley. They were shot in the Riding, but I have not yet seen Captain Ferguson to ascertain exactly where. I am also informed by Mr. Ferguson that a labouring man in his brother's employ declares that he has more than once lately seen a bird, answering to the description of Pallas' sand grouse, picking on the road alone, near to a village called Hunsley, about four or five miles from Skidby. He said that when frightened it flew away, " like a swallow," and, wheeling round, alighted in a neighbouring field. This would be about the same time that Martin's specimen was taken. I have not since heard of this specimen (if it really was one) having been shot, unless it was the identical specimen brought to Martin.—*Id.*

Note on Pallas' Sand Grouse. — I am confident there is not an ornithologist that will not feel pleasure in learning there are now, and have been for many years, in the aviary at Windsor, several of those beautiful little birds, the sand grouse, particularly as they were the property of the good Prince Consort. I received this information by the gracious command of Her Majesty, through the Hon. Sir Charles B. Phipps, in a communication lately received.—*S. P. Saville ; Dover House, Cambridge.*

Note on Pallas' Sand Grouse. — So little being known with regard to the habits of these strangers, and there being seemingly a diversity of opinion respecting their edible qualities, &c., I am induced to give the following short extract from my note on the sand grouse, or rock pigeon, of Southern India (Zool. 5748), which, if not identical, closely resembles it, and is probably the " Gelinote des Indes" of Sonnerat: — " Strange to say, this diminutive grouse or ptarmigan is held in no estimation by the Indian sportsman ; why or wherefore I never could discover, but think it may partly have arisen from its being most unaccountably and absurdly misnamed pigeon, for we know there is, after all, much in a name. The flesh is dark and game-like, with

streaks or layers of white, but, like most other game in the East, is insipid, in consequence of the heat rendering it impossible to keep it more than a few hours." Mr. Stevenson (Zool. 8708) appears to think that not being "in season" may be the reason of their wanting flavour; but though I have eaten them "in season" and "out of season," they were invariably found tasteless. Possibly they might have been improved by keeping; but some of our Indian game birds, the snipe for instance (to say nothing of the water-fowl), prove very delicate, though eaten within an hour or two of being shot. They are considered inferior to other pigeons, particularly the large green species. As to their being improved by a "corn diet," I doubt much whether corn of any kind forms part of their food, their habitat being the arid, rocky and desert-like plains. Though we do well to examine the crops and gizzards of these stray birds, we must bear in mind that they may, and probably have been compelled to, subsist on unusual or unsuitable food. The cause of this unprecedented northern migration it is difficult to account for, though they may have been influenced or attracted by the unusually mild winter and warm spring. That they should have migrated so far north to breed, as suggested by one or more correspondent, is most improbable. As to "hatching their young," there seems to be little chance of their being allowed to lay an egg. With regard to their becoming naturalized, the querist should bear in mind that their habitat is the arid, sandy desert, or tropical plains. Doubtless a fall of a few degrees only in temperature would cause them to depart from our shores as suddenly as they came.—*Henry Hadfield; Ventnor, Isle of Wight, September* 3, 1863.

Partridge perching in a Tree.—The other day, while going along the avenue, my terrier strayed into a corn field, and rose a covey of partridges. All of them flew over a high hedge into the next field, except one. That one (an old bird), to my surprise, "split" from the rest of the covey, and alighted on the branch of a high tree. There it sat, about twenty feet from the ground, until I approached and put it off. This is the first time I have ever seen one do the same, though I have heard from gamekeepers, &c., that they do so occasionally. I write to ask you if many instances have come under your notice, or if it is known to be a usual occurrence.—*John A. Harvie Brown; Dunipace House, August* 23, 1863.

[I have read of such a fact, but never saw an instance.—*Edward Newman.*]

Jack Snipe shot on the River Hull.—An immature female specimen of the jack snipe, in excellent plumage, was shot on the river Hull, near Beverley, by Mr. T. Buckley, on the 18th of August. It was alone. This is the only instance I have met with of the jack snipe having been shot in this neighbourhood during the summer months, although common in winter. It is now in my collection.—*W. W. Boulton; Beverley, Yorkshire, August* 31, 1863.

Occurrence of the Little Bittern in Yorkshire.—On August the 22nd I called upon Mr. Roberts, birdstuffer, of Scarborough. He had just set up an immature, but beautiful, female specimen of this rare bird. It was still quite soft and fresh, and was shot on the mere close to Scarborough.—*Id.*

Sandpiper Diving.—On the 8th of July last I wounded a sandpiper, and, for the second time in my life, had the pleasure of seeing it dive. It escaped from me, I think, by getting below the bank of the river, so I am unable to say where I hit it, but think it most likely to have been hit in the wing. The water being muddy I merely saw it dive, and could not distinguish its motions beneath the surface.—*John A. Harvie Brown; Dunipace House, August* 23, 1863.

Occurrence of the Green Sandpiper near Beverley. — On the 11th of August last a fine male specimen of the green sandpiper was shot on the river Hull, near Beverley; it was alone. On the 21st of that month a pair of green sandpipers, male and female, were shot by Mr. J. Hudson, gamekeeper, of Leven, near Beverley, close to the village of Leven, whilst feeding on the bank of a shallow stream or drain: they are now added to my collection of British birds. On the 26th of August a green sandpiper was seen and fired at by Mr. Thomas Buckley, on the river Hull, near Beverley, the same gentleman who shot the specimen obtained on the 11th instant. I imagined this bird to be the female, paired to the bird shot on the 11th, as it was found near to the same place where the male was killed. All the specimens were mature birds.—*W. W. Boulton; Beverley, Yorkshire, August* 31, 1863.

Dates of Arrival of the Summer Birds, 1863.

April 13. Saw willow wren.
„ 16. Saw swallow, one or two.
„ 17. Saw yellow wagtail.
„ 26. Heard and saw tree larks in great numbers.
„ 28. Heard cuckoo.
May 1. Heard corn crake.
„ 4. Heard sedge warbler. This year there has been quite an influx of this species here. They are said to frequent marshy and reedy places mostly, but they have been common in almost every hedge and coppice quite away from water.
May 12. Saw redstart. This bird generally arrives about the 20th of April. The redstart is less common than it used to be. I can talk to old men who have not seen one for twenty years.
May 16. Found a lesser whitethroat's nest, with eggs.
„ 31. Saw flycatcher.

It is necessary to say that I am located on an eminence.— *George Roberts; Loft-house, Wakefield, August* 17, 1863.

The Maigre (Sciæna aquila) *in Carmarthen.* — I send you the particulars of a fish caught in Carmarthen Bay by the trawlers, on the night of the 31st ultimo. Length 5 feet 1 inch. Girth 2 feet 9½ inches. Weight 64 lbs. Colour coppery on back, fading to silvery on the belly, but not so brilliant as described by Couch. As there seems to be some difference as to the number of rays in the fins, I counted them, and found in the first dorsal 8, in the second 28, in the pectoral 16, in the anal 8.—*D. Williams;* 56, *Wind Street, Swansea, September* 2. [Mr. Cornish has obligingly sent me the notice of a second specimen taken near Penzance.—*E. Newman.*]

Fight between a Cobra and a Mongoose. — As many of the readers of the 'Zoologist' no doubt never see the 'Madras Times,' I forward you an extract from that paper, giving an authenticated account of a fight between the two deadly enemies, the mongoose and the cobra. You will see it mentioned that a fowl that was bitten died half an hour after. In December my dog was bitten by a cobra, but it died in seven

minutes, proving that at different times of the year the poison is more effective than at others.—*Julian Hobson; Poona, August* 1, 1863. "We think the long-vexed question whether the mongoose, on being bitten by the cobra, retires into the jungle and finds some herb as an antidote for the poison, or whether the venom of the serpent produces no effect on the animal, has been at last settled. On Saturday morning last, whilst seated in the mess-house with several officers of the regiment, a servant came and stated that a snake had been seen by one of the guard to enter a hole in the ground, close to where the guard was. We immediately sent for a mongoose (a tame one, the property of an officer), and put him to the hole. He soon began to scratch away the earth, and in half an hour a fine cobra, about a yard long, came forward, with head erect and hood distended, to attack the mongoose, who seemed to care nothing for the reptile, but merely jumped out of the way to avoid the blows which the snake struck at him. The mongoose unfortunately had just been fed, and consequently did not show sufficient inclination to go in at him and kill him; so we secured the snake, and carried him over to one of the officer's quarters to have the contest carried out there, after the mongoose should have had some little time to get over his breakfast. After a couple of hours' rest we placed the cobra in a room with closed doors, we having in the meantime taken up a secure position in the room, from which we could observe all the movements of the combatants. The mongoose was let in and the fight commenced. *The Fight.*—The mongoose approached the cobra with caution, but devoid of any appearance of fear; the cobra, with head erect and body vibrating, watched his opponent with evident signs of being aware of how deadly an enemy he had to contend with. The mongoose was soon within easy striking distance of the snake, who, suddenly throwing back his head, struck at the mongoose with tremendous force; the mongoose, quick as thought, sprung back out of reach, uttering at the same time savage growls. Again the hooded reptile rose on the defensive, and the mongoose, nothing daunted by the distended jaws and glaring eyes of his antagonist, approached so near to the snake that he was forced, not relishing such close proximity, to draw his head back considerably: this lessened his distance from the ground. The mongoose at once, seizing the advantageous opportunity, sprung at the cobra's head, and appeared to inflict, as well as to receive, a wound. Again the combatants put themselves in a position to renew the encounter, again the snake struck at his wily opponent, and again the latter's agility saved him. It would be tedious to recount in further detail the particulars of about a dozen successive rounds, at the end of which time neither combatant seemed to suffer more than the other; we will limit ourselves to describe the final and most interesting encounter. *The last Round.*—The fight had lasted some three-quarters of an hour, and both combatants seemed now to nerve themselves for a final encounter. The cobra, changing his position of defence for that of attack, advanced and seemed determined now to 'do or die.' Slowly on his watchful enemy the cobra advanced; with equal courage the mongoose awaited the advance of his still unvanquished foe. The cobra had now approached so close that the mongoose (owing to want of space behind it was unable to spring out of reach by jumping backwards, as it had done in the previous encounters) nimbly bounded straight up in the air. The cobra missed his object and struck the ground under him. Immediately on the mongoose alighting the cobra, quick as thought, struck again, and to all appearance fixed his fangs in the head of the mongoose. The mongoose, as the cobra was withdrawing his head after having inflicted the bite, instantly retaliated by fixing his teeth in the head of the cobra: this seemed to convince the cobra that he was no

match for his fierce and watchful antagonist, and now, no longer exhibiting a head erect and defiant eye, unfolded his coils and ignominiously slunk away. Instantly the mongoose was on his retreating foe, and, burying his teeth in his brain, at once ended the contest. The mongoose now set to work to devour his victim, and in a few minutes had eaten the head and two or three inches of the body, including the venom so dreaded by all. We should have mentioned before, that previous to this encounter the snake had struck a fowl which died within half an hour of the infliction of the bite, showing beyond doubt its capability of inflicting a deadly wound. After the mongoose had satisfied his appetite we proceeded to examine with a pocket lens the wounds that he had received from the cobra, and on washing away the blood from one of these places the lens disclosed the broken fang of the cobra deeply imbedded in the head of the mongoose. To discover whether there was any truth in the assertion that the mongoose owes its impunity from the bite of the most venomous of serpents to its knowledge of a herb which is an antidote to the poison, or whether on the other hand a prophylactic exists in the blood of this extraordinary animal, rendering it innocuous to the bite of a reptile fatal to all other animals, we have had the mongoose confined ever since (now four days ago), and it is now as healthy and lively as ever; but should it in the course of a fortnight show the slightest indisposition, we, in the cause of truth, will not fail to inform you. We consider, therefore, that there no longer exists a doubt that in the blood of the mongoose there is a prophylactic, and that the idea that it derives its impunity from a herb is one of many popular errors. We beg to subscribe ourselves as witnesses to the above narrated encounter between a mongoose and a cobra, and remain, dear Sir, yours truly, K. Macaulay, Major 23rd Regiment Light Infantry; C. J. Combe, Captain ditto; H. G. Symons, Lieutenant ditto.—Trichinopoly, July 15th."—*Madras Times.*

Rattle of the Rattlesnake.—In a fœtal specimen examined the scales cease towards the end of the tail, and the unscaled portion is covered by thickened cuticle, the rudiment of a rattle, which must fall off. As the animal grows the last three vertebræ are covered with hardened cuticle arranged in ridges; as growth continues this covering is displaced, a new layer forming underneath it, and the old slipped backward over one ridge in a manner not well determined; this is in turn displaced by a new layer beneath, pushed backward over a single ridge, and so on indefinitely. An interesting point yet to be settled is whether the cuticular caudal rings are set free at the time of moulting. That there is no definite relation between the age of the animal and the number of rattles, was shown by specimens over six feet long having only twor attles, and others of eighteen inches with six or seven.—*From 'Proceedings of Boston Society of Natural History,'* Vol. viii. p. 121.

Description of the Larva of Vanessa Urticæ.—The eggs are laid in the months of May and June, on the leaves of Urtica dioica and U. urens (stinging nettles), in batches of sixty or eighty, and sometimes a much larger number; the females which perform this duty having survived the winter. In a period, varying according to the temperature, of about fourteen days, the young larvæ emerge, and, remaining in company, spin together the leaves of the food-plant; as they consume the leaves the limits of their dwelling is extended, and they continue to live in company until fully half-grown; they then separate, and each feeds alone. When full-fed they rest in nearly

a straight position, but on being disturbed fall off the food-plant, and lie in a curved posture, the head and tail approaching. The head is wider than the 2nd segment, but narrower than those which follow, somewhat notched on the crown, and covered with spinose points, which vary in size, and each of which terminates in a bristle; the 2nd segment is narrow, and has a transverse series of small spines, each of which terminates in a bristle; the 3rd and 4th segments have each a transverse series of eight spines—two on each side of the belly near the insertion of the leg, very small and inconspicuous; and two others on each side of the back, conspicuous and branched, each of the branches, as well as the central spine, terminating in a bristle; the following segments, from the 5th to the 12th inclusive, have each seven branched spines, one medio-dorsal, the others at regular intervals, the medio-dorsal spine always placed slightly in advance of the rest: the 13th segment has four branched spines. Head black, its warts white: body with the dorsal surface black and irrorated with yellow dots, each of which emits a slender bristle; these dots are frequently so numerous as to form a broad yellow dorsal stripe, which, however, is always interrupted by a narrow median black stripe: on each side are two yellowish stripes, one above, the other below the spiracles; the subspiracular stripe is the brighter and more distinct of the two; the spiracles are black and surrounded by a pale ring; the belly is pale, excepting between each pair of claspers, where it is dark, but still irrorated with minute white dots; spines generally smoky green, but not unfrequently black; claspers smoky green. When full-fed it sometimes crawls away from its food-plant, and selects a twig or leaf of some neighbouring plant, or the coping-stone of a wall, or a wooden rail or palings, on which to undergo its change to a pupa, but more often it prefers the under side of a nettle-leaf; in either case it spins a slight web over the object selected, and, suspending itself therefrom by the anal claspers head downwards, it becomes a rather elongate and sharply angulated pupa, which has the head deeply notched on the crown, the points distant and acute; the thorax is dorsally humped, the hump having a median elevated point; on each side of the thorax, near the insertion of the wing-cases, are two rather obtuse elevations; the back has three series of raised points, the median series consisting of six, all of them small and insignificant; each lateral series consists of nine points, three of them thoracic, small and insignificant, the remaining six conspicuous and abdominal; the terminal segment of the abdomen is slightly spatulate, and terminates in a complete fringe of minute hooks, by which the pupa is attached to the web: the prevailing colour of the pupa is brown, mottled or reticulated with black, and adorned with golden spots and reflexions; the spots generally comprise the lateral spinous processes; about the junction of thorax and abdomen the reflexions or tints of gold are more extended, sometimes embracing the wing-cases.—*E. Newman.*

Description of the Larva of Vanessa Atalanta. — The egg is solitary, laid in May and June, here and there, on the leaves of Urtica dioica (stinging nettle): almost immediately after emerging from the egg the little larva draws together the leaves of the nettle, and feeds in concealment; as it increases in size it requires more space, and continues to increase the size of its domicile up to the period of pupation; I have never met with it feeding exposed: when removed from its retreat it feigns death, bending its extremities together; all its movements are slow and lethargic, and its only object, when exposed, appears to be again to conceal itself. When full-fed the head is broader than the 2nd segment, but narrower than the succeeding segments; it is covered with projecting warts, which vary considerably in size; body obese, tapering

slightly towards the extremities; 2nd segment narrow, having a transverse series of small spines, one of which on each side is somewhat larger and more horny than the rest; the 3rd and 4th segments have each a transverse series of eight spines; a pair on each side small and inconspicuous; the remaining four longer, conspicuous and branched, or emitting minor spines, each of which terminates in a bristle; the other segments, from the 5th to the 12th inclusive, have each seven branched spines, one medio-dorsal spine being placed in advance of the rest; the 13th segment has four spines. Head black and rather shining, the smaller points white, the larger ones black: body with the ground colour generally gray-green, irrorated with black and having a rather broad waved stripe on each side just below the spiracles: belly smoky flesh-colour; legs shining black; claspers smoky flesh-colour: such is a description of the usual colouring, but this is extremely variable; the ground colour in some is dingy white, and the lateral stripe scarcely distinguishable; in others it is mottled gray-green, the lateral stripe inclining to yellow; again, in others the ground colour is intense black, thickly sprinkled with white dots, and the lateral stripe brilliantly white or yellow: again the spines on the 3rd segment are sometimes intensely black, while all the others are smoky flesh-coloured, but in other specimens all the spines are alike dingy and semitransparent, with black tips. When full-fed it constructs a somewhat more elaborate retreat; it gnaws through the petiole of a leaf, or eats the main stalk of the nettle within a few inches of the top, not quite separating it; the part thus almost separated falls over and completely withers, and this withered portion is formed into a compact retreat, secured from casualties of weather and from the inspection of birds; from the roof of this the larva suspends itself by the anal claspers, and in two days becomes an obese, humped and angulated pupa, the head of which is notched on the crown, the divisions containing the palpi being distant and very obtuse; the thorax has a large dorsal elevation terminating in a median point: on each side near the edge of the wing-cases are two obtuse angles; on the back of the abdomen are three longitudinal series of elevated points; the median series consists of six rather insignificant and inconspicuous points; each lateral series consists of nine points, two of which are thoracic and seven abdominal, the lateral points being much larger and more conspicuous than those of the median series; the anal segment is slender and beak-like, and is terminated by a dense fringe of minute and very acute hooks, by which the pupa is suspended from the silk of which the roof of its retreat is constructed: the colour of the pupa is reddish gray, delicately reticulated and marbled with black: it appears covered with bloom, like that on a ripe plum, and is adorned with very beautiful golden spots,* more especially on the lateral thoracic points. The perfect insect appears about the fourteenth day, and seems to delight in settling on autumnal flowers and sunning itself on leaves, or in pathways; but the ovary of the female contains no eggs, and she seems to possess no attraction for the male; both sexes hybernate early; they reappear in the spring, but later than our other Vanessæ: the usual intercourse then takes place, and oviposition follows.—*Edward Newman.*

Occurrence of Sphinx Convolvuli near Derby. — Last evening, between 7 and 8 o'clock, I captured a very fine specimen of the Sphinx Convolvuli, hovering over a bed of Petunias. I have not seen one here since the year 1846.—*Henry R. Crewe; Breadsall Rectory, near Derby, September* 10, 1863.

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* A popular fallacy attributes these golden markings to the presence of parasites.

Sphinx Convolvuli at Hackney. — A male specimen of this species was taken by a neighbour of mine on the morning of the 5th of September, fluttering just outside his house. It has suffered but little by falling into unentomological hands, and will, as soon as removed from the setting-board, be added to my collection, it having been presented to me.—*Thomas Huckett ;* 49, *Warburton Road, Hackney, September* 7.

Note on Limacodes Testudo. — On the 5th of July I was fortunate enough to beat into my net a pair of L. Testudo *in cop.* Not having a female in my collection, I hesitated for some time about sacrificing her, an immaculate specimen, for the sake of her eggs. At last I determined on this course, and placed her in a paper cage containing a bottle with some sprigs of oak. I opened the cage in about a week, and found its occupant dead and spoiled ; but the walls of the dwelling were plentifully sprinkled with what at first appeared to me spots of some dried exudation from her body, but which I soon perceived, from their number and regularity, to be eggs. None were laid on the gauze covering of the cage, and only a few on the oak leaves. The egg is quite unlike any other Lepidopterous egg that I have ever seen. It is slightly oval in form ; its lower surface is flat on the paper, the upper surface slightly convex. Each egg is quite 1-twentieth of an inch across, which seems very large for the size of the insect. Its colour is pale yellow, with an opaline appearance. I thought my fortune was made when I saw how liberal my Testudo had been, for there were certainly more than two hundred eggs ; and I was very chary of them, hoping to have a goodly row of the imago for exchange. I therefore only sent batches to Mr. Doubleday and a friend at Brighton. This parsimony I now regret, as, among a number of skilful breeders, there would have been a better chance of a successful issue in some quarter. But to proceed. My eggs were hatched (scarcely any failed) in nine days: The young larvæ were very stout, whitish and hairy, with small black heads ; but they would eat nothing, though they had the choice of oak, hazel, sallow, &c., both tender and tough ; and they all died. My Brighton friend, a very successful breeder of Lepidoptera, placed the eggs on a young growing oak, enclosed in a muslin bag, and when he opened it found all the eggs hatched and the larvæ dead, having scarcely eaten anything. Mr. Doubleday also placed the eggs on a young oak, and tells me that they all hatched, but that, with the exception of five, they would not feed, and of these only two now survive, which grow very slowly. The only time I ever took the larva of L. Testudo was on the 6th of October, 1860 : it was three parts fed, but gradually withered up. My Brighton friend above-mentioned writes :—" A few Septembers ago I found one more than half-grown crawling up an oak bole. It formed a compact, egg-shaped, brown cocoon, but never emerged from it. Before that I once (in August) beat a young one about 1-eighth of an inch long ; but it soon died." I should think the larva must have been beaten occasionally by many of your readers, who might be able to fill up some gaps in the history of the insect ; but I fancy that the peculiarity of the egg has never been noticed hitherto. I enclose a leaf nibbled by the young larvæ, sent me by Mr. Doubleday.—*E. Horton ; Lower Wick, Worcester, August* 28, 1863.

[My detailed description of the larva in a former number of the 'Zoologist' (Zool. 6732) goes far to complete the history of this remarkable insect.—*E. Newman.*]

Description of the Larva of Arctia mendica. — The eggs are laid in May, on the leaves of Urtica dioica (stinging nettle), several species of Rumex (dock), and some other herbaceous plants ; the young larvæ emerge in June, and at first are pale, almost colourless, with the exception of a yellowish head and anal extremity, and a

ring of black dots on every segment; after the first ecdysis the ground colour becomes dusky, the yellowish or rather reddish extremities still remaining; the black dots are now very evident warts, and are twelve in a transverse series on every segment—two small and approximate on the back; two others, also small and approximate, on the belly; the rest are conspicuous and intensely black, and each emits a fascicle of radiating black hairs: after the last ecdysis the larva falls from its food on the slightest touch, and feigns death, lying for a few seconds curled in a ring; it then rouses itself and travels with extraordinary velocity; the head is now red-brown and very glabrous; the body smoky green, the bristles red-brown, a few only black; the two dorsal series of warts are nearly concolorous with the body, the next series on each side intensely black, and the next or third series is concolorous with the body; while the fourth on each side, this being below the spiracles, has the upper half pale and the lower half black; those of the fifth series are longitudinally lengthened, and entirely black; the legs are red-brown; the ventral claspers red-brown, with a dark mark on the outside of each; the anal claspers of the same colour, without the dark mark: at the end of July it spins a lax web on the surface of the ground, and changes to a smooth pupa, and in this state it remains until the following May, when the perfect insect makes its appearance. I am indebted to Mr. Thomas Huckett for this larva.—*E. Newman.*

Description of the Larva of Arctia lubricipeda.—The eggs, which are hemispherical, and at first of a silvery glaucous hue, are generally laid on the upper surface of the leaves of almost every garden or hedgerow plant, in the month of June: I cannot find that the female exercises any choice in providing for her offspring: the eggs are laid with some regularity, and closely approximate, but not absolutely in contact: about the tenth day the eggs become lead-coloured, and under a lens the long hairs of the contained larva may be observed spirally arranged round the interior of the now transparent shell, and there is also a dark substance in the centre of the egg: the young larvæ begin to emerge on or about the 1st of June, and different batches of eggs continue to disclose their contents throughout the month: the young larvæ have a black head and a white body, with eight clearly perceptible longitudinal series of warts, each of which emits a very long black bristle; they feed in company on the upper cuticle and the parenchyma of the leaf, leaving the veins a complete net-work, but attached together by the lower cuticle; after the first ecdysis the young larvæ separate; their colour becomes slightly darker, and the hairs appear more numerous and relatively shorter; when half-grown the colour is smoky green-gray, the dorsal darker than the ventral surface, and having three whitish stripes—one narrow, median and rather indistinct, and one on each side passing above the spiracles; the pale lateral stripes are bordered above with darker smoky green, giving the appearance of dark subdorsal stripes; the warts are pale, and each emits a fascicle of radiating hairs, the greater number of which are of uniform length, rather short and bristle-like, but some few are conspicuously longer than the rest. When full-fed, which is about the 1st of August, the larva rests in a straight position; it falls from its food-plant if disturbed, and rolls itself in a ring, but unrolls after maintaining this position for a few seconds, and begins to travel; the warts are now twelve on each segment; two small, dorsal, approximate, and placed slightly in advance of the rest; and there are moreover two others, also small and approximate, on the ventral surface of the 5th, 6th, 11th, 12th and 13th segments; all the warts probably exist in the infant larva, but are too minute to attract attention: head pale brown; the ocelli large and conspicuous, and comprised

in a dark crescentic mark on each side of the mouth; mandibles black; ground colour of the body smoky green, the warts paler, the pale medio-dorsal stripe only visible on the 2nd, 3rd and 4th segments; an interrupted whitish lateral stripe, composed of a series of pale amorphous blotches, is very conspicuous; the spiracles are white, the bristles are brown, a few longer hairs generally black; the ventral surface dingy smoky green; the legs and claspers brown. In August or September it descends to the surface of the earth, and spins a slight brown cocoon, denuding itself of its bristles, and interweaving them with the silk of the cocoon; it still retains on each wart a fascicle of short, pale, radiating hairs; in this receptacle it changes to a pupa, and remains in that state until the following May.—*Edward Newman.*

Description of the Larva of Arctia Menthastri. — The eggs are laid about the middle of June, on the leaves of a number of herbaceous plants, as several species of Rumex (dock) and Plantago (plantain), sometimes on Urtica dioica and U. urens (stinging nettles), and very commonly on the different species of Mentha (mint), where these occur; also on Ulmus campestris (elm), when growing dwarfed as in hedges; and in gardens on dwarf-beans, scarlet-runners, beet, &c.: the eggs are laid in patches of from forty to eighty each, and, hatching in about ten days, the young larvæ feed in company, eating only one of the cuticles and the parenchyma of the leaf, and leaving the net-work of veins connected by the other cuticle; they are at first very pale-coloured, with a series of dark warts on each segment, out of each of which springs one or more dark hairs: after the second ecdysis the larvæ separate, and gradually become darker in colour, and are full-fed in August, when they may commonly be found at rest in a straight position on the under side of a leaf during the day: if disturbed they fall from the food-plant and feign death, rolling in a compact ring, but maintaining that position only a few seconds, and then unfolding and travelling with great activity. The head is porrected in crawling; it is very glabrous, and decidedly narrower than the body: the body is of nearly uniform breadth throughout; the segments very distinct, and the incisions between them very deep; each segment has a transverse series of twelve warts, two of which—approximate, dorsal and smaller than the others—are placed in advance of the series; in addition to this series of twelve warts on each segment, the 5th, 6th, 11th, 12th and 13th segments have each two small approximate warts on the ventral surface; each of the warts emits a fascicle of radiating hairs, those from the middle of the wart being longer than the rest. Head dark brown in front, with a median pale longitudinal line; the sides are also pale, the antennal papillæ and labrum being white: body dark brown, nearly black, slightly paler on the sides, and having a medio-dorsal and very distinct, narrow, orange-red stripe, extending from the 3rd to the 12th segments, both inclusive; on the 2nd segment this stripe is also perceptible, but much paler and less conspicuous; the legs and claspers are nearly black, and the hairs, which are so long and numerous as almost to hide the body, always excepting the bright dorsal stripe, are generally very dark brown, and sometimes jet-black; the spiracles are white. After ceasing to feed the larva sheds all its hairs, with the exception of a slight lateral fringe below the spiracles, the colour of the skin becomes paler, and there is some appearance of a pale lateral stripe; the warts are now black, and very conspicuously contrast with the paler ground colour; and the second series on each side is composed of larger, darker and more conspicuous warts than the rest: the hairs shed at this period are incorporated with the slight web-like cocoon which the larva spins on the surface of the earth from the middle to the end of August, and in which it turns to a pupa, remaining in that

state throughout the winter, the perfect insect emerging in the May or June following.—*Edward Newman.*

Poisonous Property of the Larva of Liparis auriflua. — I was much interested by your observations (Zool. 8730) on the valvular openings in the larvæ of the genus Liparis, and it occurred to me that they might be for the purpose of emitting some poisonous vapour or pungent acid, as in the squirt of Dicranura vinula. One of my boys a year ago was twice affected in an extraordinary manner after handling larvæ of Liparis auriflua: his eyes were quite swollen up, and his face covered with large blotches. He might have conveyed the poison to his face on his fingers, but his hands were not inflamed at all; and I am inclined to think that the insects squirted or puffed something into his face as he stooped over to examine them. I remember some time ago reading a similar account of a lady who had been dissecting this same larva, and whose face had inflamed in consequence: it was in some small popular book on insects.—*E. Horton; Lower Wick, Worcester, September* 15, 1863.

