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THE
ZOOLOGIST:
A
POPULAR MISCELLANY
OF
NATURAL HISTORY.

CONDUCTED BY

EDWARD NEWMAN, F.L.S., MEMB. IMP. L.-C. ACAD.

VOLUME THE FIFTEENTH.



LONDON:
JOHN VAN VOORST, PATERNOSTER ROW.

M.DCCC.LVII.

Oh, how sweet to sit at sunset
On some gate among the corn fields,
And to watch the busy millions
As they seem to rise towards heaven!

Insect Hunters.



P R E F A C E .

ANOTHER VOLUME of the 'Zoologist' is complete,—a volume filled with more and with better matter than any which have preceded it. Bulky, however, though it be, it contains no notices of books, no original papers of my own (at least none to occupy space), and scarcely one-half of the original communications which have been sent to me for publication. A portion of the arrears may yet be available, but the principal papers have been returned to the respective writers, and have appeared in journals less popular than my own. It is a most ungracious task to make the necessary selection, but in every instance I have been guided solely by the desire to publish what I believed would be most acceptable to my readers; and I trust that the authors of papers I have declined will give me credit for that species of worldly wisdom which acts from interested motives, and the obvious interest of a journalist is, by every means in his power, to extend the circulation and the popularity of his journal.

Although I hold that an Editor is in no way committed to the opinions or expressions of his contributors, yet I feel it most undesirable that any communication offensive to a single reader should be allowed to pass unnoticed; and I regret to say that such a paper has appeared: I allude to that by Dr. Knox on the present state and future prospects of Zoology. The theme is an excellent one, replete with opportunities for diffusing instruction; but the learned author has mixed with much that is valuable, sentiments and expressions which have caused infinite pain, not to myself alone, but to some of

my most valued supporters. It were idle for me to repudiate any participation in the sentiments to which I have alluded : the entire management of the 'Zoologist' for fifteen years is the unanswerable evidence of this. But, were there nothing objectionable in Dr. Knox's views, it must be obvious, even to the Doctor himself, that the 'Zoologist' is not a medium for their expression : with polemics and politics the 'Zoologist' can have nothing to do.

There is another feature in the present volume which must not be passed over without explanation, the irregular appearance and final cessation of the Reports of the Meetings of the Entomological Society. I am fully aware that the executives of our learned Societies in London have long held that their Proceedings, like juvenile wines, improve by keeping, and that they have rarely indulged us with a draught of knowledge until it has been some years in bottle. In prominent contradistinction to these, the Entomological Society took an exactly opposite course, and became really remarkable for the promptitude and accuracy with which copious reports of its Proceedings were circulated throughout the country in the pages of the 'Zoologist.' Without attaching blame to any one, I may state that the commencement of irregularity in the transmission of these Reports led to remonstrance on my part and reply on the part of the Society; farther delay, farther remonstrance and farther reply; until at last I voluntarily abandoned all idea of claiming these Reports as I had previously done under an agreement with a former Council of the Society. Still the monthly publication of these Reports is so favourite a project of my own that I will not relinquish it without another effort, and I entertain some idea of becoming my own reporter, and of supplying a series of Reports, next year, of the scientific doings of a Society in which so many of my subscribers have always taken the warmest interest.

The study of Zoology has been progressing with us favourably and steadily; but I could wish, and have often expressed the wish, that our attention should not be so much confined to the acquisition of

species, or the examination of the remains of beings that have lived. In furtherance of this wish I have penned an essay on the 'Employment of Physiological Characters in the Classification of Animals.' I wish naturalists to bear in mind that, as the possession of life is in itself a grand general character, so are the modes of using and continuing life deserving of study, inasmuch as by their discrepancies they furnish us with divisional characters. I am well aware that there are those, especially in our museums, who reject and ridicule the idea of going beyond the treasures of a museum for information. By all such my views will be regarded as purely nonsensical; but we are not without men who weigh a matter before they pronounce an opinion,—who say to themselves, Are these things true. Are we right in disregarding truth? Entomologists will not forget that some years back, combining the characters of economy and metamorphosis with those of form, I argued the propriety of uniting *Stylops* with the *Coleoptera*, the flea with the *Diptera*. Every one who trusted implicitly to books pronounced my views absurd, untenable; and so they are when judged by books, but not if we appeal to Nature: those who do appeal to Nature are with me to a man. It was but the other day that Dr. Hagen emphatically pronounced that *Acentria nivea* was lepidopterous; since then an entomologist has found its larva and pupa, and his observations, in the January 'Zoologist,' will confirm the Doctor's views; but a question of deeper interest is opened by these announcements. Why is not the entire tribe of *Phryganeina* lepidopterous? The cased larva is no objection; the form of pupa is no objection. Then turn to the perfect insect: the substitution of hairs for scales is no objection; the formula of wing-rays is the same; the obsolete mouth is no objection; indeed, when we seek for a valid objection we cannot find a single character possessed by *Phryganea* that has not already been pronounced unimportant in the case of *Psyche*. I am aware how opposed this is to received opinions,—how the works of Ingpen, Samouelle, Curtis, Stephens and Westwood may be cited as conclusive against it. But, gentlemen, go to Nature; ask her; watch the living animal, and then contest the point; make yourselves masters of the subject, and let the

readers of the 'Zoologist' benefit by your observations. We have an aquatic section of Diptera, Neuroptera, Coleoptera, Hemiptera : it is in perfect accordance with the known laws of Nature that there should be an aquatic section of Lepidoptera.

Again, in the beautiful class of birds, may I not be allowed to invite attention to their lives, to their living actions : the contrast between Nature and what is called Science is here most forcibly set forth. Look at our museums : the very best of them convey little information, give little idea of the living bird, its nest, its eggs, its young, its flight, its food, its history. Surely it is not unreasonable to suggest to our ornithologists another object besides simple destruction of life in their excursions to the woods and fields. What do they obtain by indulging this propensity ? Certainly no improvement of heart or head, but perhaps a bulky collection of caricatures of Nature, more libellous, more repulsive than caricatures of the human form. I do not, however, ask the ornithologist to renounce collecting, but I ask him to study as well as to kill. No author on Ornithology but has discovered the impossibility of founding a natural arrangement on the feathers and bones, the beak or the toes : is it unreasonable to beseech our authors to observe the creatures themselves when "instinct with life ?"

Species are the alphabet of Natural History ; but what is the value of an alphabet unless you go farther than obtaining knowledge of the letters ? Let me entreat the readers of the 'Zoologist,' now a larger circle than ever, to consider these things, to bear with patience the ridicule which a study of living Nature will certainly induce from those who suppose, or who believe it their interest to suppose, that Nature can only be studied in museums.

EDWARD NEWMAN.

Devonshire Street, Bishopsgate,
November 21, 1857.

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The 'ZOOLOGIST' will be continued both as a Monthly and an Annual Publication. As a Monthly, it will contain about forty pages of letter-press, occasionally accompanied with illustrations engraved on wood; will be on sale two days before the end of every month; and will be charged One Shilling. As an Annual, it will be sold on or about the 1st of December; will contain twelve Monthly Numbers, bound and lettered uniformly with the present Volume; and will be charged Thirteen Shillings. An Alphabetical List, both of Contributors and Contents, will be published once in the year.

THE ZOOLOGIST

FOR 1857.

Stray Notes from an Ornithologist's Diary during the past Summer.
By MURRAY A. MATTHEWS, Esq.

IN the neighbourhood of Barnstaple, North Devon, during the last eighteen months, specimens of the rarer British birds have occurred more frequently than, perhaps, in any other part of England for the same period. It is my opinion that were an active and enthusiastic ornithologist to establish himself in this quarter, and work it diligently, many new and important facts would be collected relative to the habits and economy of some of our scarcer birds with which the bird-studying world is as yet but imperfectly acquainted. The situation of Barnstaple and the country round it is one peculiarly fitted to attract any birds which may be straggling westwards. We have a most diversified country: hills, fallow-lands, dry heath, elevated moors, extensive rushy marshes, and where the Taw below Barnstaple flows broad and tidal, previous to its uniting with the Torridge at Appledore and joining the Bristol channel, we have broad sandy flats, which are left dry as the tide retreats, and here and there soft beds of ooze, formed from that alluvial deposit which the Taw has rolled down through many a fertile meadow on its way from the wilds of Dartmoor. And where the two rivers meet there is a large tract of dry and barren sandhills, known favourably some years ago to entomologists as a sure haunt of *Deilephila Euphorbiæ*, bordered landwards by an extensive fenny flat called the Braunton Marshes. Above Barnstaple, again, there are the Tawton Marshes, in which, in October, 1855, a fine specimen of the great gray shrike (*Lanius excubitor*) was killed by a farmer: this bird is now in my collection. In these marshes also, during the severe weather last January, several fine specimens of the bittern were shot. A little way to the south of Barnstaple, near a village of the

name of Lankey, a fine adult male of the mountain finch (*Fringilla montifringilla*) was shot by a farm-labourer as early as the 20th of July: this is in itself a valuable fact, as it might in some way countenance the supposition that this beautiful species occasionally breeds in our southern counties. It is a bird, according to the late Mr. Yarrell, excessively rare as a summer visitant, and far from commonly met with even in the winter months. The specimen in question was in very handsome plumage, and it was its gay appearance that attracted the notice of the man who shot it, as it was flying about a hedge in company with some yellow buntings and greenfinches.

The great capture near Barnstaple this season, to detail which I have been chiefly led to connect together these rambling notes, has been the cream-coloured courser (*Charadrius cursorius*), which was shot by the Rev. J. Landon, of Braunton, early in the last week of the past October: this is the first occurrence of this rare straggler to Europe in North Devon, and, I believe, anywhere in the southwestern corner of England: the bird was met with in the Braunton Marshes, and was fired at several times by the Rev. J. Landon and his friend before they succeeded in killing it: Mr. Yarrell mentions but four instances of its occurrence in the British islands, and these are at very wide intervals. Two specimens of the peregrine falcon (*Falco peregrinus*) have been secured in our neighbourhood this year. I have myself shot several individuals of the curlew sandpiper (*Tringa subarquata*) by the side of the Taw this summer, or on its sandy flats during low water: two of these were adult males in fine summer plumage; the first I killed on the 14th of August, the second out of a small flock as late as the 6th of September; the last, singular to relate, was in far brighter plumage than the one I obtained in August, and had its breast and belly marked with the rich chestnut-red which distinguishes this bird at once from any other of the genus: it gave no symptoms of having commenced the autumn moult, while the dunlins had some time previously been changing the gay colours in which they appear during the bright summer months for that less conspicuous but far warmer dress in which they resist the icy winter winds: owing to the singular richness of the plumage, together with the circumstance of its having been obtained so late in the season, I have considered this specimen of some little value, and have presented it to the Museum of the Ashmolean Society at Oxford. I have had many opportunities this summer of observing the habits of this beautiful little sandpiper, and consider it one of the most graceful of the genus: it generally associates with the ringed plover and dunlin,

never in any numbers, and can readily be distinguished from them by its longer legs and more upright carriage. A flock composed entirely of curlew sandpipers is very rarely to be observed, and I have only once noticed one; there were in it about ten of the birds, the greatest number I ever saw together: they are wilder than the common dunlin, and, as the flock in which they are is approached, are the first to take wing. I was much interested one afternoon, upon wounding a bird of this species in the wing, to find that it could swim; for, upon my giving it chase, it swam readily across a small channel of the river, with as much grace and ease as our well known *Totanus hypoleucos*. The female of the curlew sandpiper is a larger bird than the male.

This season the knot sandpipers have been very plentiful with us: they made their first appearance on the 22nd of August, in company with a large flock of dunlins, and a few days afterwards were to be seen by themselves in great numbers. These birds are foolishly tame: as one advances towards them they have a peculiar custom of turning round and presenting the whole side of their bodies towards one, and, after they have all veered round, of remaining motionless until one gets quite near to the flock: they watch you narrowly, however, all the time, and seem to be meditating as to what strange thing it may be that is approaching them; their decision, unfortunately for themselves, generally would appear to be that you are drawing nigh to them with none but friendly intentions, as they do not ever think of taking wing and retreating until, as it often happens, the terrible gun has sent forth its destructive volley, and numbers of them lie dead or wounded upon the sands. As the flock is on wing the birds can be readily recognised by their peculiar flight: this is slow, in comparison with that of the other sandpipers, and generally low over the surface of the sands: upon observing the direction for which the birds are making, it is no difficult matter, either by running or walking fast, to intercept them, when a most destructive shot can be taken at them, as they will not alter their course the least upon the enemy's approach.

On the afternoon of the same day in which I first noticed the arrival of the knots, I was attracted, on passing a flock of dunlins, by hearing a strange and peculiarly shrill whistle proceeding from some bird among them: curiosity prompted me to fire, and I had the satisfaction of finding that I had killed a beautiful specimen of the little stint (*Tringa minuta*), still in summer plumage: this little bird is excessively rare along the western coast of England, and has but been noticed once or twice in the South of Devonshire. The bartailed godwit has been this season unusually plentiful, and great numbers of them have been shot:

after the severe gales of the 26th and 27th of September they were driven into the river in large flocks, and were easily approached: they have singular tactics as one walks towards them: while they feed they are generally scattered over the ooze in a long irregular line; as one approaches them the birds on the flank sides of the flock take wing, wheel once or twice over the others, uttering all the while their peculiar cry, and finally settle closer together among the rest: this manœuvre is once or twice repeated as one draws nearer to them, and each time they rise and settle they form themselves into a thicker body, and, if they remain on the ground until one arrives within a reasonable distance for a shot, a great number can be always laid low by a single discharge.

One stormy afternoon, on taking my usual walk along the river, I observed a dark-coloured tern hovering sedulously in quest of small fish over the shallows which were left by the retiring tide: it was not without some wading that I succeeded at last in obtaining a shot at and killing the bird, when I found it to be the lesser tern (*Sterna minuta*), a species which, although I believe far from uncommon along our eastern coast, is but rarely seen so far west as Devonshire.

On the 23rd of September, when walking near the water's edge, I remarked a light-coloured bird, which suddenly flew swiftly past me, and, alighting on the water a little further on, commenced swimming on the crests of the waves, appearing as it rose and fell again very much like a miniature duck: I at once saw that the bird before me could be no other than the gray phalarope (*Phalaropus lobatus*), which the northern gales had driven southwards from his home along the Norwegian coasts. I enjoyed the sight for some little time, and then, having advanced and shot the bird, found it, just as I had imagined, a very fine specimen in a beautiful state of intermediate plumage. A few days afterwards, when sailing on the river, I observed another, but the wind blowing fresh at the time, I was unable to tack about so as to get anywhere near it.

MURRAY A. MATTHEWS.

Merton College, Oxford.

Birds of the Crimea. By THOMAS BLAKISTON, Esq.,
Lieut. Royal Artillery.

THE following notes are made up from my journal kept while serving with the Army of the East during twelve months in 1855 and 1856; but, before commencing, it will be as well to say that the observations refer mostly to the neighbourhood of Sebastopol, and there-

fore must not be considered as referring to the Crimea generally, nor must the list be taken as including anything near the whole of the birds which inhabit that country; for, in the summer, living in a single bell-tent in very hot weather, ever expecting to be on the move, and in the winter with plenty of other work, and few conveniences or books of reference, little could be expected.

It is needless to say much concerning the country; suffice that, taken generally, the peninsula may be considered a continuation of the plains or "steppes" of Southern Russia, the only mountainous or even hilly parts being the south and south-east. The climate appears to be very variable in different years.

BIRDS OF PREY.

Of the vultures I have never observed but the one species, the griffon vulture (*Vultur fulvus*), which was numerous during the year, and my friend Dr. William Carte considers that their numbers are greatest during the summer, and he also remarks that they seldom occurred in cloudy or foggy weather: he was lucky enough to kill and preserve a specimen, which, together with many others from the same country, he has liberally presented to the Royal Dublin Society. Any one who would wish to inspect living specimens, can do so at the Gardens of the Zoological Society, where are two fine birds, presented by the Commandant of Balaclava, which were taken near the Monastery of St. George. There were numerous opportunities of observing these birds feeding on carrion, of which there was little want, in the shape of dead horses, mules, cattle and sheep: I have seen as many as fifty together at a time. Many a time have I waited in the high cliffs overhanging the Euxine for a close shot at them without success, and their appearance, when flying below one, is of a uniform light ash-brown, except the wing feathers, which appear nearly black. I note this, because I consider with Bewick that it is a great point in Natural History to know the appearance of animals at a distance or in motion, as such knowledge often saves valuable time.