[As was to be anticipated, I have received numerous inquiries as to the use of these medio-dorsal spiracles, if so they may be called: I can only say in reply that I have published all I know respecting them.—*E. Newman.*]

Description of the Larva of Liparis Salicis. — The eggs are laid in rows, in early autumn, on the bark of the Populus dilatata (the Lombardy poplar), and occasionally on Salix viridis and S. alba, and probably other species of willow; they are always covered and protected during the winter by a white downy substance, evidently from the body of the parent moth; they hatch in April, and are full-grown in June. The full-fed larva rests by day in a straight position, very commonly on the trunk of its food-plant, and in this situation is a very conspicuous object; it reascends the tree in the evening, and feeds principally in the night. Head nearly of the same width as the body: body of equal width throughout, rather depressed; each segment has a transverse series of eight rather conspicuous warts, each of which emits a radiating fascicle of hairs; those of the series on each side nearest the median line of the back are stiff and bristle-like; on the following or middle series of warts, which is situated just above the spiracles, the hairs are of two kinds, those on the upper or dorsal side of the wart stiff and bristle-like, those on the lower or spiracular side, long and silky; indeed this series of warts is distinctly double on the 3rd and 4th segments, and sesquialterous on the others; the 2nd segment has a connected transverse series of warts, composed of one wart from each longitudinal series, but all fused as it were into a continuous mass; on the 5th and 6th segments severally are two transversely-placed, curved, horn-like processes, the extremities of which lean outwards; on the 10th and 11th segments severally is a nearly circular, median, valvular, dorsal opening. Head black and slightly hairy, the hairs very slender, soft and of a whitish hue: median stripe of the back intense velvety black, interrupted by a series of eleven pale lemon-coloured, or sometimes white, double blotches, each of which is intermediate between two segments, half on the anterior, half on the posterior margin of each: when the larva rests each pair of blotches seems united into one, but when it crawls the division becomes obvious; on each side of these median lemon-coloured blotches, and also within the median black stripe, is a series of very irregular and very small spots of the same delicate colour; sides of the larva gray; warts red-brown; bristles red-brown, interspersed with a few black ones; long hairs on the sides pale yellow; dorsal processes black, dorsal valves reddish; legs black; claspers red-brown. It spins a slight web on the trunk of its food-plant, and in this it changes to a hairy pupa, in which

state it remains about fourteen days. The imago appears in July. I am indebted to Mr. Huckett for the larva described.—*Edward Newman.*

Description of the Larva of Liparis monacha. — The egg is laid in the autumn, in the crevices of the bark of Quercus Robur (oak), Pinus sylvestris (Scotch fir), and other trees, and hatches the following spring as soon as the leaves are expanded. The larva is not full-grown until late in June; it then rests in a nearly straight position, and does not readily fall off its food, nor does it feign death if disturbed. Head scarcely so wide as the body, prone, hairy on the cheeks near the mouth: body obese, rather depressed, and slightly dilated on the sides, each segment having six conspicuous warts arranged in a transverse series, and forming together six longitudinal series; the second wart on each side of the 2nd segment is seated on an evident fleshy tubercle, which projects sideways and then slightly forwards; and all the other warts of the second longitudinal series on each side partake of this tubercular character; each segment has moreover two very small, approximate, dorsal warts, in addition to the six more prominent ones I have described: every wart emits a fascicle of radiating stiffish bristles; the 10th and 11th segments have moreover a medio-dorsal valvular opening. The head is gray, delicately reticulated with black: body beautifully varied with delicate shades of green-gray, yellow-gray and smoky brown: the dorsal surface is yellow-gray; the warts very dark, almost black; the hairs on the warts of the first and second longitudinal series are black: the dorsal warts on the 3rd segment are connected by a transverse black fascia; the dorsal surface of the 4th, 5th, 6th and 7th segments between the warts, is reticulated with smoky brown; similar reticulations form a decided patch on the dorsal surface of the 9th, 10th and 11th segments; this patch is restricted and indented at the incisions of the segments: sides green-gray; the dark colour of the second series of warts on each side, connected in some degree by dark reticulations, gives the appearance of a dark lateral or spiracular stripe: belly, legs and claspers green-gray, claspers much dilated at the extremity. It spins a very slight web on the branches of trees, and in a week changes to a pupa, brown with a tinge of bronze, and furnished on every segment with lax fascicles of bent red hairs; immediately behind the head are two fascicles of bristle-like black hairs, and behind these a third of the same kind: the anal extremity is black, and furnished with a number of minute hooks. The web consists of a few threads only, and does not in any way hide the pupa. The imago appears in July and August. I am indebted to Mr. Wright for specimens of this larva.—*Id.*

Description of the Larva of Orgyia antiqua. — The eggs are laid in July, August, September, and even October, on a nearly flat web, spun by the female larva as a cocoon in which to undergo pupation: they are nearly spherical, but slightly depressed on the summit: when first laid they are beautifully glabrous and pure white, except a brown spot in the very centre of the depression, and a brown ring surrounding the spot: they are arranged compactly, touching each other, and remain in that state throughout the winter; they do not hatch simultaneously, but emerge in succession, one after the other, the hatching period of a single batch extending over many days or even weeks; hence some of the larvæ are full-fed while others have not yet escaped from the egg; this peculiarity will account for the constant succession of larvæ we observe in our gardens. The larvæ when hatched seem to exercise no choice in the selection of a food-plant, but eat indiscriminately of every leaf that the garden supplies. The full-fed larva rests in a nearly straight position; it falls off its food-plant when annoyed, and remains for a short time in a curved posture, which can scarcely

be called a ring. Head prone, scarcely so wide as the body: body of nearly uniform width, the divisions of the segments rather strongly marked; the 2nd segment has two fascicles of hair, porrected in front directly over the head; the hairs composing these tufts are of different lengths, and each is ciliated along its shaft and tufted at the extremity: the 5th, 6th, 7th and 8th segments have each an erect, median, dorsal brush; the 5th and 6th segments have also a thin fascicle of hair on each side projecting outwards; the 10th and 11th segments have each a circular, dorsal, valvular opening; the 12th segment has a thin fascicle of long hairs slanting backwards; this fascicle is composed of two kinds of hairs, those in the middle simple, those on the outside longer and of two lengths, but both having the shaft ciliated and the extremity tufted; the 3rd, 4th, 9th, 10th, 11th and 12th segments have each eight wart-like protuberances, each of which emits a radiating fascicle of stiff hairs; the 5th, 6th, 7th and 8th segments have each three such warts on each side. Head black and shining; labrum and base of antennal papillæ white: body with a broad, median, dorsal stripe extending from the 5th to the 12th segment, velvety black; the dorsal brushes generally ochreous, but subject to great variation, being frequently tinged more or less with smoke-colour, especially at the summit; sometimes, although rarely, these tufts are entirely black: the valvular openings are coral-red; the sides of the body are gray, with a pale longitudinal mark on each side of the 11th and 12th segments; adjoining the black dorsal stripe there is an indistinct pale lateral stripe, embracing the spiracles; the 2nd, 3rd and 4th segments are beautifully variegated, principally with black and red; the tufted fascicles on the 2nd and 6th segments are black; the warts are red, and most of the hairs not otherwise described are pale yellow: the ventral surface, legs and claspers are pale. There is not, however, any part of the larva absolutely constant in colour, the tendency being to a darker hue than I have described. When full-fed the larva spins a delicate, but compact, web over the surface of a brick, a stone, the bark of a tree, or any other enduring surface: this is composed chiefly of silk, but is invariably interspersed with a a great number of the hairs of the larva; beneath this web it changes to a pupa, which is black, shining and hairy: the penultimate and ante-penultimate segments are whitish beneath; the last segment is reddish, pointed, and furnished with a number of minute hooks, which are invariably firmly affixed to the web; the hairs are soft, delicately slender, and nearly white; the dorsal surface, exactly where the dorsal brushes were situated in the larva, is covered with a scabrosity which has much the appearance of clusters of minute eggs; the pupa of the female is considerably larger than that of the male, and differs in the absence of the usual wing-cases. The male appears in July, August and September: he is constantly on the wing, flying all day, whether the weather be bright or cloudy; his sole object appears to be to discover the female, who, in direct contrast to the volatile propensities of the male, never leaves the web in which she became a pupa, but, crawling on the surface of this web, she receives the embraces of the male, and immediately afterwards commences the duty of oviposition.—*Edward Newman.*

Description of the Larva of Himera pennaria.— The eggs are laid on the bark of Quercus Robur (oak), Betula alba (birch), and Carpinus betulus (hornbeam), and do not hatch until spring, when the young larvæ ascend the trunk and branches, and, scattering themselves in all directions, feed on the leaves of these three trees: their presence may be detected by the small and nearly circular holes which appear in the leaves of the hornbeam almost directly they unfold. The larvæ are full-fed in June, and then rest in a straight stick-like position, with the head and anterior segments

elevated at an angle of 45°. The head is about the same width as the body, subporrect, and scarcely notched on the crown: the body is uniformly cylindrical and smooth, with the exception of two conspicuous, glabrous, approximate warts, placed transversely on the back of the 12th segment; each of these emits from the summit a single erect bristle. Head brown: body brown, with numerous fine black markings and a few yellow ones; the black markings are mere dots, but are collected into groups, sometimes forming short, longitudinal, waved lines; the yellow markings are in pairs and often very obscure, two on the back of each segment from the 3rd to the 12th inclusive; there is also a series of three yellow spots on each side; each spot situated just behind a spiracle; the warts on the 12th segment are red; belly nearly of the same colour as the back, except the space between the legs, and between the ventral and anal claspers, which is glaucous green, approaching to blue. The full-fed larva descends the trunk in June, and, making a slight excavation in the earth, changes to a pupa just below the surface: the perfect insect appears in October and November.—*Edward Newman.*

Description of the Larva of Tephrosia consonaria.—The egg is laid in May, on the trunks of Betula alba (birch), Fagus sylvatica (beech), and more rarely on Carpinus betulus (hornbeam), on which trees the larvæ feed. They are full-fed in June and July, when they rest in a straight posture, parallel with a twig of the food-plant, to which they hold both by the legs and claspers, the head being slightly elevated and porrected. Head somewhat narrower than the body: body nearly uniformly cylindrical, but restricted at the incisions of the segments, shining; both head and body have a few scattered hairs; each segment of the body, from the 5th to the 11th inclusive, has four small dorsal warts, forming a quadrangle; the 12th segment has two such dorsal warts rather larger than the rest. The head is grayish brown, reticulated with darker colour, and sometimes tinged with green: the body is gray-brown, tinged with green, and having twelve narrow and closely approximate, dorsal, rivulet markings, of a darker colour, extending throughout its length; the dorsal warts are dark brown, almost black; the belly is green; the ventral claspers are tinged with red; the legs and anal claspers are of the same colour as the body. When full-fed it descends the trunk, and, burying itself in the earth, changes to a pupa, and remains in that state during the winter; the moth appearing in April and May of the following year. I am indebted to Mr. Doubleday for these larvæ, and the information respecting their economy.—*Id.*

Description of the Larva of Phigalia pilosaria. — The eggs are laid in crevices of the bark of Carpinus betulus (hornbeam) and some other forest trees, very early in the spring, and are hatched before the leaves begin to expand: the young larvæ find their way to the buds, and continue to feed on these until the leaves expand, previously to which they grow very slowly, but no sooner are young leaves available than the larvæ feed on them voraciously, and are full-fed by the end of May or beginning of June, when they rest in a nearly straight position, but with the back slightly arched: they neither fall off the food-plant nor feign death when disturbed. The head is prone, of less circumference than the body, and notched on the crown: body of uniform circumference, beset with numerous conspicuous warts, scarcely amounting to humps; each of these warts emits a strong but short bristle, which terminates in an extremely fine point: the situation of the warts I will describe:—on the 2nd, 3rd and 4th segments they are small and insignificant; on the 5th segment are two placed transversely on the back, and one on each side, but these are still inconspicuous, although manifestly

larger than those on the preceding segments; on the 6th and 7th segments, in the same position, are two dorsal and two lateral warts, all much larger: the same number and arrangement of warts obtains on the 8th, 9th, 10th and 11th segments, but all these are small as on the 5th segment: on all these segments, that is from the 5th to the 11th inclusive, there is a minute wart in advance of each principal wart; on the 12th segment are two transversely placed and rather prominent dorsal warts, and two minute warts behind them: every wart terminates in a bristle. Head slightly hairy, opaque brown, with two paler, transverse, waved markings across the face: body sometimes yellow-green, but generally brown, with the warts black and a few yellow markings, *viz.*, on the 2nd segment a transverse mark immediately behind the head; on the back of the 3rd and 4th segments two approximate stripe-like markings, and an amorphous mark in the region of each lateral wart. It descends to the ground, and changes to a smooth pupa just below the surface of the earth, during the first week in June, and the perfect insect appears in January or February following. I am indebted to Mr. Wright for specimens of both varieties of the larva.—*E. Newman.*

Description of the Larva of Geometra papilionaria. — The eggs are laid in the autumn, on Betula alba (birch), on the leaves of which the larva feeds; the young larvæ emerge in two or three weeks, according to the temperature, and feed for a short time only, hybernating when very small: in early spring they again begin to feed, and are full-fed towards the end of May. The full-grown larva rests in a bent posture, the legs as well as the claspers holding the food-plant; the head is prone, and brought into contact with the legs; it is very slightly notched on the crown. The body is obese, rough as though covered with shagreen, humped on the back, and dilated on the sides below the spiracles; the 2nd segment has a dilated anterior margin projecting slightly over the head, and two small dorsal humps placed transversely; 3rd segment with one large dorsal hump on its anterior margin; 4th and 5th segments without excrescences; 6th with two small wart-like humps placed transversely near its anterior margin; 7th with two large and closely approximate humps on its anterior margin; 8th and 9th each with two smaller and more distant humps on their anterior margin; 10th and 11th without excrescences; 12th with a median, dorsal, double excrescence, not very prominent. Head pale dingy green, with two brown markings on the face: body apple-green, the summits of the humps tinted with red; there is a rather broad, median, dorsal stripe of red-brown on the 11th, 12th and 13th segments; there is a narrow stripe on each side, inclining to yellow below the spiracles; and there are two red-brown markings on the ventral surface of the 11th, 12th and 13th segments, continued into the anal claspers; legs and anterior pair of claspers dingy apple-green. In June it spins together some of the leaves of its food-plant, forming a thin whitish cocoon, in which it changes to a green pupa, having brownish wing-cases, and a reddish blotch on the back of the same segments which have the red-brown stripe in the larva. The perfect insect appears about Midsummer. I am indebted to Mr. Thomas Huckett for this larva.—*Id.*

Description of the Larva of Venusia cambricaria.—The eggs were laid (in confinement) on the 17th of July, and the young larvæ emerged on the 27th; on being offered the leaves of several trees they selected those of Pyrus aucuparia (mountain ash or rowan tree), which abounds in the locality where the moths are taken, and the trunks of which are a favourite resting-place of the moth by day. Larva full-fed on the 20th of August; it then rests in a perfectly straight position, with its head porrected: head rather narrower than the body: body of nearly uniform width throughout its length,

but not perfectly cylindrical, being slightly dilated on the sides, where the lateral skin-fold is conspicuously developed; every segment has two transverse but irregular series of minute warts, each of which emits a minute bristle; these minute warts and bristles are ten or twelve on each segment. Head dingy, transparent green: body brighter green, with a faint indication of paler longitudinal stripes; in the specimen before me, for which I am indebted to Mr. W. R. Jeffery, of Scarborough, there are reddish blotches on the sides of the 2nd, 3rd, 4th, 6th, 7th and 8th segments, and also on the backs of the 6th, 7th and 8th segments, but there is a want of uniformity about the form and position of these blotches that leads me to doubt whether they are accidental or really characteristic of the species:* legs semitransparent purplish or pinky green; ventral claspers pale transparent green, with a purple spot at the base; anal claspers nearly concolorous with the body, but more transparent: it spun together a division of the leaf of its food-plant on the 21st of August, and changed to a pupa on the 24th.—*Edward Newman.*

Sterrha sacraria near Banstead Downs.—A female of this rare species was taken by Mr. George W. Hall, on the 21st of August, 1863, and a male by Mr. Bouchard in the same locality.—*Id.*

Notes on Cidaria immanata and C. russata.—The eggs of C. immanata are deposited in August, and last year they hatched on the 22nd of March; they are then of a primrose-yellow. The larvæ feed upon Fragaria vesca (strawberry) and are full-fed on the 2nd of June. Larva elongate, and of a pale green colour, exactly like the plant; the segmental divisions yellow; between the segments are a series of minute white spots, bounded with dark green, forming ocelli with a fine bristle in the centre of each; there is a darker green dorsal line, and the spiracular part is exceedingly flabby, projecting from the sides: the head is yellowish pale green; the small tail-like anal appendages, claspers and legs are pink. Moths emerged from the 19th of June to August. Of C. russata, the eggs were deposited on the 29th of May and hatched on the 15th of June. The young larva are of a dirty white colour; they fed on Fragaria vesca (strawberry), and were full-fed on the 16th of July. The larvæ when full-grown are exceedingly like those of C. immanata, but rather less, the ocellated spots are rather more abundant, and, instead of the anal appendages, claspers and feet being pink, a dull brown-red is nearer the colour. The perfect insects emerged from the 28th of July to the 14th of August. None of my C. russata had the anal parts or any other part rosy, and in no instance was the spiracular line red, but invariably the same colour as the body.—*R. S. Edleston;* 34, *Kennedy Street, Manchester.*

Notes on Larvæ of Dicranura vinula.—Having reared a pretty considerable number of the larvæ of D. vinula during the present season I have ventured to put upon record a few observations respecting their habits. A good number of them were reared from the egg. The earliest eggs were found at the beginning of June, and I took young larvæ as late as the middle of August, some of which have not yet completed their growth, so that the period of the larva extends from June to September. The markings on the back, it is well known, vary slightly in different individuals; I have yet to ascertain whether these are distinctive of the different sexes. Besides this there is one

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* Similar blotches frequently occur on the larvæ of Oporabia dilutata, but are remarkable for their inconstancy: Mr. Jeffery, whose opinion from practical experience is far greater than mine, considers them constant in V. cambricaria.—*E. N.*

variety, distinguishable even from the egg, which is pink instead of red. From these lighter eggs the larvæ produced have, throughout their earliest stages, a reddish tint in those parts of the body where the other specimens are black; and after the last change of skin they are lighter than the others, both in the ground colour and the shadings. Does this produce the variety of the moth once isolated as D. erminea? These larvæ were fed both on willow and poplar, but the poplar seemed to be the most congenial food, and the largest in growth were fed exclusively upon it. They were supplied with fresh leaves twice a day, at 8 A.M. and 6 P.M., and really appeared to manifest some dim consciousness of the approach of feeding time, even when their stock of food was not exhausted, although they certainly did not display the restless agitation which the accustomed hour provokes in the captive Carnivora. At each successive change of skin the larva devours the cast-off garment, with the exception of the head, which seems too tough a morsel. The time occupied by each change is usually four days, and the larva eats nothing for about half a day after it is completed (saving the old skin). These larvæ are remarkably pugnacious after they have changed their skins for the last time, the approach of an observer immediately occasioning the protrusion of the tentacula or inner horns. As they increase in size they become more pacific. These larvæ have, as most entomologists have observed, the power of ejecting a fluid in defence when annoyed or irritated. Old writers on Natural History state that this fluid is thrown from a rose-coloured aperture behind the head. On the contrary it is below the head, extending, when the larvæ are full-grown, transversely about two lines, just beneath the chin, if one might so call it. Rennie says that this power of ejection is lost when the larvæ are removed from their parent tree. This is the case with most, but singularly enough not with all; three of those I had were exceptions to this rule. This liquid is of an acrimonious nature, probably containing an acid. A large proportion of the larvæ lost one or both of their "horns" or "tail appendages" from a curious cause. They appear to be reckoned tit-bits by some individuals, and when they could do so successfully they employed their jaws in nibbling off the posterior ornaments of their companions. This strange propensity was not occasioned by any scarcity of their accustomed food. The larvæ, however, when awake are peculiarly sensitive to any attacks of this kind, and I noticed that these approaches were only successful at times when the individual attacked was in a state of repose. I use the word "awake" advisedly, for from my observations made upon many species of lepidopterous larvæ, I feel convinced that they do sleep at times, or something very nearly analogous to it. This same propensity manifested itself in a brood of Smerinthus ocellatus, half of which had the posterior horn nibbled off. When the larvæ of D. vinula are about to cease eating and form their cocoons the whole ground colour changes to a dull brown. I was anxious to ascertain whether any two of the larvæ, who were seeking at the same time for a convenient spot to form their cocoons, would unite and form a common one, as sometimes occurs with the silk-producing larvæ: no such instance occurred. They seemed, however, fond of forming their cocoons upon those of their predecessors. In one corner of a box I have no less than six clustered together. Several larvæ ornamented their cocoons by interweaving some of the excreta, or "caterpillar's pills" as a juvenile friend calls them, thus presenting rather an odd appearance when finished.—*John R. S. Clifford;* 21, *Robert Terrace, King's Road, Chelsea, September* 14, 1863.

Description of the Larva of Clostera curtula.—The eggs of the first brood are usually laid during the month of April, on the bark of Salix capræa (sallow), Populus tremula

(aspen) and other species of poplar. When hatched the young larvæ associate in companies, spin together the leaves of the food-plant without altering their perfectly flat position, and reside entirely in the domicile thus formed, eating only the upper cuticle and parenchyma of the lower of the two leaves of which their dwelling is composed, leaving the ribs as it were skeletonized, yet connected together by the lower cuticle. When the leaves forming this dwelling are separated the larvæ are seen in a curved position, the head turned on one side. After ten days the larva leaves its domicile at night to feed, and returns to it before morning. The head is rather wider than the body, which is somewhat depressed in form, but of nearly uniform substance throughout; there is a dorsal hump on the 5th and another on the 12th segment; each segment, except the 2nd, which has but a single wart on each side, has also a transverse series of six warts of nearly uniform size, besides a minute wart just behind the spiracle on the 5th, 6th, 7th, 8th and 12th segments; on the 9th, 10th and 11th segments there are two warts below the spiracle instead of one; all the warts emit silky hairs: at this period the head is black, the body opaque black, with a broad pale yellow median stripe, which is composed of four narrow approximate stripes, and is interrupted on the 5th and 12th segments by the dorsal humps, which are black; all the warts are pale yellow; the belly, anal flap and anal claspers are smoke-coloured, with a tinge of pink; the legs black; the ventral claspers smoke-coloured. After the last ecdysis, which takes place in May, the larva leaves its domicile, rarely returning to it, and its appearance is greatly altered; the black dorsal humps remain, the warts and hairs remain; the warts orange-red, the hairs nearly white; the whole body with these exceptions is reddish gray, spotted with black; the body having greatly increased in size is now wider than the head, which is black only on the sides, having a red stripe down the face, a black clypeus and a white labrum: it still spins together the leaves of its food-plant, the lower usually remaining flat while the upper is raised into a manifest convexity; in this retreat it changes to a pupa of a dark brown colour, and rounded at the anal extremity. The perfect insects appear in July, and immediately commence breeding; the larvæ again feed up, remain in the pupa state during the winter, and emerge in the ensuing April. I am indebted for this larva to the Rev. Percy Andrews. —*Edward Newman.*

Description of the Larva of Notodonta carmelita.—The female lays her eggs on the smallest twigs of the food-plant before the buds have burst, and the eggs are hatched in fourteen or sixteen days; the infant larva resembles the adult, excepting that the lateral stripe is inconspicuous and very faint yellow, the red markings not being observable. The adult larva rests generally in nearly a straight posture, the first pair of claspers not being attached, but the anal pair usually holding on. Head scarcely larger than the second segment, porrected when at rest: body scarcely cylindrical, convex and transversely wrinkled above, slightly dilated at the sides, and flattened beneath, somewhat attenuated towards both extremities; there is no trace of the dorsal elevation on the 11th segment so observable in some of the genus. Head pale, semi-transparent green, with two approximate longitudinal yellow lines on the face, separated only by the usual suture; dorsal surface of the body apple-green, with raised pale yellow markings variously situated; a bright stripe along each side, being a dilated skin-fold, and including the spiracles, which are black; this stripe is of three colours, white, yellow and pinkish red, the colours being clearly defined; it commences immediately behind the head, and extends the entire length of the larva, passing below the anal flap; belly, legs and claspers glaucous-green. Feeds on Betula alba (birch);

feeds for ten or eleven weeks, and is full-fed in June or July, when it buries itself in the earth and changes to a pupa. The perfect insect usually appears in April, sometimes in March, I am indebted to Mr. Mawson, of Cockermouth, for this larva and for the information concerning its economy.—*Edward Newman.*

Larva of Acronycta Alni near Aylesbury.—I have great pleasure in adding one more locality for Acronycta Alni. Yesterday, while walking along a footpath under some trees, a larva of this species dropped on my hat from a large lime tree. A strong wind was blowing at the time. It appears to refuse all kinds of food, having tried it with lime, elm, alder, poplar, willow, sloe, crab, hawthorn, bramble, wild rose, sycamore, oak, &c. It does not appear to be full-fed, and has greatly diminished in size, so that I fear I shall not be able to rear it.—*W. E. Parsons; New Road, Aylesbury, September* 8, 1863.

Description of the Larva of Mamestra Brassicæ.—The egg is laid on the cultivated varieties of Brassica, as summer cabbage, brocoli, cauliflower, sea-kale, &c., and the young larva emerges in a few days and immediately commences its destructive career. I am unable to give a precise date for oviposition or for the emergence of the larva, having observed them feeding throughout the summer and autumn; in a perfectly natural state this larva devours the leaves of almost every herb, particularly the various species of Chenopodium and Rumex: in the garden it spoils even more than it devours, perforating the hearts of cabbages, and leaving the galleries it excavates filled with its disgusting frass. When full-fed it rolls in a compact ring if annoyed, and remains in that posture for a considerable time; when crawling the head is somewhat porrected. The head is scarcely so broad as the body, and partially received into the 2nd segment: body cylindrical, smooth and velvety, the 12th segment slightly incrassated dorsally. Head very glabrous, testaceous, reticulated or marbled with darker brown: body usually divided longitudinally into two equal regions as regards colour; the dorsal region, including the spiracles, is olive-brown; the ventral region dingy yellow; the division between the two colours is usually abrupt and clearly defined, and extends throughout the length of the larva from the head to the anal claspers; on the back of every segment is a somewhat obscure triangular mark pointing backwards, and rendered more conspicuous by being bounded by a lighter shade; in each triangle are two white dots placed transversely; the spiracles are also white; the legs and claspers are of the same colour as the ventral surface. Such is a description of the normal and more marked colouring of this ubiquitous larva, but it varies infinitely; in some examples there are evident black dorsal markings on each side of each segment, except the 12th, and on that a large square black patch, of which the hinder and lateral margins are well defined, but not the anterior margin; in others the olive hue of the back is replaced by a clear brown, and again in others the entire body is of a pale and perfectly uniform dingy green. The larva changes to a brown and glossy pupa in the earth, and remains in that state throughout the winter; the perfect insect is on the wing in May, June, July and August.—*Edward Newman.*

Correction of an Error.—In the 'Zoologist' for September (Zool. 8702) is a description of a larva from Ireland, under the name of Dianthœcia capsophila: it is described with great care and exactness: the describer has done his best for it; and this description is unquestionably a very good word-painting, an accurate description of one stage of the larva of Dianthœcia carpophaga; in fact all the Editor has to do in his corrections is to say "for capsophila read carpophaga," and the whole is correct. —*C. S. Gregson; Spring Hill, September* 3, 1863.

[The Editor leaves this task to his subscribers, some of whom may possibly retain the name of capsophila, while others may accept Mr. Gregson's correction.—*E. N.*]

Description of the Larva of Dasypolia Templi.—The time and mode of oviposition have not been observed, but there is little doubt that the egg is laid on the stem of Heracleum sphondylium (cow parsnep), the larva while young feeding within the stem; as it grows older and larger it burrows downwards, head foremost, until it enters the root, in the very centre of which it excavates a circular gallery, at least half an inch in diameter: its presence in the root is detected by the dying appearance of the plant on which its destructive powers are being exercised. Removed from its gallery the full-fed larva neither feigns death nor rolls in a ring, but crawls slowly and deliberately, and embraces the first opportunity of again concealing itself in the root. Head porrected in moving, but when at rest nearly withdrawn into the 2nd segment, very glabrous: body uniformly cylindrical, and having a conspicuous corneous plate on the 2nd and another on the 13th segment; on the 12th segment are three minor corneous plates, arranged transversely. Colour of the head and corneous plates testaceous-brown, very glabrous: body dingy flesh-coloured, rather shining, and having a number of dark brown dots on every segment; these dots form a transverse series on the back of the 3rd and 4th segments; they are four in number on the back of the following segments, from the 5th to the 11th, both inclusive; the 12th segment has but two dorsal dots in addition to the three corneous plates already mentioned; on each side of each segment are four such dots, and within the area bounded by these four dots is a white spiracle margined with black, and there is one other similar dot on each side of each segment at the base of each leg and clasper; every dot emits a minute hair: on the 5th, 6th, 11th and 12th segments are numerous smaller dots of the same colour, and these are arranged in a transverse series: the legs and claspers are nearly concolorous with the body. About the 8th of August the larva leaves its gallery through a lateral opening, and changes to a smooth brown pupa in the earth, without the slightest appearance of a cocoon, and generally from three to four inches below the surface of the ground: the anal segment of the pupa is rather long and slender, and terminates in two strong and sharp spines. A female emerged on the 8th of September. I am indebted to Mr. W. R. Jeffrey, the discoverer, for specimens of this larva, as well as for its history, which was previously unknown. Notwithstanding the troglodyte character of this insect, it is very apt to be infested by an Ichneumon, which, like the larva, leaves the root, and undergoes pupation in the earth, spinning a large and extremely tough silken cocoon.—*Edward Newman.*

Description of the Larva of Hadena Chenopodii. — The eggs are laid about Midsummer, on the stalks and leaves of several species of Chenopodium, on which the larvæ appear almost exclusively to feed; they are full-fed about the end of August, and then fall off their food-plant and roll into a compact ring if annoyed. Head narrower than the body, porrected in walking: body obese, uniformly cylindrical, very smooth and velvety, the anterior extremity sometimes extended in a leech-like manner. Head glabrous, opaque green, reticulated on the sides of the cheeks with paler markings: body olive-green, delicately reticulated with black, and having two particoloured stripes on each side; the upper imperfectly defined, white or pinky white, or more rarely yellow; it extends from the head completely round the anal flap, and is bordered above with a series of amorphous patches of intense velvety black; the lower stripe is narrow, but very distinct and clearly defined; it passes just below the spiracles

from the head to the anal claspers; its colour is pink, narrowly bordered above and below with pure white: the spiracles are also pure white, delicately bordered with black: belly, legs and claspers pure olive-green. Such is a description of the more usual or normal colouring of this pretty larva, but neither of the colours seems absolutely constant, except those of the subspiracular stripe; the upper stripe is sometimes entirely wanting, and the dorsal surface varies from the normal opaque green to bright apple-green, to pink, to clear brown, and to deep olive-brown: it is full-fed at the end of August, and changes to a smooth brown pupa below the surface of the ground, remaining in that state until the following June, when the perfect insect emerges.—*Edward Newman.*

The so-called Mine of Lithocolletis.—I was somewhat surprised to see my communication (Zool. 8648) headed "Mine of Lithocolletis Larvæ mounted as Transparent Objects on Card-board." As I had intended the plan for every description of mine, I was still more surprised to see that you had mistaken the common Nepticula aurella for a Lithocolletis, but I let it pass unheeded till Mr. M'Lachlan's remarks (Zool. 8734) called for an explanation. Mr. M'Lachlan will observe that I merely said in my communication the plan "would do" for Lithocolletis mines. I am still inclined to think card-board less cumbrous than glass, and paper (which I generally use) still less so than card-board.—*H. W. Kidd; Haslemere, September* 4, 1863.

[I am quite willing to acknowledge my mistake. Mr. Kidd's mentioning the genus Lithocolletis must have given me the idea. The title of all communications should be given by correspondents: it not only avoids the risk of error, but it saves me an infinity of trouble. I am sure Mr. Kidd will kindly oblige me in this matter in future communications.—*Edward Newman.*]

Life-Histories of Sawflies. Translated from the Dutch of M. Snellen van Vollenhoven, by J. W. May, Esq.

(Continued from page 8656).

Cimbex Amerinæ.

Imago. *Linneus, Ent. Syst.* ii. 106, 5, ♂; *Id.* ii. 106, 6, ♀ Tenthredo marginata. *Fabr. Syst. Piez.* p. 16, No. 5, ♂; *Id.* p. 17, No. 6, ♀, Cimbex marginata. *Panzer, Faun. Germ.* 65, f. 1 et 17, f. 14. *Hartig, Blatt. und Holzwespen*, p. 71. *Lepel. Monogr.*, p. 35, No. 97, mas; *Id.* p. 56, No. 98, femina.