The falcons, including eagles, hawks, kites, buzzards and harriers, being such an interesting family of birds, I regret that, although they were numerous, I am unable to furnish much information concerning them; but I have no doubt that a resident naturalist in the country would have opportunities of observing their habits very closely, which would tend to clear up many doubtful points.

To commence with the eagles: the white-tailed sea eagle (*Falco albicilla*), I think, inhabits the Crimea during the year, is by no means

uncommon about the cliffs on the coast where it breeds, and I have noticed it fishing in the harbour of Sebastopol. An officer succeeded in taking a couple of young ones from the nest on the 12th of April, in the cliffs between Balaclava and the Monastery of St. George: he said that the nest was quite free from dung, owing to the peculiar mode of evacuation, which was observed when they were afterwards kept in confinement. Dr. William Carte has a specimen of this species.

The same officer who procured the young eagles agreed with me that two large eagles which we observed for a few days, always together, were the golden eagle, but, never having obtained a clear view, this bird is only included among the doubtful, and does not form one of the 129 species which we have made out for certain. I have on more than one occasion observed a smaller species, one of which I shot at, while quail-shooting one day, and, having wounded him, had a great hunt about the cliffs, but failed in capturing him.

There is one more species of which I must speak: the only specimen I know of having been killed was by a friend of mine in the far-famed Valley of Baidar, in May, who kindly brought me the specimen while fresh, which I accordingly skinned, not knowing the species, however, until my return to England, when, on walking through the British Museum, I espied one that was to my mind the same, and so it turned out to be, namely, the tawny eagle (*Aquila naevoides*). I preserved the sternum of this bird.

Let us now pass on to others of this family; and we find the hobby (*Falco subbuteo*) to be in appearance and habits a true falcon, though of no great size, being a peregrine in miniature: he stands, as it were, on the crest of the hill of falcons, as typical of the whole family, the slope on the one side being carried down by the eagles to the vultures, and on the other by the hawks, buzzards and harriers to the next family, owls, which, in like manner, rise to a culminating point, and fall again, uniting in another valley with the insect-feeders; and when we look at this gradual development of some characters with the falling off of others throughout the whole system of Nature, and at the filling up of gaps by the discovery of new species, we are led to ask, Who can define where one order, family or genus ends and another begins? and we find ourselves at a loss to ascertain that precise link in the chain where the dividing line should be drawn, and are ready to say that "species alone exist in Nature." Professor Rymer Jones has well illustrated this difficulty, in speaking of the animal and vegetable kingdoms. "Light and darkness are distinct from each other, and no one possessed of eye-sight would be in danger of confounding night

with day, yet he, who, looking on the evening sky, would attempt to point out precisely the line of separation between the departing day and approaching night, would have a difficult task to perform." The hobby is a most active and graceful bird on the wing, and often have I watched him chasing locusts and other winged insects, at the catching of which he is very expert, and, with a little attention, it is easy to see him take the prey from his claws with his bill. Whether this bird is a summer resident or merely a passing visitor about the time of the equinoxes I cannot say, but I should think it likely that some breed in the country, and that their numbers are augmented about the middle of September, for it did not attract my notice until that time, when it was numerous, and continued so until the end of the month, after which, on account of an attack of fever, I did not notice it until the 21st of November, at Scutari, on the Bosphoros, when I immediately recognised him by the peculiar evolutions while pursuing insects in the air. I have often seen seven or eight hawking together, but did not observe any during the spring, perhaps on account of their favourite food, the locusts, not being about at that season.

During the whole year I observed hawks of one kind or another, many of which were never made out: once I thought I saw a kite, and, early in May, I observed a large species, which appeared, seen from underneath, to be of a buff colour, with the ends of the wings and spot at the shoulder of each dark; and a day or two after a uniform dark coloured hawk.

I am, however, certain of the kestrel (*Falco tinnunculus*) and lesser kestrel (*Falco tinnunculoides*); the former of which I first observed, and shot a specimen on the 8th of August, when searching with my gun for an owl which I had seen near the camp. Not being aware at the time of the existence of the latter species, I must therefore say that I observed the one or the other, or both, from the 12th of April, numerous during the spring, particularly about the cliffs of Inkermann, where, I should say, they breed, and during a ride to the Alma at the end of May. Dr. William Carte brought home specimens of both species.

I shot a specimen of the sparrowhawk (*Falco nisus*) on the 4th of September, which I preserved, but I have no note of having observed it at any other time.

Specimens of the redfooted falcon (*Falco vespertinus*) and marsh harrier (*Falco æruginosus*) are to be seen in England, which have been brought from the Crimea, and I shot several of the hen harrier (*Falco cyaneus*) which was abundant in September; I again observed it towards

the end of February, and saw some fine adult males in March and until near the end of April. I cannot say whether this species is resident during the year.

The habits of birds whose movements are more or less restricted to the night are of course not easily observed, and therefore it is that, by the superstitious, all kinds of depredations are laid to their charge, and, for this reason, the species of the family we now come to have been called birds of ill omen. It was towards evening of a day at the end of September, having been skinning specimens all the afternoon, when I mounted my horse, and, having gone some distance past a French camp, it had grown dusk. I had just pulled up after a sharp gallop towards Cape Violente, and was approaching a part of the cliffs where the French used to throw their dead cattle into the sea, when an owl circled upwards, and was lost to sight.

At the edge of the cliffs there were a number of dead bullocks together, and when I approached within thirty yards a large bird hardly rose, and, flapping its wings, rested on the very edge of the cliff: my first and momentary thought was that I had disturbed a vulture who had taken up its position for the night on the scene of its last meal; but the form of the dark figure, standing in relief against the clear evening sky, at once undeceived me, and two large horns erect on his head denoted him a horned owl, and, from his size, likely to be the eagle owl (*Strix bubo*), which I believe he was, for I have since seen a specimen brought from the country. I know of one that was in confinement, and have heard of others being seen. During the continuation of my evening's ride along the cliffs I noticed many more owls and bats, and it had been dark some time before I reached the camp.

The short-eared owl (*Strix brachyotus*) and the long-eared owl (*Strix otus*) both inhabit the Crimea: I obtained the former in September and April, and the latter in March. Dr. William Carte also obtained both these, and considers that the former is resident during the entire year.

There was a diminutive species, not larger than a thrush, which was pretty generally distributed, being common about rocks, buildings and old trees, and many were observed in the trenches during the siege: I had several opportunities of observing it, and have hunted more than once after one in the dusk of the evening, but neither Dr. William Carte nor myself ever obtained a specimen, and thus far I cannot trace a single one that has arrived safely in England, although I have heard of some that were preserved. I observed one go into a small hole in

a tree near Tchorgoun, on the Tchernaya, in April, where I think it was breeding.

There is still another species, which I have not identified, of which I shot a specimen at the end of July; but, on account of the heat, which, about that time, was one day as high as 98° Fahrenheit in my single tent with a thorough draught, I was unable to skin it, and moreover could not make out the sex by dissection, on account of the damage done by the shot, but, from a detailed description made at the time, I think it likely to have been Tengmalm's owl (*Strix Tengmalmi*), but, without further proof, am obliged to number him among the doubtful.

It is most likely that there are many specimens now in the United Kingdom, which, if known, would help to swell this list, and therefore, as it is my intention to continue these notes on the remainder of the birds of the Crimea, I should feel thankful to any one who could furnish me with the existence of species for certain, and any information concerning them, for I hope, at the end, to insert a true classified list of the birds ascertained to exist in that country, and, likely enough, a short paper on a few birds observed in Bulgaria.

I may here mention that I have among my specimens from the Crimea those rare birds *Alauda leucoptera* and *Xema lambruschini*.

THOMAS BLAKISTON.

Woolwich, November 10, 1856.

Lists of Birds observed in the Crimea.

By L. H. IRBY, Esq., Lieut. 90th Light Infantry.

Griffon Vulture (*Vultur fulvus*). Very common in the winter of 1854-5, but was less numerous afterwards, probably in consequence of the burial of all animal matter. This bird nested in the rocks near Balaclava.

Egyptian Vulture (*V. percnopterus*). Very common during the winter of 1854-5; not often seen afterwards: was observed more in flocks than the griffon vulture.

Golden Eagle (*Falco chrysaëtos*). Only one specimen of this bird came to my knowledge, which was killed while feeding on a dead dromedary in December, 1854.

Whitetailed Eagle (*F. albicilla*). Seen in the winter of 1854-5, and also bred on the rocks near Balaclava.

Whiteheaded Eagle (*Falco leucoryphus*). Common in the

interior of the Crimea; not seen among the rocks by the coast. This bird bred, in two instances, on trees close to the Katcha river: the nests were about thirty feet from the ground, and were very large, formed of sticks, lined with grass and old rags. The remains of a hare was in one nest, in which was also a young bird, just hatched, which did not live long, as may be imagined. A very fine specimen was killed with a revolver, while sitting on a tree near the Alma: the bird was apparently gorged, and therefore allowed a very near approach. This eagle is apparently distinct from the American whiteheaded eagle (*F. leucocephala*), and is not, I think, described in any English work on Ornithology: unfortunately I was not aware of this at the time, and so did not particularly notice it: it is known to the Russian naturalists under the name of leucoryphon. A friend of mine, a good observer of birds, saw one of these eagles chase an osprey, and make it drop its fish: I have heard that the American whiteheaded eagle does the same. The head, feet and sternum of one of these birds are in England, and will no doubt clear up the question as to whether it is a distinct species or not.

Osprey (*Falco haliaëtus*). Two or three pairs frequented the harbour of Sebastopol in the spring of 1856.

Peregrine Falcon (*Falco peregrinus*). Seen on two or three occasions in winter.

Hobby (*F. subbuteo*). Migratory; first seen on the 24th of April; became common in June: appears to catch beetles, &c., on the wing, whereas the lesser kestrel generally catches them on the ground.

Redfooted Falcon (*F. rufipes*). Only two specimens, adult and immature male, came under my observation, which were killed on the 7th of June, 1856.

Merlin (*F. aesalon*). Observed in December, 1854, and in January, 1855.

Common Kestrel (*F. tinnunculus*). Common all the year, and often bred in the holes of trees.

Lesser Kestrel (*F. vespertinus*). Migratory; first seen in the beginning of April, and became very common afterwards: nested generally on rocks, sometimes on trees. On the 5th of May, 1856, I saw a lesser kestrel, a hoopoe, a bee-eater and roller go into holes in the banks of the Katcha, within a space of six or seven square yards. This little hawk appears to feed, when in a wild state, entirely on insects and beetles, generally taking them on the ground. A female, which was kept alive, would eat mice, and was also very fond of flies.

Goshawk (*F. palumbarius*). A single specimen was seen near the Bulganak in September, 1854: the observer, who told me of it, is himself a practical falconer, and therefore could not have mistaken it.

Sparrowhawk (*F. nisus*). Observed four times, in December, 1854, in December, 1855, and on the 1st and 16th of May, 1856.

Honey Buzzard (*F. apivorus*). One was killed on the 21st of May, 1856, and several seen in the same month.

Roughlegged Buzzard (*F. lagopus*). Seen in the vicinity of the Tchader Dagh, about the 30th of April, 1856.

Common Buzzard (*F. buteo*). Once seen.

Common Kite (*F. milvus*). Once seen.

Marsh Harrier (*F. æruginosus*). Very common in spring about the marsh at Inkermann.

Hen Harrier (*F. cyaneus*). Very common throughout the year.

Ashcoloured Harrier (*F. cineraceus*). Common, and bred.

Long-eared Owl (*Strix otus*). Common in winter.

Short-eared Owl (*S. brachyotus*). One seen in December, 1855, nailed up over the door of a French canteen in "Little Kamiesch."

Scops Eared Owl (*S. scops*). Seen in May, 1856.

Barn Owl (*S. flammea*). Two were seen; one killed in the spring of 1856.

Tawny Owl (*S. aluco*). Seen two or three times.

Little Owl (*S. passerina*). Common throughout the year, frequenting holes in rocks and old stone quarries.

Redbacked Shrike (*Lanius collurio*). Migratory; first seen on the 1st of May, 1856; was afterwards more common than any bird, except the ortolan bunting.

Lesser Gray Shrike (*Lanius minor*). Migratory; first seen about the 1st of May, 1856, and was very common.

Spotted Flycatcher (*Muscicapa grisola*). Arrived in May, and was common in the vicinity of Yalta.

Golden Oriole (*Oriolus galbula*). Migratory; arrived in the middle of May, but was not numerous.

Missel Thrush (*Turdus viscivorus*). Very common throughout the year, particularly about Baidar and Varuntka.

Fieldfare (*T. pilaris*). Migratory; first seen on the 12th of November; last seen on the 28th of February, and was very common, though never seen on the high ground.

Redwing (*T. iliacus*). Migratory; arrived about the same time as the fieldfare, but was not so numerous.

Song Thrush (*T. musicus*). Seen occasionally in winter, and became common by the first week in April.

Blackbird (*T. merula*). Common throughout the year.

Hedgesparrow (*Accentor modularis*). Once noticed.

Robin (*Sylvia rubecula*). Noticed in December, 1855, and on the 18th of April, 1856.

Bluethroated Warbler (*S. suecica*). Only seen once, on the 18th of April, 1856, at Inkermann.

Redstart (*S. phœnicurus*). Seen in April, 1856.

Black Redstart (*S. tithys*). One was obtained by the Surgeon of the "Europa" transport at Eupatoria, in December, 1854.

Pied Wheatear (*Saxicola leucomela*). Migratory; first seen in the middle of May, and was not uncommon among the rocks and quarries at Inkermann.

Wheatear (*Sylvia œnanthe*). Migratory; first seen on the 7th of April, 1856, and was common.

Stonechat (*S. rubicola*). Rare.

Whinchat (*S. rubetra*). Rare.

Sedge Warbler (*S. Phragmitis*). Migratory and common, arriving in May.

Nightingale (*S. luscinia*). Migratory; first noticed, when singing, on the 23rd of April, 1856: was more common near Yalta than about Sebastopol.

Whitethroat (*S. cinerea*). Migratory, arriving in spring, and common.

Lesser Whitethroat (*S. curruca*). Migratory, arriving in spring, but not common.

Blackcap (*S. atricapilla*). Migratory, arriving in spring, and seen occasionally.

Willow Wren (*S. trochilus*). Migratory; first seen on the 21st of May, 1856, but was not common.

White-eyed or Barred Warbler (*S. nisoria*). Twice noticed about the end of May, 1856; one which I shot was very difficult to get, skulking in a juniper bush, in the same way as a Dartford warbler does in furze.

Great Titmouse (*Parus major*). Common throughout the year.

Blue Titmouse (*P. cœruleus*). Common throughout the year.

Cole Titmouse (*P. ater*). Common throughout the year.

White Wagtail (*Motacilla alba*). Migratory, and common, arriving in the first week in April.

Yellow Wagtail (*M. Rayi*). Migratory, and very common, arriving in April.

Blackheaded Yellow Wagtail (*M. melanocephala*). Arrived in April; was rather scarce, and only found in marshy ground.

Grayheaded Yellow Wagtail (*M. neglecta*). Migratory, arriving in April, and was not uncommon.

Meadow Pipit (*Anthus pratensis*). Common throughout the year, except in very hard weather.

Tree Pipit (*A. arboreus*). Migratory; very common: first seen on the 23rd of April, 1856.

Sky Lark (*Alauda arvensis*). Common all the year; immense flocks were seen in winter.

Crested Lark (*A. cristata*). Migratory and common, arriving in May.

Shorttoed Lark (*A. brachydactyla*). Migratory, arriving early in May, and bred.

Calandra Lark (*A. calandra*). Common and indigenous, breeding on the steppes north of Sebastopol: was found in large flocks in winter, and was very good to eat.

Common Bunting (*Emberiza miliaria*). Migratory, arriving in April; seen once in December, 1855.

Blackheaded Bunting (*E. schæniclus*). Common, and seen throughout the year.

Yellowhammer (*E. citrinella*). Common throughout the year; but not seen except in the woody parts.

Ortolan Bunting (*E. hortulana*). Migratory and very common; first seen April 1st, 1856.

Meadow Bunting (*E. cia*). Seen in December, 1855. A spider was in the mouth of one that was shot.

Chaffinch (*Fringilla cœlebs*). Common all the year.

Brambling (*F. montifringilla*). Migratory, arriving about the end of October and departing in March. Seen in large flocks in winter, often in company with the siskin and goldfinch.

House Sparrow (*F. domestica*). Common all the year.

Goldfinch (*F. carduelis*). Common in winter, but the greater number appeared to go North in spring.

Siskin (*F. spinus*). Common in winter; apparently migrates. One was seen near the Katcha on the 5th of May, 1856.