Larva. *Rösel.*, ii., Bomb. Vesp. tab. I. (The figure of the cocoon is very bad).

Cimbex æneo-niger, clypeo albo, antennarum clava rufa, pedibus cæruleo-nigris, tibiis ac tarsis fulvis, ventre et ano rufis, feminæ abdominis segmentis albo marginatis.

Baron Charles De Geer, in his 'Mémoires pour servir à l'Histoire des Insectes,' Vol. ii. p. 2, 232 (German translation), has given a detailed

description of a sawfly under the name of Tenthredo Amerinæ, which, however, is not Amerinæ, but probably Lucorum. This has hitherto caused much confusion in the descriptions of these two so nearly allied Cimbices, which we hope our present paper will clear up for the future. The eggs of this species are attached to the veins of the leaves of the willow. The larvæ emerge in June, and remain in company until the second moult. Their growth is slow, so that full-grown larvæ are met with until August, and even till late in September; these must be the product, if not of a second generation, at all events of eggs laid later in the season.

When full-grown the caterpillar is $3\frac{1}{2}$ neth. inches (centimetres) long; the first three segments are stouter than the others, and the whole larva decreases gradually in size towards the tail; it has twenty-two legs, and is of a green colour, darker on the back, having more of a grayish tinge towards the ventral surface. The head is green, and the eyes are placed in round black spots; the entire skin is wrinkled.

The margins of the spiracles are black, having the form of the impression of a stag's hoof, being hereby distinguished from those of most other Cimbices. Above the spiracles are the mouths of small round excretory canals, as is the case in Abia ænea, *Kl.* (see fig. 2).

Each abdominal segment is divided on the dorsum into seven dermal folds, as shown in the third figure, which also gives the colour characterizing the larva during the winter, which season it passes in the cocoon.

It scarcely ever makes use of its last pair of legs; it uses the anterior legs in crawling, and even in the act of progression curls the terminal segments under the belly.

During the day time it usually lies rolled up on the leaves of the willow, but in the evening crawls up the tree and feeds on the leaves.

This species also is able to defend itself from attack by ejecting a clear fluid, which it can throw to a distance of more than a foot; the mouths of the ducts conveying this fluid may be seen just above the spiracles. If the animal is touched on the left side, the fluid is ejected from that side only, and so *vice versâ;* but if it is touched on the back it defends itself from both sides simultaneously. After having performed this action five or six times, it is obliged to rest some time, in order to receive a fresh supply of fluid in the ducts. This faculty of ejecting a fluid is possessed most strongly after the second change of skin, and is entirely lost if the larva be not kept supplied with fresh leaves for food.

In August or September, or, according to Hartig, as early as July,

the larvæ descend the tree, and get into the crevices in the trunk, or amid the moss about the root, and there spin up in a most singular cocoon; this is made up of minute meshes formed by coarse threads, and is transparent, so that the larva may be seen lying within the cocoon; the case itself may most aptly be compared to a tanned fishing-net (fig. 4). According to Klug these little nets are found in great numbers in the midst of the decayed parts of old willows. What purpose is served by the singular structure of the cocoon is to me an enigma; the hypothesis put forward by Frisch, namely, that the openings serve to let out the redundant secretion of the larva, is certainly untenable. The young insect remains in this cocoon until May of the following year, in exceptional cases for two years, having changed therein to a pupa in the middle of April.

In consequence of the transparent structure of the case in this species, the state of activity of larvæ, even during the winter, can be well observed; on being touched it jerks the abdomen smartly round. In order to get out of the cocoon the imago, by means of its large mandibles, gnaws a wide opening in the net-work. The sexes of the perfect insect are so differently coloured that earlier entomologists have regarded the male and the female as distinct species. Both are rather more than two centimetres long; black, with a metallic lustre on the head and thorax, these divisions of the body being, especially in the male, covered with long gray hairs. The antennæ have five joints, the last being clavate and coloured red; the four lower ones are black. The upper lip,—which in the male is very large, rounded and somewhat curved,—as also the clypeus, are white; the jaws are very deep brown. The abdomen is black in the male, with gray hairs at the base; the ventral surface, as also the anus, are ferruginous; in the female the abdomen is also black, but destitute of hairs; the third and fourth segments have two white triangular spots on the sides, and the succeeding segments are bordered with white; the belly is yellowish white, with narrow bluish black diagonal lines, and two longitudinal lines at the sides. The wings are glassy, with a brown border, and a brownish spot before the stigma; the nervures, as well the stigma, are deep brown. The legs are very hairy in the male, less so in the female; in both sexes the coxæ and femora are bluish black; tibiæ and tarsi ferruginous. The posterior femora have a little tooth at the knee.

The antennæ are somewhat longer in the male than in the female. The labrum (fig. 9) is broad, slightly emarginate, and rounded anteriorly, narrower at the base, subtranslucent, and having but few hairs.

The mandibles (fig. 10) in the male are very narrow and long, remarkably pointed, with two blunt teeth in the middle, and a notch a little further towards the point. They are beset with fine hairs on the outer border.

The maxillæ (fig. 11) consist of two membranous lobes, of which the upper is somewhat triangular, and the lower more lancet-shaped. The palpi, which are pretty long, consist of six small joints of about equal length.

The labium (fig. 12) is quadrate-elongate, a little broader anteriorly; the tongue is composed of three lobes, of which the central one is the smallest and narrowest. The labial palpi have four joints, the last being the longest.

Frisch was acquainted with the imago of our insect, and probably with the larva also; nevertheless his description, numbered 25, in the fourth volume of his 'Beschreibung von Allerlei Insecten in Teutschland,' evidently confuses this larva with that of the Cimbex living on the alder, and which I shall provisionally name lutea (as it appears to me doubtful whether it is the same species as femorata), notwithstanding that it constitutes a part of the variabilis of Klug.

Although we have a superabundance of willows in this country, this species of sawfly appears to occur but seldom, and may even be called rare. I have never seen the imago on the wing, and M. Fransen, whom I had requested to collect for me some cocoons, with living larvæ, in the neighbourhood of Rotterdam, where I had formerly taken it, was only able, with much trouble, to get me ten, which he had dug out of the decayed parts of hollow willow trees.

I have not been able to observe the eggs.

Capture, in Scotland, of a Cis new to Britain. — I send you an account of a Cis new to Britain, which I have recently determined. It is at once distinguished from all our other species by its even thorax, polished and even pubescent surface, and distinctly punctate-striate elytra.

Cis lineato-cribratus, *Mellie, Annales de la Société Entomologique de France*, 1848, p. 336, Plate 3, fig. 14 of the Monograph.

The antennæ have ten joints, and it is a true Cis, though Thompson, in his recent Part, places it under the genus Octotemnus, but admits that he has not had an opportunity of examining the structure of the antennæ. My specimens are small, about the size of Octotemnus glabriculus, but narrower, more elongate and cylindrical; chesnut-brown, with antennæ and legs paler. The head of the male has two short blunt horns. Thorax narrowly margined at the sides and posterior margin, shining,

equal, very finely and thickly punctate, and gibbous at the sides. Elytra smooth and not pubescent, distinctly punctate-striate, the striæ being formed by large irregular points, producing a somewhat angulose appearance. It was taken in fungus in Scotland, near Loch Tay, in September, 1862, by my friend Mr. H. Montague.—*John A. Power* 52, *Burton Crescent*, *September* 16, 1863.

Coleopterous doings in Kent and Devonshire.—I have recently been amusing myself with a short ramble, during which I looked for insects, though not altogether on Entomology intent. I found Coleoptera extremely rare, and few to be obtained of any value, except in one or two limited spots. The east coast produced me almost nothing, with the single exception of Deal, which was pretty prolific. I found the usual insects, such as Harpalus cordatus, H. servus, &c., Helops pallida, Masoreus luxatus, Philonthus lepidus, Hydroporus parallelogrammus, Agabus conspersus, Dyschirius nitidus, D. salinus, Syncalypta setigera, Limnichus sericeus, &c., but obtained also a few rarer ones, new I think to the place, including Homalota cæsula, Saprinus metallicus, Philonthus vernalis, Falagria sulcatula, the latter in abundance. I then transferred myself to North Devonshire, where I found a still greater deficiency of insect life; and besides the ordinary coast things, such as Tachyusa sulcata, Cercyon depressum, Nebria complanata, Aepys marinus, Apion Hookeri, &c., the only insects I took worthy of notice were Stenus Guynemeri in profusion, and Quedius auricomus in plenty, in company with that frequent haunter of small waterfalls, Dianous cæruleus. Myllæna brevicornis was in abundance; Homalota maritima also occurred, far below high-water mark. My favourite haunt at Mickleham has recently produced me a fine series of the rare Haploglossa gentilis and H. pulla, a few specimens of the lovely Lycus minutus, with a profusion of Tachyusa umbratica and many other fair insects.—*Id.*

Proceedings of Societies.

Entomological Society.

August 3, 1863.—F. P. Pascoe, Esq., V.P, in the chair.

Donations.

The following donations were announced, and thanks voted to the respective donors:—'Bulletin de la Société Impériale des Naturalistes de Moscou,' Année 1862, No. 1; presented by the Society. Five quarto Tracts on Fossil Insects, &c., by H. A. Hagen, C. von Heyden, H. von Meyer and H. Rathke; Ten Numbers of the 'Neue Preussische Provinzial-Blätter' for various years, containing articles on Entomology; Six octavo Tracts on Neuroptera, &c., by Dr. H. A. Hagen; Five octavo Tracts on Neuroptera, &c., by F. Brauer; Three octavo Tracts on Coleoptera, Myriapoda, &c., by Professor E. von Siebold; Two octavo Tracts by Victor Motschulsky; One octavo Tract, by Franz Loew; Ten octavo Tracts, by Mons. E. de Selys Longchamps; One octavo Tract ('Separatabdruck naturwissenschaftlicher Abhandlungen aus der Schriften des Zoologisch-Botanischen Vereins in Wien'); presented by Dr. H. A. Hagen. 'The Intellectual Observer,' No. 19; by Messrs. Groombridge and Sons. 'The Zoologist' for August; by the Editor. 'The Athenæum' for July; by the Editor. 'The Reader' for July; by the Editor. 'The Journal of the Society of Arts' for July; by the Society.

'Zwölf Amerikanische Nachtfalter; Chilonidarum et Crambidarum Genera et Species;' by the Author, Professor P. C. Zeller. 'Stettiner Entomologische Zeitung,' 1863, Nos. 7—9; by the Entomological Society of Stettin. The following addition to the Library, by purchase, was also announced:—'Auguste Vinson, Aranéides des Iles de la Réunion, Maurice et Madagascar.'

Exhibitions, &c.

The Secretary, referring to the exhibition, at the July meeting, of some white silky matter probably caused by lepidopterous larvæ, said that he had received another communication from Mr. Thomson, enclosing specimens of the moth which flew out of the bin when the chicory was disturbed. These proved to be Ephestia elutella; but it was thought improbable by the lepidopterists present that the silky web was the product of that species.

The Rev. Hamlet Clark exhibited the water-beetles captured by Mr. F. G. Waterhouse during his recent journey of exploration with Stuart across the Australian continent. There were two species of Cybister, both new, but allied to northern forms; three of Hydaticus, of which one was a dark variety of a Moreton Bay species, one was common in the North, and the third was new; two of Colymbetes, both new; one of Agabus, new; two of Copelatus, of which one occurred in Lizard's Island and the other was new; one of Eunectes, which occurred everywhere; two of Hydroporus, of which one was a common South-Australian form and the other a new species; one of Hyphidrus, new; two of Gyrinus, of which one was common at Adelaide and the other new; and one of Dineutes, new. There were thus seventeen species, the produce of the Expedition, represented by twenty-six specimens; of these two were common species in South Australia, one occurred in profusion at Adelaide, and one was common everywhere, leaving thirteen new species, of which seven were without any special affinities, whilst six were nearly related to northern species.

Mr. Stainton exhibited some alder leaves said to contain larvæ of Tinagma resplendellum; the larvæ, however, were not visible, being concealed within the midrib or leaf-stalk. When young the larvæ gave a slight curvature to the leaf, and were almost always found on the antepenultimate leaf of an alder shoot; they then mined down the midrib and leaf-stalk, eating down one side and returning up the other side, and finally, when nearly full-fed, made a blotch on the leaf, by which they might readily be discovered.

Professor Westwood had endeavoured to discover generic characters in the eggs of birds, but had been unable to do so. He should be glad to know if Mr. Stainton's experience of leaf-mining larvæ had led him to the discovery of characters in the mines which were of generic value; if so, regard ought to be had to them in any future arrangement of the Micro-Lepidoptera.

Mr. Stainton replied that not only were the characters of the mine of high importance for the discrimination of species, but he considered that the mines exhibited generic characters also. If a new mine were shown to him he could generally name the genus to which the insect was to be referred.

Mr. Haward exhibited the pupa and a bred imago of Ocypus ater. The larva was found in, and fed on, a piece of elm wood; and had been kept in a glass jar between two and three months, at the end of which time the imago emerged.

Professor Westwood called attention to the ravages committed on the willow trees

in Essex by Cryptorhynchus Lapathi. There was an interesting paper on the subject published in the Linnean 'Transactions' during the last century, by W. Curtis, since which time he was not aware that any further record of the destructive habits of the species had been made. The larva burrowed in the willows, and had attacked the rarer cultivated species in Essex to such an extent that the growers were in fear of entirely losing their crops.

Mr. Timins exhibited bred specimens of Papilio Machaon, Thais Cassandra, Polyommatus Iolas and Clostera anachoreta, their appearance having been hastened by keeping the pupæ in confinement at a temperature of about 60° Fahr. He also read the following notes :—

On Rearing Lepidoptera in Winter, and on the possibility of Naturalizing Exotic Lepidoptera.

"The statement of some old authors 'that Lepidopterous insects, when forced by the application of heat to emerge from the pupæ before their usual time of appearance, are never properly developed,' having been quoted and repeated in various more modern works, may mislead the tyro in Entomology; and as I have established the contrary fact by experience, I have thought it advisable to make these few notes on the subject, with the view of drawing the attention of collectors to the possibility of rearing Lepidoptera in the winter, and of rearing, and perhaps naturalizing, exotic species of Lepidoptera.

"The advantages of causing Lepidoptera to emerge from the pupa during the winter appear to be that the collector has more time to devote to their setting, and more space upon his setting-boards than during the summer; and that very often the collector may travel during the summer, in which case his pupæ cannot easily be attended to.

"I have reared the following species during the winter (placing the pupæ in a warm room for the purpose):—Papilio Machaon, Thais Hypsipyle, Polyommatus Iolas, Smerinthus Populi, Phæosia Dictæa, P. Dictæoides, Saturnia Spini, S. Pavonia-Major, Phalera bucephala, Clostera curtula, Plusia Moneta.

"Specimens of each of these species (and of many others) emerged from the pupæ during the months of January and February at Boulogne-sur-Mer; and at Oxford, during the month of April, I reared Thais Hypsipyle and Polyommatus Iolas (in 1860). In no case was there any variation from the usual type of the species, except in the case of Smerinthus Populi, and this was due to the various kinds of food with which I supplied the larvæ of that species, and which produced some singular varieties. I have also reared various species of Exotic Lepidoptera from imported pupæ; *e.g.*, at Boulogne I reared Vanessa (Araschnia) Prorsa, Polyommatus Iolas, Saturnia Pavonia-Major, Thais Medesicaste, T. Cassandra, and T. Hypsipyle, from pupæ sent from the South of France; and also Catocala Fraxini from German pupæ: and at Oxford I reared Thais Medesicaste, T. Hypsipyle and T. Cassandra; also P. Iolas, Heliothis dipsacea and Ophiusa Geometra from French pupæ. I also reared Plusia Moneta and Deilephila Nicæa from Italian pupæ at Boulogne.

"In the 'Butterfly Vivarium,' published some years since, a suggestion was made of the possibility of naturalizing some of the beautiful species of Exotic Lepidoptera. So far as I can learn, no notice seems to have been taken of this suggestion, though it cannot be devoid of interest to many of our British collectors, and I have made

these few remarks, showing the possibility of rearing Lepidoptera from imported pupæ, in the hope that some of our collectors may be induced to try this mode of enriching our native Fauna. Whether such artificially-reared species would, if set at liberty, propagate themselves is a question which entomologists resident in Britain must set at rest. I have not myself had facilities for settling this point, but I have, I trust, shown the possibility of introducing foreign species into our country. We have succeeded in destroying some of our native species, *e.g.*, Chrysophanus Chryseis and C. Dispar, which appear to have become nearly if not quite extinct; and may it not be worth while to see whether we cannot enrich as well as impoverish our native Fauna?

"The specimens which I have had the pleasure of exhibiting this evening will prove the truth of my assertion, that they do not offer any variety or deviation from the ordinary types of the species, and they will at the same time disprove the ancient and oft-quoted opinion, that Lepidoptera, unless reared in their natural state and under their natural condition of temperature, are never properly developed."

Mr. Pascoe, after announcing the appearance of Professor Lacordaire's sixth volume, containing the Curculionidæ, and speaking in terms of admiration of the author's masterly treatment of the subject, took the opportunity of stating that Lacordaire was in error in supposing that Eurhamphus fascicularis was confined to New Zealand, as he knew species to occur also in Australia.

It was announced that Mr. B. T. Lowne's entomological excursion to Bahia was abandoned, and that two Messrs. Wilson of Adelaide (cousins of Mr. Alfred R. Wallace) were about to make a natural-historical exploration of the islands to the east of New Guinea.

Paper read.

A paper, entitled "Descriptions of some new Genera and Species of Exotic Hemiptera," by Dr. C. Stäl, of Stockholm, was read by the Secretary.

September 7, 1863.—Frederick Smith, Esq., President, in the chair.

Donations to the Library.

The following donations to the library were announced, and thanks returned to the respective donors: — 'New Species of North American Coleoptera,' prepared for the Smithsonian Institution, by John L. Leconte, M.D.; 'List of the Coleoptera of North America,' prepared for the Smithsonian Institution, by John L. Leconte, M.D.; presented by the Smithsonian Institution. 'Proceedings of the Entomological Society of Philadelphia,' May to December, 1862; by the Society. 'Boston Journal of Natural History,' Vol. vii. Nos. 1—3; 'Proceedings of the Boston Society of Natural History,' Vol. vi. Sheets 23—27 inclusive, Vol. vii., Vol. viii., Vol. ix. Nos. 1—11; by the Society. 'Abhandlungen der Mathemat-Physikalischen, Classe der Kœniglich Bayerischen Akadamie der Wissenschaften,' Vol. ix.; by the Academy. 'Bibliotheca Entomologica,' von Dr. H. A. Hagen, Vols. i. and ii.; by the Author. 'Genera des Coléoptères,' par

M. Th. Lacordaire, Vol. vi. and Livr. 5 and 6 of Plates; by Prof. Lacordaire. 'Monographie des Elaterides,' par M. E. Candèze, Vol. iv.; by the Author. 'Proceedings of the Natural History Society of Dublin,' Vol. iii. Part II.; by the Society. 'Beitrag zur Käferfauna der Insel Jesso, bearbeitet von August Morawitz,' Erste Lieferung. Cicindelidæ et Carabici; 'Vorläufige Diagnosen neuer Coleopteren aus Südost-Sibirien,' von Cand. August Morawitz; 'Vorläufige Diagnosen neuer Carabiciden aus Hakodade,' von Cand. Aug. Morawitz; by the Author. 'Proceedings of the Royal Society,' Vol. xii. No. 56; by the Society. 'The Intellectual Observer,' No. 20; by Messrs. Groombridge & Sons. 'The Zoologist' for September; by the Editor. 'The Athenæum' for August; by the Editor. 'The Reader' for August; by the Editor. 'The Journal of the Society of Arts' for August; by the Society. 'On Cephalization, and on Megasthenes and Microsthenes, in Classification,' by James D. Dana; by the Author.

Election of a Member.

William Wix, Esq., of Cockshot Hill, Reigate, was ballotted for, and elected a Member of the Society.

Exhibitions, &c.

Mr. S. Stevens exhibited some Hemiptera and Hymenoptera, and a collection of Coleoptera made by Mr. F. G. Waterhouse during his journey of exploration across the Australian Continent; from one-fourth to one-third of the Coleoptera appeared to be species new to Science.

Mr. Bond sent for exhibition the following Lepidopterous Larvæ, admirably preserved by Mr. T. Baker, of Cambridge:—Papilio Machaon in four different stages of growth, Vanessa Io, Arctia caja, Odonestis potatoria, Gastropacha quercifolia, Porthesia auriflua, and Cucullia Verbasci.

Prof. Westwood remarked that Mr. Baker's preparations rivalled those of Dresden in beauty: he had been informed that the method adopted at Dresden was to squeeze out the intestines through a hole made near the anal extremity of the larva, then to insert a fine straw, and blow the skin out, after which it was placed in a glass vase, which was itself placed in a tin vessel and held over a lamp, by which the larva-skin was quickly dried. The small larvæ, as those of the Tineæ, were put alive into the hot bottle, baked until they swelled to the proper extent and dried, and were then pinned with all their contents inside.

Mr. D. Sharp exhibited a specimen of Coccinella labialis, taken a week previously at Herne Bay.

Mr. Janson expressed an opinion that C. labialis was only a variety of the common C. 7-punctata.

Mr. Waring exhibited two males and a female of Lithostege nivearia, taken in Suffolk; and a male specimen of Sterrha sacraria, taken at Banstead Downs: both these rare Geometræ had been captured by Mr. Bouchard.

Mr. Stainton entered at length into some interesting details respecting the characters of the mines of numerous genera of leaf-mining Tineæ, and exhibited the result of his observations by means of a table, in the different columns of which the principal and distinguishing peculiarities of each genus were shown.

Papers read.

Mr. Walker communicated a paper entitled "Characters of undescribed Lepidoptera:" the species described belonged to the three Heterocerous families of the Castniidæ, Agaristidæ and Zygænidæ, and were most of them in the collection of the British Museum.

Prof. Westwood read some "Descriptions of new Species of Longicorn Beetles:" some of the species described belonged to Mr. Semper, of Altona, and were principally from the Manillas; the other descriptions were drawn up from specimens in the Oxford Museum.

The Secretary read the Introductory Remarks to Major Parry's "Catalogue of Lucanoid Coleoptera; with Descriptions and Figures of new and interesting Species."

Arising out of some remarks by Major Parry on the extraordinary mandibular development of the Lucanidæ, and a suggestion that the intermediate form of male, more nearly resembling the female, so constantly found in this group of insects, might possibly be neuters, an interesting conversation took place. Mr. Bates inquired whether the generative organs of these so-called small or intermediate males had ever been properly examined, and referred to Mr. Pascoe's explanation of similar phenomena among the Longicorns, by what was termed "dimorphism." Prof. Westwood said that the suggestion that these were neuter forms was not new, but had been made by Kirby and Spence in their 'Introduction to Entomology;' he himself had never examined the organs of generation of these particular forms, but intermediate male forms seemed to occur in almost all the cornuted beetles, and also in those with long antennæ. Mr. Pascoe said that his notion had been that the second form was probably the produce of a second brood, born or reared under different circumstances from the original brood. Mr. Bates replied that, in the Copridæ, the two forms certainly occurred in the same brood; he had once thought that the variation of the mandibles and antennæ was owing to the absence of any precise function which those organs had to fulfil, by reason of which absence there was nothing to limit or give the character of fixedness to the amount of variation. Mr. Janson thought it was settled that the function of the mandibles of the Lucanidæ was to break or bruise the bark of trees, with a view to the sustenance of the insect. Mr. Jekel replied that the females, without the development of mandibles, had to do that as much as the males with the large development. The President referred to the case of certain bees which were unmistakeably males, and possessed appendages in the form of horns, as *e.g.* the male of Osmia cornuta. Mr. Bates inquired whether the males of the Lucani (L. Cervus, for instance) fought with one another, and used their mandibles as weapons of offence, like deer, which amongst the Mammalia might be considered to correspond with the horned beetles amongst insects. Prof. Westwood said that males of Trichiosoma had been found fighting together, with their mandibles locked. Mr. Bates concluded that, fundamentally, horns were excrescences of the male organization, and that it was an afterthought of Nature to make them subserve any particular function. —*J. W. D.*

Marine Captures in the Vicinity of Torquay. — Last year you did me the honour to publish (Zool. 8263), for the benefit of naturalists whose studies lay in the same direction as my own, a list of the Actiniæ, &c., which I took during a holiday at Tenby. This summer I selected Torquay as a suitable spot for researches in Marine Zoology, and the following is an account of my captures in shore-collecting and dredging during a fortnight or so in the middle of July. The best hunting-grounds for the former are Goodrington Sands, Livermead Head, and the point in the vicinity of the gas-works; for the latter, off Berry Head and Hope's Naze. With very few exceptions most of the objects are suitable for the marine aquarium; the others are interesting either for the microscope or as subjects for the study of comparative anatomy. Some of the creatures are comparatively rare, while others are of course excessively common, but nevertheless not to be despised on that account. Considering that that delightful and fashionable watering-place has been ransacked over and over again by amateurs and trade-collectors, I am far from being dissatisfied with the results of my captures. I was much struck by the scarcity of Actinia Mesembryanthemum, and by the abundance of Bunodes crassicornis and Anthea Cereus. It reminded me strongly of the remark of Dr. Collingwood (Zool. 7859), in noticing a similar occurrence at Liverpool, and assigning for the cause the rule of Nature in certain kingdoms, which sometimes holds good, that "the stronger of two nearly-allied species should prevail over the other until it became dominant, and absolutely excluded it." For the same reason I cannot help thinking that, as it continues to get scarcer, A. Mesembryanthemum will become more highly prized than it now is. The absence, in the list, of more numerous species of Acalepha, is remarkable, as the weather was gloriously fine during my stay, the sea, with one or two exceptions, unusually calm, and my perseverance with the surface-net unwearying.

List of Objects in Marine Zoology, chiefly suitable for the Aquarium, taken at Torquay, July, 1863. (Marked * were taken by the dredge):—

Poriphora.

Halichondria caruncula
H. panicea
Grantia nivea
Pachydermatisma Johnstoniæ

Actinoida.

*Actinoloba Dianthus
Actinia Mesembryanthemum
„ „ *var.* δ. fragacea
Anthea Cereus
Bunodes gemmacea
B. crassicornis
*B. coronata, *var.* plebeia
*Adamsia palliata
*Sagartia parasitica
*S. viduata
*S. miniata
*Zoanthus Couchii

Alcyonaria.

*Alcyonium digitatum

Acalepha.

Chrysaora cyclonota
Cydippe pomiformis

Echinodermata.

*Ophiura texturata
*Ophiocoma rosula
*O. bellis
*Uraster rubens
*Solaster papposa
*Asterias aurantiaca
Asterina gibbosa
Cucumaria pentactes
*Ochnus brunneus
*Echinus miliaris
*Spatangus purpurea

ANNELIDA.

Nemertes Borlassii
*Pontobdella muricata
*Sabellaria alveolata
*Serpula contortuplicata
S. triquetra
*Terebella conchilegia
*Nereis bilineata
N. à sang vert
*Aphrodite aculeata

CRUSTACEA.

*Stenorhynchus tenuirostris
Portunus puber
*Inachus Dorsettensis
*Ebalia Bryerii
*Porcellana platycheles
Palæmon serratus
Pandalus annulicornis
Mysis (?)
*Pagurus Bernhardus
*P. Prideauxii
Carcinus mænas
Cancer pagurus

CIRRHOPODA.

Balanus Balanoides
B. porcatus

TUNICATA.

Botryllus polycyclus
Clavelina lepadiformis
Ascidea virginea

CONCHIFERA.

Venus verrucosa
*Pecten opercularis
P. varius
*Anomia ephippium

GASTROPODA.

Doris tuberculata
*D. pilosa
*Eolis papillosa
E. amethystina
Cyprea europea
*Turritella fascicularis
Chiton cinereus
Trochus zizyphinus
*Aporrhäus Pes-Pelicani
Purpura lapillus
Nassa reticulata

CEPHALOPODA.

Sepia officinalis

PISCES.

Cottus bubalis
Blennius pholas
Motella vulgaris
Crenilabrus Donovani
*Lepidogaster bimaculatus.

—*W. R. Hughes; The General Hospital, Birmingham, August* 29, 1863.

Error in Dr. Bree's 'Lists of the Birds of Europe.'—I shall feel obliged if my subscribers will be good enough, at page 242, No. 60,—the concluding No. of my work,—to erase, at No. 25, "Once captured by the Rev. O. P. Cambridge."—*C. R. Bree.*

Errata.—Page 8728, line 7 from bottom, for "D. conysta" read "D. compta." Page 8730, line 14 from top, for "town" read "tarn."—*E. Birchall; September* 1.

The Otter near Liverpool. — A very fine male otter was captured this morning in Bromborough Pool, just above this factory. He was seen on the bank opposite the works, and after a sharp chase of two hours, in boats, was stunned by a blow with a stone, and captured alive. He is still alive, but is, I fear, injured internally, as he appears very dull and sluggish this afternoon. He was first seen near the mouth of the Pool, consequently in fully salt water, and hence I suppose him to have strayed up from the Mersey. A partly grown otter was seen by a colleague, some two or three years ago, in the small stream which runs into the Pool from Raby Mere, but was not seen or heard of afterwards. There seems no reason to suppose this to be the same individual, as it is scarcely probable that such an animal could entirely escape notice, even if it could find subsistence, in so small a rivulet as that which forms the commencement of the Pool. It is however, I believe, a very rare occurrence to find the otter in salt water. Mr. Moore, of the Museum, to whom I go for assistance and information in all Natural-History matters, tells me that the occurrence is sufficiently uncommon to render it worthy of notice. — *W. H. Hatcher; Price's Bromborough-Pool Works, near Birkenhead, September* 15.—'*Naturalists' Scrap-Book*,' p. 105.

[I suspect the persecution of the otter may hereafter be thought a mistake, like that of the barn owl and some other birds. The otter revels on eels, and eels on the fry of trout and salmon.—*Edward Newman.*]

A Whale stranded at Speke. — On Friday, July 17th, a large specimen of a whale was observed by some fishermen stranded on a sand-bank at Speke: its struggles were so violent that no boatmen durst venture near it; all they could do for a length of time was to keep an eye on it. When dead it was secured with ropes and towed to the shore. A notice in the daily papers attracted many people to see it, and for several days it was kept for public inspection. I visited it on the 22nd, in company with Mr. Turner, of the Royal Institution, and Mr. Rouleton, of the Lending Library; and we made an external examination, and took correct measurements as under. It was lying on its back, a position very favourable for examination of the under surface, but hiding all view of the blowers. I believe it to be a specimen of Johnston's hump-backed whale (Megaptera longimana of Dr. Gray's 'Catalogue of the Cetacea in the British Museum,' 1850, p. 26), and if so it would appear to have been, up to that date, only once observed on the British coast, namely, at Newcastle, by Dr. Johnston; and it is remarkable that both specimens were females. The dimensions are:—Total length in a straight line from snout to cleft of tail, 31 feet 4 inches; length of gape, about 8 feet; from snout to the eye, 8 feet; length of eye, 3 inches; from the snout to commencement of the pectoral fin, 11 feet; length of pectoral fin, 10 feet; extreme width of tail at the tips, 11 feet; from the snout to commencement of the dorsal fin, or rather hump, 18 feet; length of dorsal fin, 3 feet 3 inches; from snout to cloaca, 21 feet. I had no opportunity of examining the viscera, but learned from the butchers that a quantity of shrimps were found in the stomach. The genus Megaptera is distinguished from the genus Balæna, or true whalebone whales, by the presence of a dorsal fin or hump; by the belly being plaited or deeply grooved, and the plates of baleen being broad and short, which characters agree with this specimen. The longest plate of baleen measures about 2 feet long by 5½ inches at base, and they were so close together that I counted thirty-eight in the length of a foot. The creature was quite black, except the belly, which was mottled and streaked with white, and the pectoral fins were milk-white, except a black blotch here and there. The carcase was purchased by Mr. Brock, of Clement Street, Vauxhall Road, who has

most liberally presented the skeleton to this museum, and it is now being prepared, but some months will elapse before it is ready for inspection. — *Thomas J. Moore; Museum, William Brown Street, Liverpool.*—'*Naturalists' Scrap-Book*,' p. 103.