Linnet (*F. cannabina*). Seen in winter.

Lesser Redpole (*F. linaria*).

Greenfinch (*F. chloris*). Seen occasionally during the year.

Hawfinch (*F. coccothraustes*). Once obtained in December, 1855, at Inkermann. This bird has also been seen at Heraclea, in Asia Minor.

Bullfinch (*Loxia pyrrhula*). Common in the woody part about Baidar, &c.

Starling (*Sturnus vulgaris*). Common and breeds; not observed till the middle of March. The Russians were in the habit of putting up small boxes placed on poles for these birds to nest in, and were very indignant if they saw any one shoot either the starling or the rosecoloured pastor, taking care to make it understood that starlings in general were unfit to eat.

Rosecoloured Pastor (*Pastor roseus*). Migratory; very common, and generally seen among cattle; first seen on the 10th of May.

Raven (*Corvus corax*). Common in the winter of 1854-5, but was not so common latterly.

Carrion Crow (*C. corone*). Seen occasionally.

Hooded Crow (*C. cornix*). Very common in winter; a few remained to breed. The nests which I saw were on trees, within a few feet of the ground.

Rook (*C. frugilegus*). There was a rookery near Sebastopol, on the road to Alouchta.

Jackdaw (*C. monedula*). Very common throughout the year, and bred in holes in the rocks at Inkermann, and in rocks along the "Water Ravine."

Magpie (*C. pica*). Common all the year, and bred. I once saw, with the aid of a telescope, three of these birds waiting by a white-tailed eagle, and, directly the eagle flew away, they pounced on the remains of what he had been feeding on: I went up to the place, and found the feathers and remains of a blackbird. It appeared to me very extraordinary that an eagle should catch a blackbird, and if he had caught it I should have thought he would have bolted it without leaving a feather.

Jay (*C. glandarius*). Found throughout the year in the woody parts about Baidar.

Spotted Woodpecker (*Picus major*). Common throughout the year wherever there were any quantity of trees.

Wren (*Troglodytes europæus*). Common throughout the year.

Hoopoe (*Upupa epops*). Migratory; first seen on the 9th of April: was very common, and bred. The young ones will live well in confinement if fed on soaked bread.

Cuckoo (*Cuculus canorus*). Migratory; first seen on the 24th of April, and was quite as common as in England.

Roller (*Coracias garrula*). Migratory; first seen on the 1st of May; was very common, and bred in holes in the north bank of the Katcha,

about a mile from the sea; they also nested in holes among the rocks at Inkermann.

Bee-eater (*Merops apiaster*). Migratory; first seen on the 5th of April, and was not uncommon, frequenting the same places on the Katcha as the roller.

Kingfisher (*Alcedo ispida*). Seen only once in winter, but was not uncommon in May.

Swallow (*Hirunda rustica*). Very common; breeding in rocks. Migratory; first seen on the 3rd of April, 1856.

Martin (*H. urbica*). Not so common as the swallow. Migratory; first seen on the 3rd of April, 1856.

Sand Martin (*H. riparia*). Migratory, and not uncommon; first seen on the 22nd of April, 1856.

Whitebellied Swift (*Cypselus alpinus*). Migratory; first seen on the 2nd of April, 1856: was very numerous, nesting in inaccessible holes and caves in the cliffs at Inkermann.

Swift (*C. apus*). Migratory; first seen on the 10th of April, 1856: was not so common as the whitebellied swift.

Nightjar (*Caprimulgus europæus*). Migratory, and often seen among the short brushwood and juniper bushes; first seen on the 1st of May, 1856.

Ring Dove (*Columba palumbus*). Seen in April and May, 1856.

Rock Dove (*C. livia*). Seen occasionally on the sea coast.

Turtle Dove (*C. turtur*). Migratory; first seen on the 25th of April, 1856, and was very common.

Pheasant (*Phasianus colchicus*). I am not aware that this bird is found in the Crimea, but it probably is, as they are found in small numbers at Samsoun, in Asia Minor, and also in the vicinity of Scutari.

Partridge (*Perdix cinerea*). Is found throughout the year on the steppes, but not in great numbers.

Redlegged Partridge (*P. rubra*). Seen occasionally during the year.

Quail (*Perdix coturnix*). A few are found in April; in September great quantities arrive on their passage.

Great Bustard (*Otis tarda*). A flight of these birds arrived about the 5th of January, 1856, the wind at the time being N.N.E.; great numbers were killed and seen near Balaclava and Kamara; they are also seen about the plains near the Alma in May.

Little Bustard (*O. tetrax*). Found on the plains near the Alma: several which I saw that were killed in May were in the summer plumage.

Thick-knee or Stone Curlew (*Ædicnemus crepitans*). One was killed on the 6th of May, 1856, in front of the camp of the 2nd Brigade, Light Division.

Golden Plover (*Charadrius pluvialis*). Seen in flocks in the first week in March, 1856.

Dotterell (*C. morinellus*). Seen in great numbers from the 26th of March to the 9th of April, 1856: on one occasion I killed fourteen couple in the day.

Ringed Plover (*C. hiaticula*). Seen on the coast near the Katcha on the 1st of May, 1856.

Little Ringed Plover (*C. minor*). Common in spring and summer, and seen inland as well as on the coast.

Lapwing (*Vanellus cristatus*). Common; not seen till March; seen near the Katcha in May, 1856.

Curlew (*Numenius arquata*). Seen occasionally in April, 1856.

Greenshank (*Totanus glottis*). Seen on the 30th of April, 1856.

Redshank (*T. calidris*). Seen in small numbers in the first week in April, 1856.

Green Sandpiper (*T. ochropus*). Common from the 1st to the 10th of April; seen also in May, and once in the first week of June.

Wood Sandpiper (*T. glareola*). A flight of wood sandpipers appeared about the 15th of April, 1856, but did not stay.

Common Sandpiper (*T. hypoleucos*). Seen only once, on the 6th of May, 1856.

Crane (*Grus cinerea*). Three seen in January, 1855.

Numidian Crane (*G. virgo*). One was killed by a Tartar with a stick, another was kept alive in the yard of an hotel at Yalta, in May, 1856. Some species of crane was seen flying in great flocks in spring, but they were too high up to enable any one to identify the species.

Great White Heron (*Ardea egretta*). Seen now and then. A Russian officer told me it was uncommon.

Heron (*A. cinerea*). Seen several times during the year.

Purple Heron (*A. purpurea*). This bird is the common heron of the Crimea, being seen more frequently than any other, but I could not find out where it bred, all birds were so harassed by "sporting" Frenchmen that they had no chance of resting.

Buffbacked Heron (*A. russata*). Seen two or three times in May, 1856.

Little Egret (*A. garzetta*). Obtained on the Alma on the 24th of April, 1856, and on the Tchernaya in May, 1856: both specimens were adult males.

Bittern (*A. stellaris*). Killed several times in winter: is very common at Sinope.

Little Bittern (*A. minuta*). Several were seen and obtained in the spring of 1856; the first on the 2nd, the last on the 22nd of May.

Night Heron (*Nycticorax ardeola*). Seen in April, May and June, 1856; is common in the vicinity of Scutari.

Black Stork (*Ciconia nigra*). Seen once, in the spring of 1856.

Woodcock (*Scolopax rusticola*). Common, arriving in October and departing in March.

Great Snipe (*S. major*). First seen on the 9th of April; was common at the end of May, and probably would have bred, had it been left undisturbed.

Common Snipe (*S. gallinago*). Common in winter and spring; last seen in May.

Jack Snipe (*S. gallinula*). Seen once in April, 1856.

Water Rail (*Rallus aquaticus*). Seen in December, 1855.

Land Rail (*Gallinula crex*). Migratory and very common; first seen on the 1st of May, 1856.

Spotted Crake (*G. porzana*). Seen in April, 1856.

Little Crake (*G. pusilla*). Common in April.

Baillon's Crake (*G. Baillonii*). Very common in April in the marsh at Inkermann.

Moorhen (*G. chloropus*). Seen occasionally.

Coot (*Fulica atra*). Observed occasionally in April and May.

Hooper (*Cygnus musicus*). Observed two or three times in winter.

Whitefronted Goose (*Anser albifrons*). Very common.

Ruddy Sheldrake (*Anas rutila*). Two seen on the 24th of April, 1856, on the Alma.

Shoveller (*A. clypeata*). Not seen in winter; first seen on the 23rd of April, 1856, and was not uncommon during May.

Gadwall (*A. strepera*). Not seen till the 1st of May, 1856, and was common in May and the first week in June.

Pintail Duck (*A. acuta*). Very common in winter; last seen in April.

Wild Duck (*A. boschas*). Very numerous in winter; a few remained in spring.

Garganey (*A. querquedula*). First seen in April; very common in May.

Teal (*A. crecca*). Seen in winter, but not later than April.

Wigeon (*A. Penelope*). Very common in winter; last seen in April, 1856.

Pochard (*A. ferina*). Very common in winter.

White-eyed Pochard (*A. nyroca*). Seen once in winter.

Goldeneye (*A. clangula*). Common during severe weather.

Tufted Duck (*A. fuligula*). Common in winter.

Common Scoter (*A. nigra*). Seen occasionally in winter.

Smew (*Mergus albellus*). Very common in winter.

Goosander (*M. merganser*). Seen in winter.

Redbreasted Merganser (*M. serrator*). Once seen exposed for sale in a French canteen, as "un canard," on the 8th of January, 1856.

Great Crested Grebe (*Podiceps cristatus*). One obtained on the 5th of January, 1856.

Eared Grebe (*P. auritus*). Seen in Kamiesch harbour on the 4th of November, 1855, and again exposed for sale in a French canteen in January, 1856.

Cormorant (*Carbo cormoranus*). Common throughout the year.

Shag (*C. cristatus*). Seen occasionally.

Great Northern Diver (*Colymbus glacialis*). Seen in Balaclava harbour in December, 1854.

Caspian Tern (*Sterna caspia*). Common, arriving about the 19th of April.

Common Tern (*S. hirundo*). Common, arriving early in May.

Arctic Tern (*S. arctica*). Seen two or three times in May.

Lesser Tern (*S. minuta*). Seen in May.

Herring Gull (*Larus argentatus*). Seen in the spring of 1856.

Great Blackbacked Gull (*L. marinus*). Seen several times.

Lesser Blackbacked Gull (*L. fuscus*). Seen on one or two occasions.

Common Gull (*L. canus*). Common all the year.

Kittiwake (*L. tridactylus*). Observed occasionally.

Guillemot (*Uria troile*). I am informed that this has been seen near Balaclava.

In conclusion, I may as well say that a skua gull and a pelican were seen, but as they were not shot it was impossible to identify them.

L. H. IRBY.

Aldershott, November, 1856.

Occurrence of the Great Gray Shrike near Leeds.—While out grouse shooting a few miles beyond Otley, Yorkshire, about a fortnight ago, my attention was attracted by a bird in a detached holly-tree, which appeared to me to be a stranger, and, upon nearer inspection, it proved to be a graybacked shrike, and as I wanted a specimen I

considered myself very fortunate when she fell to my shot (for it proved to be a very fine female specimen).—*John J. Wilson; Ronnahay, near Leeds, November 13, 1856.*

The Hooded Crow (*Corvus cornix*).—A specimen of this bird, in fine plumage, was shot by Mr. Matthews, gamekeeper on the Melbourne estate, near the High Wood, Melbourne, on the 9th of November last: there was a pair, but the second bird escaped: they had been drawn to the spot by the smell of a dead cat, over which they sat, on a tree, uttering their coarse, loud notes. This bird is rarely killed in Derbyshire.—*John Joseph Briggs; King's Newton, Derbyshire.*

The Black Redstart (*Sylvia tithys*).—On the 3rd of November last a man named Joseph Thompson, an under-keeper on the Melbourne estate, brought me a small bird which he had accidentally caught in a vermin-trap set in a dry ditch. Never having seen an example in the flesh of the black redstart, at first sight I mistook it for a female redstart; but recollecting that the redstart usually leaves us in August, and that this was caught on the 3rd of November, some eight or ten weeks after the redstarts' departure, I was induced to examine it more closely, and I have no doubt of its being a female of the black redstart. The plumage is darker than that of the female redstart, with which it has been compared, and it is distinguished from it by some small spots on the throat, and in appearance it precisely agrees with the coloured figure of the female black redstart figured in the Rev. F. O. Morris's 'British Birds:' these circumstances warrant me in concluding that it is a bird of this rare species, the first, I believe, ever taken in Derbyshire. Another bird, which, from the description I received, I have no doubt of being a male of this species, was seen a few days afterwards near the spot where the female was taken.—*Id.*

Great abundance of the Pied Wagtail (*Motacilla Yarellii*), &c.—Extracts from notebook:—"Ventnor, Isle of Wight, October 8, 1856. I this afternoon observed a number of these common, but most elegant birds, in a meadow near Steephill, following the cattle: they were by no means shy, allowing my approach within a few yards, and it was interesting to remark their manner of taking the flies, with which the animals were surrounded; so long as they continued quietly grazing the wagtails would run to and fro, darting after the flies in all directions, and even occasionally taking them from off the sides and legs of the cows, and one or two I saw settle, for an instant only, on their tails; but, when the cattle moved, they would all rise at once and follow them, each animal having a bevy of wagtails in attendance. Towards sunset, after gathering together in large flocks, I noticed them taking an easterly direction, which I have for some days perceived to be their usual course. Although not (in the common acceptation of the term) a migratory race, they are doubtless instinctively seeking out the most sheltered localities wherein to pass the cold and dreary winter months, and where the presence of cattle ensures them, if not a constant, at least a more plentiful supply of food than could possibly be met with in their more exposed summer haunts. It has been remarked by one of our most celebrated naturalists (Professor Macgillivray), that 'they very rarely perch on a tree or bush;' but I have frequently seen them, when disturbed, alight on willows and other aquatic trees, and even on the occasion referred to I observed one not only fly into a large plane-tree, but remain perched on one of the branches for a considerable time. October 11, 1856. Last willow wrens seen by me. October 12, 1856. Saw a perfectly white swallow."—*H. W. Hadfield; Tunbridge, November 4, 1856.*

House Sparrow.—Probably it may have been observed, but I am not aware that I have seen it remarked on,—the somewhat peculiar habit that the house sparrow has,

not only of resorting to and occupying its old nest, but of repairing and relining it for the winter, when the leafless trees no longer afford it a secure or snug place of roosting: I say somewhat peculiar, because I am aware that it is recorded of the wren, that it retires at night and in severe weather to its old nest. I find it inserted in my note-book, "Ventnor, October 13, 1854. Saw a house sparrow carrying feathers into its nest under the eaves." Again, "Tunbridge, November 1, 1856. Observed this morning a house sparrow carrying feathers into the ivy on the ruined castle in this town. In the afternoon saw another sparrow, with its bill crammed full of dry grass, fly on to the cottage and disappear among the creepers."—*Id.*

Migration of the Swallow Tribe.—In remarking on the migration of swallows (Zool. 4995), I quoted White of Selborne, as well as Cuvier, showing what their opinions were regarding the torpidity of swallows. Having just reperused Montagu's Introduction to his 'Ornithological Dictionary,' I there observe that he even seems to have been impressed with the same notions, although his remarks are somewhat more guarded:—"That an accidental summer hird of passage may be by disease prevented from returning to its natural winter quarters we can admit; because there are a variety of instances of the swallow and martin having been seen flying in the months of November and December, roused probably from a state of torpidity by an unusual warmth of the air."—p. xxvii. Having for many years been a pretty close observer of the swallow tribe, and having more than once had ocular proof of their presence during the winter months, long after the main body had taken its departure, the question naturally arises or suggests itself, what becomes of these stragglers? I do not presume to unravel this knotty point, or clear up the mystery; but, at the same time, I beg to suggest to all who may take an interest in the subject, whether it is not highly probable that none stay with us but the late broods, which are *compelled* to remain behind, subsisting for awhile as best they may, but soon to be driven by the increasing severity of the weather to seek shelter for a *time*, under the eaves of houses or in holes and chimneys; and doubtless the stronger among them instinctively endeavour to work their way to the southward, but leaving the more feeble to perish, as I never, that I am aware of, observed one later in the season than the month of December.—*Id.*; November 19, 1856.

Migration of the Swallow Tribe.—"October 23, 1856. Last swallow observed by me in this neighbourhood: it was flying about the church steeple, where I had previously noticed a few for some days."—*Id.*; December 2, 1856.