The Ornithology of Formosa or Taiwan.

By Robert Swinhoe, Esq., F.L.S., F.G.S., &c.*

(Concluded from page 8760).

81. Anthus Richardi, *Vieill.*

82. Alauda cœlivox, *Swinhoe, Zool.* 6723. Throughout the plains, the downs, the grassy plateaux, wherever the locality is suitable in Formosa, this little lark is found, delighting the ear of the savage, the colonist, and the adventurer alike, with its sweet song as it disappears into the sky. But it often also sings on the ground, or mounted on some stone or prominence. In the Pescadore Islands, between Formosa and the main, it is also very common, and almost the only bird there. It is abundant in the South of China, from Canton to Foochow. In Shanghai it is replaced by a similar form, but intermediate in size and proportions between it and the so-called A. arvensis of Peking and its neighbourhood. In my large series of skins from Formosa there is considerable variation in the length and thickness of the bill, some, in the bulkiness of that organ, drawing close to the Mirafræ of Africa and India. For a more detailed account of this bird I must refer my readers to the 'Zoologist' (Zool. 6723).

83. Emberiza spodocephala, *Pall.*

84. E. sulphurata, *Schleg.*

85. E. aureola, *Pall.*

86. E. fucata, *Pall.*

87. E. cioides, *Temm.*

88. Fringilla sinica, *L.*

89. Passer montanus, *L.* The prevailing house sparrow, as in China. Its eggs are very variable, even in the same nest, as to colour, size and shape.

90. P. russatus, *Temm. & Schleg. Faun. Japon.* p. 90, pl. 50. In places where it occurs it is a shy bird, frequenting retired spots on

* I have lately seen the specimen of Regulus modestus in Mr. Hancock's collection at Newcastle. That bird was shot by Mr. Hancock on the coast of Yorkshire, and I can vouch for its being identical with our Chinese Reguloides superciliosus, mentioned at page 8557.—*R. S.*

the woody hills, and nesting in holes of trees. In fact, as regards its habits, it may be called the tree sparrow of Eastern Asia, the true tree sparrow of Europe having there usurped the position of the house sparrow, which does not occur.

91. Munia acuticauda, *Hodgs. As. Res.* xix. p. 153, 1836. In Formosa this is an abundant resident species, being met with in all plantations throughout the low country in small parties. It is a lively little bird, constantly moving about its perch, whisking its pointed tail from side to side, and uttering a rather musical trill-note. It generally prefers selecting a building-site in the neighbourhood of human dwellings, placing its wren-like nest in some bush five or six feet from the ground, often in quite exposed places; but being such a small, delicate bird, and so gentle and familiar in its habits, it is protected by the Chinese, and looked upon as the harbinger of good. It is known in Amoy as the O-pe-la; in Formosa as Aw-tsew-pe-la. In its disproportionately large and not very elegant nest it seldom lays more than three eggs, quite white when blown, but when fresh of a pale ochreous-pink. The males and females are similar in plumage; the young are of a light olive-brown, whitish on the under parts, but always having the white rump-band. This species has been semi-domesticated in Japan, where it breeds, like the canary, in confinement, and produces every variety of albinism and melanism. There are several living examples of these varieties at present in the gardens of the Zoological Society of London.

92. M. topela, *Swinhoe;* Chinese, Topelá. It is often kept in confinement. When singing the male draws himself up to his full height and stretches out his head, the beak is opened, and the throat shaken; but only a low murmuring sound is emitted, which is scarcely audible to a person standing close to the bird: it is the most absurd attempt at singing that ever I witnessed; and yet it draws forth the admiration of the females, for while he is so engaged numbers draw round him and bend their heads forward to listen.

93. Heterornis sinensis.

94. Sturnus cineraceus, *Temm. Pl. Col.* 563; *Faun. Japon.* pl. 45.

95. Acridotheres cristatellus, *L.*

96. Corvus sinensis, *Gould.* Unfortunately I did not procure a specimen, owing chiefly to the great objections the natives had to shoot them. The Chinese colonists there look upon this bird with a kind of superstitious reverence; "for," say they, "whenever the savages sally out and kill any of our number, this crow always sets up a sympathetic 'laou-wa' (or wailing cry)." I asked them if the

crow was not always setting up this cry, whether any mishap had happened to them or not. In reply to this they shrugged their shoulders and laughed, as they always do when the follies of their superstitions are pointed out to them, but they do not believe in them the less for that.

97. Pica media, *Blyth.*

98. Urocissa cærulea, *Gould, Proc. Zool. Soc.* 1862, p. 282. The mountain nymph is by no means an uncommon bird in the large camphor-forests of the mountain range. It is there to be met with in small parties of six or more, flying from tree to tree, brandishing about their handsome tail-appendages, and displaying their brightly contrasted black-and-azure plumage adorned with white, and their red bill and legs, among the deep foliage of the wood. They are shy birds, soon taking alarm at the approach of a stranger, giving warning to each other in loud notes, and then gliding away one after another with a straight flight into an adjoining tree (the flight being executed with short quick flaps of the wing, while the body and tail are held nearly horizontal). They feed on wild figs, mountain berries, and insects, chiefly Melolonthine Coleoptera.

99. Garrulus taivanus, *Gould, Proc. Zool. Soc.* 1862, p. 282. Though the members of this genus are somewhat migratory, yet their peregrinations are always within a limited sphere; and wherever the jay occurs in isolated localities we meet with aberrations from the typical form. This apparent rule in this interesting group is highly suggestive.

100. Dendrocitta sinensis, *var.* Formosæ.

101. Megalæma nuchalis, *Gould, Proc. Zool. Soc.* 1862, p. 283. This barbet is a true forest-bird, frequenting the higher mountains of the interior, where it may be met with in great abundance, though generally scattered through the wood singly or in pairs. It affects the highest branches of large trees, sitting solitary and often motionless for hours together. Its note is loud and discordant, the bird often making its presence known by its voice when one would otherwise pass it by unnoticed from the resemblance of its plumage to the general foliage. When seen flying from tree to tree it looks like a cross between an oriole and a parrot, if such a thing can be imagined. It feeds on berries and occasionally on insects, also, as I am told, on small birds.

102. Gecinus tancola, *Gould, Proc. Zool. Soc.* 1862, p. 283.

103. Picus insularis, *Gould, Proc. Zool. Soc.* 1862, p. 283.

104. P. kaleënsis, *Swinhoe.*

105. Centropus viridis. This bird is fond of perching on the thick foliage of evergreen trees, balancing itself on its unstable perch by means of its wings, and springing from one branch of leaves to another, by means of its long lark-like claws, after locusts and other soft insects of that family. It suspends its large rush-framed cradle between the long leaves of the sugar-cane and other reeds, weaving the dried hanging leaves into the bottom of its nest, and thus forming them into supports. In this rather rude structure it lays generally four white eggs, which vary much in shape and size, but are usually obtuse at both ends, averaging 1·3 by 1 inch, are rather thick-shelled and rarely glossy. Its flight is straight, executed with short flaps and once and again a motionless sail through the air, the tail being held somewhat horizontally, but generally rather on the decline. At the end of September, 1861, a nest of four live young birds was brought to me, and I kept them alive some time. Like other young cuckoos, their appetites were insatiable, and when nearly choking they would still continue their cry for more food. This cry is a loud and frequent imitation of the syllable "churr." As soon as you left them to themselves their notes would change to "toc-toc-too," uttered in a subdued voice. This last note is often heard from the adult bird. The little creatures, only partially clothed with a rufous down, with the quills only just beginning to sprout, looked complete oddities. Their mouths were of a dark red-pink. A week after, the inside of their mouths had paled to flesh-colour with the top of the tongue black, the beak was flesh-coloured washed with brownish, irides gray, legs leaden violet; the lark-heel was then very short.

106. Cuculus kelungensis, *Swinhoe.*

107. C. canorus, *L.* On the coast near Taiwanfoo I procured a stray specimen of this species. Mr. Blyth has examined and identified it. It was procured in September, and was apparently on its southerly migration. I never heard or saw the European cuckoo at any other time in Formosa.

108. Treron Formosæ, *Swinhoe.*

109. Turtur rupicola, *Pallas.*

110. T. chinensis, *Scop.*

111. T. humilis, *Temm.*

112. Coturnix communis, *Bonn.*

113. Turnix ocellatus, *Scop.* Chinese name, Bo-bay (tail-less) Kaw-toon.

114. Excalfactoria chinensis, *L.* Chinese name, Koo-lew.

115. Bambusicola sonorivox, *Gould, Proc. Zool. Soc,* 1862, p. 285.

Native name, Teëk-koë (Bamboo-fowl.) This and the Foochow bamboo-fowl are of very similar habits and notes. This species is found throughout all the hills of Formosa, generally scattered about the bush, never in coveys. It is very puligistic, the males and females both singing the same loud cry, beginning with "killy-killy," and ending rapidly with "ke-put-kwai," which is so powerfully uttered that it may be heard at a great distance. They are not easily flushed, lying so close to the ground that you may walk over the spot whence the noise appears to come, and rarely put up the bird. Each pair selects its own beat, setting up, frequently during the day, the challenge-note; and woe betide any other partridge that encroaches on the forbidden ground! They both set on him at once, and buffet him without mercy till he takes to his heels. This pugnacious propensity often meets, as it perhaps deserves to do, with an evil fate. The Chinese fowler listens for the challenge, and sets on the disputed hill a trap with a caged decoy within. The decoy is trained, and sets up a reply. The lord and lady of the manor rush to the spot, and run recklessly into the trap and are caught. The captures are taken to the market and sold as cage-birds, the Chinese having a great love for the horrible screeching cry that this bird is incessantly sending forth. In the night this bird leaves the shelter of the grass and bush, and repairs to the branches of bamboos and other trees to roost. It is an excellent percher, being quite at home on a branch, in which respect it differs from the Chinese Francolin (*Francolinus perlatus*), which never perches. It nests in a depression in the ground, usually under shelter of a bush or tuft, and lays a large number of eggs, from seven to a dozen or more. The eggs a good deal resemble those of the common partridge, being of a dark brownish cream-colour.

116. Phasianus torquatus, *Gmel.*

117. Euplocamus Swinhoii, *Gould, Proc. Zool. Soc.* 1862, p. 284. I was informed by my hunters that a second species of pheasant, which was denominated by the Chinese colonists Wá-koë, was found in the interior mountains; that it was a true jungle-bird, frequenting the wild hill-ranges of the aborigines, and rarely descending to the lower hills that border on the Chinese territory; and that in the evening and early morning the male was in the habit of showing himself on an exposed branch or roof of a savage's hut, uttering his crowing defiant note, while he strutted and threw up his tail like a rooster. I offered rewards and encouraged my men to do their utmost to procure me specimens of this bird, and I was so far successful that I managed to obtain a pair; but in my trip to the interior

it was in vain that I sought to get a view of it in its native haunts, and to make acquaintance with it in a state of nature.

118. Glareola orientalis, *Lath.* The flight of this bird is much like that of the golden plover, only swifter, with more evolutions. Its eggs are four in number, laid in a depression in the ground. It often feeds on the Cicindelæ that swarm on the sands: running with velocity after its prey, springing lightly into the air as the insect takes wing, and snapping it with a quick turn, in the manner of a Muscicapa it wheels round and alights again on the ground.

119. Squatarola helvetica, *L.*
120. Charadrius longipes, *Temm.*
121. Ægialites Geoffroii, *Wagl.*
122. Æ. cantianus, *Lath.*
123. Æ. philippinus, *Scop.*
124. Hæmatopus longirostris, *Gray.*
125. Recurvirostra Avocetta, *L.*
126. Totanus glottis, *L.*
127. T. stagnatilis, *Bechst.*
128. T. calidris, *L.*
129. T. glareola, *Gmel.*
130. T. ochropus, *L.*
131. T. brevipes, *Vieill.*
132. Tringoides hypoleucos, *L.*
133. Limosa uropygialis, *Gould, B. of Austr.* vi. pl. 29.
134. Numenius minor, *Schleg. Faun. Japon.*
135. N. uropygialis, *Gould.*
136. N. major, *Schleg. Faun. Japon.*
137. N. arcuatus, *L.*
138. N. rufescens, *Gould, Proc. Zool. Soc.* 1862, p. 286.
139. Tringa Cinclus, *L.*
140. T. acuminata.
141. T. platyrhyncha, *Temm.*
142. T. Temminckii, *Leisler.*
143. T. damacensis.

144. T. albescens, *Gould.* The small parties of these birds that visit our salt-marshes rise all together, when disturbed, with a loud twittering note. When one is wounded its companions fly round and about it to try and render it assistance, in the manner of curlews, and often keep by the fallen until it dies, thus too frequently endangering their own lives. I have not observed this sympathy with the distress of its fellows displayed by any other species of Tringa.

145. Calidris arenaria.
146. Strepsilas interpres, *L.*
147. Lobipes hyperboreus, *L.*
148. Scolopax rusticola, *L.*
149. Gallinago scolopacina, *Bonap.*
150. G. stenura, *Temm.*
151. G. megala, *Swinhoe. Ibis*, 1861, p. 343.
152. Ibis nippon, *Schleg. Faun. Japon.*
153. Platalea major, *Schleg. Faun. Japon.*
154. Ardea cinerea, *L.*
155. Herodias alba, *L.*
156. H. garzetta, *L.*
157. H. eulophotes, *Swinhoe*, *Ibis*, 1860, p. 64.

158. Buphus coromandus, *Bodd.* This species arrives in Formosa in April in very large flocks, which do not separate, but breed together, feed together, and remain in constant company till they leave our shores again in the beginning of October. They are very partial to insects, and may be frequently seen seated on the backs of and near cattle, catching the flies that swarm about them. I have found in their stomachs maggots, grasshoppers, and many other insects; but they do feed on fish when they can get them, though they are by no means such assiduous fishermen as many of their brethren are. They are much tamer than most herons, and so are easily approached within shot. In confinement they soon become tame and docile, and will feed readily on almost any food offered. They often build in company with the egrets and other herons on the branches of trees, fighting and squabbling together, and robbing one another's nests of materials in much the same manner. The nest is merely a small flat pannier of twigs, on which three eggs are usually laid. The eggs are bluish white, with a tinge of green, much lighter and rather larger than those of H. garzetta. In South China and Formosa this bird, as I said before, is only found as a summer visitant, wending southwards in winter, which season it doubtless passes in India and its archipelago, though I can find no note of that in any work.

159. Butorides javanicus, *Horsf.* This solitary, skulking, bittern-like species is abundant in all marshy grounds throughout Formosa, a few also occurring in winter. It feeds by day, prowling about in the water-covered fields of paddy, searching for tadpoles, shrimps, and small fish, as well as for grasshoppers and many kinds of insects. At night it roosts on long reeds and bamboos, or on the branches of trees. On these I have seen it nesting. I procured one egg at Taiwanfoo,

which is of a pale duck's-egg colour, 1·63 inches long and 1·25 broad. The young are more like the adult than is usually the case among the lesser herons.

160. Ardeola prasinosceles, *Swinhoe, Ibis*, 1860, p. 64. Our Ardeola is a constant resident in South China and Formosa, frequenting wet paddy-fields during the day, where they feed on grasshoppers and almost anything they can catch, and roosting at night on the banyan and other large trees. They are called Tsan-la, or rice-field herons, by the Chinese, and paddy-birds by Europeans. They may often be seen together in the same field, as they are a common species, but they neither associate in flocks nor breed in company. Their wicker nests are usually placed on the high branches of banyan trees; and their eggs, seldom exceeding three in number, are bluish white and rather large. The young birds are splashed with dusky on the wings, but they are otherwise very similar to the adult in winter dress. In September the summer plumage begins to fall away, and is replaced by the winter feathers, in which latter dress, as has been before remarked, the several species of the genus are almost undistinguishable from one another. In April the complete nuptial dress is again assumed.

161. Ardetta flavicollis, *Lath.*

162. A. cinnamomea, *Gmel.*

163. A. sinensis, *Gmel.*

164. Nycticorax griseus, *L.* In summer, when the young require incessant feeding, it is not unusual to meet the night heron abroad during the day, searching for food; but at other seasons it is strictly a night bird, roosting in daylight in company, among osiers or bamboos, on the banks of inland waters, and rambling about in the twilight and darkness of night in search of food. In the darkest nights their loud "kwa" may be heard as the birds are winging their way overhead. The Chinese call them Am-kong cheow, or bird of darkness, and look upon them with superstitious dread. They are thought to have some connexion with evil spirits; and as it is the Chinese custom to propitiate the evil demons, that they may not play any of their mad pranks on humanity, so they give protection to these their birds. In large cities superstition is laughed down, and not so prevalent; we therefore, in the Formosan capital, were not thought to commit any great sin in disturbing the ill-hallowed bird; but among the country people at Tamsuy, the villagers for miles round would flock to us when we were out with guns, and beg us not to disturb a colony of night herons that had commenced nesting operations in a fine

bamboo-grove. This plantation of tall bamboos, mixed occasionally with longans and other trees, was on a hemp-farm of some four acres, which is entirely encircled. The flock of night herons, about two hundred or more in number, showed themselves about this wood for the first time in March. For a fortnight they merely made it their roosting-site for the day. In April all was excitement, fighting and building; and towards the middle of the month many of the birds were laying. In the first few days of April a large colony of egrets came to the same trees, and about the middle of the month a large flock of yellowheads (*Buphus coromandus*). At first the confusion was very great, the flocks of the several species coming into constant collision; but before the end of April all seemed amicably arranged, and you could often see on the same tree several nests of the three distinct herons, the females of each sitting, and the males standing by to protect. This large mingled heronry was a most interesting sight, and many times on a fine evening I have taken boat and crossed over to the heron farm to view it. The farm-house stood at one end of the plantation; and its inhabitants were always courteous and kind, and allowed me to roam about their grounds as I pleased. A small wood of large trees stood close to the cluster of huts, and these a party of gray herons had made their home; and here and there among the bamboos you could observe a few of the yellowbilled egret. Thus, within the precincts of these few acres, one had the opportunity of watching and comparing the habits of no less than five interesting species of herons. Few naturalists, I fancy, could ever have had such an opportunity as this; but my time was short, and I was obliged to leave the country before Ardea cinerea and Herodias eulophotes had commenced laying. The bamboos were mostly thirty or forty feet high, bending and curving in all directions, and on almost every available spot throughout their quivering lengths the wicker nests were placed. As you made your way through the dung-stained herbage underneath, clouds of all the several species rose from the trees above, and hovered about the air croaking and screaming. As soon as you had stalked on a few paces, the birds alighted again on their respective positions, and continued their avocations as before. The bamboo is too unstable a tree to trust one's weight to at the height required to be reached for the nests, and they were moreover covered with prickles. I was therefore obliged to look to the dark-leaved evergreen, the longan, for eggs. Out of one of these I procured several eggs of three species—Buphus coromandus, Herodias garzetta, and the Nycticorax. There were always three in each nest. The

eggs of the night heron were the largest and greenest; those of the yellowhead pale bluish, almost white, and finer grained; those of the egret smallest and bluish green. I have seen many heronries in different parts of China and Formosa, but none that I ever saw were so large or so excitingly interesting as the one on the Tamsuy river. It was a sight not easily to be forgotten.

165. Gallicrex cristatus.

166. Porzana fusca, *L.*

167. Gallinula phœnicura.

168. G. chloropus, *L.*

169. Rallus striatus, *L.*

170. Larus crassirostris, *Vieill.; Bp. Consp.* p. 212.

171. L. niveus, *Pall.*

172. L. cachinnans, *Pall.*

173. Chroicocephalus Kittlitzii, *Bruch.*

174. C. ridibundus, *L.*

175. Hydrochelidon indica, *Steph.*

176. Sternula sinensis, *Gmel.*

177. S. minuta, *L.*

178. Sterna cristata, *Steph.*

179. S. caspia, *Lath.*

180. Anoüs stolidus, *L.*

181. Diomedea brachyura, *Temm.* The albatross on wing is never figured correctly. When flying the wings are curved like the head of a pickaxe, and it skims the surface, rising and falling with every trough of the sea, with scarce any motion perceptible in the wings, except at their tips. They often sail upwards, and continue in their flight, throwing first one shoulder forward and then the other. In the male of this albatross the bronchi, on leaving the trachea, bulge considerably as they run horizontally, then contract and bend forwards and downwards, and lastly, turning sharp round, rise upwards and bulge again before entering the lungs. In the female they are short and simple, without convolutions.

182. D. nigripes, *Aud. Orn. Biog.* 1839, p. 327. I kept four of this species, and two of the Diomedea brachyura, alive for some days in my verandah at Amoy, but could not get them to feed. The first few days they used to walk about in a clumsy manner, but afterwards they got weaker and could not manage to rise. Both species had a common habit of stretching the neck and raising the bill upwards, uttering at the same time a loud, hollow-sounded, moaning bellow, as of some animal in pain. The production of this sound seemed to

force up oily matter into the mouth, for the birds would go through the movements of swallowing for some time afterwards. Through the day, and often in the night, this miserable moan would be uttered at set intervals. I kept one of this species alive, to see how long he would live without food, and he lived on, week after week, without showing any particular signs of weakness, till about the 20th day. He then began to look shaky, but still obstinately refused to eat fish. On the 29th day he died: but his abstinence from food was in reality greater than that extraordinary number of days; for he had been in the possession of the fishermen who caught him nearly a week before he came to me. When fresh taken in the spring, the birds are particularly fat: but this starved specimen had survived on the gradual absorption of his adipose tissue; for when I dissected him his flesh was quite hard and dry, with scarce any signs of fat about any part. Birds of prey, and most birds that wander far and seek a precarious living, can survive a long while without food; but I never before heard of such an extraordinary power of abstinence as these albatrosses have proved themselves to possess.

183. Colymbus septentrionalis, *L.*
184. Podiceps minor, *L.*
185. Phalacrocorax carbo, *L.*
186. P. bicristatus, *Pall.*
187. Querquedula Circia, *L.*
188. Q. crecca, *L.*
189. Q. glocitans, *Pall.*
190. P. falcaria, *Pall.*
191. Mareca Penelope, *L.*
192. Dafila acuta, *L.*
193. Anas boschas, *L.*
194. A. pœcilorhyncha, *Pennant.*
195. Spatula clypeata, *L.*
196. Tadorna vulpanser, *Flem.*
197. Casarca rutila, *Pall.*
198. Fuligula marila, *L.*
199. F. cristata, *Ray.*
200. Clangula glaucion, *L.*
201. Mergus serrator, *L.*

There are, doubtless, other species comprised in the immense flocks of Anatidæ that spread down our shores during winter. None, however, as far as I am aware, stay to breed. Geese and swans I did not observe; but most certainly some species of these also come to us, as

they descend to much lower latitudes on the coast of China. I may here remark that a black scoter duck, shot by Capt. Blakiston on the Yangtsze, turned out to be the American black duck (*Œdemia americana*, Swainson), and not the European Œ. nigra as one would have expected. I have never met with this duck, and have not, therefore, included it in my list.

The Osprey near Uxbridge. — A fine osprey, probably driven inland by stress of weather, was shot at Uxbridge on the 1st of this month. It had been observed in the neighbourhood for several days before it was killed. The stomach, which I had an opportunity of examining, was quite empty, with the exception of about half an ounce of sand or grit, kept in a moist state by being mixed with gluten, which I suppose must have been swallowed with a fish that had been killed and eaten upon a sandy shore. The bird was in fine plumage, and, when I saw it, was in the hands of Mr. Gardener, of Holborn, for preservation.—*J. Edmund Harting; Kingsbury, October* 12.

Osprey in Cambridgeshire. — A fine young female was shot on the Ouze by Mr. Towgood, of Paxton Hall, St. Neots, on the 15th of September last. It had been seen several days previous, fishing in that locality. Upon dissecting it I found the remains of a perch, apparently, by the scales of the fish, from three-quarters to one pound in weight, and from the condition of the bird I have no doubt it had fared well in our neighbourhood.—*John Baker; Cambridge.*

Food of Small Birds. — My observations this year have afforded me ground for hoping that the oft-repeated protests of naturalists and others, against the destruction of small birds, have not been fruitless. This summer I have noticed a fair number of all our common migratory insectivorous birds: whinchats, willow wrens, sedge warblers, whitethroats, cuckoos, tree pipits and wagtails, have been plentiful. Our resident birds, especially finches and blackbirds, are numerous; but this is to be attributed partly to the mildness of last winter, and to the abundance of haws and other winter food. But while congratulating ourselves on having done some good, we must not overlook the possibility of reactions. It strikes me that it would be an easy matter for certain birds to be allowed to increase much to our prejudice. Many writers include all the small birds in their commendations to favour; but it must be obvious that some small birds are much more useful to us than others. The sparrows, for instance, and perhaps some other granivorous birds—like moles, polecats, adders, and some of the rapacious birds—would soon become too numerous if allowed to multiply uninterruptedly, particularly in corn-growing and well-cultivated districts. The sparrow is an active and hardy bird, and does not suffer as much as our insectivorous residents from the severity of our winters. Further, its natural enemies are on the decrease. In regard to its feeding habits, from observations I have carried on the last three years, I am led to infer that its utility to the farmer and the gardener is greatly exaggerated. I believe the number of insects destroyed by the sparrow, as compared with the number destroyed by any insectivorous species, is quite insignificant. I examined the crops of ninety sparrows that had been shot by a keeper on the 27th of June, when insects were numerous, and I did not find a single insect; nearly all their crops were distended with corn procured from the stacks. In April I noticed sparrows feeding on

the newly-sown barley-fields. In May and June I saw flocks feeding among the grasses. About the 20th of July I noticed them alighting on the fields of growing barley and wheat. I have examined a great many young of different ages, and, though I have found insects in their crops and gizzards, I have always found vegetable matters and sand. From what I have remarked I think the young are fed pretty largely on insects half the time they remain in the nest, that is, about a week; yet I have found young, not one-third fledged, whose crops contained nothing but wheat. I have found sand, or rather little angular bits of stone, in the gizzards of naked sparrows. Were very young sparrows fed entirely on insects, I imagine they would not need sand. Naturalists have been unanimous in charging farmers with the destruction of small birds; but I am not aware that the farmers about here have ever destroyed, or encouraged the destruction of, any small birds but sparrows. Poisoned seed is not used. It may be remarked, however, that the practice of sowing poisoned grain, though very dangerous and quite reprehensible, would never materially lessen the numbers of the small insectivorous birds, those that are of the most use in the field and garden, for they seldom, if ever, touch grain. It almost seems to me that the farmers have as much reason to complain of the naturalists as the naturalists have to complain of the farmers; for hundreds, perhaps I may say thousands, of insectivorous birds and their eggs are destroyed annually by naturalists, or so-called naturalists. Every rare bird is shot as soon as it alights on our shores. Many are proud to read of the capture of a rare bird, but nothing gives me greater pleasure than to hear of one having escaped the gun. Were certain of those birds allowed to establish themselves and multiply, they might have peculiar tastes, and rid us of insects, such as the larva of the gooseberry sawfly, which is disliked by our common birds, and thus be of the greatest service to the farmer and gardener. Ornithology would also be greatly benefitted; the habits of those birds could be studied more readily and more advantageously. I take it to be one of the grand duties of naturalists to point out which birds should be encouraged and protected, and to what extent; certain insectivorous birds might facilitate the increase of herbivorous insects by preying on carnivorous tribes, and thus be actually hurtful.—*G. Roberts; Lofthouse, Wakefield, September* 21.

Food of Small Birds. — I have read with much interest the article on the "Food of Small Birds" (Zool. 8760). It contains much valuable information, but still it is not "the whole truth." It may be that with *all* species the balance of the work they do is for our benefit. But there is no denying that some kinds, rooks and sparrows in particular, will do an amount of damage to the farmer that it is difficult to estimate. This is entirely ignored by the article before us. Very soon after the grain is formed in the wheat-ear the sparrow may be seen busy pecking it out, and frequently by the side of a thick hedge or copse, before the corn is ripe, a long strip several yards wide will be nothing but straw. In a dry season like the past summer, about a fortnight before the wheat was fit to cut, the rooks would select a piece bounded by ploughed land (without an intervening hedge), fly up to the standing corn, bite off the whole ear at its base, carry it into the ploughed land, and there quietly enjoy it. I had two pieces like this, in which two long strips, about three hundred yards by one yard, were completely destroyed; and the rooks would not be deterred by scarecrows of dead brethren, nor by the gun. Then, again, they will often settle on the shocks, and serve them in a similar manner. And when a field of corn is much laid they will sometimes take advantage of it. No stomach analyses will convince the practical farmer that they do not do him pounds' worth of actual damage, though, as I said before, the

balance may be, and I believe is, on the right side for them. Rooks especially do us an amount of good, of which I fancy we have little idea.— *Edward T. Bennett; Betchworth, September* 6, 1863.

Food of Small Birds.—The old adage of "Audi alteram partem" ought to be considered. I observe the editor of the 'Zoologist' has resumed the subject; but his comparison of the French Government having "taken up" the subject and ventilated it is not a good parallel. The small birds in France are nearly all destroyed; I mean sparrows, finches of all sorts, and blackbirds and thrushes. In England these birds are too numerous, also sparrows and other small native birds. I mentioned in a former communication how much the landed property in France is subdivided, in consequence of there being no law of primogeniture; and all the enactments made will not cause an increase of small birds equal to that in England. In France even robins are dressed and eaten eagerly. A few years ago, on changing my residence, my gardener mentioned that it was no use to sow peas in a particular far-end of the garden, as the sparrows had hitherto eaten them all. The peas were, by my orders, sown there; and on their ripening they were beset by sparrows, but on having two or three killed every day for a week they deserted the peas. Rooks I have endeavoured to preserve for thirty years; but when I lived near my rookery I was compelled always to make a few examples when sowing my crop of potatoes. The worthy editor spares the robin (which is venerated all over England); but in July, if the bird were opened, you would report of his having eaten a few bunches of various fruits: he is a "robbing bird," but on a small scale and for a short period.— *H. W. Newman; Hillside, Cheltenham, October* 5, 1863.

[My much-respected namesake scarcely ventures to look the question full in the face; that a rook has stolen a potato, a magpie a silver spoon, a robin a bunch of currants, and a jackdaw a pair of spectacles, is recorded on the most unquestionable authority, and cannot be controverted: but these isolated facts do not carry with them the inference that the rook is particularly destructive to potatoes, &c. Mr. Bennett, a very scientific farmer, seems to me to take a much clearer view of the case, that "the balance of the work done by birds is for our benefit;" this is the philosophic plan, and not to select a single instance. Our French friends seem to me to have done this very fairly by exhibiting the contents of a stomach every month in the year. —*Edward Newman.*]

Food of Small Birds.—In your paper on the "Food of Small Birds" (Zool. 8760) you state that M. Florent-Prévost's series of specimens illustrating that subject "attracted no attention whatever." Permit me therefore to enclose the following extract from an article on "Ornithology in the International Exhibition," which appeared in the 'Ibis' for July, 1862, by which you will see that public notice was especially directed to those specimens while the Exhibition was still open. The 'Ibis' may not enjoy so large a share of support as other Natural-History periodicals, but it seems only fair to its editor that his efforts to keep its readers acquainted with what is passing in the ornithological world should receive their due acknowledgment. I may further add that, if my memory serves me right, a medal was very properly bestowed on M. Florent-Prévost for the same series of specimens.— *Alfred Newton; Magdalene College, Cambridge, October* 1, 1863. "The extensive area occupied by the French department contains several noteworthy objects to the ornithologist. Entering from Italy, a large series of well-mounted birds meets our eyes as they stand well arranged on the shelves to our left hand. There is first (886) a series of the principal types of mam-

mals and birds considered to be useful and hurtful to agriculture in France. These specimens are borrowed, we believe, from the galleries of the Jardin des Plantes. They are all correctly named and labelled, and were, as we are informed, selected for the purpose by M. Florent-Prévost, Aide-Naturaliste to the Museum of Natural History of that establishment,—a name well known in the literature of Ornithology. The same gentleman exhibited (885) a very interesting series of the dried contents of the stomachs of the principal birds of France, arranged in order, with the object of showing the nature of their food. Each specimen is marked with the date at which it was obtained, and, as an accurate register has been kept of the birds' stomachs examined in this way for the last twenty-four years, the *résumé* gives a very fair notion of the nature of the sustenance of the birds of France in all seasons, and affords a base upon which they may be divided into the two catalogues of *utiles* and *nuisibles*." — *Ibis*, Vol. iv. p. 287 (July, 1862).

Food of Small Birds.— In your paper on the "Food of Small Birds" (Zool. 8760) should we not read "crow" for "rook"? or are we to understand that M. Prévost finds, from actual observation or examination, that the food of the rook, amongst other things, consists of "birds, field-mice, young rabbits, different animals and decaying substances"? If this assertion be correct, the rooks in France must live differently to those in England, I fancy, or my notions respecting the food of this species are erroneous. At all events, I may be allowed to say that, though I have repeatedly watched rooks feeding through a glass, and have examined the stomachs of several after they had been shot, I never could discover either the remains of "different animals" or "decaying substances;" nor have I hitherto heard of such a discovery having been made. I am therefore anxious to be set right on this point. — *J. Edmund Harting; Kingsbury, October* 12, 1863.

[I can throw no additional light on this subject.—*E. Newman.*]

Scarcity of certain Summer Birds.—Mr. Boulton notes (Zool. 8726) the scarcity of some of the summer birds of passage in Yorkshire. I have remarked the same in this district (West Sussex). The wryneck did not arrive until the 11th of April, which is some days later than usual; and I have not seen or heard more than one or two all the summer, whereas in former years we have had great numbers of them about, and their note has been common almost every day through the months of April and May. The redstart also, though it does not breed here, usually visits us on its way northward, arriving from the 2nd to the 6th of April; this year it did not appear until the 14th, and then in extremely limited numbers. The redbacked shrike, again, was both late and scarce; and the same may be said of almost all the summer migrants. The wood and grasshopper warblers, on the contrary, have been more numerous this year than formerly. Can you or any of your readers assign a cause for the lateness of arrival and scarcity above mentioned? — *W. Jeffery, jun.; Ratham, Chichester, September* 9, 1863.

Arrival and Departure of Summer Birds at Taunton.—I enclose a list of the summer migratory birds I have been able to observe this year. As to swallows, I first saw them at Paignton, near Torquay, on the 10th of April, and here in Somersetshire on the 12th. Swifts I first saw on the 8th of May, at Teignmouth, and they must have departed between the 18th and 25th of August, during which time I was away, as there were plenty of them when I went, but none when I returned. Spotted flycatchers I also missed about the 31st of August: — Swallows, April 10th and 20th; chiffchaff, 15th; redstart, 16th; common sandpiper, 17th; sand martin, 12th; yellow wagtail,

21st; whitethroat, 23rd; blackcap, 28th; martin, 28th;—all at Paignton. Swift, May 8th, at Teignmouth.—*Cecil Smith; Lydiard House, Taunton, October* 10, 1863.

Fascination of Birds by Light.—Some interesting remarks upon this subject (Zool. 8630) led me to make inquiries of the keepers of the North Unst ("Flugga") light-house, who now inform me that after dark nights they constantly find birds, either dead or disabled, lying outside the lantern. The various species of sea-fowl which inhabit the neighbouring rocks, and which retire to rest before darkness has fairly set in, seem to escape the danger; it is chiefly the migratory kinds, and those whose habit it is to fly by night, which suffer. Among these I recognize from description a species of owl (shorteared?), a black-and-white wagtail, the snow bunting, the crossbill, the snipe, the wild duck, the storm petrel. The latter occurs chiefly in spring and autumn, very seldom at other times, and occasionally in such numbers that upwards of a score have been picked up at one time by the men, who complain loudly of the trouble caused by the birds vomiting oil upon the glass as soon as they strike against it. One which, having been only slightly injured, was kept alive for some days, at last managed to escape; but as it descended towards the sea a great blackbacked gull dashed after it, and, seizing the poor little bird in its bill, disappeared with it in the cliff beneath. This was witnessed by two persons whose word may be relied upon. Golden plovers have now become very numerous, and are constantly upon the wing during the early part of the night. One dark night in the beginning of this month, as I was carrying a lantern over the hills near Burrafirth, several of these birds flew close past, and once a whole flock came sweeping towards me, and, separating on either side, passed almost within arm's reach, their shrill cries, rushing wings, and the glancing white of their plumage, producing an effect not to be described, and utterly bewildering at the moment. I have no doubt that some would have struck against the lantern, had it not been so constructed that the light, falling upon my figure behind it, warned them in time. In the hope of gaining some useful information as to the movements of some of our migratory birds, I have obtained from the light-keepers a promise to send all future captures to me, at the same time carefully noting the side of the lantern upon which they fall. Should the result prove interesting it will, with the permission of the editor, be duly recorded in these pages.—*Henry L. Saxby; Baltasound, Shetland, September* 26, 1863.

Nesting and Eggs of various Birds.—I have had two nests of kestrels' eggs brought in during the past season, the one containing five, the other six eggs. In the latter nest five of the eggs were of the usual size and shape, namely, broadly oval, 2¼ inches long by 2⅛ broad, and weighed barely three-quarters of an ounce. The sixth egg was very small; I think I never met with a smaller kestrel's; it weighed a little less than half an ounce, and was barely 2 inches long by 1¾ broad; it was very richly marked, quite clotted with colour, which seemed supplied in great profusion. The smaller egg of the nest of five was very pale and faintly coloured. In a nest of sparrowhawk's eggs that I received was one of a pale blue-green, with only one small spot of light yellow-brown. That useful bird the barn owl still breeds with us in some numbers, as a rule in hollow trees, but I have known several instances of their nesting in the holes of chalk-pits and cliffs, and I have known them breed in pigeon-colts on two or three occasions. The longeared owl breeds here sparingly. I took a nest in a small fir-plantation; it contained two young, apparently about half-grown, and two eggs, which I now have in my cabinet. The nest, I suppose, originally belonged to the crow, but the owls had quite flattened it and spoiled its beauty; it was so flat that the wonder

was the eggs did not roll out. That brilliant little denizen of the Thames side, the kingfisher, is by no means rare with us, and may frequently be seen darting along, like a flying jewel, as the sun gleams on its azure blue coat. I have repeatedly taken their nest; but nest it can hardly be styled, for I never found anything more than a few fish-bones and scales mixed up with the loose mould on the floor of their burrow. Considering the size of the egg, they lay a large number; I have frequently taken seven, and in one instance I took eight, eggs. It must be a busy time for the old birds to keep so many mouths supplied. It is an easy matter to discover their nesting-place, for if a burrow is tenanted by kingfishers the nestings show very plainly at the entrance-hole, where they drain out. They oftentimes choose very curious situations for nesting; I knew of a pair last season which bred in a hole in a gravel-pit in the middle of a thick plantation of firs, and quite a mile or more from the water. The first batch of eggs were taken, when they laid a second, and succeeded in rearing and bringing off their young. I once found the eggs of this species in a burrow on the top of a high hill, nearly if not quite a mile from the water. Another pair frequented a small pond in a garden in the town, and doubtless meant to breed, but they were continually disturbed. I have noticed that the second layings of eggs are rarely so large or so many in number as the first.—*Charles Stubbs; Henley-on-Thames, Oxon, September* 11, 1863.

Barn Owls four in a Nest.— A brood of barn owls was discovered in an outhouse on the farm of Treaton, near here. There were four of them, all the same size and age. I think it is very unusual to find so many in a nest.—*Robert H. Leven; Kenaway Burns, Windygates, September*, 1863.

Note on the Shorteared Owl. — The shorteared owl, which is an annual visitant to our fens from October until spring, has allowed me every facility for making an examination of a great number of specimens, alive and dead. A minute scrutiny of their outward appearance has led to my discovering the mark of external sexual distinction, that feature being the very observable rich dark colouring of the female, and thicker streaks of black pervading the entire plumage; while the male is very much lighter, and only faintly marked (upon the breast particularly), and less rich in general colour; the face of the male and the circle of feathers round the eyes are also much lighter. Never having seen this species properly delineated, I have been induced to forward two sketches for Mr. Newman's inspection, and I think no one can point to an instance of the quill-feathers being depicted as represented in my figures. They are, in every representation I have seen, made to appear with the second quills drawn up or level, which is a sad mistake, as this bird never reposes with them in that position, and, as far as my knowledge goes, at no time perches upon a tree, which it is nearly always represented as doing. Both by day and night the shorteared owl takes its food and roosts upon the ground; a turnip-field is a very favourite resort. I have inquired of numerous friends and correspondents whether they have seen this owl perching, and I am pleased to say that all have confirmed my experience in this matter.—*S. P. Saville; Dover House, Cambridge.*

Pied Flycatcher near Land's End. — This little flycatcher has very seldom made its appearance in our southern or western counties, and seems to have a very limited range even in the district where it is most common. In common with others of our soft-billed migrants, several of which only visit our groves very sparingly in the Land's End district during the summer season, such as the common redstart, lesser whitethroat, reed warbler, wood wren, &c., the bird now under notice is found some-

times in the autumnal migration at the Scilly Isles; and I now record the occurrence of one, apparently a bird of the year, during the past week, at Scilly, and agreeing in plumage with one I have in my collection from the same locality. From little or no acquaintance with this species I am induced to suggest whether the black plumage yields in the autumn to the more leaden tone of colour of such as I have observed from Scilly. I may add here that in no instance have I seen or heard of the nightingale occurring in Scilly or in any part of Cornwall. — *Edward Hearle Rodd; October*, 1863.

Golden Oriole in the Isle of Wight. — A magnificent male specimen of the golden oriole was shot here, by a labouring man, on the 10th of September. I purchased the bird, and have it still in my possession.—*H. Rogers; Freshwater, Isle of Wight.*

Scarcity of Redstarts. — I have noticed a great difference in the number of these birds, particularly within the last thirty years; but for this I cannot account, except from the great increase of population, and the consequent overplus of mischievous boys. These birds generally build near the habitations of man; but they are certainly not taken by birdcatchers for their song.—*H. W. Newman; Hillside, Cheltenham, October* 5, 1863.

A Word for the Stonechat. — An opportunity was lately afforded me of watching the prodigious quantity of insects (particularly larvæ) this species devours in the space of even a few seconds. I have recently been staying in a neighbourhood much frequented by the stonechat, and I cannot express the delight I experienced to sit and watch a solitary bird alight upon a cabbage, and in the most energetic manner possible take the larvæ off the leaves with incredible alacrity, then dart at some unlucky fly. I observed the stonechat diligently pursuing his captures from day's dawn to the close of night's sable curtain. I hope those residing in localities frequented by this bird will, from these facts, afford them protection.—*S. P. Saville.*

The Dartford Warbler on the Banks of the Thames at Woolwich. — When out shooting on October 1st, I saw, hopping about in some blackthorn-bushes on the banks of the river, a bird, which, from its small size and mouse-like movements, appeared strange to me. It kept so near the ground that it was with difficulty I could get a shot, which only wounded it. I scrambled through the bushes as quickly as possible, but only in time to see it run into a rat's hole. After a fruitless attempt to rake it out with my ramrod, I left the spot; but on returning some time afterwards to the same bushes I found it fluttering about in them, and, finding I could not catch it, fired a second time, fortunately killing it. On examining the bird I found it to be a fine male specimen of the Dartford warbler. In the stomach I found some small grasshoppers and the wing-case of a small green beetle. When I fired the first time it uttered a cry somewhat similar to the squeak of a mouse.—*H. Whitely, jun.; Woolwich, October* 20, 1863.

Gray Wagtail (Motacilla boarula) *an Autumn Visitor to Shetland.*—Several of this species have lately arrived in Unst, and may now be seen actively searching for food upon various parts of the coast. The stomach of one of these birds, shot by me to-day, contained small marine univalves, a few minute fragments of sea-weeds, some grains of sand, and some flies. It is perhaps chiefly in order to obtain the latter that the bird frequents lee places upon the shore which are fully exposed to the warmth of the sun. In pursuit of these flies it displays great activity, running swiftly and catching them as they skim above the ground, and sometimes, though very seldom, rising upon the wing to take one which would otherwise be out of reach. I have so

frequently had occasion to note the occurrence of the gray wagtail during the months of August and September that it may now be considered as a regular autumn visitor. It usually appears after a stiff breeze from S. or S.W.; but whether this drives it from the south, or detains it upon its way from the north, yet remains to be proved. The latter can scarcely be the case, for Yarrell observes that "this species has no very high northern range, never appearing in Denmark, Norway or Sweden;" nor is it included in Mr. Newton's 'Catalogue of the Birds of Iceland.' — *Henry L. Saxby; Baltasound, Shetland, September* 17, 1863.

Notes on the Rosecoloured Pastor. By Henry L. Saxby, M.D.

A young bird of this species made its appearance here last week, and was shot by me soon afterwards. As it flew past with some starlings its light colour immediately attracted my attention; but never having previously seen one in first year's plumage, I was unable to satisfy myself as to its species without a closer inspection. The flock alighted among a number of cows, and then, by creeping behind a loosely-built wall, I approached sufficiently near to obtain a good view of the then unknown bird, and to make some notes as to its general appearance and habits, which are usually described as precisely resembling those of the starling; but in this case some slight points of difference most certainly existed. Several times the flock was disturbed, and flew off to other feeding-grounds; and the pastor, although apparently desirous of keeping up with it, was not unfrequently left some distance behind; and even upon the ground it sometimes wandered far away: when the starlings made any sudden stop or wheel it became widely separated from them; but, like them, it usually alighted abruptly, although it occasionally circled a little previously. It approached the cows quite fearlessly, and twice it darted rapidly forward and appeared to seize an insect upon the foot of one of them. I think that it procured all of its food either upon or above the surface of the ground; for during the whole time of my presence, a period of about three hours, I never observed it boring with its bill, although its companions were constantly doing so, the hour being early, and the ground consequently still soft. When, by an incautious movement, I either occasioned a slight noise or exposed myself to view, the main body of the starlings, obedient to the warning cry of the most vigilant, immediately paused, looked up in their peculiar manner, and took flight; and the pastor, when it happened to witness any indications of alarm, at once took the hint and made off with the rest; but the cry alone was evidently lost upon

it, and met with not the slightest attention. Upon the ground the pastor was certainly well able to outstrip its companions, and, like them, progressed by means of a series of rapid steps; but it differed chiefly in its lighter and less stately movements, and by carrying the body more horizontally; indeed I fancied that in general appearance it more closely resembled a blackbird. It was rather fond of standing upon a stone or a slight eminence whenever an opportunity offered, and altogether its peculiar motions, and apparently careless search for food, presented a strong contrast to the sober, business-like demeanour of the starlings. Its note was a little like that of a starling, and less harsh. At last, seeing that the flock was becoming more and more difficult to approach, and having very little more time at my disposal, I risked a long shot, whereupon the starlings made for the open fields, but the pastor, with difficulty fluttering across the garden wall, fell upon the ground within forty yards of the very tree from which I shot my first specimen of the bird, in August, 1860. The present one proved to be a male, only a few months' old; the stomach contained some small beetles, a few worms, and a considerable number of small gnats.

A bird so unattractive in appearance as this species, in the plumage of its first autumn, might very easily be overlooked, and I have no doubt that in this state it has more than once been thrown aside, under the supposition that it was a light-coloured starling or a young thrush; nor is it until a side-by-side comparison is made that an observer (at least one equally inexperienced with myself) becomes fully aware of the difference. I have just shot some first year's starlings, and remark that in them the feathers upon the front of the head extend no further than the posterior margin of the nostril, while in both specimens of the rosecoloured pastor the feathers extend some distance further, partly occupying the depression above the nostril: this distinction seems to hold good at all ages. The following description of the rosecoloured pastor, in the plumage of its first autumn, was taken before the skin was removed from the specimen.

Whole length	8¾ inches.
Wing from carpal joint to tip	5½ „
Bill (measured along upper ridge)	8½-twelfths.
Tarsus	1 inch.
Middle toe and its claw	1¼ „

Tip of upper mandible dusky brown, the remainder of the bill yellow. Eye reddish brown. Forehead and top of head light dingy

brown, each feather centred with darker. Cheeks, ear-coverts, back and scapulars rather paler than top of head; upon the lore a few small, scattered, black feathers. Tail-feathers light brown, with still paler edges. The whole of the wing-feathers, including both sets of coverts, dingy brown, edged with soiled white. Chin and throat white; breast and front of neck white, tinged with brown, each feather darker in the centre. Abdomen white: under tail-coverts white, mottled with several shades of light brown. Tarsi and feet light reddish brown, paler and more slender in form than those of the starling. Head without any appearance of a crest.

The specimen killed upon the 10th of August (a month earlier) is black and salmon-colour, like an adult, only the tints are less pure, the crest is not so conspicuous, and some brown feathers among the scapulars seem to be the remains of the old dress, the bird not having completed moulting. From the above facts we may calculate that the moult takes place about the end of July or the beginning of August, and also gain ample evidence, if it were yet wanting, that the perfect plumage of the adult is not attained before the third autumn. The measurements of both of the above specimens are precisely similar, and also agree with those of an adult.

HENRY L. SAXBY.

Baltasound, Shetland,
September 12, 1863.

A Note on Pipits.—I have noted with much interest how birds will take advantage of any circumstance which may conduce to their comfort in the way of procuring food or shelter: as examples of this, during the herring-fishing season in Loch Fyne, in the morning, after the nets have been "haled," pipits alight in many of the boats, and commence searching the nets for any marine animalculæ which may be adhering thereto, not being interfered with in their pursuit by the fishermen, who have facetiously dubbed them with the respectful title of "skipper." These pipits are generally the shore pipit (*Anthus obscurus*), with an occasional meadow pipit (*A. pratensis*). Along the west coast of Scotland are many wooden wharves for the accommodation of steamboats; these are largely taken advantage of by numerous pipits, wagtails, &c., for nightly shelter, the birds evidently considering them admirably adapted for the purpose of dormitories.—*John Kerr; Greenock.*—'*Field.*'

Notes and Queries on the Cuckoo.— Naturalists or "unnaturalists," we have all been bred in the belief that this favourite visitant invariably deposits a single egg in the nest of some other bird; and I note that our most recent ornithological authorities retain the dogma, for which I presume the notorious voracity of the young bird is thought to offer abundant reason. My observations during the late season, limited as they have been, have yet aroused suspicion as to the uniformity mentioned, and they

are subjoined to promote discussion. Early in June, visiting the Formby shore, with a view of inspecting the breeding-places of some of our water-fowl, I unexpectedly chanced upon a titlark's nest containing three eggs, only one of which belonged to the builders of the little domicile; the others were intrusions, and certainly eggs of the cuckoo, although one is rounder and of a much lighter ground colour than usual, its fellow being of average size, shape and colour. Revisiting the neighbourhood a fortnight later, above a mile from any house, and about that distance from the site of the first, I found a second nest of the same bird, containing, as before, a pair of cuckoo's eggs, the legitimate occupants in this case numbering three. Again did the same features present themselves, one proving of a much lighter colour than the other. Inquiry among the young rustics substantiated the fact of duplicate cuckoo's eggs in one nest being no unfrequent occurrence, and one youth assured me of his having once found three cuckoo's eggs in one nest. I may here remark that, although in Yorkshire and more southerly counties the nest of the hedgesparrow, white wagtail, skylark, &c., is occasionally used, I never knew of any other than the titlark's in this district. In few localities probably does the meadow pipit abound more than in this, and throughout the island its nest is the one universally haunted by the cuckoo. Eggs of an unusually light ground colour, or with less spots or blotches of colour (as occurs with hawks, blackbirds, missel thrushes, &c.), I have generally regarded as those of young birds, often as the first laid; and this belief obtains among all country people, doubtlessly grounded on fact. Upon this assumption the two eggs in each of the above cases may be apportioned to one bird, a young one. In reference to the voracity of the fledglings, is it not more likely that a young, inexperienced cuckoo would lay two eggs in a nest than an older bird? Assuredly there was no lack of titlark's nests in the place; and, regarded in every light, it seems to me in the highest degree improbable that in so open a situation different cuckoos would deposit an egg in the same nest. Have any of your readers met with duplicate eggs of the cuckoo in one nest? Have the eggs of this bird been found in this district in any other nests than those of the titlark (*Anthus pratensis*)? How many eggs will an old cuckoo lay in a season? — *H. Ecroyd Smith; Aldbro' House, Egremont.* — '*Naturalists'-Scrap-Book*,' p. 107.

Occurrence of the Grass Parrakeet (Melopsittacus undulatus) *at Westerdale, in Cleveland.*— Receiving information, a week since, of the circumstance that two birds of a most unusual description had been shot at Westerdale in the course of the past summer, I took an early opportunity of going over to see them. They proved to be a male and female of the species named above, and in remarkably fine and perfect plumage. It appeared that they had been observed some days before they were shot, and as far as I could collect they must have been living at least twelve or fifteen days in a state of nature about the village of Westerdale, besides the indefinite time they must have spent in winging their way thither from the place at which they had made their escape from confinement. The man who shot them told me they "wrought despertly about the roads, making maest o' their living about them," that their flight reminded him of that of the wagtail, and their note of the chirpings of the sparrow. The same remote village, situated in the very midst of the moorlands rolling and spreading for miles in every direction, has seen the arrival, during the early autumn, of a carrier-pigeon, with, I believe, a Dutch legend upon its wing-feathers. Though I have made the inquiry, I cannot hear of any aviary, within a circuit of from fifteen to twenty miles, from which the parrakeets could have escaped; and the perfect state

of plumage precludes the idea that they had been confined in the strait quarters of a small cage.—*J. C. Atkinson.*

Slate-coloured Variety of the Chimney Swallow.— A week or two since I had sent for my inspection the most beautiful slate-coloured variety of this species I ever saw. It was of an uniform slate-gray colour, slightly clouded, and very indistinctly barred with a slightly darker hue. The under part of the throat faintly marked with very light chesnut; the ordinary bar of spot-like white markings was quite visible if held in certain lights. The eyes were light hazel; tarsus whitish brown; beak of the latter colour. The whole under portions of its plumage were of a light dirty white. I am aware that white and nearly white varieties of the two cognate species are not of unfrequent occurrence; but these are so frequently designated by the ordinary cognomen "Altin's swallow" that I deemed the note of a slate-coloured Hirundo rustica would not prove uninteresting. It was shot at Stretham, Cambridgeshire, one day last month. —*S. P. Saville; Dover House, Cambridge, October*, 1863.

A Swallow turning Pirate. — I was very much amused, a few days since, while watching one of my little favourites, the Motacilla campestris, which was busily engaged seeking for its food upon the grass opposite my residence. A swallow which chanced to swoop leisurely past darted and caught up what I imagined to be a larva. The wagtail in the most plucky manner darted after the impudent offender, and chased him for at least a minute or two. Whether my little favourite succeeded in recapturing his dainty morsel I was unable to determine.—*Id.*

Scarcity of Swallows. — The scarcity of swallows has been alluded to by several writers in the 'Zoologist.' As far as the martins are concerned it may be accounted for in this way:—Since I resided where I am at present I have encouraged the martins to build a few nests round my upper windows; but the moment these birds had finished their nests the sparrows took possession, and but for my assistance my friends the martins never could have hatched a single brood: the pertinacity with which those lazy, impudent birds, the sparrows, endeavoured to keep possession of their ready-made houses was remarkable; when one was killed, in a couple of days another helpmate made his or her appearance to make up the pair of robbers; and this continued from about the 5th or 6th of May until the first week in August, and during the whole of this time the martins were annoyed, even after they had laid their eggs and during incubation. The finishing of the martins' nests each time they built was carefully watched by the sparrows, which took possession immediately after completion. In each year since May, 1860, I have destroyed about five couples of sparrows. No wonder that the martins are diminished in number, when in thousands of houses they have no chance of having a brood until August or September, when their intruders have finished their two or three hatches of young sparrows, and have taken flight for the wheat-fields. What will the small-bird preservers say to this, my true and unvarnished tale! The common chimney swallow is not quite so subject to the intrusion above mentioned, as most of them build their nests several feet under the entrance of a chimney-top, in the summer, where no fires are kept; but many of their young ones are lost, in their first attempt to rise in a straight direction, by falling to the bottom of the chimneys. I have during my life extricated some when they have been heard fluttering near the fire-places in my bed-rooms. Those wonderful birds the swifts are not subject to these trespasses, but sometimes they are destroyed by rats or mice. The swallow tribe is venerated by most people who delight in ornithological Natural History; they are the harbingers of spring, and arrive, weather permitting, at

the same time each year. The wonderful duration of their flight and their beautiful gyrations have excited the admiration, and even the adoration, of some of the heathen nations; and the manner in which their nests are preserved, almost within reach of the hand of man, is a proof that they are respected more than the generality of other birds in Great Britain.—*H. W. Newman; Hillside, Cheltenham, October* 5, 1863.

White Swallow (Hirundo rustica) *near Beverley.* — A white specimen of Hirundo rustica has been observed by several persons, during the last few days, flying about Hull Bridge, on the river Hull, Beverley. It was seen by my friend Mr. R. Stephenson, of the Hull-Bridge House; also by Mr. H. Hewitson, of Beverley; also by my own servant, and several other witnesses, who all agree as to its species, as indicated both by the longer tail and its companions, which were true "swallows," in contradistinction to "martins." This bird has since been shot, but was so completely shattered that the man who shot it unfortunately threw it away. — *W. W. Boulton; Beverley, September* 24, 1863.

Late Stay of Swifts. — While walking with Mr. Fryer, in his garden at Chatteris, our attention was suddenly drawn to two swifts, which, in company with about a dozen swallows, were making their way overhead. They were flying directly from west to east, and were apparently "hawking" *en route.* This, I believe, is very late (October 14th) for swifts to remain with us. Will you kindly allow me, now I am about it, to inform collectors and others that I no longer deal in insects, birds' eggs, &c., or collect for sale?—*W. Farren;* 10, *Rose Crescent, Cambridge, October* 13, 1863.

Late Stay of Swifts. — I have observed the very unusual circumstance of swifts not having migrated till about a month after their average time of doing so. For about twenty years I have been interested in observing the swallow tribe, and especially the swift. This year, after the middle of August, of course I expected any day to notice they had taken their departure; but September came and still they were with us, in number about thirty. On the 10th instant the majority left us, and the remainder on the 16th or 17th. I cannot account for their departure being delayed so late. I do not believe their nests were disturbed at the usual breeding time, as there are several colonies of them in different parts of the town, and generally in very inaccessible places. Nor has the weather, from the 20th of August to the present time, been remarkably fine and warm; on the contrary, I should say it has been colder than the average of seasons. As Yarrell mentions, in his 'History of British Birds,' that one swift was seen by Mr. R. B. Hale, M.P., of Alderley, on the 9th of September, 1839, it may be worth recording the very remarkable circumstance of thirty or upwards remaining till the 10th of September, 1863. — *Joshua Whiting; Hitchin, September* 17, 1863.

[I have several notes to the same purport. The swifts have, without doubt, stayed unusually late this year, and other Hirundines are following the example; swallows and martins were abundant near London yesterday (9th of October), and I saw one sand martin over the Surrey canal amidst a host of its congeners.—*Edward Newman.*]

Hoopoe in the Isle of Wight.—I have a beautiful specimen of the hoopoe, shot near Alum Bay yesterday; it is in a very handsome state of plumage; it was shot by a man of the name of Downor. This man shot two others in 1861, which I also purchased of him.—*H. Rogers; Freshwater, Isle of Wight, October* 9, 1863.

Rock Dove in the Isle of Wight. — Two large flocks of rock doves were seen here on the 12th of May; it was a very rough and stormy day. Several hundreds of the

above birds passed within twenty yards of me, flying in a south-westerly direction. I had no doubt of the species, as I could easily distinguish the colours. They alighted on some trees, and, being noticed by several persons, many of them were shot, and some of them were brought to me for preservation. I think it is unusual for so many to be seen together. It was blowing a gale from the north-east.—*H. Rogers; Freshwater, Isle of Wight.*

[It is rather curious that the rock dove should settle on trees. I took great interest in the movements of these birds both in Scotland and Ireland, and never saw one even venture into tree districts; they confined their movements very much to the sea-cliffs, settling on ledges, billing and cooing, and pushing one another off and then running into holes.—*Edward Newman.*]

Pallas' Sand Grouse in Suffolk and Norfolk. — I had intended, in the present number of the 'Zoologist,' to have contributed a second paper on the sand grouse in this district, bringing my previous notes down to the present date. My time has, been so much occupied of late that I must postpone for the present any lengthened communication. Your readers will probably be interested in knowing that two or three other specimens were killed in Norfolk and Suffolk in July, subsequent to my last notice; that small parties were observed throughout August and September in the Yarmouth and Lynn districts, where our extensive sand-hills have from their first arrival afforded great attractions; and that three male birds were shot in the neighbourhood of Lynn as late as the first week in October. These birds I examined in the flesh. They were in high condition; the crops filled with small seeds similar to those before described; the plumage far brighter in tint than in any of the earlier specimens, the autumn moult being quite complete, with the exception of the first primary quills being as yet no longer than the second, and the tail-feathers but partly grown. That these were adult males there could be no doubt; but the difference in the size of the testes, compared with those previously examined, was very remarkable, and from their appearance might indicate that there was no reason why the females should not have laid during the last few months, although after the most careful inquiries I cannot ascertain that any indications of their nesting with us have been anywhere observed. Mr. Newton has received authentic information, however, of their having bred this summer in Denmark.—*H. Stevenson; Norwich, October* 22.