Nidification of the Hedge Sparrow.—Montagu seems to be of opinion that the hedge sparrow rears but one brood in the year:—"We have never been able to discover with certainty, either in the redbreast or hedgesparrow, who are the earliest breeders, the production of a second brood after the first has been brought to maturity. Their attention to their young continues long after they leave the nest."—p. xiii. But, on referring to my note-book, I find it recorded, "Ventnor, Isle of Wight, May 23, 1852. It is but a few days since the young hedgesparrows quitted their nest, but I observed the old birds very busy to-day collecting materials for a new one, which they are building in the same hedge, only a few yards distant from the old one."—*Id.*; November 19, 1856.

Occurrence of the Avocet (Recurvirostra avocetta) near Newark.—In the first week of last October, while fishing in the river Trent, near Newark, I saw three specimens of this beautiful bird on the wing: they were travelling up the course of the river, and as the nature of the ground partly concealed me from their view, I had a good

opportunity of observing them, as they passed at about twenty yards distance.—*H. Matthews*; *Plumtree, near Nottingham, November 20, 1856.*

Double Egg of Young Goose.—I have lately received a double egg, which was the first of any description laid by a young goose last spring. The outer shell measures $4\frac{7}{10}$ inches in length, and $2\frac{6}{10}$ inches in its greatest diameter; the inner shell is much less than the average of eggs laid by geese. Each shell contained a perfect yolk as well as white, which is, I believe, not usual. Are all the double eggs which occur laid by young birds?—*J. F. Brockholes*; 7, *Egerton Terrace, Birkenhead.*

Beautiful Variety of the Common Woodcock.—A most exquisite variety of the woodcock was killed, about the 6th of this month, at Hanworth, near Aylsham, in this county. Like the specimen described by Mr. Newman (*Zool.* 4631), all the markings peculiar to the woodcock in its usual plumage are in this bird more or less faintly indicated by the most delicate buff or fawn tint on a ground of white, whilst those parts which, in the normal colouring of this species, are deepest, are here also most plainly discernible. The whole of the under parts are white, yet still showing the usual bars when closely examined, resembling the faintest water-markings, visible only in the strongest light.—*H. Stevenson*; *Norwich, November 15, 1856.*

The Teal (Anas crecca) breeding in Cheshire.—On the 15th of May last I received from a country boy nine slightly sitted eggs of the teal, which had been found a day or two previously near Leasowe. The account he gave of the nest agrees pretty closely with that of Bewick: it was composed of a great quantity of materials, and lined with feathers: the site chosen for it was a hole amongst rough herbage on the margin of a large moss-ditch, provincially termed "fender." On the 26th the same boy had five more quite fresh eggs, which were found in a neighbouring field. In this instance the nest was composed of few materials, without any lining of feathers. On the 4th of June four more quite fresh eggs were found in the same neighbourhood, and under similar circumstances with the last. As the three nests, which were within a mile from the shore, were so close together, and the second and third so badly constructed, it is probable that they belonged to the same birds, especially as one pair only were seen. I saw the parent pair of teals in the neighbourhood of the nests at the time, and it is probable that they eventually succeeded in rearing a brood of young, since several have been seen in company this autumn close to where the nests were found, and still continue to frequent the place.—*J. F. Brockholes*; 7, *Egerton Terrace, Birkenhead.*

The Little Auk (Uria alle).—A beautiful specimen of this species was taken about the beginning of last November by William Hunter, Esq., near Kilborne, Derbyshire: it was found on a small pool near the Windmill, and hunted down by a dog, to which it afforded a considerable chase, by diving and endeavouring to elude pursuit; it was, however, taken alive, and put into confinement, but it died the next day. The spot where it was taken cannot be less than 120 miles from the sea, which is probably one of the longest distances it has been driven from the coast. I am not aware of another individual having been taken in Derbyshire: it is in the possession of Mr. Hunter, of Kilborne Hall.—*John Joseph Briggs*; *King's Newton, Derbyshire.*

Explanation of supposed Phenomenon.—A few days ago, as I was reading Jesse's 'Country Life,' I met with the following passage, and, as I have myself known a case of the same kind, in which the apparent want of veracity in the narrator is satisfactorily explained, I thought you might consider it worthy of insertion. Jesse says, "When I was at a visit at the house on the beautiful island in the Windermere Lake, I was informed that a person in the neighbourhood of Grassmere Lake has seen swallows

emerging from it." The man "bore a good character for honesty and credibility, and was as intelligent as most persons in his sphere of life, being a working carpenter." Some fourteen years ago, when residing at Great Glenham, in the county of Suffolk, I was told that our servant boy had seen a swallow fly *out* of the pond: as it was very early in the spring, and the weather cold and inclement, I felt little doubt that the bird he saw was not a swallow, and still less that it had not emerged from the water. Some days afterwards the man servant asked me to look at a bird which had been found near the pond before mentioned, which he said was like a swallow with web feet: directly I saw it I knew it was a stormy petrel, "Mother Cary's chicken" of the sailors, but I did not examine it sufficiently to be able to tell the species. The bird had doubtless been driven inland by stress of weather, had alighted in our pond as an eligible resting-place, and on rising from it had been mistaken for a swallow. Whether it is likely that the accounts of the emergence of swallows from the water, in the spring, have arisen from like causes, I am not prepared to say; but I mention this incident, for which I can vouch, as tending to throw some light upon a subject which appears to have attracted considerable interest.—*E. N. Bloomfield; Clare College, October 31, 1856. [Obligingly communicated by Professor Henslow.]*

The Short Sun Fish (*Orthogoriscus Mola*) and its parasite *Cecrops Latreillii* at the Channel Isles.—An example of the short sun fish was taken during the past summer between Jersey and Guernsey. I did not see the specimen, but two of its parasites (there were four taken) were brought to me for identification while staying in Guernsey. The parasites were *Cecrops Latreillii*, and were adhering, as they are usually found, to the gills.—*Alfred Merle Norman; Kibworth, Leicestershire, October, 1856.*

The White Shark (*Carcharias vulgaris*) cast up at Herm.—My friend Mr. C. F. Lukis, the well-known naturalist of the Channel Isles, while staying for a few days on the Islet of Herm in August, fell in with a white shark "twelve or fourteen feet long," among the rocks near the famed shell beach. I am not aware of any well-authenticated instances of the occurrence of this shark upon our coasts, and it is admitted with some doubt into Yarrell's work.—*Id.*

The Angel Fish (*Squatina angelus*) in the Firth of Clyde.—Our late lamented ichthyologist says that this fish is frequently taken on the east coast of England, and has been several times taken in Ireland, but no instance is given of its having been met with in the West of England or Scotland, neither does it occur in the 'Catalogue of the Fish of the Moray Firth,' by Mr. Gordon, though Dr. Baikie (*Zool.* 3845) says "rare" for the Orkney at Shetland Isles. It is by no means uncommon, however, in the Firth of Clyde, where it may be frequently found thrown up after gales. On one occasion we harpooned a fine fellow who was basking asleep in the sun, but it broke away before it could be secured.—*Id.*

The Anglesey Morris (*Leptocephalus Morrisii*) at Falmouth.—I have dredged a specimen of this remarkable riband-like fish in fifteen fathoms off Falmouth.—*Id.*

On the Maintenance of Molluscan Life in a very limited supply of Water, subjected to the exclusion of all Atmospheric influence.
By the REV. ALFRED MERLE NORMAN, B.A.

It is now six years since Mr. Warington first announced his success in adjusting the relation between animals and vegetables in a limited quantity of water, so that health was preserved to all the inmates of the small glass tank which was employed. Since that time we all know the general use into which they have come, and the deserved admiration in which they have been held, enabling us, as they do, to have even in our drawing-rooms the most beautiful examples of marine and fluviatile life: add to this, most of us know the valuable discoveries that have been made and are making by their use, and the many interesting facts relating to the habits and economy of Fish, Mollusca, Crustacea, Radiata, &c., which have been brought to light. A host of inquirers have thus sprung up, and, led on by Messrs. Warington, Gosse, &c., are each contributing their iotas to the cause of Science.

Accident, I may say, has revealed to me a fact during the past year, which is highly interesting from the connexion it may have with this subject. Hitherto the inmates of our aquaria, as far as I am aware, have been confined to those species which are to be met with in this country; but the fact that I have discovered would almost lead one to hope that we might, without difficulty, transport the beautiful shells of Africa or the Pacific, and have the marine life of all climes fully represented in the Zoological Gardens. Such an idea is, I confess, building a mountain on a mole-hill—but to the facts.

One day in the first week in October, last year, I started for a conchological walk from Oxford towards Woodeaton, having my water-net and bottles in my pocket. At the foot of the hill on which Woodeaton stands there runs a beautiful little stream of the purest and most limpid water, and, having fished in this, I turned the contents of my net into a small bottle filled with water from the brook, tightly corked and pocketed it, and then walked home. The next day I left Oxford, and, as I had no time to remove the animals from the shells, the bottle was packed as it was, in a hat-box with all sorts of other things.

I will now mention what the contents of this bottle were, not indeed that I knew at the time of packing my hat-box, but as it will be more convenient for the reader to know, I will let him into the secret, though

I did not know the whole of it myself for more than a year afterwards. My friends in the bottle, then, were as follows:—

Animal.

- 1 *Bithonia tentaculata*, junior, $\frac{1}{10}$ th of an inch long.
- 31 *Valvata piscinalis*, six being full-grown, the rest small.
- 8 „ *cristata*; two full-grown, the remaining six young.
- 18 *Limneus stagnalis*, *Frey*; the largest not exceeding $\frac{1}{8}$ th of an inch long: it was for the sake of these that I had saved the contents of my net.

Vegetable.

Two small pieces of leaf, I *think*, *Myosotis*; the largest could scarcely have exceeded $\frac{1}{8}$ th of an inch square; the one was green, the other half decayed.

Two small seeds.

The bottle which contained these was a short wide-mouthed two-ounce one, and it was about two-thirds filled with water from the brook. The cork was of close texture, had a box-wood cap to it, and fitted the bottle very tightly.

The bottle remained where it had been packed, entirely forgotten, for some six weeks, until, going one morning to get some shells from the hat-box, I found it. To my great surprise, instead of the water being foul and stinking and all the animals dead, the water was as clear as when put in, and several *Valvatæ* were clinging to the sides of the bottle. On looking more closely I found that the *Limnei* were all dead, but that all the *Valvatæ* and the *Bithinia tentaculata* were alive. Another point that struck me as remarkable was that the one little piece of leaf was as green as ever, and had not been at all eaten, and the other was not at all more decomposed than when placed in the bottle. I immediately determined to leave the bottle as it was, in order to make further observations, and see how long these *Mollusca* would remain alive in the (say at the outside) ounce and a half of water, shut up, too, in an air-tight bottle. The following are the observations that have since been made:—

Middle of March. The two seeds, of whose presence I was now for the first time made aware, germinated, and in a few days had shot up long slender sickly stems to the surface of the water, and their cotyledons expanded, but remained of a sickly yellow. The half-decom-

posed morsel of leaf has disappeared; the green piece still remains in the same condition as before.

April 22. The cotyledons remain in the same condition, they have not put forth any true leaves.

June 2. One of the seed-plants and also the little piece of green leaf have disappeared; the cotyledons of the other seed-plant are rotting away.

June 8. The remaining plant has vanished. The Mollusca have been dying one by one during the months that have passed; by agitating the bottle, &c., I can procure signs of life from only three, namely, one *Valvata piscinalis* and two *Valvata cristata*.

August 6. Have been absent during the past month. It appears that only one *Valvata cristata* remains alive.

October 8. Up to this time, just a year and a day or two since I filled my bottle at the Woodeaton brook, the *Valvata cristata* has certainly been alive; as it is now, however, dead, I have opened the bottle, and turned the water out into a saucer, in order to examine and count over the shells. To my astonishment but delight the young *Bithinia tentaculata*, which has given no sign of life for many months past, is nevertheless still alive; all the rest are dead. Having removed the empty shells, I have replaced the water with the *Bithinia* in the bottle and recorked it.

November 15. The *Bithinia tentaculata* is still alive. I have removed the cork in order to *taste* the water, which is as *clear as crystal*; it is *perfectly pure and good*—I should consider myself very lucky had I never to drink worse!

We have here some very remarkable facts for our consideration; but, before saying anything on them, it may be well to mention certain conditions which I am of opinion were absolutely essential to the attainment of the results arrived at.

1st. The water was of the purest kind, taken from a swift-running bubbling stream, so that it was thoroughly aërated when placed in the bottle.

2nd. The bottle has been always kept in a *dark place*, a cupboard in a wall, where the temperature is very equable: had it been placed in a warm place, or where it was under the stimulus of sunlight, there cannot be the slightest doubt but that the chemical changes would have taken place that would have at once destroyed life.

3rd. I would wish notice to be taken that the Mollusca were captured at a season of the year when it is probable the vital functions were not in great activity: had they been incarcerated at a time when

these had been in full play, when the animal required considerable nourishment to supply the rapid absorption consequent upon growth of body and the secretion of the shell, the supply of nutriment must utterly have failed to meet the demand, and the mollusks must have perished. In the month of October, however, Mollusca, for the most part, have completed their growth for the year. The functions and secretory powers having been heavily taxed, as Mr. Lowe has recently shown, during a short period are comparatively dormant, and all the vital functions are gradually entering upon that sluggish and semi-torpid state in which the winter is passed. I am of opinion, therefore, that the vital powers of the Mollusca being in a state of comparative inactivity at the time they were inclosed, rendered them able to bear up against the severe trials to which they were subjected; that these circumstances being unaltered as the seasons came round, the animals remained in their comparative torpor, since the functions were not called into activity by any sensible rise in the temperature, or by the stimulating influence of the sunlight. The facts that none of the Mollusca increased in size during their incarceration, and that they always appeared to be in a very lethargic state, seem to add weight to this supposition.

There remain a few observations to be made upon the *results*.

The *first* point that may strike the reader is that the Mollusca lived during such a lengthened period without food. They had not *much*, certainly, to be divided among forty mouths, which remained to be filled after the death of the eighteen Limnei; still they had *some*—the two little scraps of leaf and the two cotyledons. I think it, moreover, highly probable that they fed upon the bodies of their deceased friends, for, although naturally vegetable feeders, many inland Mollusca have been known to become animal feeders: I have myself seen *Arion empiricorum*, *Limax maximus* and *agrestis*, and *Helix aspersa* devour decomposed animal matter. Granted, however, that they ate everything that was in the bottle, animal as well as vegetable, they must have been even then on extremely “short commons.” The fact, however, that inland Mollusca can live for very lengthened periods of time without food is already known. Mr. Woodward, in his excellent ‘Manual of Mollusca’ (published as one of Weale’s Rudimentary Treatises), at pp. 18, 19 gives many instances; I will extract the last:—“The most interesting example of resuscitation occurred to a specimen of the desert snail (*Helix desertorum*) from Egypt, chronicled by Dr. Baird (Ann. Nat. Hist. 1850). This individual was fixed to a tablet in the British Museum, on the 25th of March, 1846;

and on March 7th, 1850, it was observed that he must have come out of his shell in the interval (as the paper had been discoloured, apparently in his attempt to get away); but, finding escape impossible, had again retired, closing his aperture with the usual glistening film; this led to his immersion in tepid water, and marvellous recovery." To the instance mentioned by Mr. Woodward I may add two from my own observation. In August, 1852, I collected some specimens of *Helix sylvatica* at Sion, in the valley of the Rhone; on removing them from the chip box in which they had been placed, a year and a half afterwards, the majority of them were found to be still alive. While now writing I have a *Helix aspersa* near me which certainly has not tasted food since March, and as it was captured the first spring day that I had seen one of his race abroad, it seems highly probable that he has not had more than a single meal (if he had had time to get that) for nearly a year, since *H. aspersa* usually retires to hybridate about this time, at any rate in this cold part of the country. I therefore do *not* consider the abstinence from food of the Mollusca in the bottle to be anything novel.