Pallas' Sand Grouse in China.—Your readers will be both surprised and delighted to hear of the abundant occurrence of this species, during winter, about the plains between Pekin and Tientsin. Flocks of hundreds constantly pass over with a very swift flight, not unlike that of the golden plover, for which we at first mistook them. The market at Tientsin was literally glutted with them, and you could purchase them for a mere nothing. The natives called them sha-chee, or sand-fowl, and told me they were mostly caught in clap-nets. After a fall of snow their capture was greatest, for where the net was laid the ground was cleared, and strewed with small green beans. The cleared patch was almost sure to catch the eye of the passing flocks, who would descend and crowd into the snare. It only remained then for the fowler, hidden at a distance, to jerk the strings, and in his haul he would not unfrequently take the whole flock. Numbers, however, were shot with matchlocks. When on the ground they were rather shy and difficult of approach; but when on the wing they would sometimes dart within a few yards of you. They possess rather a melodious chuckle, the only note that I have heard them utter. The natives say that during the summer they

are found abundantly in the great plains of Tartary beyond the Great Wall, where they breed in the sand.—*R. Swinhoe, in 'Ibis.'*

Quail shot near Beverley. — About the middle of last month (September) a very well-marked male specimen of the quail was shot by Mr. Harland, farmer, of Holme, near Beverley, upon his own farm. I saw it in the flesh at Mr. R. Richardson's, bird-stuffer, of Beverley, into whose able hands it has been entrusted for preservation. The last quails seen or shot near Beverley, to my knowledge, were a pair, male and female, shot by Mr. Kemp, gamekeeper, near Beverley, five years ago, and now in my collection.—*W. W. Boulton; Beverley, October* 1, 1863.

Occurrence of Temminck's Stint at Scilly. — This little Tringa has made its autumnal appearance at the Scilly Isles, and I dare say may now be pretty generally found in its winter plumage in our estuaries.—*Edward Hearle Rodd; Penzance, September* 10, 1863.

The Spotted Redshank (Totanus fuscus) *in Cornwall.*—A specimen of a young bird of the year of this elegant sandpiper was killed near St. Austell last week; others I observe have been obtained in different English counties this autumn, and I heard of one having been seen at Scilly this week. The visits of this species are rare, and at long, or rather uncertain, intervals in this county, and therefore, as an interesting species, their occurrence perhaps deserves a simple record.—*Id.*

Ruff (Machetes pugnax) *shot near Beverley.* — A very beautiful specimen of the ruff was brought to me this day by Mrs. W. Simpson, of Aike, near Beverley. It was shot last evening (September 23), by her husband, Wm. Simpson, on the Barmston Drain, close to the village of Aike. The bird was alone, and on dissection has proved to be a male without the frill. It is about ten or twelve years since a specimen of the ruff has been captured or seen in this highly-cultivated district, to my knowledge. Both specimens are now in my own collection.—*W. W. Boulton; September* 24.

Reeves in the Isle of Wight.—On the 18th of May two of the above birds were shot here in a very interesting state of plumage, just changing from the winter to the summer dress. On Saturday, the 3rd of October, I obtained two others; these are very different from those I obtained in May, having lost all the summer plumage, except a tinge of yellowish gray on the breast. These birds are a new and interesting addition to our Isle-of-Wight Avifauna.—*H. Rogers; Freshwater, Isle of Wight, October* 9.

The Curlew Sandpiper near Yarmouth.—In your notices, at different times, of the capture of rare birds, I have only once or twice observed the occurrence of the curlew sandpiper. As I am inclined to believe that this is rather an uncommon, or at all events a local species, a note of two specimens obtained lately at Yarmouth, may perhaps be interesting. On the last day of September I was hunting on Breydon Water, Yarmouth, when I observed a solitary sandpiper feeding with some gulls upon a mud-flat. The gulls all took wing long before I was within shot, but the sandpiper allowed me to approach within forty yards before rising, when I shot it. It uttered two sharp notes, not unlike a dunlin, for which bird I at first mistook it; but the white tail-coverts and somewhat longer wings distinguished it at once from that species. On picking it up I found it to be an old bird in an intermediate state of plumage, having just a tinge of chesnut on the breast, and still retaining the rich markings on the back peculiar to the summer plumage. It proved afterwards, on dissection, to be a male, and I found the stomach filled with remains of small worms, coleopterous insects, and a few minute pebbles. The second specimen, a handsome male bird in nearly full summer plumage, I purchased the following day from a man who killed it, at the same

place, in May last. In this state of plumage I fancy it must be rare. — *J. Edmund Harting ; Kingsbury, Middlesex, October* 7, 1863.

The Rednecked Phalarope near Chichester.—On the 25th September a rednecked phalarope was shot while swimming on a pond near here. It appears to be a bird of the year, and when compared with a gray phalarope received the same day from Sidlesham the difference was very striking. Three or four were seen about the pond a day or two before, and were mistaken for sandpipers. — *W. Jeffery, jun. ; Ratham, Chichester, October* 6, 1863.

Gray Phalarope near Greenock. — I beg to record the capture, in this neighbourhood, on the 6th instant, of the gray phalarope.—*John Kerr ;* 9, *West Steward Street, Greenock, October* 9, 1863.

A List of Waders that have occurred at Kingsbury Reservoir during the Summer of 1863. By J. Edmund Harting, Esq.

Amongst our annual summer visitants are to be included many of the Grallatores or waders, which arrive here in May and August, on their migration to and from their breeding-places in the North.

This year we have been visited by no less than ten species, in the enumeration of which I have adopted the order observed in Mr. Yarrell's admirable system.

1. Ringed Plover (*Charadrius hiaticula*). Appeared for the first time in May, in twos and threes, and remained about our Reservoir some days, during which time several were shot. After an absence of about seven weeks this species reappeared in small flocks of from eight to twenty, and young birds as well as old were then to be seen. A young male which I shot towards the end of July accorded well with the description given in Yarrell's 'British Birds,' having the beak almost entirely black; no black band over the white on the forehead; the lore, ear-coverts, and collar round the lower part of the neck only, dusky; and the legs and toes pale yellow. The stomachs of all that I have examined contained either the remains of small beetles and worms, or a mass of semi-digested vegetable matter, sometimes both, and invariably some small particles of sand or gravel. Yarrell says that the ringed plovers "pair and go to nest early in the season," and mentions the fact of Mr. Salmon's having found eggs by the 30th of March. I would observe that only old birds are to be found here in May, apparently, as I take it, on the way to their breeding-grounds; and we do not see the young until the end of July or beginning of August. The earliest arrival that I have noted down for this species is May 3rd, and the latest stay on their return in autumn August 28th.

2. Curlew (*Numenius arquata*). A solitary specimen appeared at the Reservoir here on August 3rd. This is not the first time of its occurrence, but it is an uncertain visitant, and certainly not common.

3. Redshank (*Totanus calidris*). I have three of these birds in my own collection, all of which were obtained at our Reservoir this year. One of them, an adult male, in fine plumage, was shot in May by Mr. F. Bond, who kindly presented it to me; the other two, which are male and female birds of the year, were killed on the 17th of August. These latter have not the rich markings on the breast peculiar to the adult bird in summer plumage, and the colour of the legs and base of bill is much lighter. The stomach of one which I examined contained vegetable remains only, with a few pebbles.

4. Green Sandpiper (*T. ochropus*). A female of this species was killed here on the last day of April, by Mr. F. Bond, and upon dissection we found rudiments of eggs in the ovary. On August 3rd several of these birds were observed, and two or three were shot. Since then I have seen others. This species is a regular summer visitant.

5. Wood Sandpiper (*T. glareola*). On August 4th, while walking round the Reservoir in company with my friend Mr. Bond, we saw a wood sandpiper which had just been killed there. The person who shot it told us that he had wounded another that was with it, but not having winged it he had failed to find it. He had no idea of the species, and called them "greenshanks," observing that he had often killed such birds before. But no doubt he would call the green sandpiper a "greenshank," and common and rare birds would be all "greenshanks" to him. In this case a real wood sandpiper was to be consigned to the spit with as little remorse as if it had been a sparrow. It is to be deplored that rare birds should be killed and eaten in this way, and, as is generally the case, without any record of their occurrence or capture.

6. Common Sandpiper (*T. hypoleucos*). This bird does not belie its name, being the commonest species of sandpiper that visits us, generally arriving about the first week in May, and after leaving us for June and July—to breed, as I believe, further north—it returns again at the end of July or beginning of August, and remains until the middle of September. Both young and old birds are then to be found. I obtained a full-grown young male on September 7th, which externally differed hardly at all from an old bird. This and the green sandpiper always remain here later than any other species, and, unlike the ringed plover, dunlin and some others, they do not stay so

much at the broad water of the Reservoir, but are to be found singly or in twos and threes, all along the course of our brooks. The stomachs of several specimens that I examined contained either a mass of semi-digested beetles and aquatic insects, or vegetable matter only; and, as in the case of the ringed plover, there were always several minute pebbles or particles of sand.

7. Greenshank (*T. glottis*). Seven of these birds appeared on the 1st of August, and on the 3rd of that month three were seen and one shot. The greenshank is an uncommon visitant, although this is not the first time of its occurrence here. The same may be said of the wood sandpiper, little stint, and other of our rarer waders.

8. Little Stint (*T. minuta*). Early in May, Mr. Bond saw a pair of these little birds at the Reservoir. They only allowed him one chance of shooting them, but his gun then unfortunately missed fire. A fine specimen of the little stint, now in my possession, was killed here on the 9th instant. Another was seen at the same time, but escaped.

9. Temminck's Stint (*T. Temminckii*). A few small stints appeared here during the first week in August, and one was shot. Unfortunately I was not able to see it, so that I am unable to say for certain whether it was T. Temminckii or T. minuta. But Mr. Bond, judging from the time of year, is inclined to refer it to T. Temminckii. I have therefore recorded the capture of a small stint under this name.

10. Dunlin Sandpiper (*T. variabilis*). I have a pair of these birds, in fine plumage, now in my collection, that were killed here on April 7th. This species is one of the earliest to arrive, and, after leaving us, like the others, for six or seven weeks, returns again in August. The plumage, however, is then very different. It is much duller, the rich reddish brown tint of the upper parts becoming dull grayish brown, and the black upon the breast entirely disappearing.

In this list of our Grallatores I have only mentioned those species that have occurred here this summer; otherwise I might have added the ruff, the blacktailed godwit, and other rarities that have previously been killed here. It will be observed also that I have not included the lapwing, which remains with us to breed; the heron, which is to be found here at all seasons; the landrail, which generally arrives the first week of May, and leaves us as soon as the hay is carried; the moorhen, which, like the heron, is to be found here all the year round; and the coot, of which species one or two examples generally occur every season. If we add these five to the above list of ten (which perhaps ought rather to be called *passing* summer

visitants), we have, I think, a very fair proportion of wading birds for one neighbourhood, and a greater variety, I am inclined to believe, than many more favoured localities can boast of.

J. Edmund Harting.

Kingsbury, Middlesex,
September, 1863.

Notice of a singular Duck shot near Beverley.—The following account of the capture of this specimen I received from the lips of Mr. P. Martin, who shot it himself, and who is a man of the strictest integrity, and most respectable in his station. He says, "I was told that a strange duck had been seen in a drain, on a part of Cottingham Common, the property of Mr. Bayley, of Cottingham: on going to the place with my gun, I saw the duck for a moment, swimming about by herself: she immediately got up on seeing me, and flew away with great rapidity, and more after the fashion of a snipe than any other bird I know. I fired and killed it. This would be about the month of November, 1852. Finding the duck a very strange one, I enquired next day at the Hull Zoological Gardens, to ascertain whether any duck had made its escape, but no such bird was gone, nor could I ever learn of an escape of this duck in the Riding. Its wings were both perfect." The following is a description of the duck as it stands, with closed wings:—Sex uncertain; appearance would lead me to the conclusion that it had been a mature female. Length from tip of bill to end of tail, 21 inches. Bill: colour gone; length 2½ inches, gradually curving downwards from the base to the tip; lower mandible curved to correspond with the upper (which it does) in perfect proportion and symmetry; width, over widest part at upper mandible 1½ inch; margins of upper mandible overhang those of the lower, about one-eighth of an inch on either side, and are deeply pectinated; tooth, half an inch in length, and about three-eighths of an inch in breadth; colour gone. Iris (said to be a correct imitation of the original), dark reddish hazel. Head, crown, nape, throat and neck, both above, below and on the sides, a uniform creamy buff-colour, which is, if anything, a shade deeper on the crown and cheeks. Neck, remarkably slender for the size of the bird. Breast, pale creamy buff, gradually fading to a creamy white on the belly and sides. Back, same creamy white as on the breast. Wings have the second quill-feather the longest. Greater wing-coverts grayish brown, with a slightly rufous tinge, darker towards the outer edges, and which together form a somewhat triangular-shaped bar across the wings when closed, two inches in breadth in the widest part, which is above: each feather of these greater wing-coverts is pointed at the end, the outer web dark coloured, the inner web almost white, the shafts are white, and all of them are tipped with creamy white to the extent of five-eighths of an inch below, to one inch and a half above: "above" and "below," as used here, of course have reference to the present position of the bird, which is standing. Lesser wing-coverts pale creamy white, same as on belly and sides. Primaries pale creamy white on outer webs; shafts white; inner webs slightly tinged with gray towards the end, the rest creamy white. Secondaries creamy white. Tertiaries darker reddish buff, and some of the shorter ones rather mealy. Tail rich creamy buff above, paler below. Upper tail-coverts creamy buff. Under tail-coverts pale creamy white. Legs and toes, colour faded, apparently have been dark brownish

orange, darkest on sides and back of tarsus. Claws pale in colour, but faded. Webs apparently orange, but faded. Hind toe more like that of the Fuligulinæ than of the true Anatinæ, but the membranous expansion is not so decided as in most of the pochards: resembling them, however, in this particular, as well as in one or two characters of bill (although in other features of this organ it is quite dissimilar), I should be inclined to class my specimen under the subfamily Fuligulinæ.—*W. W. Boulton; Beverley, Yorkshire.*

The Little Auk and Spotted Crake in Devonshire.—A little auk (*Alca alle*) was obtained at Plymouth a few days since, and a spotted crake (*Crex porzana*) near Tavistock. The latter bird was found dead on the line of railway, and doubtless met its death by flying against the telegraph wire.—*John Gatcombe; Plymouth, October* 15, 1863.

Razorbills and Guillemots in Devonshire.—The late severe gales have caused sad havoc among the razorbills and guillemots. For the last fortnight I have been visiting Seaton, a watering place on the coast of Devon, where I found numbers of them lying dead on the shore, washed up by the force of the waves. During a heavy sea these birds remind one of ships on a lee shore not able to "claw off," as the sailors say. At such times they may be seen riding on the immense waves close to the land; and it is really wonderful to observe the instinct and dexterity these poor birds evince to avoid being dashed on shore: intently watching the moment when the tall thin waves are about to break and roll over on the beach, they suddenly dive through them, and, appearing almost immediately on the other side, are enabled to maintain their position for hours together, until at length, becoming exhausted from want of food and continued exertion, they are obliged to succumb, and get rolled on shore almost lifeless at your feet, surviving the shock but a very short time.—*Id.*

The Deaf or Death-Adder of Australia.—The idea that snakes sting has long been laughed out of the minds of the most credulous, and he who would venture upon such an assertion at the present day must expect to meet with general discredit. Nevertheless, I am disposed to believe that there is a species in Australia, commonly called there the deaf or death-adder, that really does possess a sting at the tip of its tail, which, as well as its bite, is venomous and fatal to human life. Neither ought the idea that a creature possessing such a property is to be found in a country whose natural productions are so much at variance with those of the rest of the world be thought more improbable than the existence of the peculiar warning process at the tail of the rattle-snake would have appeared to the ancient naturalists. And before your readers reject it, let them remember that in ancient times a black swan was esteemed such a myth that the improbability of its existence became the subject of a proverb; and, even in modern days, had any one asserted some years ago that there was a mammal, a quadruped, which had the bill of a duck, such an idea would have been held quite as incredible as the one I now venture to advance, supported by my own personal observation. The aboriginal natives of Australia, as a general rule, subsist more upon the smaller mammalia and reptiles (as opossums, snakes, iguanas, &c.) than upon kangaroo or emu; for it requires quite a large party to hunt down either of the latter, and as the blacks generally travel in small parties or in families, they trust chiefly to what they can pick up on the road for a subsistence. Thus they can scarcely err with

with respect to the nature and qualities of those objects which come so immediately within the scope of their daily experience. Now, with respect to the deaf or death-adder, they affirm unanimously that its head and its tail are alike deadly, and they always exhibit a greater horror of its fatal powers than of any other venomous reptile. I once had an opportunity of almost verifying this asserted fact of the poisonous sting of the deaf-adder. I was travelling up the bush to Port Curtis with some bullock-drivers and their drays, and also with a small party of blacks, men, women and children, who had joined us for the sake of protection against the native tribes through whose country we were passing. We stopped and had some tea on the shingle in the dry bed of the river Boyne, when, as I was drinking mine, hearing a woman knocking two stones together (and feeling sure it was not Geology she was studying), I asked her what she was doing; she showed me the tip of a deaf-adder's tail which she had chopped off with a sharp flint, before cooking the body to eat. I asked her why she did it, and she said, "The tail of this fellow snake is carbon saucy (very poisonous), as bad as the head itself." I thought at first it could be but a fancy of the blacks, yet, upon consideration, I felt sure that they were not likely to be so greatly mistaken on such a subject, living amongst and feeding upon almost all the wild animals of the bush, as they do, from the time they are born till their death. I mentioned the names of other venomous snakes to her, as the black snake, the brown snake and whip snake, and asked her if they also had a "saucy fellow moondy (tail);" upon which, shaking her head, she uttered "Wacka-m-pa" ("no, no," or, "no indeed"), and rather smiled, as if she thought me a bit of a "new chum." She went, and, getting the bit of tail she had cut off on to a flat stone (not liking to touch it with her fingers even in its dissevered state), she brought it to me, and squeezing it between the stones, just as you might press the abdomen of a wasp, something not unlike a short bristle protruded from the pointed end, pointing to which she said, "There, that fellow killem you merry-makey (very soon)." I now regret I did not preserve the tail and bring it home, but having other things to attend to at the time I thought no more about it till some years after, when, on my return to England, I happened to mention the subject to my father-in-law, Mr. Dawson, of the Woodlands, who advised me to write a short account of it for the 'Zoologist.'—*H. M. Fuller; Niton, Isle of Wight.*

Crocodiles in the Nouaer Country, White Nile.

By John Petherick, Esq.*

Our boat was made fast under the village of Subchaya, and not far from it was the house of our conductor, Saleh Wallad Omar Abt il Samad—according to his own account a keen sportsman, who, disdaining agricultural pursuits, supported himself and family by the produce of his gun and spear. Six years ago, in company with three of his fellow villagers, he went to a small island called Geizet-il-Arab—a choice resort of crocodiles in search of their eggs. Going the round

* Reprinted from the 'Field' newspaper.

of the island, three crocodiles escaped into the river, and on closely investigating the spot a quantity of eggs were discovered in the sand. No sooner had they made off with their booty in the direction of a small tent which they had pitched than a crocodile, having watched their proceedings, rushed to the place of her deposit, and as rapidly returned to the river, and, swimming, followed them opposite to their destination, where until nightfall her eyes were perceptible above the water. Their repast that night was a rich one, but as soon as the last embers of their fire had died away the crocodile charged them furiously, repeating her attack several times during the night, and it was only by the frequent discharge of their firearms that they kept her from closing upon them. From that time the crocodile, hitherto harmless, became furious, and fell upon all the cattle it could catch upon the river side. Among many victims was a fine mare belonging to an Arab in the village of Nega-il-Arab, half an hour's walk from the river. The mare, as is usual, was allowed her freedom to graze in the coarse abundant pasturage, and whilst drinking was suddenly seized in the back of the neck by the jaws of the crocodile. The mare being an animal of great power, in an agony of pain, violently threw up her head, and with it the crocodile, which dropped on her back, and with her unwonted burden she galloped off to her stable. The astonished villagers belaboured the crocodile so heartily with their "naboot" (stout sticks common to every Fellah), that it was soon induced to let go its hold and dismount; but the mare died from the joint effects of its wounds and the fright.

The breeding season of the crocodile takes place during the low stage of the river in March, and they deposit their eggs in the sand on the banks, or, in preference, in small sand-banks or islands in the stream. The eggs are white, hard, and in size not unlike those of a domestic goose; the exact measurement of one I found in the Nouaer country, on the White River, being $3\frac{1}{2}$ inches in length and $5\frac{3}{16}$ inches in circumference. Cuvier observes that, of all animals, the crocodile attains the greatest dimensions, considering its size at birth.

Fearful combats take place between the males for the females, the largest and most powerful one invariably monopolising the latter in his district.

When about to lay, the female crocodile, having made choice of a spot, will dig with her claws in the sand a hole about six inches deep, drop her egg therein and carefully cover it. She will then proceed to make several similar holes around the first, in order to mislead any one in search of her treasure. Daily she will contribute one egg to

her store, at the same time carefully widening the excavation, turning the eggs and re-covering them with sand. Unless disturbed she will lie near or over them, and leave them but for a short time to feed in their close vicinity, and she will even then watch them zealously by raising her head to the surface of the water, and occasionally run towards them at short intervals to satisfy herself that all is right, and return to her feeding-ground. The number of eggs depends upon the age and size of the animal, and varies from forty to sixty.

At the commencement of the hatching season the nest is widened to accommodate the eggs, being arranged close to each other and equidistant from the surface. A slighter covering is now placed over them, so that incubation by means of the sun's heat may take place. During this stage the attention of the animal towards her eggs is redoubled in watching and turning them, and it is dangerous for a single person to approach the spot, as she will fearlessly attack and give chase at considerable speed. After such a circumstance, or if on her return from feeding, she should discover traces of man or beast in the vicinity of her charge, the wary crocodile will decamp with her eggs in her mouth and seek for another locality.

From various sources I am informed the hatching time takes ninety days, therefore it is during the first increase of the Nile that exclusion takes place. The mother, then carrying off her young in her mouth, will place them in the shallow water of some retired creek or in a crevice in the bank, where she will nourish them until able to accompany her and prey upon small fry for themselves.

It is well known that these reptiles, although they seize their prey under water, cannot under the same circumstances swallow it, and must proceed to shore for that purpose, where, resting on their fore legs and the head out of water, they are enabled to feed. Large animals or man when caught are retained under water until putrefaction commences before they are devoured.

Men who in Egypt devote much of their time to the destruction of these animals, like our friend Saleh Abt il Samad, throw up low embankments twenty or thirty yards from the river side, in localities where they love to bask in the sun. A few days suffice to accustom the wary reptiles to the new objects, and, lying close in ambush behind one or the other, the skilled hunter seldom passed a day without a shot. Swimming lazily towards the shore, with the tip of the nose and eyes only above the water, a careful survey is taken before the crocodile ventures to expose itself on the land; then, sometimes lingering on the water's edge, at others taking a short run, the reptile will cast a

hurried and uneasy glance around, and seeing nothing to fear will lie down, but will for some time retain its head elevated on the watch. Gradually overcome with sleep by the influence of the sun, the head at length drops until prostrate upon the sand. Saleh, who has been narrowly watching the above proceedings from behind his bulwark, and whose nerves have been as irritable as those of his unconscious prey were tranquil, fires, and if fortunate enough to plant his ball in the brain, the crocodile, after a twitch or two of the tail, remains on the spot; but if, although hit hard, that organ has remained intact the crocodile attempts to escape, pursued by our hero, who seizes the tail, and lifting its extremity as high as possible from the ground, thus rendering the animal powerless, so succeeds in arresting its progress for a second, until a companion shall have battered in its skull with an axe.

This Saleh admits is dangerous work, but practice makes perfect. If the wounded animal is conscious of his approach the tail is instantly curved to receive him. Placing himself in the arc described by it he escapes injury, but if on the wrong side a blow from it might be fatal.

The negroes spear and catch crocodiles with baited lines, and on our subsequent progress through the Shillook, Dinka and Jangal districts we have picked up several of these lines, which, in lieu of a hook, are armed with a piece of hard wood a foot in length, pointed at each end and attached in its centre to the line. A fish, bird, or flesh or entrails of any animal serve for a bait, and when, as usual, greedily taken, the short line is torn from its slender fastenings on the bank, but a float indicating its whereabouts, the negroes pursue in canoes and spear the crocodile.

What strange things sometimes happen! On the 21st of April, in company with three other boats belonging to our expedition, we were becalmed, and were towing with great difficulty among the rank high weeds on the western bank in the Nouaer district. Whilst I was employed in writing the above from my notes, one of our sailors in swimming on board, and when within a couple of strokes only from the boat, was seized by a crocodile, and instantly drawn beneath the surface in deep water to appear no more.

JOHN PETHERICK.

The Nouaer Country, White Nile.

Proceedings of Societies.

Entomological Society.

October 5, 1863.—F. P. Pascoe, Esq., V.P., in the chair.

Donations to the Library.

The following donations were announced, and thanks returned to the respective donors:—'The Journal of the Royal Agricultural Society of England,' Vol. xxiv. Part 2; presented by the Society. 'Sitzungsberichte du Königl. bayer. Akademie der Wissenschaften zu München,' 1863, I. Heft. 3; by the Academy. 'The Intellectual Observer,' No. 21; by the Publishers. 'On the Development of Chloëon (Ephemera) dimidiatum,' Part 1; 'On the Development of Lonchoptera,' by John Lubbock, Esq., F.R.S., F.L.S., F.Z.S.; by the Author. 'Exotic Butterflies,' No. 48; by W. W. Saunders, Esq. 'The Zoologist' for October; by the Editor. 'The Journal of the Society of Arts' for September; by the Society. 'The Farm and Garden,' Vol. ii. No. 22; Vol. iii. Nos. 25, 26, 27, 28 and 29; by C. A. Wilson, Esq., Corr. Memb. Ent. Soc. 'The Athenæum' for September; by the Editor. 'The Reader' for September; by the Editor.

Exhibitions, &c.

Prof. Westwood supplemented the account he had given at the last Meeting of the method pursued at Dresden in the preservation of larvæ, by stating that the larva-skin was not first blown out and afterwards placed in a glass vase over a lamp, but the skin was first placed within the vase and blown whilst actually suspended over the lamp, by which means the rapidity of the skin's drying was much increased; it was done with a small tube or blow-pipe fixed at the end of a bladder, which was held under the arm or between the knees, so as to leave the hands at liberty; and the straw which was inserted into the body of the larva was fastened by a cross-pin stuck through the skin, which was thus retained in its proper position throughout the process of blowing.

Mr. W. W. Saunders exhibited some young Swede turnips, the lower part of the roots of which had been consumed by the larvæ of Agrotis segetum; the young plants had been very healthy, and promised an excellent crop; three weeks later they ceased to grow, and became yellow, which was attributed at the time to the weather; a fortnight afterwards a careful examination was made, and it was discovered that the roots were attacked just below the surface of the ground; scarcely one was affected above the surface, but the whole under part of the tubers was eaten away, four or five larvæ being found in each turnip, and the whole crop, three acres in extent, being entirely destroyed. He should be glad to hear of any remedy, or rather of some mode of preventing such destruction in future.

Prof. Westwood referred to Curtis's 'Farm Insects,' where many suggestions were made for preventing the ravages of the larvæ of A. segetum, or "surface grubs," as they were called. He himself believed that there was no plan so efficacious as employing children to pick and destroy the grubs, or turning a lot of ducks into the field.

Mr. Saunders pointed out that all the remedies suggested by Curtis were inapplicable to the present case, where the grubs were only found under ground, and within the earth-covered part of the root; in fact, the natural plan of getting at the grub was

to pluck up the turnip; he was afraid that nothing would be effectual, short of discovering and destroying the eggs of the parent moth.

Mr. Stainton exhibited living larvæ of Anesychia bipunctella, from Wiesbaden; the species was formerly supposed to occur in this country, and, though now included amongst the reputed British Tineæ, might not improbably be found here again.

Mr. Stainton also exhibited specimens of Tortrix grandævana, *Zel.* (= tussiliginiana, *H. S.*), a large and prominent species, the larva of which was found on sand-hills on the shores of the Baltic, fed on the roots of the common coltsfoot (*Tussilago*), and formed perpendicular tubes in the sand, of the thickness of a man's little finger, within which it turned to the pupa; frequently the surrounding sand was blown away, and the tubes thus exposed were opened at the top by birds, which came in quest of the fat pupa within. This also was a species not unlikely to be found in this country, now that its habit had been discovered.

Mr. W. W. Saunders mentioned that one of his sons had observed, at Valencia, some sand-tubes which corresponded exactly with Mr. Stainton's description, and the origin of which he had hitherto been unable to explain.

Prof. Westwood exhibited some larva-cases of Psyche helicina; also some Trichopterous larva-cases, found at Mentone, and coated over with particles of stone; the silken grating spun by the full-grown larva when about to turn to the pupa, which was said to be usually at the head only of the case, was in this species spun at both ends, and this circular silken covering was closed up throughout one half of the circle, whilst the remaining semicircle was radiated open-work; the cases also had a long tail or appendage, which looked like a piece of grass or straw attached to the end. The species was Aspatherium picicorne; and out of one of the specimens the Professor had had the pleasure of extracting a parasitic Ichneumon, Agriotypus armatus, whose habit it was to descend beneath the surface of the water for the purpose of depositing its eggs upon the Trichopterous larva-case.

Mr. M'Lachlan remarked that, according to Von Siebold, all the specimens affected by the parasite had a peduncle attached to the case; but the appendage to the cases exhibited appeared to be nothing but straw or vegetable matter.

Prof. Westwood also exhibited specimens of a beetle belonging to the family Nitidulidæ, which was parasitic in the nest of Trigona carbonaria, the honey bee of New South Wales: the wax which accompanied the specimens of the beetle sent to him was merely a rude shapeless mass, and he was unable to ascertain whether or not the Trigona made cells; he had also been desirous of discovering whether the larva of the beetle fed upon the larva of the bee, or upon the wax: with this view he had placed pieces of cooked meat before the larvæ, but they avoided it, and many of them died; upon the removal of the meat, he put in portions of the wax, which was soon found with the Coleopterous larvæ crawling over it.

The President sent for exhibition some specimens of the same beetle, accompanied by the following note:—

"This very interesting insect was obtained by Mr. T. W. Woodbury, of Exeter, from a nest of Trigona carbonaria, in which it lives, feeding upon the wax of which the combs are composed. The nest came from Brisbane, in Queensland. Specimens of the insect have been forwarded to Mr. Murray, who has so long worked upon the family of the Nitidulidæ, to which it belongs; and he informs me that it is the Brachypeplus auritus of his work, the ear-like form of the basal joint of the antennæ having suggested its specific name. The insect is closely allied to the British Carpo-

philus hemipterus, which is frequently found in great numbers feeding upon figs; both select a sweet and nourishing substance upon which to feed, both in the larval and perfect condition. I hope on another occasion to give some account of the nest in which the beetle was found, as my friend Mr. Woodbury proposes a thorough investigation of it."

Mr. Bates exhibited some South-American palm-nuts attacked by the larvæ of Caryoborus cardo, one of the Bruchidæ, which had recently been received by Mr. Cutter, of the Crystal Palace; specimens of the imago, of the larva in various stages of growth, and of the nuts in corresponding stages of destruction, were shown; the nuts belonged to three species of palm, of which the largest was probably the Maximiliana regia. A similar disappointment had occurred to Bonpland, who brought over a number of nuts from New Granada, intending to plant them in France, but on his arrival the whole were found to be attacked by the larvæ of Caryoborus curvipes.

Mr. Cutter (who was present as a visitor) explained the circumstances under which he had received the palm-nuts: 1000 specimens of each kind had been sent by Mr. Henderson, of Parà, and the consignment would have been worth £30, if not attacked by the larvæ, from which, however, scarcely a single nut was free, whilst some contained as many as a dozen grubs.

A letter from Mr. John Young, of No. 80, Guildford Street, addressed to the Treasurer, was read, in which the writer complained of the presence of large swarms of a small ant in the kitchen of his house, and enquired what means could be adopted to rid the house of such a pest.

Mr. Bates suggested a search for the nest, and when found to deluge it with hot water.

Prof. Westwood said that, many years ago, a Committee of the Society had examined into this very subject, and the conclusion arrived at was that the most efficacious plan was to make a careful search for the principal runs, and place therein pieces of raw meat; these were quickly covered with ants, which might at once be put into boiling water and destroyed, and the process then be repeated.

Mr. Stainton gave the following account of the Entomological Proceedings of the 38th meeting of German Naturalists, held at Stettin, from the 18th to the 24th of September last:—

"Monday, September 21, 1863, under the Presidency of Herr von Kiesenwetter.

"Director Loew exhibited his work on the European Trypetidæ, and called attention to the twenty-six photographic figures, which had been executed at the Royal Printing Press at Vienna.

"Dr. Kraatz, of Berlin, reduced Melolontha albida of Redtenbacher, from Austria, and M. albida of Mulsant, from France, as also M. candicans of Burmeister, by the help of Grecian specimens, to the ordinary cockchafer (*Melolontha vulgaris*), and showed that Greek female specimens were hardly to be distinguished, or were quite undistinguishable from the Rhineland M. albida of Erichson (Rhenana, *Bach*), without, however, being able with certainty to refer the last-named species to M. vulgaris as a variety. The fourth German species, M. aceris, *Erichson*, was identical with the M. albida of Bach, and must be called M. pectoralis of Germar.

"Herr v. Kiesenwetter, in reference to the preceding and to the Darwinian theory, suggested to entomologists that in no other branch of science did material stand so ready to hand for making experiments in breeding by selection the commonest species of insects.

"Herr Toepffer, of Stettin, explained how he had succeeded, by means of a breeding apparatus, in obtaining healthy larvæ and imagos from the eggs of Bombyx Mori brought by the Prussian expedition from Japan, so that he had already distributed eggs gratis amongst 150 breeders, who were, almost without exception, very well satisfied with the results; the species seemed well acclimatized and produced each year better cocoons. Herr Toepffer expressed himself little satisfied with the Ailanthus and Ricinus larvæ recommended by Guérin-Menéville. In conclusion he exhibited cocoons of the different races, and various manufactures of Pomeranian silk."

"Wednesday, September 23, 1863; under the Presidency of Herr Schulrath Suffrian.

"Professor Münter spoke concerning the Fungi parasitic on insects, and exhibited a larva of Bombyx pudibunda with a huge Gordiceps, and a Carabus nemoralis with Sphærius entomorhiza. He called on entomologists to direct their attention to these objects when collecting.

"Herr Stein, of Berlin, Director Loew, and Dr. Hagen spoke of similar appearances amongst exotic insects.

"Dr. Hartig, from Brunswick, made a communication respecting the Calobates Rhizomæ, recently discovered by him, and exhibited a specimen. It is an insect allied to Aphis, which occurs at the roots of fir trees, and is distinguished by a perfectly anomalous structure of the legs, since the tibia and tarsus are grown together in one straight piece. He also stated that Hylesinus micans, and especially Pissodes Hercyniæ, had lately become highly injurious to the forests of Brunswick and Hanover, and that along with them their foes, Cryptus impressus, Conites Hercyniæ, &c., had appeared, of which he exhibited several bred from Pissodes larvæ.

"Director Loew made a long discourse on the anatomical peculiarities of Oncodes varius; his conclusion (which, in reference to the allied anatomy of the Cyrtidæ, seemed well founded) was, that Oncodes should be referred to the neighbourhood of the Bombylidæ.

"Dr. Hagen spoke concerning the respiratory organs of Euphæa splendens, on which a discussion arose, in which Director Loew, Professor Grube, and others took part.

"Dr. Rogenhofer, from Vienna, exhibited specimens of both sexes of Pyralis luridalis of Fischer, of which the older name was connectalis of Hübner; he also spoke concerning the habits of Cephus spinipes and Cephus compressus.

"Professor Hering, of Stettin, remarked that Leucania Elymi, now that its habits were known, had been obtained in considerable plenty on the sand-hills near the Baltic amongst Elymus arenarius."

Paper read.

Mr. Baly read a paper entitled "Descriptions of New Phytophaga," in which were described fifteen new species, nearly all belonging to the true Chrysomelidæ.

New Part of 'Transactions.'

A new Part of the 'Transactions,' Third Series, Vol. i. Part 7, being the third quarterly part for 1863, was on the table.—*J. W. D.*

The Hobby Falcon at Plymouth.—About the middle of October a specimen of this little hawk was shot on Mount Batten, a projecting piece of rocky ground on the margin of Plymouth Sound. It is now in the collection of Mr. Dunstan. This falcon is a rare visitor to this neighbourhood. Mr. Bolitho, our long-celebrated animal preserver, told me it was many years since he received a specimen of this species.—*J. J. Reading; Plymouth, November* 2, 1863.

Occurrence of the Osprey near Hayle.—An osprey was captured on the sand hills near Hayle, on Saturday, with all the upper plumage margined pale, showing signs of immaturity as compared with some specimens having an uniform dull brown cast.—*Edward Hearle Rodd; Penzance, October* 21, 1863.

Marsh Harrier in the Scilly Isles.—We had a great gale here on Monday week from the S.S.E., just about the period of the autumnal migration. I have received information that just after the gale hawfinches, wood wrens, shorteared owls, &c., were observed on the Islands, and I have examined to-day a very beautiful specimen of the marsh harrier (female) with the whole of the head and throat of a rich cream-yellow, shot on one of the Islands. It is to be hoped that this interesting species, showing the link between the harriers and buzzards, will not become extinct, as others have been observed on the Cornish Moors; but they are very scarce.—*Id.*

The Redbreasted Flycatcher in company with Pied Flycatchers at Scilly.—Amongst the various arrivals of different birds in their migratorial movement at this season of the year at Scilly, flycatchers were observed on Friday last, three of which were captured, one of them from its smaller size being at the time taken for a chiffchaff. The four outer semi-white tail-feathers arrested the attention of my nephew and Mr. A. Pechell, who were the captors, and they were sent over here for my inspection. The little bird, from the description my nephew gave before I saw it, led me to believe it would prove to be a second specimen of the Muscicapa parva. He writes:—"Pechell has sent three little birds to be preserved, and we want your opinion about them. Two we think are young pied flycatchers, the third seems to be something like a chiffchaff, but the tail is not right and the white feathers seem odd. I think they are all young. The actions of the bird with the white tail were those of a flycatcher." On examining this third and small bird it proved to be the redbreasted flycatcher. The sides of the breast are tinged with buff-brown, which colour is perceptible across the breast. The chin and middle parts of the breast and belly white, not quite pure. The four outer tail-feathers with their basal halves irregularly white, leaving the tips to the extent of two-thirds of an inch brown. I venture an opinion that this is an immature male bird. —*Id.*

Migration of the Ring Ouzel.—The Rev. Gilbert White observed that the ring ouzel was seen at Selborne during its migrations about Easter and Michaelmas. Now as I live about twelve miles from Selborne I have looked for these birds for two or three springs and autumns without success, till the 7th of April, 1863, when a neighbour came and told me he had just seen, in a narrow lane not far from the house, a blackbird with a white breast. I thought at once that it must be a ring ouzel; so off we set, and on getting into the lane that leads from Preston Cand over to the Oak Hills, we began to look into the fields on either side of the road, and had not looked long before my companion espied what we took to be a blackbird, but which, on closer examination, proved to be a ring ouzel. We went in pursuit, and soon came up with the bird, which, however, did not let us get within shot of it, but flew off a short distance in the direction of Bradley, a small village about a mile and a half distant from Moundsmere.

It did not fly far in that direction, but on our getting pretty close to the bird it flew up into the air, and made as if it were going to Moundsmere; suddenly, however, it altered its course, came back again, and perched in a tree not far from us, with the beautiful white mark on its breast showing distinctly: my companion fired and knocked it down. We looked about, but could see no more of the birds till next morning, when I was riding up the lane and saw another. I hastened home and told my companions, who were soon on the alert, and with myself at once started for the spot where I had observed the bird. Here, as I anticipated, we found it, but were unable to get a shot: we tried all the morning, and got wet through, but never could we get near this wary bird. Sometimes it would perch high up in the hedge, at others low down, sometimes in the road. Next day we found a ring ouzel in an ivy-covered tree, close to the place where we saw the bird the day before: this one we shot as it flew over our heads. The stomachs of both these birds were full of ivy berries, which White, in his 'Natural History of Selborne,' says is their food during their stay with us in spring. I think we saw another of the birds next day, but am not certain. From that time till the 12th of October I saw nothing of the birds; but on that day, whilst in a field not far from Bradley, where the men were sowing wheat, I observed a bird fly over, which I immediately recognised as the ring ouzel, and it proved to be one, for we shot it in the next field. On searching a little farther we found five more, but four of them flew off towards Moundsmere, the other towards Bradley. I have kept a sharp look out after them ever since, but have not seen anything of them. The stomach of the bird shot contained blackberries and a small snail.—*Anthony S. Bradby; Moundsmere, Hants, October* 22, 1863.

Redwing Singing in England.—At Zool. 8766 is a statement by Mr. Joseph J. Armistead, of Queenwood College, Stockbridge, Hampshire, that he had shot two specimens of the redwing while in the act of singing, and had heard several others. The announcement was kindly accompanied by an offer to send one of the skins. The skin was requested, and has been sent. The packet was opened in the presence of Mr. Bond, and we both of us instantly pronounced it to be that of a song thrush, not deviating in any respect from the usual colouring.—*Edward Newman.*

Scarcity of certain Small Birds (*the Redstart and Goldfinch*).—Mr. Roberts (Zool. 8771) notices the scarcity of the redstart near Wakefield, Yorkshire. With me this handsome bird is a great favourite, and I am sorry to say that it is a very scarce bird in our neighbourhood. I have generally had one in one of the holes in my garden wall, but this year I have never seen nor heard of one. Last year I knew of four nests, a very unusual number, and I was pleased to think they were on the increase. They are very shy birds, except when they have young, and they generally build in out of way places, so that they may be often overlooked, except by the practised eye. There can be no mistaking the song of the cock bird. I have not seen a goldfinch, except in a cage, for more than twenty years. There were a pair that built in a pear tree in this neighbourhood for some years, until one of the York "fanciers" heard of them, when they quickly fell a prey to his wiles. Bird fanciers and breeders have a particular liking for goldfinches reared in a pear tree, which they say make the best cross with the canary.—*J. Ranson; York.*

Robin's Nest in a Carpenter's Basket.—A joiner in this neighbourhood bought a new joiner's bass basket, which he left on his bench for two or three days, whilst he was working from home. On his return he found that a pair of robins had taken possession, and built a nest in it. Of course they were not disturbed, and in due course of time

the hen laid and sat on five eggs, and brought up four young ones. Six or seven men were working in the shop almost daily.—*J. Ranson.*

Nests of the Robin.—I have often been struck with the great difference in the materials of which the robin's nest is built. Three nests built last year in one village, showed in a remarkable degree this variety in the materials. The first nest was built in the side of a hay-rick, and the outer materials were hay. The second was built among some young shoots growing on the trunk of a very ancient churchyard elm, and the materials were moss from the banks of a neighbouring wood. The third nest was built on a cam side at the bottom of a dead fence, and in a narrow lane at the opposite side of which there was an oak-planting. Two young gentlemen, having found this nest, set me to find it, telling me it was between two gates, which were about a hundred yards from each other. I carefully examined the bank no less than three times without success, when the parent betrayed it. In the whole course of my experience I never saw so complete a deception. The cam was thickly strewn with oak leaves, and oak leaves were thickly woven into the nest, which was half imbedded in the bank and canopied by the twitch grass, which grew thickly about, and among which the last year's leaves of the oak were thickly matted. The nest seemed a part of the bank, and assimilated so well with the oak leaves and herbage with which it was surrounded, that I believe no boy, however keen his eye, would have detected it, unless it was betrayed by the parent. The nest in the rick, being built of hay, was also bad to detect; and the nest in the elm seemed to be a par tof the trunk, the old moss being of the same colour as the knot upon which it rested, and from which the young shoots sprung. The three nests were built of the materials best calculated to deceive and best assimilating to the surrounding objects. Had the architects been endowed with reason they could not have hid their nests better than they were hid.—*Id.*

The "Query about the Robin."—Captain Hadfield having made a few objections to the truth of the "Query about the Robin" (Zool. 8523), I feel myself called upon to make a few remarks on his observations. The Captain's communication reads as if I had vouched for the truth of the popular notion, which I carefully avoided doing. To believe the young ones killed off the old ones or made war upon them, is, says your correspondent, "so unnatural." If it were not something uncommon there would be nothing strange in it, and there would be no need to call attention to it. There are two or three things in the Captain's communication that convince me that he is but little acquainted with the habits of the robin. First, he says, "the parent birds have to rebuild and rear another progeny before reappearing in our gardens." The mistake into which the writer has fallen is one that is very common, namely, that the robin leaves the gardens and retires from the villages to build its nest and rear its young, and is thus withdrawn from our observation. My experience goes to prove that the robin rarely withdraws far from its winter haunts to build its nest, and it will not leave the garden if it can find a convenient place to build in. This year I have had two nests in my garden, both in holes in the wall, and I have known of four others,—one in a garden wall, two at the bottom of a hedge, not a stone's throw from a farm-house, and the fourth in a tool-basket in a joiner's shop at the bottom of a garden. I have known, at three different times, of a nest in a slit of the privy wall, above a score in cow-sheds and stables, several in hay-ricks, outbuildings, holes in the wall, and there has not been, for the last seven years, a year in which I have not had two or three in my garden. I have no hesitation in saying that the building away from the near

neighbourhood of houses is the exception and not the rule. A friend has drawn my attention to some remarks on the robin by the late J. Rennie, M.A., a close and very accurate observer of nature. He says, "It is no less an erroneous notion that the redbreast, during summer, flies from the habitation of man, which he has haunted during winter, nesting in wild and solitary places. Even in the near vicinity of London,—in Copenhagen Fields, Chelsea, Battersea Fields, Kennington, Peckham, Deptford, Greenwich,—wherever, indeed, there is a field and a few trees, we have heard redbreasts singing during the whole summer." Such is also our experience, and I know it to my cost, for they are very partial to red and white currants and also to raspberries; they have no objection to a sly nibble at a May Duke cherry. Secondly, your correspondent seems to think the robin a kind and gentle bird, "so unnatural" does he consider the charge against them. Now it is a well-known fact that it is a very quarrelsome and pugnacious bird, and two of them rarely meet without a fight. A gentleman, whose name was well-known some years ago, writing of the robin, says it is "instinctively pugnacious." Mr. Thompson mentions a case of two robins which began fighting in one of the most frequented parts of Margate. "They struggled together, and fell at the feet of the passengers, rose in the air, still fighting, and finally fell into the water, where they still clung together most pertinaciously." The same writer says he never observed this pugnacity in any season but the autumn; so that their extreme pugnacity after the breeding season is here vouched for on the best authority. There are two reasons given in Captain Hadfield's communication why robins should not be common. First, "Their great tameness and familiarity make them an easy prey to cats." That cats are very fond of killing and devouring birds I readily allow, but from some unaccountable reason there are few cats (I never knew one) that would either eat a shrew mouse or a robin. In our neighbourhood the chaffinch and the hedge-sparrow, during the spring and latter part of the year, haunt the doors, gardens and stack-yards in droves, and are nearly as familiar as the robin, and yet they are always abundant. For one robin you may see a hundred chaffinches and hedgesparrows. Mr. Whatt has truly said that they possess great advantages over other birds. Their nests are respected by nest plunderers, they possess a perfect immunity from the sportsmen, and are petted, fed and sheltered during the inclement weather. Secondly, "Being a tender and sparsely feathered species many perish of a severe winter, particularly in northern counties." I think there are few persons at all acquainted with the robin and its habits that will agree to this proposition. I consider the robin to be as well feathered as the hedgesparrow, and its great familiarity is an advantage to it in the winter, for it will in very severe winters take refuge in the cottage kitchen, in cowsheds and stables; and I believe it suffers less from cold and hunger than any of our small birds. As far as Mr. Whatt is concerned I think your correspondent has not thrown any light on his doubts; neither has he convinced me that the popular notion is incorrect—*J. Ranson; York.*

Black Redstart at Winchester.—Last Tuesday (October 26th) a black redstart was shot in my garden by Mr. Malcolm Wykeham Martin. It was accompanied by another, which has disappeared. I noticed that this bird is fond of alighting on a stone, a door step or a dead branch of a tree, when it dips its body and jerks up its tail like a water ouzel. The sooty black body and red tail are conspicuous while it is on the wing.—*C. A. Johns; Winton House, Winchester.*

Singular Nesting Place of the Pied Wagtail.—For some years past a pair of chimney swallows have built their nest and reared their young in one of our chimneys, but this

spring a pair of wagtails took possession of the old nest, and have reared one brood, and the hen, on the 29th of June, was sitting on her second laying. The swallows made two or three ineffectual attempts to build in the same chimney, but were compelled to take to another chimney. It is the first time I ever heard of or saw a nest in a similar situation.—*J. Ranson; York.*

Snow Bunting near Barnstaple.—I was greatly astonished when out shooting yesterday at seeing a flock of some fifty snow buntings rise before me while walking across a stubble field situated on some high ground about three miles from here. When I first saw them I imagined they were merely ordinary sky larks, as the sun was shining brightly on them at the time, and under such circumstances birds often appear to have white wings, or even to be entirely white; I have occasionally seen rooks look so. They pitched again only a few yards ahead, and the dogs having put them up a second time they flew in an opposite direction, and I at once saw what they were; being however very tame they did not go far, but alighted again in the same field. I then called the dogs to heel, and walked up to the spot where I had marked them down, but could see nothing of them for some time, until at last one individual stood bolt upright and looked around for some seconds, as if to take a survey of what was going on, and being apparently satisfied it squatted down again close to the ground. I then noticed several others in the same position, their plumage harmonizing so well with the stubble and quartz pebbles with which the field abounded that it was extremely difficult to distinguish them from surrounding objects. The little fellows had their eyes fixed on myself or the dogs, but they did not appear to be particularly frightened at either of us; the nearest could not have been more than five yards from me, and very pretty and interesting they looked. I was really very sorry to have to shoot at them, but as these were the first I had ever seen alive, and my brother not having a Devonian specimen in his collection, the temptation was too great; and, moreover, I wished to prevent any mistake or doubt on the subject, so I fired; and when the flock rose, three unfortunates were left on the ground dead. Upon examination neither of these were in the same stage of plumage. No. 1, evidently an old bird, was nearly white; No. 2 had the tawny and white markings equally divided; and in No. 3 the tawny plumage almost entirely predominated: the two latter were without doubt young birds. After having their ranks thus thinned the remainder evinced no desire to leave the field, but settled down again but a short distance from the spot where their three comrades had just met with such a sudden death. Poor little birds! to be so cruelly received after their tedious flight from northern climes. However, they will not, I hope, be molested again as long as they remain where they are. How long they had been there of course I am unable to say, but the three killed are uncommonly plump and fat, and I intend having them roasted as soon as their skins have been taken off, and daresay they will be very good. It is very extraordinary these birds being so far south so early in the year: as far as I can recollect only one has been seen in this neighbourhood (excepting Lundy Island) for many years, and that one used to frequent a large turnip field, in company with other small birds, in January, 1858, when snow was on the ground.—*G. F. Mathews; Raleigh House, near Barnstaple, October* 25, 1863.

Parrot Crossbills at Brandon.—Seven specimens of the parrot crossbill, five of them males and two females, were received by Mr. J. A. Clark for preservation, having been killed near Brandon, in Suffolk, on the 24th of October, 1863.—*Thomas Huckett.*

The Jay and Cherries.—I have frequently suffered from jays plucking my peas, which they shell as dexterously as a good housewife, but it was not until this spring

that I knew that they were lovers of cherries. Standing on the grass-plat opposite the residence of a friend I saw a jay come into the cherry trees, and this summer I have had frequently to drive them out of two large cherry trees in my own garden.—*J. Ranson; York.*

North Yorkshire Haunts of the Kingfisher.—"In the district of North Yorkshire, I am best acquainted with, I have never seen it" (the kingfisher), says the Rev. J. C. Atkinson, in his 'Birds' Nests and Eggs.' In the River Ouse, about Linton-on-Ouse, and in its tributaries, the Nidd, the Kyle, the Swale and Yore, the kingfisher is as common as such a bird can be; and on a recent fishing excursion to the River Seven, which runs through Rosedale, on its way from the Moor, I observed no less than seven of these beautiful birds within a mile of the water-mill at Appleton-le-Moor.—*Id.*

Occurrence of the Whitebellied Swift near Manchester.—On the 17th inst. a large swift was seen flying about St. Mary's Church at Hulme. On the following day it was flying for some time inside the church, but eventually fell down and was captured by Mr. Jones, the organist. It died shortly afterwards in his hand, and he presented it to a friend, Mr. Jones, who is a collector, and sets much value on his prize. The bird was in fair condition, but the intestines were empty. The sex, unfortunately, was not ascertained.—*S. Carter;* 20, *Lower Mosley Street, Manchester, October* 26, 1863.

Late Breeding of the House Martin.—On the 3rd of this month I visited Llangollen, and observed a pair of house martins flying about the principal street. I was astonished to find they had young ones: I passed the nest three or four times daily, and constantly observed one or other of the parent birds feeding the young. Up to the time I left (the 10th) the young were still in the nest, although, to all appearance, full grown.—*Id.*

A Nest of Rook's Eggs in October.—On the estate of S. Hawes, Esq., at Slinfold, the very singular occurrence of a pair of rooks having built their nest and laid four eggs, which they are now hatching, might be seen. They commenced building on the 16th inst., and Mr. Hawes has, to satisfy his own curiosity, climbed the tree and seen the number of eggs we have above stated.—'*West Sussex Gazette,*' *October* 28, 1863.

Partridge Perching in a Tree.—Mr. Harvie Brown does not state in his note on this subject (Zool. 8770) whether the covey alluded to consisted of common or French partridges. If of the former the perching of a single individual as described is certainly unusual, but if French or redlegged birds (*Perdix rufa*) the circumstance is not uncommon. I have seen single birds of the latter species settle in trees when flushed from the turnips in two or three instances during one day's shooting. They will also sit in a road on a park wall or paling.—*H. Stevenson; Norwich, October* 5, 1863.

Curious Foot of Partridge.—On the 1st of December, 1860, a French partridge's leg, singularly imbedded in a lump of earth, was sent to me by a bird-preserver in this city, who had received it from a gentleman in Suffolk, who owns one of the heavy-land farms in that county. The poor bird to which it belonged had been seen hobbling about in a very unusual manner, and was without much difficulty run down and secured, when it was found that the lower half of one leg, with the foot, was imbedded in a mass of earth, which raised it considerably from the ground, and necessarily kept the limb in a bent position. This lump, measuring $7\frac{1}{2}$ inches in circumference, and weighing $6\frac{3}{4}$ ounces, had become as hard as stone, and certainly in that state accounted for the bird not being able to free itself from its incumbrance. Two toes only were visible on one side, of which one had the nail torn off level with the edge of the mass itself. From the upper part protruded a short bit of peat or straw, and this being entangled

round the foot had, I imagined, collected the soil around it by degrees, which had afterwards caked and hardened.—*H. Stevenson; Norwich.*

Moa on the Western Coast of New Zealand.—There were no wild animals indigenous to the country seen; but of birds there was a great variety, but none took to wing, with the exception of wild pigeons. All the rest appeared to burrow in the ground. There was one bird about the size of the common domestic fowl, but in plumage superior to the king parrot of New South Wales. Another description, but of a more dusky colour, stood about three feet high, and appeared to have peculiar imitative abilities, and apparently amused himself in mocking the men when talking together at their camp. With the exception of the pigeon, all the birds came out at night. The Maoris informed the party that if one of these birds was shut up in a dark room by himself it would make a noise exactly like six or seven men in earnest conversation. And, lastly, they saw a bird, or something like what the "moa" is said to be. This bird they consider stands about nine feet high. It made its appearance at the camp one night, and thrust its head over the fire, but only remained a very short time. The dogs gave chase, and they heard it for some time making its way through the timber. The impression left by its foot was about eight inches in length, and about four in width, and pointed in the form of a toe at each end, and from appearances, the leg bone must be situate about the centre of the foot; in places where the soil was soft and spongy its feet had sunk in some six inches. They baited some large eel-hooks, having strong lines, attached, with portions of the bodies of wild pigeons, which bait it must have taken, as the lines were found broken and some goodly sized logs capsized, with which they formed a sort of trap. They consider this bird very much like the emu of Australia. This party, after obtaining a supply of provisions on Saturday, started on another expedition to the same quarter the following day. They are very sanguine of making a capture of this extraordinary bird this trip. Although you may consider this story rather romantic and improbale, it is nevertheless true.—*Correspondent of the 'Otago Times.'*

Spotted Crakes in the Hackney Marshes.—Two specimens of the spotted crake (a male and female) were shot in Hackney Marshes, by Mr. R. M. Presland, on the 7th of October. A third by Mr. J. A. Clark in the same locality on the 26th; and a fourth, by the same gentleman, at Leyton, on the 28th.—*Thomas Huckett.*

Little Ring Plover at Scilly, with a glance at the Autumnal Visit of Migratory Birds at the Islands. — It is many years since you recorded the occurrence of this rare little dotterell, and I believe the last capture was reported by Mr. Grantham, at or near Brighton. I have just examined a beautiful specimen sent over by my nephew, who is on a visit to Mr. Smith, for the woodcock and snipe shooting there, and I think a transcript of his letter will be an interesting way of communicating the fact of the occurrence of this bird, as well as of affording a sketch of a sportsman's appreciation of the interesting scenes which every now and then occur at those Islands: — "We were of course much delighted to hear that the little bird sent to you by the last packet was a veritable redbreasted flycatcher. This steamer will bring you something very nearly as good, as I think there is no doubt of its being the little ringed plover, of which I believe only one or two specimens have been killed in England. I was looking out for warblers, &c., when I saw a small bird sitting on the mud by the Abbey (Trescoe) Pond. I saw immediately that it was something rare. It rose, and its note was a single sharp whistle, not like that of the common ringed plover, and shorter in duration. Its flight was remarkably stint-like, which it also

resembled in its tameness. On approaching it I saw it resembled a ringed plover, and, like that bird, it jerked up its head, turned or cocked its eye towards the ground, and hastily swallowed some small insect. I and my friend Mr. Pechell got a telescope, and watched its actions for some time. The bird agrees exactly with Yarrell's description. There have been considerable numbers of black and common redstarts on the rocks here, but rather shy. I got a specimen of one which I think is a black redstart. There was a glorious sight for an ornithologist yesterday morning. I heard there were six wild geese feeding on the Abbey Green. When I was looking at them through the glass, I heard a general scream from all the birds in the place. On looking up—for the wild geese uttered a note of warning and the ducks splashed in the water, enough to frighten old Tregeagle himself—down comes Falco peregrinus (a young bird), and knocks over a moorhen which was flying heavily to the nearest bushes. There was just time to see the moorhen, with its green legs, soaring in the air, when round came the falcon again, having been carried fifteen or twenty yards beyond where he struck the bird, picked up the moorhen and flew over the fence with it; he then rested for a few minutes on the ground, and appeared to give the moorhen its quietus, and then flew off to the sand-banks, where I found the remains of the prey. I always considered that the way in which a peregrine carried his prey was by clutching it close to its body, but the moorhen seemed to be dragged behind the falcon, as if carried by the legs being extended behind, as I have seen in pictures. There have been about fifteen woodcocks killed here, but the snipes are very scarce. I hope the bird I now send you will turn out a rarity." So much for my nephew's report of a day's ornithologizing at Scilly; he has, as a companion, my friend Mr. Augustus Pechell, who is well calculated to encourage a young aspirant to Natural History to watch objects worthy of notice. I am indebted to him for many valuable communications on Ornithology, and for the addition of one of the rarest British birds to my museum, namely, the brown snipe (*Macrorampus griseus*), killed at Scilly. In a concurrent letter with my nephew's he writes me: — "I am very glad to hear that the small bird has turned out to be so valuable a one,—Muscicapa parva,—but am grieved that it should have been so damaged by the shot. I am glad Gould will see it before it runs the risk of dropping to pieces. I hope, however, that Vingoe will make it worthy of a place among your flycatchers on its return. You will be glad to receive by the packet a little ringed plover, shot by your nephew on the Pool here, on Tuesday last, the 27th. It uttered a note once on rising, — a short whistle, quite different from the ringed plover's, with (it struck me) less plaintiveness than usually belongs to a plover's cry. The marks given by Yarrell as distinctive of the bird are clear in this specimen,— the white shaft of the first quill-feather, the black beak (the base of the under mandible was yellowish), and the outer tail-feather with the dark patch on the inner web. It is a slender, elegant little bird, and very cleanly shot. We have had some woodcocks and snipes, but neither in any quantity, the wind not having been northerly enough. Scilly is, as you say, 'a trump of a place' for rare birds, and a locality which produces in one week a red-breasted flycatcher and a little ringed plover can be called by no other name. There are six wild geese here. I can find you a young pied flycatcher in the garden, and a chiffchaff or two, perhaps a blackcap, and plenty of goldcrests. With regard to all the pied flycatchers being in appearance young birds, do you not think that the older and stronger small migratory birds make their way to the south with less deviation than the younger? A moderate easterly wind might affect the direction of the flight of the

latter, and deposit them at Penzance or Scilly; whereas the former would not suffer at all, or much less, from lee-way, and make their passage to France. Of the many goldcrests that come here I hardly ever see the crest of an elderly male. I have not seen one this year, though the birds are numerous." The above remark and suggestion, as to the flight of the old and young pied flycatchers, arose from my suggestion as to the whole of the specimens of the bird which have come under my notice, from time to time, being in the immature plumage, not being confined to young birds, but to old birds in winter plumage as well. With respect to the goldcrests not showing the orange-coloured under feathers of the crest, I think that this may arise from these feathers being much more frequently obscured by the lemon-coloured upper crest covering them.— *Edward Hearle Rodd; Penzance, November* 1.

Pallas' Sand Grouse in Norfolk and Suffolk, during the Summer of 1863. By Henry Stevenson, Esq.

(Second notice. See Zool. 8708—8718.)

In my previous paper upon the appearance of this most interesting species in the above district, I traced the occurrence of specimens in various localities from the 23rd of May to the 9th of July. The pair recorded under the latter date I have since ascertained were purchased at Lynn, and were killed on the sand-hills between Holme and Hunstanton. Through the kindness of Mr. Dix, of Ipswich, I have since heard of a male bird killed at Sizewell, in Suffolk, on the 7th of July; and another, also a male, at Croxton, near Thetford, Norfolk, a day or two later. Mr. Cole, for whom the latter bird was preserved, has supplied me with the following particulars: — "It was killed on my farm by one of the boys, about the 10th of July last. There were four of them together at the time, feeding on turnip-seed; the three remaining ones were seen often afterwards, but could not be shot. Once or twice when riding I got within shot, but never when walking. Their flight is peculiar, very sharp and quick, with a humming sound." From that time until the beginning of October I cannot ascertain that any more birds were killed in either county, although small detached parties, too wild to allow their persecutors a chance, still frequented their old haunts. During the last week in July a flock of about thirty were said to have appeared at Blakeney, where others had been shot, but these disappeared again on the following day. In the Yarmouth district my latest account of them is to the 3rd of August, on which day, writes Captain Longe, "a small flock of twelve or thirteen were seen near Winterton, on the beach;" and in the 'Field' of September

26th Mr. Fenwick Hele states that a single sand grouse "was seen and shot at on the 18th instant," at Alderton, near Aldeburgh, Suffolk.