The *second* point to be noticed is, however, of great importance,—*the fact that these animals lived during such a lengthened period without any oxygen being supplied to them.* It is not a little remarkable that the pulmonated *Limneus stagnalis*, which breathe the air by means of *lungs*, were unable to find a sufficient amount of oxygen in the air confined between the water and the cork (about one-third of the volume of the bottle) to support life, and *at once* died, whereas the *Valvatæ* and *Bithinia*, though more than double the *Limnei* in number, were able, by *means of their branchiæ*, to extract a sufficient quantity of oxygen from the water for respiration during a considerable period of time, and that some of them lived for a whole year. I do not see how any additional supply of oxygen could have been imparted to the water after it had been placed in the bottle; the small piece of leaf, a mere atom, even if growing under favourable circumstances, could have aërated the water to but a very trifling amount; but as it was not attached to this plant, and moreover was deprived of the stimulus of light, I imagine that it could not have contributed in the slightest degree to the oxygenating of the water: the two cotyledons, never having put forth leaves, could not have had any influence either. On the other hand, we see many causes that we should have expected would have rendered the water unfit for the maintenance of life, and many sources whence it might naturally have been thought that carbon would have been abundantly generated; the decomposing

animal and vegetable tissues would give off a considerable quantity of carbonic acid, and the two seeds in the process of germination must also have liberated carbon. The supposition, however, that the Mollusca which remained alive became cannibals and devoured the remains of their friends will, in a great measure, do away with the difficulty as regards the most abundant source of deleterious gas. Lest it should be supposed that any oxygen could have been derived from the air, I again repeat that the cork was quite air-tight, and this is best proved by the circumstance that since the water was placed in the bottle not the smallest quantity has been lost by evaporation, and, as a proof that such is the case, and as evidence, moreover, of the purity of the water, it may be mentioned that there is not the slightest stain upon the glass at the height the water stands,—not the least sign of high-water mark (so to speak) upon the sides of the bottle, and if it was emptied it would be impossible to find the faintest trace which would mark the height at which the water had stood.

I shall hope to make further experiments on the subject of this communication, to see if the same results can be again attained. Perhaps some one by the sea will see what can be done with salt water. I would recommend any person trying the experiment to procure the water a mile or two from land, to ensure its purity, and that the Mollusca should be of some *species which inhabit the Laminarian zone*, say *Trochus striatus*, *Montagui* or *tumidus*, or some of the *Rissoæ*; the other necessary conditions to ensure any chance of success being that the animals be taken in the autumn or winter, when the vital energy is at a low ebb,—that the bottle be tightly corked or fastened down, so as to prevent all communication with the external air,—that it be kept in a place where the temperature is cool and equable, and that it be effectually secured from all light.

ALFRED MERLE NORMAN.

Kilworth, Leicestershire,
November 17, 1856.

*The Classification of the Deltoides and Pyralites of M. Guenée, with
Remarks.* By C. R. BREE, Esq.

IN the eighth volume of his great work, the 'Histoire Naturelle des Insectes Lépidoptères,' M. Guenée has given us a reconstruction of the Linnean group *Pyralis*. Taking from it the small genus *Nola* of

Leach, he has added to it the genus *Scoparia* of Haworth, better known to modern entomologists as the genus *Eudorea* of Curtis and Stephens. The group thus formed he has divided into two divisions, constituting the seventh and eighth divisions of his great class *Heterocera*, or nocturnal *Lepidoptera*; and these divisions he has named respectively *Deltoïdes*, after Latreille, and *Pyralites*. The *Deltoïdes* he subdivides into three families, the *Platydidæ*, *Guen.*, *Hypenidæ*, *H.-S.*, and the *Herminidæ* of Duponchel. Of these families the two last only are represented in Great Britain. The *Pyralites* he divides into four tribes: 1, the *Squamosæ*, comprising a single family, the *Adontidæ*; 2, the *Pulverulentæ*, comprising two families, the *Pyralidæ* and *Cledeobidæ*; 3, the *Luridæ*, consisting of eight families, five of which are represented in Great Britain; and 4, the *Plicatæ*, consisting, like the first tribe, of a single family, the *Scoparidæ*, into which he has absorbed the genus *Eudorea* of Curtis.

The *Deltoïdes*, so called by reason of the triangular figure of the insect when in repose, form the transition between the *Noctuidæ* and the true *Pyrales*. They approach the former very closely: "Les premières *Deltoïdes* ont une extreme affinitè avec les dernières *Noctuelles*, et la ligne de démarcation est très delicate."—Tom. viii. p. 2. Herrich-Schæffer has, in fact, united them to the *Noctuidæ*. The division appears to have been in great trouble, and had great difficulty, even from ancient times, in finding a resting-place. Fabricius united them with the *Crambi*. The *Theresiens*, we are told, separated them from the *Pyrales*, under the name of "*Pyrales with long palpi*," in which they were followed by Treitschke, Hübner, Stephens and Duponchel; while the founder of the group, Latreille himself, joined two other genera with them.

As restricted by Guenée, the *Deltoïdes* form a very natural group, which "conduira des veritables *Noctuelles* aux *Pyrales* proprement dites."

M. Guenée enters into a history of the classification of the second (eighth) division, the *Pyralites*, from the days of Linneus. Scopoli, Schrank, Hübner, Latreille, Lamarck and Haworth had each a separate arrangement of this group. Treitschke, it appears, was the first to commence a definite classification of the *Pyrales*; Stephens seems to have confounded them with the *Deltoïdes*; Duponchel follows Treitschke, but characterizes the group with more exactness, and details the genera with more order and form; and, lastly, Herrich-Schæffer, to whom M. Guenée pays a high compliment, while he severely criticises his arrangement, divides the *Pyrales* among the

twenty-four sections into which he splits the second tribe of his Noctuelles.

It must be admitted on all sides that M. Guenée displays a most profound knowledge of the subject he has undertaken. The 'Histoire des Insectes Lépidoptères,' will doubtless become the standard work of modern days; and if it brings to bear upon the subject a higher amount of practical knowledge than any other it must be the basis of that great desideratum, a universal nomenclature of the Lepidoptera. Of the work, the first volume, comprising the butterflies, is by M. Boisduval and Guenée; the second, third and fourth are not published; the fifth, sixth, seventh and eighth, by M. Guenée, comprise his eight divisions of the Heterocera; and the Geometridæ is shortly to be published. Below I give from M. Guenée an arrangement of the British species of Deltoides and Pyralites. It is fortunate that most of the generic types occur in this country. I propose, if acceptable to British entomologists, that the arrangement of Boisduval and Guenée be used for naming their collections of Lepidoptera. If any one can make a better proposition I will adopt it, for one. It is, however, quite time that this subject were set at rest, that all our energies may be free for the study of other departments of our favourite science.

HETEROCERA.

Div. 7. DELTOIDES, Lat.

General Characters.—LARVÆ with deep indentations, the segments often knotted and hairy, but never velvety or completely glabrous, with six feet scaly and the two anal feet constant; the ventrals never vary more than from six to eight. The larvæ are never closed in cases or between the two membranes of leaves. They live solitary upon trees or low plants.

CHRYSALIDES unarmed, smooth; abdominal rings free, conical, and terminating in hooks or spines. They are contained in cocoons spun between leaves or in the ground.

IMAGO. *Antennæ* slender, cylindrical, always pubescent, ciliated or pectinated in the male, and garnished with isolated hairs in the female; often dilated or marked above the middle with squamose or velvety nodosities. *Labial palpi* only visible, compressed, never recumbent, always protruding beyond the head, either stretching forward or else surrounding it to rise above it, or even to be thrown upon the thorax; the second joint always long, the third always distinct

and agreeing in character with the second, with which it is often elbowed. *Spiral tongue* always well developed, though slight and short. *Body* usually thin, always glossy. *Thorax* short, rounded, slightly convex, covered with scales or a few hairs slightly adherent; the neck never elevated. *Pterygoids* slight, never ornamented with raised hairs. *Abdomen* long, slightly consistent, slightly velvety, not having, in the female, either projecting oviduct or anal tuft passing beyond its length. *Legs* long, not velvety; *tibiæ* shorter than femur, often dilated, and furnished with hair disposed in brushes or tufts; the *middle legs* furnished with one pair and the posterior with two pairs of spurs, always long and robust, particularly the inner ones. *Wings* proportionally large and thin, slightly squamose, rarely dentate, never raised in repose or folded round the body; *superior wings* never covering each other or entirely hiding the inferior ones, often marked with the same lines or spots as the Noctuæ; *inferior wings* well developed, slightly or not at all folded, having rarely colours or marks distinct from the upper ones.

NERVULATION. In the *upper wings* the subcostal furnishes from five to six nervules; areola generally existing, always unique, placed above the cell, of which it is independent, and always grouping around it; all the superior nervules inequally disposed, the median quadrifid and the submedian simple. *Lower wings*: the costal always joined to the subcostal just after its origin, the last only bifid and the median quadrifid; only two nervures free, the internal and the submedian.

Fam. 1. HYPENIDÆ, H.-S.

- Gen. 1. *Madopa*, *St.*, *Dup.*, *Gn.*, H.-S.
Colobochyla, *St.*, *Ill.*, & *Cat. B. M.*
Hypena, *Tr.*
Crambus, *Haw.*
 1. *Salicalis*, *W. V.* (Type).
- Gen. 2. *Hypena*, *Schr.*
Crambus, *Haw.*
Hyblæa, *Fab.*
 1. *Proboscidalis*, *Lin.* (Type).
 2. *Rostralis*, *Lin.*
Vittatus, *Haw.* Var.
Palpalis, *Fab.* Var.
 3. *Crassalis*, *Fab.*
Tenicularis, *Hüb.* Var.
Achatalis, *Hüb.* Var.
- Gen. 3. *Hypenodes*, *Gurn.*, H. D.
Cledeobia, *St.*, H.-S.

1. Albistrigalis, *Haw.* (Type).
Nolalis, *Guen.*
Tænialis, *Hüb.*
2. Costæstrigalis, *St.*
Leucopteralis, *Guen.*
Acuminalis, *H.-S.*

Gen. 4. Schrankia, *H.-S.*

Hypenodes, *H. D., St.*

1. Turfosalis, *Wocke.* (Type).
Humidalis, *H. D., St.*

Fam. 2. HERMINIDÆ, *Dup.*

Gen. 1. Rivula, *Guen.*

1. Sericealis, *W. V.* (Type).
Leeana (Tortrix), *Fab.*

Gen. 2. Herminia, *Lat.*

Polypogon, *Schr., H. D. Cat.*

1. Derivalis, *Hüb.*
Glaucinalis, *W. V.*
Emortualis, *Haw., St., Wood.* 768.
2. Barbalis, *Lin.*
Strigilata (Geom.), *Clerck.*
Pectitalis, *Hüb.*
3. Tarsipennalis, *Tr.*
Tarsicrinalis, *Hüb., H. D., Cat., Wood,* 767.
4. Grisealis, *W. V.*
Nemoralis, *Fab., Wood,* 766.
5. Cribralis, *Hüb., Wood,* 763.

Div. 8. PYRALITES, *Guen.*

General Characters.—LARVÆ thick, rarely elongated, with dilated and moniliform rings much attenuated at the two extremities, glossy and shining; segments verrucose and pilose; sixteen perfect feet; ventrals thin; head small and shining, frontal plate horny, that of the nape always distinct. They live always enclosed, some in animal substances, others in moss, others in water, the greater number between the leaves of vegetables, which they tie together with silk.

CHRYSALIDES unarmed, smooth, with a fine skin; abdominal rings free; form conical. Contained in cocoons spun where the larvæ have lived.

IMAGO. *Antennæ* generally long, thin and slender, filiform or moniliform, garnished with very fine hairs, rarely ciliated. *Labial palpi* sometimes disposed in a beak, sometimes normal, but of ordinary length, or when extended in a beak not having the third joint

elbowed or thrown back on the thorax, always alike in both sexes; *maxillary palpi* frequently distinct. *Body* thin. *Thorax* short and globular, more squamose than velvety. *Abdomen* long, squamose, glossy and shining, nearly always conical and short in the male, never garnished with a tuft in the female, in which it always terminates in a point more or less abrupt. *Thorax* often garnished with a squamose or velvety plate. *Legs* thin, long, glossy, very rarely velvety, anterior having the *thigh* and *haunch* long, nearly equal; *tibiæ* more than half shorter; *tarsi* very long; the two other pair of legs very long and silky, and extended beyond the abdomen. *Wings* shining, often iridescent or half-transparent, entire, never raised in repose or folded round the body; *superior wings* always longer than the inferior, marked with lines, of which the two median are constant, but the subterminal almost always non-existent or scarcely indicated; *inferior wings* imperfectly developed, sharing often the marks and colours of the superior.

NERVULATION. In the *upper wings* no areola; the subcostal has six complete nervules, the 1', 2' and 1'' always free, median quadrifid. In the *superior wings* the costal is robust, nearly always bifid, and giving birth to 2' and 3'; the subcostal stretching only to the disco-cellular, which it crosses in the form of the letter X, then reduced to a very thin thread, very often atrophied before the base of the wing and sometimes quite extinct; median constantly quadrifid; three free nervures after it, submedian, intermedian, and the internal.

Tribe I. *Squamosæ*, Guen.

Fam. unique. ODONTIDÆ.

Gen. 1. *Odontia*, Dup.

1. *Dentalis*, *W. V.* (Type).
Fulminans (Noct.), *Fab.*
Radiata (Noct.), *Erp.*
Ramalis (Pyr.), *Fab.*, non *Hüb.*

Tribe II. *Pulverulentæ*, Guen.

Fam. I. PYRALIDÆ, *Guen.*

Gen. 1. *Pyralis*, *Lin.*

1. *Fimbrialis*, *W. V.*
Costalis, *Fab.*, *Wood*, 781.
2. *Farinalis*, *Lin.* (Type).
Lienigialis, *H.-S.* Var.
3. *Glaucinalis*, *Lin.*
Nitidalis, *Fab.*, *Hüb.*

Gen. 2. *Aglossa*, *Lat.*

1. *Pinguinalis*, *Lin.* (Type).
Streatfeildii, (*Curt.* 455, *Wood*, 777. Var.)
2. *Cuprealis*, *Hüb.*
Capreolatus, *Haw.*

Fam. 2. *CLEDEOBIDÆ*, *Dup.*Gen. 1. *Cledeobia*, *St.*

1. *Angustalis*, *W. V.* (Type).
Erigalis, *Fab.*
Bombycatus, *Haw.*
Curtalis, *W. V.*

Tribe III. *Luridæ.*Fam. 1. *ENNYCHIDÆ.*Gen. 1. *Pyrausta*, *Schr.*Botys, *H.-S.*

1. *Punicealis*, *W. V.* (Type).
Porphyralis, *Hüb.*, *Wood*, 796.
2. *Purpuralis*, *Lin.*
Punicealis, *Hüb.*
3. *Ostrinalis*, *Hüb.*
Punicealis, *Haw.*, *Wood*, 794.
Purpuralis, *Hüb.* 35?

Gen. 2. *Rhodaria*, *Guen.*

1. *Sanguinalis*, *Lin.* (Type).
Cruentalis, *Scriba.*

Gen. 3. *Herbula*, *Guen.*

1. *Cespitalis*, *W. V.* (Type).
Zonana, *Schæff. ic.* pl. 262 (♀).
Vestianella, *Clerck*, non *Lin.*
Sordidalis, *Hüb.*, *Wood*, 792.

Gen. 4. *Ennychia*, *Tr.*Botys, *H.-S.*

1. *Cingulalis*, *Lin.* (Type).
Fascialis, *Dup.*
Anguinalis, *Haw.*
2. *Anguinalis*, *Geoff.*
Fascialis, *Schrank.*
3. *Octomaculalis*, *Lin.*
Guttalis, *W. V.*
Atralis, *Fab.*
Trigutta (Noct.), *Esp.*

Fam. 2. *ASOPIDÆ*, *Guen.*Gen. 1. *Agrotera*, *Schr.**Asopia*, *Tr.*, *Dup.*

1. *Nemoralis*, Scop.

Erosalis, *Fab.* (A single specimen taken by Mr. Hemmings, June 26, 1851, near Enfield). — *Ent. An.* 1855, p. 23.

Gen. 2. *Endotricha*, Zell.

Agrotera, *St.*

Asopia, *Tr.* (*H. D. Cat.*)

1. *Flammealis*, *W. V.*

Meritalis, *Fab.*

Fam. 3. STENIADÆ.

Gen. 1. *Diasemia*, *St.*

Prodelia, *Guen. olim*, *H. D. Cat.*

Hydrocampa, *Dup.*

Nymphula, *Tr.*

Botys, *H. S.*

1. *Litteralis*, *Scop.* (Type).

Argentalis, *Fab.*

Reticularis, *Lin.*

Gen. 2. *Nascia*, *Curt.*

Ebulea, *H. D. Cat.*

1. *Acutalis*, *Eversmann.*

Cilialis, *H.-S.*, *H. D. Cat.*, *Hüb.* 119? *Tr.* 124? *St.* 53? *Wood*, 821?*

Gen. 3. *Stenia*, *Guen.*

Dolycarthria, *St.*, *Cat. Brit. M.*

Margaritia, *St.*, *Ill.*

Botys, *Tr.*, *Dup.*

1. *Punctalis*, *W. V.* (Type).

Ætnealis, *Dup.*

Longipedalis, *St.*, *Curt.*, *Wood*, 825.

Fam. 4. HYDROCAMPIDÆ, *Guen.*Gen. 1. *Cataclysta*, *H.-S.*

Hydrocampa, *Lat.*, *H. D. Cat.*

1. *Lemnalis*, *Lin.*

Moniliata, *Schæff. ic.* 119.

♀, *Uliginata*, *Fab.*

Gen. 2. *Paraponyx*, *St.*

Hydrocampa, *Lat.*, *H. D. Cat.*

Nymphula, *Tr.*, *H.-S.*

* There is some confusion about this insect. M. Guenée points out that neither the figures, as quoted, nor the descriptions agree. Some of them apply equally to *Ebulea Catalaunalis*, which is not a British insect. The name here given is a modification of that of Eversmann, who figured the insect as *Chilo acutellus*. It is the *Edulea cilialis* of Doubleday's *Cat.*—*C. R. B.*

1. Stratiotalis, *Lin.*
Paludata, *Fab.*, non *Lin.*

Gen. 3. Hydrocampa, *Lat.*
Nymphula, *Schr.*, *Tr.*, *H.-S.*

1. Nymphæalis, *Lin.*
♀, Potamogalis, *Lin.*, *Wood*, 799, *St.* 38, *H. D. Cat.*
2. Stagnalis, *Don.*
Potamogalis, *Schrank.*
Nymphæalis, *Haw.*, *St.* 29, *Wood*, 800, *H. D. Cat.*

Fam. 5. BOTYDÆ, *Guen.*

Gen. 1. Botys, *Lat.*
Margaritia, *St.*
Eurrhypara, *St.*

1. Lupulinalis, *Cl.*
Nubilalis, *Hüb.*
Silacealis, *Hüb.*
Glabralis, *St.*, *Wood*, 817? (*Ent. An.* 1856, p. 47).
2. Pandalis, *Hüb.*
Verbascalis, *Hüb.*
Terminalis, *Haw.*, *Wood*, 816.
Angustalis, *Haw.*, *Wood*, 816.
Oblitalis, *Dup.*
3. Flavalis, *W. V.*
Lutea (Lithosia), *Schæff. ic.*
4. Hyalinalis, *Hüb.*
5. Verticalis, *Albin.* (Type).
6. Lancealis, *W. V.*
Longalis, *Haw.*
Glabralis, *Hüb.*
7. Fuscalis, *W. V.*
Cineralis, *Fab.*
Fimbrialis, *St.* 56, *Wood*, 828.
Julialis, *Schr.*
8. Terrealis, *Tr.*
8. Asinalis, *Hüb.* (Meayna alsinalis, *H. D. Cat.*)
10. Urticalis, *Lin.*

Gen. 2. Ebulea, *Guen.*
Botys, *Tr.*, *Dup.*, *H.-S.*

1. Crocealis, *Tr.*
Ochrealis, *Hüb.*
Verbascalis, *Wood*, 824.
2. Verbascalis, *W. V.*
Arcualis, *Hüb.*
Ochrealis, *Wood*, 820.
3. Sambucalis, *Albin.*, *H. D. Cat.*

Gen. 3. *Pionea*, *Guen.*

1. *Forficalis*, *Lin.*
2. *Margaritalis*, *Fab.* (Type).
Extimalis, *Scop.* ?
Erucalis, *Hüb.*
3. *Stramentalis*, *Hüb.*
Elutalis, *Hüb.*, *Haw.*, *St. Cat.* 6833.

Gen. 4. *Spilodes*, *Guen.*

- Epicorsia et Sitochroa*, *Hüb.*, *St.*, *Cat. B. M.*
Botys et Scopula, *Tr.*, *Dup.*
1. *Sticticalis*, *Lin.*
Fuscalis, *Hüb.*
Tetragonalis, *Haw.*
 2. *Palealis*, *Geoff.*
Selenalis, *Hüb.*
 3. *Cinctalis*, *Tr.*
Verticalis, *Lin.*
Limbalis, *Schr.*

Gen. 5. *Scopula*, *Schr.*

- Scopula et Udea*, *Dup.*
Margaritia, part, *St.*, *Ill.*
Botys, *H.-S.*
Euresiphita, *Hüb.*
1. *Alpinalis*, *W. V.* (Type).
Uliginosalis, *Curt.*
 2. *Lutealis*, *Haw.*
Institialis, *St.*, *Wood.* 829.
Pascualis, *Lien.*, *H.-S.*, *Isis.*
Etialis, *Guen.*, *H. D. Cat.*, *St.*, *Cat. B. M.*
Languidalis, *Eversm.*
 3. *Olivalis*, *W. V.*
Umbralis, *Hüb.*
Nivealis, *Fab.*
 4. *Prunalis*, *W. V.*
Leucophæalis, *Hüb.*
Nebulalis, *Haw.*
 5. *Ferrugalis*, *Hüb.*
 6. *Decrepitalis*, *H.-S.**

Tribe IV. *Plicatæ*, *Guen.*Fam. unique. *SCOPARIDÆ*, *Guen.*Gen. 1. *Stenopteryx*, *Guen.*

- Botys*, *Tr.*, *Dup. olim.*
Scopula, *Curt.*
Nomophila, *Hüb.*, *St.*, *Cat. B. M.*

* Said to have been taken by Mr. Hodgkinson and Mr. Buxton.—*Ent. An.* 1856, p. 32.

1. Hybridalis, *Hüb.*
Noctuella, *W. V.*
- Gen. 2. Scoparia, *Haw.*
Chilo, *Tr.*
Eudorea, *Curt., St., Dup., H.-S.*
1. Ambigualis, *Tr.*
Dubitalis, *Hüb.* 207? *Wood*, 1442.
 2. Cembralis, *Haw.* 498, *St.* 299, *Wood*, 1440.
 3. Pyralalis, *W. V.*, *Haw.* 499, *St.* 299, *Wood*, 1443.
Dubitalis, *Germ.*
Tristrigella, *St.* 300, *Wood*, 1444. Var.
 4. Muralis, *Curt.* 4, pl. 170, *St.* 301, *Wood*, 1447.
 5. Mercurialis, *Lin.*, *St.* 302, *Wood*, 1449. (Type).
 6. Cratægalis, *Hüb.*
 7. Resinalis, *Haw.*, *Wood*, 1448.
Mercurii, *Fab.*
Delunalis, *Guen., olim.*
 8. Coarctalis, *Zell.*
Angustea, *St.*, *Wood*, 1450.
 9. Pallidulalis, *St.* 300, *Wood*, 1445.

C. R. BREE.

Stricklands, November 11, 1856.

On Pupa Digging. By the REV. JOSEPH GREENE, M.A.

SOME years since a few remarks of mine on this subject were read before the Entomological Society. I imagined the matter to have excited little or no interest until I read, with, I trust, pardonable gratification, the following passage in an article addressed to the 'Intelligencer,' p. 74:—"Most of your readers will recollect a paper on digging for pupæ, which gave such an impetus to that mode of collecting." On reading this paragraph I forthwith determined that I would, if spared, write a few additional observations for the pages of the 'Zoologist,' in the hope that its readers might thereby be persuaded, in however slight a degree, to apply themselves with zeal to the only method by which their favourite study can be pursued during the long and dreary months of winter and early spring. I am the more induced to take this step, from the fact that I not unfrequently receive communications from my entomological friends and correspondents, making grievous complaints of their want of success; some asking information as to the "modus operandi,"—all inquiring, "What is the cause of my want of success?" In reference to the first of these questions, some remarks will be found at the close of this paper; in regard to the second,

“What is the cause of my failure?” I answer, Many causes doubtless combine to produce this undesirable result, such as want of experience, a sticky and clayey soil, unfavourable (*i. e.* wet) weather, &c. But I have no hesitation in expressing my firm conviction that, in nine cases out of ten, want of *success* proceeds from want of *patience*. A meets B. “Have you heard,” enquires A, “of C’s wonderful success in pupa digging? He has taken *dodonæa*, *Chaonia*, *Fagi*, *ocularis*, and I don’t know how many rare insects.” “You don’t say so,” excitedly replies B; “how is it done?” “Oh!” replies A, “simply enough: take a common garden-trowel and a box lined with moss; dig at the roots of any good sized tree, or tear off the moss, and the pupæ will tumble into your box *ad libitum*.” Enthusiastic B rushes home, seizes a trowel, procures a box large enough to hold all the pupæ for miles round, and departs, buoyant with hope, upon his first pupa-digging excursion. “Let me see,” he soliloquises, “what shall I do with my *surplus* pupæ? Ah! Mr. L. wants *trepida*; well, he shall have two: and, if I remember rightly, Mr. S., who sent me so many insects I did not possess, said he wanted *ridens*; therefore he shall have three.” While thus meditating a majestic oak strikes his eye. “Lo!” he exclaims, “the very tree for both species!” Nervously, yet firmly, he grasps the trowel, and approaches the unconscious tree. Forthwith the trowel is inserted half a foot into the earth, and, by a prodigious muscular effort, a gigantic sod is turned up. Eagerly he gloats over and peers into the sod lying before him: nothing meets his eye but a writhing worm and a wriggling centipede. “Why, how is this? here’s *nothing*!” With crushed hopes he is about to leave, when suddenly he remembers that he was directed to tap it gently, and then tear the roots asunder. The sod is tapped; an earwig! the sod is discerpted; a woodlouse! Perspiring with his exertions, with aching back, he rises from his knees, looking rather foolish. (N.B. The digger’s feelings at this crisis, are often additionally lacerated by a small mob of boys, looking on with gaping mouths). He rises, I repeat, from his knees, takes up his huge box, and goes to a poplar: the same process—the same result. Then to a birch: ditto, ditto. This is too much! Angry and disappointed he hastens home, seizes a sheet of paper, and writes off to the author of “that paper” on pupa digging to ask, “What is the cause of my want of success?” Partly, my friend, ignorance of the proper method of setting to work, but, much more, the want of patience and perseverance. I know nothing which requires a more constant and vigorous exercise of these virtues than pupa digging. A *total* want of success is undoubtedly

disheartening, and accordingly, in the hope of encouraging despondent "diggers," I now append a list of insects, all of which have been taken by me in this way. Having this object in view, the commonest species are included, with a description of the tree, locality, time of appearance, &c. While this may prove uninteresting to the experienced, it will, I trust, be instructive to the beginner, for whom I write. Where no other locality is mentioned, Suffolk is intended. As there appears to be a *biennial* change in our nomenclature, I have thought it best to adopt, as most generally known and used, Doubleday's 'Synonymic List.'

Thecla Rubi. A pupa of this insect was once found under moss on a log of wood. Bucks.

Satyrus Ægeria. I have several times met with the pupa of this butterfly, suspended from blades of grass, when digging at the roots of trees. It is a beautiful grass-green colour, and passes the winter in that state.

Ægeria apiformis. *Vide* 'Intelligencer,' p. 18. This insect, though I have not seen it on the wing, seems to swarm here, judging from the number of pupa-cases in the trunks of poplars.

Smerinthus Tiliæ. Found commonly. Birch and elm. Prefers the narrow angles formed by the roots, getting in as far as possible. October, &c.

„ *Populi*. Common. Various poplars: edges rather than the angles. October, &c.

„ *ocellatus*. Scarce. Willows. October, &c.

Euchelia Jacobææ. This insect is, I believe, considered very common, yet I never took more than one specimen in England: far otherwise, however, in Ireland, where it abounds, and I have taken the pupæ in boundless profusion under loose bark on wych elms; of course the larvæ must have crawled up the trunks to form their cocoons, as they feed on the ragwort. I think it must be *local*, as that plant is very common here, yet I have not seen the insect.

Lithosia rubicollis. In abundance under damp moss, decayed bark, &c. Chrysalis short and stout, enclosed in a delicate white web. Should be occasionally damped. Fir, larch, oak, &c. October, &c.

„ *quadra*. Occasionally. Spun up on palings, in the neighbourhood of trees covered with lichens. End of June.

„ *griseola*. May be found under moss on lichen-bearing trees. June.

Phragmatobia lubricipeda and *Menthrastris*. Common. Spun up in loose rubbish collected about the roots of various trees. October, &c.

„ *mendica*. Rarely. Under moss on trees bordering damp ditches. Gloucestershire. October, &c.

Liparis monacha. This singular chrysalis may be found by examining the trunks of oaks, in the crevices of the bark of which tree it spins up. End of July.

Orgyia pudibunda. The conspicuous yellow cocoon of this species is easily detected among loose rubbish collected about the roots of trees; sometimes under loose bark. The larva is polyphagous, and consequently the pupa may be found at various trees. October, &c.

„ *Coryli*. Very plentifully under moss on beech: generally at the roots, and not on the trunk. October, &c. Bucks.

Eriogaster lanestris. I was much surprised at finding two pupæ of this pretty insect, the other day, at the roots of an *elm*: I thought it was exclusively a hawthorn-feeder, but there was no hawthorn at all near at hand. October, &c.

Trichiura Cratægi. The compact egg-shaped cocoon of this species I have once or twice met with at the roots of poplar, the larva having probably wandered from some neighbouring hawthorn. July.

Pæcilocampa Populi. This insect is found in various situations, and on various trees,—ash, poplar, &c.: sometimes it will be found firmly glued to the inside of a piece of loose bark or to the tree itself; at others spun up tightly among decayed leaves, dead grass, &c. It ought to be among the early captures of the pupa digger, as it is common, and not difficult to find. The cocoon is black. August and September.

Platypteryx falcata. Where birch is common examine the leaves joined together, and you will not unfrequently find the pupa of this species. June, and again in September, &c.

„ *unguicula*. Substituting beech for birch, the same remarks apply to this as to the preceding.

Cerura furcula. Under bark and on trunks of willow, occasionally. September, &c.

„ *bifida*. Occasionally on trunks and under bark of poplars. September, &c.

„ *vinula*. On trunks of poplar and willow. September, &c.

In regard to the two first of these insects, the best way, I think, to find them is to draw the finger slowly down the trunk, and carefully to examine the line thus formed and about an inch on each side of it;

they will generally be found at distances varying from one to three feet from the ground. You will almost invariably find *vinula* close to the ground.

Stauropus Fagi. Once found between two decayed beech-leaves. Halton, Bucks. October.

Petasia cassinea. One female at roots of elm. July. Gloucestershire.

Ptilodontis palpina. Occasionally at poplars, but much more frequently at willows, especially when on the banks of ditches, streams, &c. When in such situations, that side of the trunk which faces the stream is often clothed with grassy sods of loose, dry, friable earth: this is the place for *palpina*; shake the sod well, and the cocoon, which is grayish and of weak consistency, will generally be found among the dry roots: it is easily distinguishable from that of *dictæa*, being much smaller,—*i. e.* the cocoon,—and not so much mixed up with earth. End of September.

Notodonta camelina. Very common under moss on various trees, beech, elm, &c. A little experience will soon enable the beginner to detect it: the pupa is enclosed in a weak cocoon, and, unlike the other species in this genus, terminates in a single point or spike. October, &c.

„ *cucullina*. Once found under moss on a beech tree, having doubtless wandered from some neighbouring maple. October. Halton, Bucks.

„ *dictæa*. See remarks on *palpina*. This species forms a large cocoon, sometimes nearly the size of *trepida*.

„ *dictæoides*. I have found the empty pupa-cases of this species at the roots of birch? I put a note of interrogation, as, having never bred it, I am not sure.

„ *dromedarius*. The only pupæ of this insect I ever found were in Ireland: they were all, nine in number, taken at the roots of an alder, and produced the variety commonly known, I believe, by the name of *perfusca*: they seem to me very different from the English specimens of *dromedarius*. October.

„ *ziczac*. Rarely, at roots of poplar. October, &c.

„ *trepida*. This autumn I have succeeded in taking no less than seventeen of this fine insect: it appears to prefer a sandy soil, and does not seem so partial to *corners* as others of this genus. Oak. September, &c.

„ *dodonæa*. During the present and preceding autumns I have taken upwards of 300 pupæ of this species, mixed with *Chaonia*,

which is much rarer here, and goes down a full month earlier. Search as usual the dry friable sods collected in the corners, or the corners themselves without any sod. The cocoon is sometimes attached to the tree, but more usually among the roots: in either case great caution is necessary. It is a good plan, when you have pulled the sod out, to put your hand in and gently feel the trunk for any cocoons which may adhere to it. It is not easy to tell the difference between *dodonæa* and *Chaonia*; but the latter is, I think, stouter, smoother and not so glossy. Oak. September, October, &c.

Pygæra bucephala. Various trees. October, &c.