October 3. — Three males killed at Hulme Point, near Lynn, Norfolk. These birds came into the hands of Mr. Howard, of Hingham who has since informed me that only four were seen together at the time; the fourth bird being also wounded and lost. Since that date no others have been noticed, and he believes that they have now entirely left that part of the county. I had certainly given up all idea of examining any more sand grouse during the present season when summoned by the birdstuffer to inspect the last three; and though sharing with other naturalists and sportsmen a regret that so many of these interesting birds should have been ruthlessly slaughtered, I was not altogether sorry for the opportunity of observing the autumn plumage of the species, and of comparing the tints of their freshly moulted feathers with those of the earlier specimens. This vivid colouring was particularly observable in the rich abdominal band, the deep orange on the side of the head, the dark markings on the back, and the sharpness of the pencilled lines across the lower part of the breast. In all of them the bar across the secondaries had a bright chesnut hue, and the wing-coverts—brighter and clearer than in any previous examples—showed a darker buff edging to each feather, looking like some delicate water-mark. The wing primaries and middle tail-feathers were light grayish blue, with some appearance of the "bloom" observable in the feathers of herons and some other birds. The first primary shaft, though beginning to elongate, had not yet projected beyond the second feather in any one of these birds, and the tail-feathers, of unequal lengths, had not attained their perfect growth, varying from 3 inches to 5 inches, 6 inches, and 6½ inches. They were all in high condition, indeed more plump than any I had previously handled, one bird weighing 10½ ounces, and two together exactly 21 ounces. The crops were filled with the seeds already noticed, and the gizzards contained the *débris* of such food, mixed with numerous small white particles of flint. I could have wished that one at least out of these three autumn specimens had been a female, as the appearance of the ovaries so late in the season might have shown some indication of the birds having laid their usual number of eggs during the summer months. The appearance of the testes in these adult males would certainly favour the impression, that although no nests have been discovered in this district, yet that such may have existed on the extensive sand hills bordering our sea-coast; more particularly since, on

the authority of Mr. Alfred Newton, this species is known to have bred during this year in some parts of Denmark. Mr. Southwell, of Fakenham, informs me that "a vague rumour" was current in his neighbourhood, early in September, that a nest had been found somewhere near Lynn; but adds, "I cannot discover the slightest foundation for the report," and my own inquiries have failed to elicit anything satisfactory on this point. I have not heard of a single bird having been seen since the last three were shot, but should a remnant remain with us throughout the winter—and the state of our climate, as compared with that in their native country, is not, I believe, incompatible with their doing so, if undisturbed—another season may produce evidences of their nesting with us, when, the novelty of their appearance having passed away, they shall, with other troubled spirits, attain to that happy state in which "the wicked cease from troubling, and the weary are at rest."

In my former paper I mentioned that the seeds taken from the crops of some of the Yarmouth birds "had been sown in pots, under the care of Mr. Youell, at his nursery-grounds." The result of this experiment has been thus communicated to me by Captain Longe, whose notes on the subject will be read with much interest. He says:—"The female shot near Breydon, on the 8th of June, contained in its crop four different seeds, which I sowed in separate pots. These I have ascertained to be Medicago minima, Chenopodium album, Polygonum Convolvulus, and Poa annua. The plants were submitted to the editor of the 'Gardener's Chronicle,' who concurred with me as to their identity. Three of the birds shot at Horsey on the 10th of June, by Captain Rising, contained no other seed in their crops than the Sagina procumbens (pearlwort)."

I must here also make a correction in my previous notes (Zool. 8715). "The first female *killed* at Yarmouth" should have been described as picked up on the beach; this being the one whose gizzard contained the small stones weighing three-quarters of a drachm. Of this specimen Captain Longe remarks, "It is somewhat curious (should only sand have been found in the gizzards of others), since it would imply that, where this bird had been, it had either been unable to procure smaller, or that the food it lived on required a larger stone in the gizzard for digestion; for from the crop being empty, and its early appearance, it is only reasonable to conjecture that the bird had never reached our coast before it was overtaken with fatigue." He believes the seeds of Polygonum Convolvulus to have been mistaken for those

of a Rumex, which would not probably have seeded so early in the year.

The total number of specimens now known to have been killed, in the counties of Norfolk and Suffolk alone, amounts to sixty-eight, as will be seen by the subjoined table, including the more recent examples:—

Norfolk,	55	Males,	27
		Females,	28
Suffolk,	13	Males,	6
		Females,	7
	68		68

HENRY STEVENSON.

Norwich, November 5, 1863.

A List of the Formosan Reptiles, with Notes on a few of the Species.
By ROBERT SWINHOE, Esq., F.Z.S., F.G.S., &c.*

I PROCURED at Formosa the following fifteen species of Reptilia, which have since been deposited in the British Museum. Dr. Günther has determined their species, and is describing the novelties in the British Museum Catalogue now publishing. To that gentleman's kindness I am indebted for the names.

1. Emys sinensis, *Gray.*
2. Trionix sinensis, *Coregm.*
3. Cistoclemmys flavomarginata, *Swinhoe.* In the British Museum there is a specimen of this species, brought home by Mr. Reeves from Canton. I should think that it was more than probable that the animal had been carried to that port in a junk, and is not indigenous to that locality, for in Formosa I found it extremely local. It did not occur in the south-west at all, but about Tamsuy, north-west Formosa, it was the prevailing species. I frequently observed it in ponds about the rice-fields, with its round back showing above the surface of the water and its head peering out. At times several might be seen together on the tops of stones in the water, basking motionless, with limbs extended. On being alarmed they would shuffle off the stones with

* Reprinted from the 'Annals and Magazine of Natural History' for September, 1863, and kindly communicated by the author. I have given the list entire, but have omitted some of the more technical parts.—*Edward Newman.*

all the energy in their power, and plumping into the water, sink immediately. If the observer kept quite still, after the lapse of a few seconds they would again appear at the surface.

4. Chelonia virgata, *Schneid.* The green turtle of Europeans in China is of frequent occurrence, often of a large size in the warm waters of the Gulf Stream on the east of Formosa. At Sawo it is taken in large numbers, dried and cut up into thin strips for food. It is of rarer occurrence on the west coast, where it is oftenest found in spring. On the Chinese coast it is a great rarity. There the fishermen have great reverence for it, as it is regarded as the emblem of longevity. When accidentally entangled in the fishing-nets, it is carried to the nearest large town and exhibited for a short time. It is then usually purchased from its captors by some well-to-do native, who has a few "good words" carved on its back, in company with his own name and the date, and fills-in the description with vermilion. The animal is then decked with ribbons and carried in a boat with much ceremony out to sea, where it is consigned with state into its native element. Some very large specimens were brought from Sawo to Tamsuy; they were kept in a boat filled with water during the day. In the evening we used to bring them out on to the deck of a vessel. One of them, for several consecutive evenings at eight o'clock precisely, would commence scratching the deck with her fore flappers and then set-to laying eggs, usually twelve in number. She would then turn round and commence pushing and scraping with her hind flappers, evidently the manœuvre she was in the habit of going through on the sandy beach, first scratching a hole for the reception of the eggs, then filling it up. I had one alive for some time in the yard of my house. It used to lie motionless in the rain-puddles, with only the top of its head uncovered. When the thermometer fell below 50° it would sally out of the water and not return till it grew warmer.

5. Caretta squamata, *Bont.* (Tortoise-shell Turtle). One of this species was brought to me at Tamsuy about the 25th of January, 1861. It was very lively and much more active than the green turtle, walking about the floor with an awkward but somewhat rapid gait. In walking it inclined the inner edge of its fore flapper up, so as to bring the claw of the outer edge as a purchase on the ground. It was killed by a deep incision in the neck above the thorax. Thus wounded it flapped about from 1.30 till 4 P. M., when it ceased to move; but at 11 P. M., when I dissected the animal, I found the heart still beating and the muscles sensible to touch and conveying motion to the limbs, though

other signs of life had ceased. The stomach contained bits of Algæ in small quantity; but the small gut was choked with bits of black stone and shell mixed with Algæ.

6. Gecko Swinhonis, *Günther*. On the plaster-washed side of my bedroom, close to the angle of the roof, every evening when the lamp was placed on the table below, four little musical lizards used to make their appearance and watch patiently for insects attracted by the light. A Sphinx or a beetle buzzing into the room would put them into great excitement, and they would run with celerity from one part of the wall to the other after the deluded insect, as it fluttered in vain, buffeting its head up and down the wall. Two or three would run after the same insect, but as soon as one had succeeded in securing it the rest would prudently draw aloof. In running over the perpendicular face of the wall they keep so close and their movements are made so quickly, with one leg in advance of the other, that they have the appearance, at a distance, of gliding rather than running. The tail is somewhat writhed as the body is jerked along, and much so when the animal is alarmed and doing its utmost to escape; but its progress even then is in short runs, stopping at intervals and raising the head to look about it. If a fly perch on the wall it cautiously approaches to within a short distance, then suddenly darts forwards, and with its quickly protruded glutinous tongue fixes it. Apart from watching its curious manœuvres after its insect food, the attention of the most listless would be attracted by the singular series of loud notes these creatures utter at all hours of the day and night, more especially during cloudy and rainy weather. These notes resemble the syllables "chuck-chuck" several times repeated, and, from their more frequent occurrence during July and August, are, I think, the call-notes of the male to the female. During the greater part of the day the little creature lies quiescent in some cranny among the beams of the roof or in the wall of the house, where, however, it is ever watchful for the incautious fly that approaches its den, upon which it darts forth with but little notice. But it is by no means confined to the habitations of men: every old wall and almost every tree possesses a tenant or two of this species. It is excessively lively, and even when found quietly ensconced in a hole generally manages to escape, its glittering little eyes (black, with yellow-ochre iris) appearing to know no sleep; and an attempt to capture the runaway seldom results in more than the seizure of an animated tail, wrenched off with a jerk by the little fellow as it slips away, without loss of blood. The younger individuals are much darker than the larger and older animals, which are sometimes almost albinos. In ordinary

fly-catching habits, as they stick to the sides of a lamp, there is much similarity between this Gecko and the little Papehoo or wall lizard of China; but this is decidedly a larger and more active animal, and often engages in a struggle with insects of very large size. I once watched a Gecko seize a Sphinx moth, but the insect, after a serious struggle, succeeded in breaking loose from it, not, however, without having been too seriously injured to live. I was assured by a medical friend at Amoy that he saw in his verandah there a large spider (a species of Mygale), quietly sucking the body of a papehoo. I suspect it would take a very large spider to pay the same respects to a Formosan Gecko. I have found the eggs of this Gecko in holes in walls or among mortar rubbish. They usually lie several together, are round, and do not seem to me to offer any appearance other than those of ordinary lizards. The young, when first hatched, keep much to themselves under stones in dark cellars, where they live until they attain two-thirds the size of the adults. At this stage they begin to show out in conspicuous places, but always evince alarm at the approach of their older brethren,—for what reason I could not make out. A little fellow that lived behind some small boxes on my table, and used to sally out to catch the smaller insects attracted by the lamp-light, would always scurry away as soon as he spied one of the larger tenants of the roof-top gliding down with hurried strides. It may have been puerile modesty, or perhaps he was aware that his precocity had induced him to affect a field to which he had no right in the presence of his seniors.

The Chinese colonists show a respect for these animals, and will not suffer them to be molested on the walls of their houses. They relate a legend as the cause of this veneration. Many years since some rebels had taken possession of the Fungshan Hien (the southernmost district of the Chinese territory in Formosa), and were threatening the capital itself, when the emperor sent across from China a celebrated general to quell the insurgents. This valiant warrior had made several onslaughts on the enemy, which only resulted in defeat and the decimation of his army. He sat one evening desponding gloomily, when suddenly his attention was drawn to something chuckling over his head. He looked up and spied a Gecko, which, to his astonishment, spoke out and asked him the cause of his despondency. The warrior, thinking that perhaps some good spirit was embodied in the little creature, unbosomed his grief to it. The lizard replied that by means of certain secretions in its body it could speedily poison the supplies of the enemies troops, and thus reduce their strength to a

shadow, and that the general could proceed and make short work of them. The brave warrior was delighted at the project, and promised, should the plot succeed, that he would recommend the lizard to the emperor for distinction. The lizard was as good as his word, and next morning large numbers of his tribe were observed making their way to the Fungshan Hien; and in a few days rumour reached the anxious general that the enemy were dying off by scores, and that their strength was fast reducing to a shadow. Whereupon he gathered his troops together, and soon succeeded in cutting to pieces the miserable remnant of the once invincible rebel band. The warrior returned elate from his victory. The lizard was at his usual spot on the wall, and chuckled louder than ever at the success of his plans, claiming for himself and four-footed companions the promised distinction. The general was true to his word, and memorialized the emperor on the subject, who graciously ordained that henceforth the tribe of Formosan Geckos should receive the rank of generals, and be respected by all classes of men. The Geckos, on hearing the good news announced, assembled and chuckled in concert; and since then every house possesses its small family of miniature generals, who manœuvre about the walls and destroy the mosquitoes and other insect pests that plague the colonists as successfully as their forefathers did the rebels; and when the thunder roars and the lightning flashes they think of the valiant deeds of their ancestors, and, in the true spirit of generals, chuckle louder than usual at what reminds them of the din of battle.

7. Mabouia chinensis, *Gray*.
8. Iapalura Swinhonis, *Günther*.
9. Coluber rufodorsatus, *Cant*.
10. Simotes Swinhonis, *Günther*, *Brit. Mus. Cat.* 1863.
11. Tropidonotus annularis, *Hallow*.
12. T. stolatus, *L*.
13. Bungarus semifasciatus, *Kuhl*.
14. Pelamis bicolor, *Schneid*.
15. Halys Blomhoffi, *Boie*.

ROBERT SWINHOE.

Note on Young Vipers entering the Mouth of the Parent Reptile.—The late John Galley, shepherd, of Cossey, in Norfolk, related the following anecdote to his son, who repeated it to me, and having full confidence in my informant's accuracy, I have taken down his statement, which is as follows:—John Galley saw a viper at Swannington, in Norfolk, surrounded by several young ones; the parent reptile, perceiving itself to be

observed, opened its mouth, and one of the young ones immediately crept down its throat; a second followed, but after entering for about half its length, wriggled out again, as though unable to accomplish an entrance. Upon this Galley killed and opened the viper, and found in the gullet, immediately behind the jaws, the young one which he had seen enter, and close behind that a recently-swallowed mouse. Galley was of opinion that the first young viper which entered was unable to pass the mouse, and that consequently there was not sufficient room for the second young one, which endeavoured unsuccessfully to follow in the wake of the first.—*J. H. Gurney; Catton Hall, Norwich, September*, 1863.

The Land Tortoise again Breeding in England.—As the tortoise at Tregullow has again become a mother this year, I beg to forward you the particulars, as furnished to me, of the fact, by Mr. William Williams, which I presume you and your readers will be interested in knowing. "The head gardener found an egg on the 7th July last, which is the only one seen this year; he immediately removed it to a pine-pit, on which was placed a little sand, the temperature of which by day was about 70°, and by night 85° to 90°. On the 28th September a fine male specimen was hatched, stronger than those produced last year. After the egg had been deposited in a hole, similar to that mentioned in a former account, the tortoise proceeded to make it stand upright; having accomplished this she covered it with earth. The young one burst the shell on the side, and walked away, leaving the other half entire, which has been taken care of."—*Edward Hearle Rodd; Penzance, October* 15, 1863.

Snake with a red mark on the Head. By T. Digby Pigott, Esq.*

Pinner Wood House, Watford,
May 11, 1863.

My dear Sir,—I thank you very much for your kind acknowledgment of my letter. I should be very glad to see it in the 'Zoologist,' if you think it worth publication. The courtesy with which you received my last communication induces me to bring to your notice a zoological puzzle, which I have never yet been able to solve, and which was recalled forcibly to my memory by your article on "the crested and wattled snake." For some years after my father's death my mother occupied an old house not far from Bungay, just within the borders of Norfolk (Broome Place), and while there one of my favourite haunts was along the banks of a brook which ran through quiet meadows, about a quarter of a mile from home. One summer evening I had taken my seat alone, with a gun, on a broken paling which overhung the water in an out-of-the-way corner, and was watching for the water-rats, which lived in great numbers along the stream. Before long more than one head was cautiously thrust out of the holes, and

* Addressed to and communicated by P. H. Gosse, Esq.

after reconnoitring up stream and down to see that all was safe, the owners had ventured out to their last evening meal on the juicy water-lilies, which grew plentifully about, and had fallen victims to my fancy for trying to skin everything which came in my way. I had waited longer than usual for another shot, and was thinking of moving, when suddenly an old rat dashed out of a hole exactly opposite me, and, ere I could fire, had dived and was hidden among the weeds. Before I had time to wonder at such unwonted behaviour, a snake glided quickly from the hole, apparently in full pursuit, and, without a moment's hesitation, took to the water behind him.

Now, Sir, I have no desire to claim infallibility for any school-boy, and most certainly not for myself, and I may no doubt have been mistaken; but I now repeat, as my decided impression and firm belief, what at the time, in spite of not a few jokes at my expense, I positively asserted as an undeniable fact, *viz.* that *on the back of the snake's head there was a diamond-shaped patch of bright red.* I know that it will most probably be objected that a boy of fifteen or sixteen cannot be expected to observe such things with the critical exactness of a full-grown naturalist, and that the same weight can scarcely attach to his evidence as to that of an older person; that the natural love of the marvellous, shaping itself into a wish to be thought to have seen something out of the common, is very apt to lead a boy, almost unintentionally perhaps, into exaggerations which may easily be repeated until he believes them to be actually true; but I do not think this was the case with me. I fired at the snake as it wriggled along the top of the water towards me (it had evidently lost the scent), and, when my shot failed to stop it, in my excitement, I jumped into the stream, and tried to belabour it with the butt end of the gun. However, it was too much for me, and I lost it in the mud I had myself stirred up.

Some little time afterwards three of us were netting roach and dace, in the next field above, where the brook is narrow and the water very clear. The plan of fishing which we had found by experience answered best, was for one to walk on each side with the flue carried between the two and reaching across, ready to drop it at a moment's notice as the shoals darted by. One of my brothers, at the time a Rugby boy, had gone on ahead of the net with a pole to drive the fish down, and had just climbed over a hedge to get to the other side of a good pool. He had been out of sight scarcely a minute, when he came running back to say that he had found a "red-headed snake," and that when it saw him it jumped into the brook and got away.

I regret that he is now in India, or I would have asked him for any particulars he could remember before writing to you.

The date of both adventures was, I think, the midsummer holidays of 1855 or 1856. I should very much like to hear what any good naturalist would say about it. Is there any creature known in England which would answer to this description? or, if not, is there any conclusive reason why these snakes, or this snake (they might well have been the same) should not be an exceptionally marked specimen of any of the well-known orders? or must I really be contented to believe that the only world in which my red-crested friend ever hunted rats, was the excited imagination of a silly boy?

I am induced, sir, to hope that the interest your writings show you to take in "the doubtful" in Natural History, and the chivalrous spirit which prompted you to take up the cudgels on behalf of poor Madame Merian and slighted mermaidens, may lead you to ask for a fair hearing, in the 'Zoologist,' or elsewhere, for a possible cousin, however humble, of the crowing basilisk of the limestone crevices in the West Indian Mountains. Once more begging you to pardon my intrusion, I remain, &c.

T. Digby Pigott.

June 1, 1863.

My dear Sir,—The solution for the mystery of my red-headed snake which you suggest, in the letter you were so very kind as to favour me with on the subject, *viz.* that the rat had wounded it, is not new to me. For several reasons, however, I do not think it tenable. If accepted in the case of my snake, the difficulty is as great as ever in the case of my brother's. I cannot say exactly how long after my adventure it was that he met with his; but my impression is that one was about the beginning and the other towards the end of the same holidays, and that some weeks at least had passed. My brother certainly had heard all about my "red-head," but (and in weighing the value of his evidence it seems to me an important "but") he was older than myself, and the only celebrity which my story had brought me was rather too much of the character of Munchausen's to make him ambitious to snatch a share of it.

Another suggestion is that, as the creature slipped out of the hole, something (possibly a withering leaf, or the petal of some wild flower growing on the bank) might have fallen on its head, where it might have rested sufficiently long to give me the notion, in the hurried glance I got, that it was part of the animal itself.

Of the two I should rather incline to the latter, but I do not in the least think that either is right.

In the 'British Cyclopedia,' the only book of reference I have at hand, I read of the common viper, "They are red, brown, gray, blue and black; but still these are only shades of difference, the causes of which are not known, and which occur at the same places, and even in the same family." And if such wide varieties as these are by no means unusual, it seems scarcely ridiculous to suppose that in very rare instances vipers may be found with even such striking peculiarities of colour as that which I believe I saw in the brook at Broome.

I write with much diffidence, because I believe there is much wisdom in the old saying that a prudent man should not believe more than half of what he sees, and far less of what he hears; and only last October I experienced a ludicrous proof of the extent to which a man's eyes may at times deceive him in such matters. I was with a cousin on one of the beautiful heathy hills which almost overhang the sea near Cromer. We had just killed a viper, and he was telling me of an unusually large one which he had met with the day before, when suddenly we both started back as our eyes fell on what appeared to be an enormous black snake coiled up at our feet. The thick ling and furze in which it lay spread over it so far that half its outer coils was all that we could see; but that was quite enough to give a fair notion of its tremendous size. "Had not I better put a charge of shot into it?" I thought. My cousin, while I hesitated, snatched a thick stick from a boy, and, pitching him his gun, aimed a blow at the unconscious sleeper which would have gone far towards giving his *quietus* to a Boa Constrictor. The heather shook, as with a frightful contortion the monster heeled over without loosening a coil, sprang out and fell at our feet. My cousin stared at me and I at him, our eyes met, and as we burst into a roar of laughter, a beater, who had come up, stooped down and picked up the black straw "pork-pie" hat which a child he knew in the village had lost on the heath the day before.

But, although completely taken in then, I have never yet heard any reason urged against the possibility (or even the probability) of the existence of a viper marked as the one I described, which has appeared sufficiently conclusive to warrant the rejection of the evidence of my senses. I remain, &c.

T. D. Pigott.

Frogs Climbing Trees.—I have several times endeavoured to draw the attention of naturalists to the climbing powers of the British Batrachians, thinking the subject to have been overlooked in the discussion of the question, "How are we to account for the discovery of frogs and toads in quarries and other elevated situations." Three several instances, proving that they can and do climb, have fallen under my own notice. These are already recorded in print. A fourth came under my notice on the 27th of October last. I was digging for pupæ at the base of a large willow tree in the valley of the Itchen, near Winchester, with some young friends, when one of the party exclaimed, "Look at this frog climbing up the tree!" I quickly ran round to the other side of the tree, and saw not one only, but five or six young frogs, from one to two feet from the ground, climb ng up the rugged bark, and using their front and hind feet just as a sailor employs his hands and feet when ascending the rigging of a ship. One, which I did not myself see, was discovered at a height of five feet from the ground, in the act of descending. It had been alarmed probably at our intrusion, and had fallen to the ground before I reached the spot; but I had no reason to doubt the accuracy of the statement, for two or three members of my party pointed to the exact spot from which is had fallen; and if a frog can climb two feet there is no reason why it should not climb twenty or more. Have any others among your readers observed similar instances?—*C. A. Johns; Winton House, Winchester.*

Larva of Acherontia Atropos feeding on Privet.—A fine variety of this insect was lately forwarded to me by Mr. William Marshall, of Enfield, to preserve. It was found feeding on privet. The ground colour, in place of yellow, is of light brown, with minute chocolate spots down the back. I have never heard of them feeding on privet before, though Mr. F. Bond informs me he has heard of a similar variety, which was taken from the ash.—*John Baker; Cambridge.*

Valvular Apparatus on the Backs of the Larvæ of Liparidæ.—When I read your remarks in the 'Zoologist' about the button-like projections on the backs of the larvæ of certain Liparidæ, I recollected seeing them referred to in Rösel's work. He mentions them in Liparis chrysorrhœa, L. auriflua and L. Dispar. Of L. fascelina he says, after the last hair tuft follow two segments, on each of which stands an orange elevation, which the caterpillar is accustomed alternately to contract and expand. Of Orgyia antiqua Kleemann says in a note, on the ninth and tenth segments stand deep red fleshy bladder-like buttons, which the caterpillar can draw in and again expand. I used to think that I had satisfied myself that they contained no aperture at the summit, though you seem to infer that such exist. I searched for it since your paper, but could not find it in L. pudibunda. There is in most of them a cup-like hollow at the top, containing a little fluid, but no communication with the animal's interior; there is certainly no communication with the respiratory tubes. Did you ever notice in these tufted larvæ that the hairs in the centres of the tufts are always moist, and that they cover a similar glandular apparatus, which is not raised into a button-like form like those you describe?—*T. Algernon Chapman; Royal Infirmary, Glasgow, November* 2, 1863.

A new Locality for Nonagria (?) Bondii.—Between the 18th and 25th of July I captured six specimens of Nonagria (?) Bondii on the coast at Lyme Regis. It was not at all common there, as I did not see more than two in an evening, and sometimes

none; but perhaps it might have been more abundant, as it appeared to be getting over, two or three of the specimens being rather worn. From the fact of its occurring so far west of Folkestone I should suppose that it will be met with in other localities on the South Coast.—*Percy C. Wormald; Kilburn, London, N.W.*

Hornets destroying an intruding Mouse.—Upon examining a hornet's nest I have found a mouse which had evidently crept into it. The hornets had killed it and covered it with the sort of paper of which they make their nests. It was a mass of about the size of a large walnut composed of bones mixed with hair inside. I have heard of bees covering snails, slugs, &c., with wax, but I never heard of hornets doing this before.—*Sidney Goodwin; Westhall Vicarage, Wangford, Suffolk, October* 26, 1863.

Notes on Sea Anemones, Observations on the Tank, &c. By W. R. Hughes, Esq., President of the Birmingham Natural History Association.

At page 6580 of the 'Zoologist' there is a most interesting paper by Mr. Gosse on the transfer of Adamsia palliata from shell to shell. During the last month I have had the pleasure of verifying that gentleman's observation. Amongst my recent captures at Torquay were three specimens of Adamsia, with their corresponding crabs, Pagurus Prideauxii,—two full-grown ones and one very small one. The larger were located on Buccinum shells, the smaller on a small Littorina. As I anticipated, the crabs in the larger shells soon died, and I had to bring the Actiniæ "up by hand," so to speak. The little one, however, did very well, made himself quite at home in one of my tanks, took food and thrived. He was occasionally subjected to sundry inquisitive pokings from two large specimens of Palæmon serratus, which have been in my possession some eighteen months, and which (except at special seasons, once in about three weeks, when Nature is measuring them for new coats) evidently consider themselves the lords of the aquarium. One evening Pagurus seemed restless and uneasy, lolling out of the shell as though he hadn't breathing space. So, bearing in mind the proceeding of my friend Mr. Gosse, in the paper above alluded to, I dropped into the tank two or three Natica monilifera shells of graduated sizes. In the morning great was my delight to find that my little pets had both decamped, and taken possession of a new tenement, consisting of the smallest Natica. How the operation was accomplished I cannot say, but no doubt, as Mr. Gosse suggests, the crab has some wonderful instinct by which he communicates the fact of his departure to the anemone. To my great regret the crab only lived a fortnight after the event, but the anemone still survives.

It has often been a matter of speculation to me, in what manner the anemone contributes to the happiness or sustenance of the crab in this remarkable social family of different Orders. The anemone appears to me to have the better of the bargain, for it obtains not only food, but the means of locomotion, as well as a certain kind of protection from its friend. Now, from the fact that the specimens of Adamsia without the corresponding Pagurus, in my possession, are always disfigured by portions of the cast slough, which adhere so closely to them that it is scarcely possible to keep them "decent in appearance," even with the most attentive treatment of the forceps, I cannot help thinking that Pagurus finds the slough of Adamsia a "delicate morsel," and, if one may be allowed the expression, "eats his friend." Specimens of Adamsia, with the crab, always appear perfectly clean, and divested of any portions of the epidermis usually adherent to anemones in confinement.

One of the remaining specimens of solitary Adamsia met with a sad fate. In the tank above referred to are five full-grown specimens of Asterina gibbosa. A few days since, I noticed one of the star-fishes remained for a lengthened period partly attached to the anemone, and partly adhering to the shell on which the latter was located. I tried gently to remove it, but without effect. Presently the star-fish was joined by a friend, and the two remained fixed on the anemone for more than a day. When they had altered their position the anemone was found to be partially eaten! The mangled remains were carried about for a short time by the prawns aforesaid, but they did not care to make a meal thereof. I do not remember to have seen it recorded anywhere that any marine animals are actinivorous. Query, would the star-fishes have found it possible to attack the Adamsia during the existence of its protecting crab?

I am fortunate in possessing a very fine specimen of Peachia hastata, upwards of four inches in length, which was obtained from Mr. Smith, a London dealer, in the early part of May last. It was originally procured from Guernsey. The arrival of the "illustrious stranger" was anticipated some days previously, and a special habitation prepared, consisting of a shallow glass pan, fifteen inches in diameter by seven high. Fully one-half of the pan was covered with sea-sand. Upon it were placed some fresh fronds of Ulva latissima, and the remaining portion filled up with water. The vessel was kept in a dark part of the room. I may mention, *en passant*, that this makes a capital aquarium for Zoanthus Couchii; some specimens

placed herein are thriving beautifully. On its arrival Peachia was put for some hours in a bath of pure sea water. It was subsequently transposed to the special home, and for four days he was wallowing on the surface of the sand, constrictions continually passing towards the caudal extremity, and during the next two days he would occasionally burrow to the extent of an inch or so. At the end of nine days from its arrival it had completely burrowed and concealed itself in the sand, with the exception of the tips of the tentacles, which peeped out, but immediately retracted on being touched. The process of burrowing was effected precisely in the manner already so beautifully described by Mr. Holdsworth, in the 'Annals of Natural History' for January, 1859:—"Its first efforts in burrowing had but little effect, and it was only after an hour's labour, when the cavity had become large enough to allow the polype to work in an upright position, and with the assistance of its whole weight, that rapid progress was made." At the end of four days from this event Peachia had wriggled himself out of his burrow, and remained wallowing on the surface of the sand; at the end of five more days he was again completely concealed, as before described. Occasionally I tried him with food, but to no purpose; on the slightest contact with the tentacles they were immediately retracted, and the food untouched. About six weeks from the commencement I succeeded in tempting him with several fresh ova of the salmon, and regularly since, about every three weeks, up to the present time, he has been fed with mussel, oyster, or raw fish. The tentacles and conchula are usually protruded, but sometimes the creature entirely disappears for a few days. It seems in perfect health and quite domiciliated.

I am also fortunate in possessing another rare and curious animal, Phellia Brodricii, obtained from the same person, and originally procured, I believe, from the little Island of Herm. It is located on the exposed surface of a piece of rock, from whence it has not altered its position. The description accords with that in Mr. Gosse's 'Actinologia,' but I have not found the specimen so shy as therein mentioned. It is impatient of the light, and only expands fully in the darkest parts of the aquarium. With an ordinary amount of care it is readily fed, and has materially improved in consequence.

W. R. Hughes.

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