Clostera curtula. Seven. It is well worthy of notice, in regard to this species, that the larva enters the pupa state *on* the tree; I had imagined that it did so among *dead* leaves: this is not the case, at least not necessarily. When full-fed it joins two leaves firmly together, and remains there till they fall off. I was not aware of this fact till the present autumn: this hint may, I hope, enable others to obtain this apparently much-prized insect. I should add that they had not *turned*, when I found them, but they never came out of the leaves. Various poplars (shrubs, best). October.

Semaphora Psi. Common under bark on various trees. October, &c.

„ *tridens*. I have little doubt that the pupa I am in the habit of taking under bark on hawthorns is this species, but as *Psi* also feeds on that tree, and it appears impossible to separate the two species, except by breeding them, I am unwilling to speak positively. October, &c.

Acronycta megacephala. By no means uncommon under loose bark on poplars, occasionally on willows: it is not very easy to get at, as it enters into the smallest chinks. Break off every bit of loose bark with the point of the trowel, and the pupa-case, which, with the pupa, closely resembles that of *Psi*, will be found firmly glued to the surface. The cocoon is formed of decayed wood. October, &c.

„ *Aceris*. Five: all on *oak*, not sycamore. October, &c.

„ *Ligustri*. Abundant under moss on ash trees. The moss must be *very* carefully torn off: the pupa-case, which is black and very tough, not *hard*, will, in most cases, be found adhering to the moss: if there be no moss, examine the trunk. There are often long perpendicular slits in the bark of ash trees, and this is a favourite hybernaculum for *Ligustri*. If both moss and loose bark are wanting, go to another tree. October, &c.

Ceropacha Or. Very rarely under moss and dry rubbish on and about poplars. October, &c. Gloucestershire.

Ceropacha ocularis. Of this rare and beautiful species I took, last autumn, four; up to the present time I have taken nine more, four being unfortunately stung. The pupa is black and stout (something like *Coryli*), enclosed in an extremely delicate open net-work of a rusty brown colour: it is very difficult to find; it frequently, nay, generally, spins on the surface of spreading moss, or barely beneath it—sometimes between two leaves; in this latter case it is soon blown away, and, in the former, falls an easy prey to the first prowling mouse: it should, therefore, be sought for as soon as possible after the change: this, I think, should certainly not be later than the first week in October. Various poplars.

„ *ridens*. Of this also rare and very beautiful insect I took twenty-six last autumn; up to the present time I have only found seven. Like the last species, it is extremely difficult to find, and should be sought for as soon as possible, *viz.* middle and end of August.* The following directions may enable others to find it:—Detached oaks growing in *meadows*, of a dry, loamy soil, seem the best; the situation evidently preferred is the corners filled with dry rubbish and little stunted brambles. Insert the trowel well into the earth, six or seven inches from the *angle*, and turn up the sod, bramble and all, if possible: to find the pupa, after this is done, is a work both of time and pain; it will not do, in this case, to *tap* the sod. First carefully examine the dead leaves, for they frequently spin up in them: you must then, regardless of scratches, tear the roots asunder as gently as possible. The cocoon is very weak, composed of little bits of stick, dried leaves, &c., and requires delicate handling. Indeed, the whole concern demands an elaborate manipulation. This is one of those pupæ, to find which exacts a large exercise of the two virtues already alluded to. (N.B. Pupa diggers wearing *gloves* will return home with empty boxes). Oak.

Apamea unanimitis. The hibernating larvæ of this species may be commonly found under loose bark on willows growing near damp ditches in April. When you return home place them in a box with a little earth and moss, and, without further care on your part, the perfect insect will appear in June.

* I take this opportunity of correcting a mistake in the 'Manual' respecting the larvæ of this species and that of *flavicornis*. In that work they (the larvæ) are said to be found in *September*. This is a strange error: *flavicornis* is one of the earliest *spring* feeders, while *ridens* is found a little later in the season. I have taken the *pupa* of this latter, as stated above, in the middle of August, and, without any question, there is but *one* brood of both these species.

Xylophasia hepatica and *rurea*. Like the last named, I have found the larvæ (full-fed) of both these species in April under damp moss on stumps of trees, &c.: they require no attention. *Hepatica* I have generally found under damp moss on *poplars*.

Segetia xanthographa. This much abused, yet, when bred, pretty insect, may be found at the roots of most trees. End of July, August.

Noctua C-nigrum and *festiva*. Occasionally at roots of trees. July.

Chersotis plecta. Very common at roots of various trees. October, &c.

Agrotis putris. Very common at the roots of various trees. October, &c.

Tæniocampa stabilis, *instabilis*, *gothica*, *cruda*. Extremely abundant at the roots of various trees. October, &c.

„ *munda*. A few at roots of oak. Gloucestershire. October, &c.

„ *populeti*. Of this rare species I once found a “nest” of thirteen at the roots of a poplar. It goes much deeper into the earth than most other insects. Bucks.

The last eight species may easily be found by simply shaking the sod, or loosening the earth, and by taking a large number (I once had 1000 pupæ of *instabilis*) of the common species, some curious and beautiful varieties may be obtained without trouble.

Orthosia Upsilon. The larva of this species may be found in profusion under loose moss and bark on willows and poplars, but they must be fed. Beginning of June.

„ *macilenta*. Of this species, so difficult to obtain in good condition, when in the perfect state, I have found only three. The chrysalis, which is extremely delicate, is enclosed in a weak cocoon. Birch. September.

Cosmia diffinis. Not uncommon where elms abound. Spins up close to the trunk. End of July. Bucks.

Cirrædia xerampelina. Of this rare species I took forty-seven last year; this year I have only met with eight. It is perhaps the most difficult of all pupæ to find, and, when found, the most liable to be injured. The following directions may be found useful:—They are to be sought for at roots of ash: trees of a good growth need only be tried; those on the borders of streams and damp ditches will be found most productive. This insect forms a hard, egg-shaped cocoon. Turn up the loose dry earth, rubbish or moss about or adhering to

that side of the tree which faces the stream; crumble it *very* carefully with the hand: should you see something resembling a cocoon, of a dark, muddy colour, take it up and try whether you have obtained a prize; but in this trying lies the danger: though hard, the cocoon is extremely *brittle*, and almost the slightest pressure crushes it: the best way, therefore, when you think you have a cocoon, is to pare one end with a penknife as gently as possible: if, after scraping it in this manner, you find it *is* a cocoon, you have found xerampelina, and may congratulate yourself. You may look for it as early as the beginning of August, certainly not later than the first week of September. I may add that Mr. Doubleday informs me that the larva feeds on the seeds of ash trees.

Xanthia ferruginea, aurago and citrago. I have found all these species, though rarely, at roots of lime trees. August. Bucks.

Chariptera aprilina. In the utmost profusion: I have taken as many as twenty at one tree. This will be one of the first pupæ found by the beginner: nothing can be easier; merely turn up the earth, and break it, and they will tumble out of their brittle cocoons in plenty. Oak. July and August.

Hadena Persicariæ. Common under moss on various trees. October, &c.

„ protea. Not uncommon at roots of oak. Cocoon greatly resembles that of xerampelina. July and August.

„ Pisi and thalassina. May occasionally be found under moss, stones, stumps, &c., on or about heaths. October, &c.

Heliothis marginata. Once found, but I cannot say where.

Abrostola triplasia and Urticæ. They may both be found, though not commonly, under moss on ash trees throughout the autumn.

Catocala nupta. This fine chrysalis occurs not unfrequently under loose bark on willows: it never enters the earth, as far as my experience goes. August.

Botys urticalis. This is the only Pyralis of which I ever found the pupa, and, strictly speaking, not even of that, since it was the hibernating larva. It (the larva) may frequently be found enclosed in a comfortable cocoon under the bark of most trees; I shall not soon forget my disappointment when the perfect insect made its appearance.

Geometra papilionaria. At roots of oak. Beginning of July.

Eurymene dolabraria. This beautiful insect I used to take in plenty under moss on beech trees in Bucks: it occurs also, but much more sparingly, on oak. The larva enters the moss at the first con-

venient place, and therefore in tearing it off (which should be done with the *hand*, not the trowel), great care must be taken in loosening the *edge* of the moss, for *there* the pupa is, I may say, invariably found. October, &c.

Ennomos illunaria. I once found, as stated in my first paper, a whole brood of this species at the roots of one ash tree. Not met with since. September.

„ *fuscantaria*. Once found spun up at the roots of an ash. August. Brandeston.

„ *tiliaria*. Two or three spun up between blades of grass growing in the corners formed by the roots. Birch. August.

Odontoptera bidentaria. Common under moss everywhere. October, &c.

Crocallis elinguaris. The pupæ of this species may be taken in comparative plenty under moss on poplars about the end of June or beginning of July.

Anisopteryx æscularia. Not uncommon at roots of elm and oak. October, &c.

Hibernia leucophæaria. One female at roots of, I think, a sycamore.

„ *rupicapraris* and *progemmaria*. Very common at roots of elm throughout summer and autumn.

„ *aurantiaria* and *defoliaria*. Also common in the same situations. Should be looked for not later than September.

The above four species may be found in little “clusters” in dry nooks formed by the roots of elm trees, and beautiful varieties thus procured: much trouble in looking for the apterous females will also be saved.

Phigalia pilosaria. Common at roots of elm. October, &c.

Biston hirtaria. Common at roots of ash. This pupa may be known by a row of dull yellow spots on each side. In October, &c.

„ *prodromaria* and *betularia*. Both common; the former at roots of oak, the latter at those of elm. October, &c.

Boarmia abietaria. Found in profusion at roots of fir trees in Gloucestershire. Last week in June: this time should be strictly adhered to, as the insect sometimes remains only eight days in the pupa-state.

Tephrosia laricaria. Several, in the New Forest, under moss on oak trees. October, &c.

„ *consonaria*. This insect appears in the perfect state about the first week in May: the pupa should be looked for, in April,

under moss and at the roots of beech: it appears to be exclusively attached to that tree. Bucks.

Harpalyce ruptaria. Common at roots of elm and lime. The pupa is enclosed in a web-like cocoon, and is greenish yellow, powdered with brown spots. October, &c.

„ *russaria* and *immanaria*. Common at roots of willows.

Ypsipetes elutaria. In abundance at roots of willows: most extraordinary varieties may be thus obtained. July.

„ *impluviaria*. Common under moss on alders. October, &c.

„ *ruberaria*. I once took about a dozen of this insect under loose bark on poplar. Bucks. April. The larva hibernates, I think; for, if I remember rightly, some had not turned when I found them in the spring.

The pupæ of the three last-named species are all black and very active.

Phæsyle miaria. Very common at roots of willows. August.

„ *Psittacaria*. Much rarer. Birch and sycamore.

The pupæ of both these species (together with that of *Epione apiciaria*, which I forgot to mention in its right place) may be found spun up in loose grass, or attached to the trunk: the latter species at willow. The pupæ of all three have a purple bloom, and I cannot see any difference between them.

Cheimatobia dilutaria and *brumaria*. These two common insects may be found in the utmost profusion at the roots of almost any tree throughout the summer. There appears to be an impression on the minds of some that *autumnaria* and *filigrammaria* are only varieties of these species. Of course the best way to decide the question is by breeding them: this I have not done, but out of many hundred pupæ of *dilutaria* I have never had anything like either of them. I am aware that, up to this time, they have only been taken in Scotland, or, at any rate, in the North. As I have had no “digging” in either of those localities the above fact may be thought of little value. I would venture to recommend the northern collectors to dig at the roots of *elm* and *oak* any time during the summer, and to collect as many pupæ as possible. (N.B. I suppose every one knows the pupa of *dilutaria*.) Should the three insects, or two of them, be or not be produced from these pupæ, it would, I think, assist considerably in solving the question. In my opinion all three are abundantly distinct.

Eupithecia exiguaris. Occasionally under bark on hawthorn. October, &c.

Eupithecia abbreviaria. Occasionally under bark on oak. October, &c.

„ *castigaria*. Occasionally under bark on hawthorn. October, &c.

„ *innotaria*. Of this rare species I have been fortunate enough, at different times, to take seven. I believe the food of the larva is not ascertained, but I have little doubt that it feeds on ash, as all my pupæ were taken under moss on that tree. To find it, see directions under the head of *Eurymene dolabraria*. October, &c.

„ *dodonæaria* (*subumbraria*, *Doub. List*). This very pretty insect I am in the habit of taking under loose bark on hawthorns throughout the winter and spring. It is enclosed in a delicate web.

REMARKS.

1. The above list, it will be seen, comprises no less than 113 insects, including many of the rarer species. It might have been considerably increased by adding others, which may occasionally be found in digging gardens, stubbing up roots, turning sods of grass, &c.; but as no fixed rules can be laid down in reference to these methods, or, to speak more correctly, since I can give none, I have confined myself strictly to *trees*, on or about which all the above may be found by assiduous collectors.

2. An examination of the list will show at once that the following trees are the most productive, *viz.*, poplar, willow, oak, elm, birch, beech, ash and hawthorn. But *all* trees should be tried. Knock off the loose bark and loosen the moss on every tree you pass. I do not think there is much use in digging at the *roots* of any trees, except those mentioned, unless a particular insect be wanted, such as *Boarmia abietaria* or *Trachea piniperda*, at roots of fir, &c., &c.

3. It will also be seen, by referring to the list, that in a very large majority of instances September and October are quoted as the best time for searching; and this is undoubtedly the case. From whatever cause or causes, such as mice, damp, mould, earwigs, &c. (I have seen earwigs eating a soft pupa), chrysalides become scarcer and scarcer as the season advances, meaning by the term *season* winter and spring. If the collector, therefore, wants any particular species, obviously his best plan is to search for the pupa as soon as possible after the larva has gone down or spun up. Assuming that the collector knows the period when the insect he wants is feeding as

a larva, and its probable or usual duration in that state, a little experience will soon enable him to know how soon he ought to dig for the pupa. A fortnight will generally be found ample time. Let us take *Notodonta dodonæa* as an example. The larva of this insect is full-fed about the 25th of August. Allowing, then, a fortnight for the change, the collector should begin to dig about the second week in September; and during the ensuing three weeks of that month he will probably find more specimens than during the whole of the remainder of the season. Of course *all* the larvæ of the same species are not full-fed on the same *day*, many causes combining to produce some uncertainty in this respect; but, as a rule, the variation is not considerable. But though, for the above reason, the pupa digger should be unusually active in his exertions during September and October, let him by no means afterwards sink into inglorious ease, content to rest on his laurels. Pupæ may be found all the year round. I seldom let anything like a fine day pass without taking a good walk into the country, trowel in hand; and if I return home in January with only *two* pupæ, instead of the *eight* which I might very probably have taken in October, I am quite satisfied. Successful or unsuccessful, I can confidently recommend the *exercise* to the corpulent and obese.

HINTS.

At the risk of appearing tedious, I append a few observations as to the method of digging, the best localities, &c. I am aware that these observations have, for the most part, appeared elsewhere; but, considering that this paper would be incomplete if they were entirely omitted, I must ask the indulgence for recapitulating some of them.

The only implements required are a common garden trowel and a small box filled with damp moss, for the purpose of carrying the pupæ, which should be handled as seldom as possible, and with the utmost tenderness. I may here remark that the pupa digger must not be surprised or disheartened if some of his pupæ dry up. This is caused by some unlucky, probably *unseen* injury, inflicted at the time of capture, and, however great his caution, will not unfrequently occur. But to return:—With regard to localities, the best are unquestionably parks and meadows with *scattered* timber trees. Those trees from which the surrounding grass has been worn away by the feet of cattle, and those situated on the borders or banks of streams, dykes, &c., when the soil is dry and friable, will be found the most remunerative. When the pupa digger enters on new hunting-ground,

let him endeavour to attain an eminence which commands a survey of the surrounding fields, &c. Having accomplished this, let him cast a scrutinizing glance around. Should a lofty oak or a stately poplar be seen rearing itself in *solitary* majesty in the middle of a field, let him rejoice; and, having hastily descended from his not "bad" eminence, let him at once proceed to it, regardless of hedge and ditch. If there be a nice dry sod, ensconced in some snug corner, formed by the roots, he can scarcely fail of success. Insert the trowel, *in this instance*, about eight inches from the trunk, to the depth of four. Turn up the sod and lay it on the ground. Look then at that part of the trunk from which the sod has been removed, and, if you cannot see, feel gently with the hand for any cocoons which may adhere. Then take the sod in the left hand and tap it softly with the trowel, and the pupæ which form no cocoon, or a very weak one, such as *Aprilina*, *prodromaria*, &c., will drop out. If the sod be composed of very loose, dry earth, simply shake it. Lastly, tear the roots asunder for *Bombyces*; if, however, the roots be strongly matted together there is little or no use in doing this. Before leaving the tree, see if there be any nooks or crannies formed by loose bark, in which case break it off with the hand if possible; if, however, this cannot be done, wrench it off with the trowel, observing that it should not be inserted further than is *absolutely* necessary. It is astonishing into how small a hole or crevice a caterpillar will creep. If, therefore, an insect such as *megacephala*, which spins up under the bark, be wanted, these little nooks must be carefully and *cautiously* examined. If moss be on the trunk or roots, tear it gently off, and search both the moss and the trunk. When these operations are ended the tree may be looked upon as "done for." In digging *round* a tree, by which I mean one whose roots do not form any angles, it is not necessary to insert the trowel deeper into the earth than three inches, or further from the trunk than four. With regard to woods, I can add nothing to what appeared in my first paper, from which I make the following extract:—"It is in vain to examine the *dense* portions; it is equally vain to dig at the *roots* of trees in such localities, with few exceptions; and you will rarely find anything, unless upon trees of a considerable growth. The thick moss which collects about the trunk and roots is the part to be examined. 'Bombyces' are generally (almost invariably) found under the moss which covers the spreading roots, and not on the trunk. The best localities in woods are the borders and open places; and it is curious that such places, when elevated or facing the North, seem to be the most productive."

Touching hedgerows, I must so far modify my former wholesale condemnation of them as to say that I found two pupæ of *ocularis* in such a situation this autumn. It should be borne in mind that in condemning hedgerows I condemn the *trees*, not the hedgerows. As Mr. Douglas justly remarks, in his highly interesting and instructive little book, the 'World of Insects,' p. 116, "Pupæ must be there," *i. e.* in the *banks* on which the hedgerows are. I shall most thankfully receive any information as to the *modus operandi* in this case from those who have tried it. I imagine that *Noctuæ*, and not *Bomyces*, will generally be found in such situations. In the occasional records of insects taken in the pupa state I observe the frequent use of this expression, "Pupa, by *raking*." What is the meaning of the term "raking?"

There is no use in trying hard, sticky or clayey ground; but the following hint will be found valuable: always *replace* the sod when you have done with it, or at least the *débris*. When first taken up the sod may be so hard as to render it impossible for the caterpillar to penetrate it; but if, after being loosened by the pupa digger's manipulation, it be restored to its place, the larva, which in the original instance would have wandered away to some more convenient spot, will now find one ready-made, and will almost certainly make use of it. This has been evidenced to me in the most unmistakeable manner, in proof of which I may adduce the following example:—One day, last June twelvemonth, I came to a most unpromising-looking oak. Observing a little angle, I inserted the trowel, and found the soil as hard as a board; nevertheless, I turned up the sod, shook it, and, having found nothing, loosely replaced it. In the following September I returned to the same tree, and, having unsuccessfully dug round it, came to my little (it was not more than three inches each way) sod, and raised it with anxious hand, when, lo! to my delight and astonishment, *five* pupæ of *Notodonta dodonæa*, all joined together in a little cluster! It is obvious that the above plan will be of no use during the winter months, but can only be made available while the larvæ are feeding, *i. e.*, in the late spring and early summer months. It will then be said, "You dig all the year round?" I answer, certainly: September and October are the most *productive* months, it is true; and August and September will be found the best time for the autumnal species; but that is no reason why the other months should be neglected. Of course I dig much more sparingly during the spring and summer, at which period insects may be taken in the larva and imago state; but I seldom go out without my trowel; and I can con-

fidently recommend the collector in want of any particular tree-feeding Bombyx or Noctua to prepare a comfortable home for the larva, in the manner given above.

When the ground is very wet do not try *digging*. Rather examine moss, loose bark, &c.

With regard to the question, which will probably be asked by my readers, "Which are the most *likely* trees?" I answer that general directions on that head will be found scattered through the paper; and I would only add in this place that it appears to me useless to try any trees but those of considerable growth, and that when the trunks or roots of such trees are thickly matted with ivy no pupæ will be found. But the uncertainty on this point is truly extraordinary. In my first paper I gave an instance; I now subjoin another. In the neighbourhood of Brandeston is a park, belonging to the Duke of Hamilton, which is filled with fine old timber oaks, and is a grand hunting-ground for the pupa digger. On one occasion I came to a meadow, adjoining this park, in which were about sixteen oaks, all fulfilling the necessary requisites for "likely" trees, old, filled with angles, and a dry soil. Out came the trowel, the box was prepared, and I began with number one. I dug for about two hours; at the expiration of that time I looked into my box, and found the result to be three *instabilis*. There remained one tree, which did not seem to offer any advantages over the others; yet at that one tree, in a corner, about the size of a good large plate, edged with loose grass, I took the following, *viz.*, three *trepida*, *seventeen dodonæa*, three *prodromaria*, seven *hirtaria*, and two or three dozen *cruda*, *gothica*, *plecta*, &c. This is a simple *fact*, and in reference to it I would ask, "Can any one assign even a plausible reason for so singular a circumstance?" The same thing, though in a less degree, occurs every day, and seems to set at nought anything like fixed rules.

If this paper be of any use in enabling the collector to fill up some of the blanks in his cabinet with his own hands (and who would not rather do so with his own hands than with those of others?), I shall feel well repaid; and any letter addressed to me as below shall be willingly and promptly attended to where further information may be desired.

That pupa digging is much on the increase I infer from several circumstances, among which I may mention the comparatively frequent record in the 'Intelligencer' of insects captured in this way. Surely the most desponding must be nerved to renewed efforts when

he reads that *bicuspis*, *ilicifolia*, *fluctuosa* and *conspicillaris* (8) have rewarded the enthusiastic pupa digger.*

In confirmation of the above opinion, I here give an extract from the letter of a highly-esteemed correspondent, Mr. Bree, of Stowmarket:—"I met some young boys, a day or two ago, digging round some trees. To my horror I found that they had read of the— (modesty forbids my giving the adjective here added) Mr. Greene in the 'World of Insects,' and were exterminating all my game. They had got about a dozen under an elm tree!" I hope Mr. Douglas may be as much pleased with this circumstance as I was.

I hope it will be borne in mind by my readers that the remarks, hints, &c., contained in this paper, are not intended as incontrovertible dogmas, but merely as the results of my own experience and observation.

And now I will conclude with one, literally *one*, word of advice to the incipient pupa digger, and it is this: PATIENCE!

JOSEPH GREENE.

Playford, Ipswich,
November, 1856.

Entomological Botany (with more especial reference to the Plants frequented by the Tineina). By H. T. STAINTON, Esq.

(Continued from page 5238)

Pyrus Cydonia. The Quince Tree.

Quince trees are often grown in gardens, and they are not inelegant trees, though perhaps now rather old-fashioned. The only insect that I have to mention in connexion with the quince tree is a *Lithocolletis*. This notice may have the effect of calling the attention of collectors to the leaves of the quince tree; and a *Lithocolletized* leaf will add a new species to our Fauna.

The insect (though not improbably the original *Cydoniella* of the 'Wiener Verzeichniss') is a recent discovery, M. Millière, of Lyon, having collected the mined leaves there, and forwarded them to Professor Frey at Zurich, who bred the insect this spring. As might be

* If this should meet the eye of Mr. Smith, will he be so obliging as to state when, where and how he obtained the pupa of the last-named insect?

expected, the insect belongs to the *Pomifoliella* group; but the redder tint of the anterior wings and the absence of white scales on the inner margin near the base readily distinguish it.

Sorbus aucuparia. Mountain Ash.

Though so completely domesticated in suburban gardens, its name *mountain* ash reminds one of its native haunts, where, in some glen on the hill-side where the burn comes brawling down, leaping over the "muckle stanes" with which the bed of the torrent is strewn, the graceful appearance of this tree harmonizes so well with the scene. In such localities, whilst watching *Argynnis Selene* flying up or down the ravine but we digress. Speyer enumerates as feeding on this plant *Zeuzera Æsculi*, *Gastropacha betulifolia*, *Hypercompa dominula*, *Acronycta strigosa*, *Diptera ludifica*, *Scopula prunalis*, *Nola cucullatella*, *Tortrix Ribearia* and *cinnamomeana*, *Penthina pruniana*, and *Spilonota ocellana*.

Among the TINEINA feeding on the mountain ash may be mentioned *Cheimabacche Fagella*, *Argyresthia conjugella* (feeding in the berries) and *Sorbiella*, *Ornix Scoticella* and *Loganella*, *Lithocolletis Sorbi* of Frey, which we have not yet detected in this country, unless *L. aucupariella* of Scott be a northern variety of it, *Cemiostoma scitella* and *Nepticula Oxyacanthella*; probably, also, other of the hawthorn- or apple-feeding species of *Nepticula* patronize the *Sorbus aucuparia*.

Sorbus torminalis. Wild Service Tree.

This plant is generally, I fancy, but little known, though not rare in our southern hedges; the leaves remind one rather of the leaves of some species of poplar, but are slightly woolly on the under side: it generally only forms bushes in hedges, but sometimes we meet with a small tree.

Speyer quotes as feeding on it *Notodonta cucullina* (probably a mistake, as the plant has no affinity with maple, though here they grow in company) and *Hibernia defoliaria*.

The most important insect feeding on it is a *Lithocolletis*, which has been named by Frey, after its food-plant, *Torminella*; it mines the under side, and belongs to the *Pomofoliella* group, being distinguished by its pale saffron ground-colour and pure white markings. The larva of this species is not uncommon on the *Sorbus torminalis* at the beginning of August and October. The perfect insect is described in

the 'Entomologist's Annual' for 1857. The mine of a *Nepticula* larva has been noticed, but the larva itself has not been met with.

Epilobium. Willow Herb.

Speyer mentions as feeding generally on this genus *Macroglossa* *Enotheræ* (one of the loveliest of the Sphingina, but which up to the present time has not made its *début* in Great Britain), *Hypercompa* *Hera* (so common in the Channel Islands), *Spilosoma* *lubricipeda*, and the equally omnivorous *Sericoris* *urticana*. *Laverna* *conturbatella*, which he also mentions, I reserve for more special consideration under *Epilobium* *angustifolium*.

Epilobium hirsutum. Great Willow Herb.

This is quite an ornamental plant along many a river-bank and marshy place, in the months of July and August. Then its large rose-coloured flowers are very conspicuous, though the plant does rather suffer from a superabundant foliage.

Speyer mentions as feeding on this species *Chærocampa* *Elpenor* and *porcellus*, and *Nænia* *typica* (which, when^l juvenile and gregarious, often completely skeletonizes the leaves of a plant). In the genus of *Tineina*, *Laverna*, two species at least are very abundant here on this plant: I allude to *Laverna* *ochraceella*, of which the larva bores in the stems in May, quitting the stem when full-fed, in order to form its cocoon inside the cuticle of one of the lower leaves; and *L. Epilobiella*, a number of the larvæ of which may be found on the head of almost every plant in July, they feeding externally on the young buds and tender leaves.

There is a singular partiality on the part of the larvæ of the genus *Laverna* for the various species of *Epilobium*; and *E. hirsutum*, being the most plentiful and the most extensively distributed, seems to be most largely patronized. Mr. T. Wilkinson has bred *L. propinquella* from either *hirsutum* or *alsinifolium*: Herr Schmid has bred *L. lacteella* and *Raschkiella* from *E. hirsutum*, and it is known to be one of the favourite plants of *Anybia* *langiella*.

But how monstrous is the difference in the mode of feeding exhibited in the genus *Laverna*! Whilst *ochraceella* bores the lower part of the stem, *Epilobiella* feeds externally, on the young buds, &c., at the summit; then *conturbatella* rolls together several of the heart-leaves; *Raschkiella* makes a long, slender mine; and *Anybia* *langiella* (which Frey unites, not unwisely, to the genus *Laverna*) makes large

blotches, often as large as the leaves. In this respect its mines resemble those of the pretty *Chrysoclista Schrankella*, which, though apparently more partial to *E. alsinifolium*, is sometimes found on *E. hirsutum*.

Epilobium angustifolium. Rose-bay Willow Herb.

An elegant plant, without the dense foliage of *hirsutum*, and with longer spikes of more conspicuous flowers. It is often grown in gardens, thriving well in damp, shady places: such are its usual resort. I had occasionally noticed a few plants of it, but had never met with a bed of it, apparently wild, till this last summer, when, in the wood on the summit of the cloud-attracting Box Hill, I found a congenial locality, a *damp, shady* place, and there *E. angustifolium* grew in profusion, in company with the pretty little enchanter's nightshade (*Circea lutetiana*).

Speyer mentions as feeding on *E. angustifolium* *Chærocampa Elpenor*; but its patrons which most deserve our consideration are three of the *Tineina*, two of which the exertions of Mr. Machin and Mr. F. O. Standish have added to the British list during the past season; they having found both of them in the aforesaid wood on the top of Box Hill. (The entomologists of Dorking and vicinity leave the treasures of their neighbourhood to the energy of the London collectors). The first species found was *Laverna conturbatella*, and its discovery was promptly followed by that of *L. Raschkiella*. The larvæ of both species were subsequently met with; under *E. hirsutum* I have already noticed their different modes of feeding.

The other larva attached to this plant, and which we have not yet found here, is *Butalis inspersella*, of which Zeller, quoting a letter from Schläger, gives the following account in the '*Linnæa Entomologica*,' vol. x. p. 253. "On the 18th of June I found, in the clusters of blossoms of *Epilobium angustifolium*, white, rather thick webs, which were quite full of small larvæ. They were still mostly very young, and hardly a fourth of an inch long; yet some were twice that size, and others even larger. In the corners of my cage they made white, transparent cocoons, in which to change to pupæ. The perfect insects appeared in about fourteen days. The web which the larvæ of *inspersella* inhabit is rather large, encompassing some of the uppermost leaves, and is much laden with grains of excrement. It reminds one somewhat of a nest of an *Hyponomeuta*."

Laverna subbistrigella has also been bred from this plant, but its habit has not yet been observed.

H. T. STANTON.

Mountsfield, Lewisham,
October 20, 1856.

On Nomenclature.—Nomenclature is a sore subject; everybody abuses it,—everybody says it is nonsense to have more than one name for an insect,—and yet every one who writes on Entomology, whether it be a monograph of a genus or a manual of a class, is sure to change some names previously considered correct by some one. This is undoubtedly very annoying; but can it be prevented?—does it not arise, of necessity, from the circumstances of the case? When a person reads up any branch of the Science, and finds a description which he has no doubt applies to a certain insect, and which bears an earlier date than the name by which that insect is more generally known, it seems to me that he has no choice in the matter, but must change it, for I believe it is generally allowed that priority is the only sure guide in this case. If every one could be persuaded to adopt some one standard it would undoubtedly be a great advantage; but how is this to be done? Your correspondents recommend Doubleday's 'Synonymic Catalogue,' and very probably there are in this country at the present time more collections arranged by that than by any other; but some of the older collections are already arranged by Guenée's works, and there is no doubt but a large proportion of those now beginning to collect will adopt Stainton's 'Manual,' and both these works, being accompanied by descriptions, have an authority and stability which are wanting in the other. It seems to me a difficulty and annoyance to which we must make up our minds, and I think it is one to which Englishmen should be especially forbearing, resulting as it does from that right of private judgment which we all prize so highly.—*Thomas Boyd; 17, Clapton Square, October 6, 1856.*

Mr. Stainton's Arrangement of Lepidoptera.—I cannot agree with the protest signed by four of our entomologists and published in the 'Zoologist' (Zool. 5289), and confess I am a heretic with respect to the infallibility of any list or arrangement of Lepidoptera in the present state of our knowledge, nor do I think the views embodied in the said protest are calculated to advance the progress of Science, or that they will receive the assent of the intelligent author of the 'Synonymic List' himself, who, I am pretty sure, in a second edition, will not follow the same plan as in the first. Truth must be our standard, and not any particular list or arrangement. I believe there are errors of classification and nomenclature in all our lists, Mr. Stainton's not excepted, but he can only "mislead beginners" where he is in error. Systematic Entomology will make no progress towards perfection if no changes are to be permitted; but, at the same time, those who make them should do so with care and truthfulness, not from caprice, and when they find themselves in error should not hesitate boldly to correct it.—*R. F. Logan; Duddingston, Edinburgh, November 4, 1856.*

Figures of Larvæ of Lepidoptera.—I have great pleasure in informing any one who would like to have good figures of larvæ that the Mr. Diggles named by Mr. Stevens (Zool. 5307) is really a first-rate artist and a most indefatigable Micro-Lepidopterist: having had the pleasure of his acquaintance many years, I can speak from having seen

his work; and when I say it was he who painted the beautiful figure of *Gastropacha ilicifolia* on rice-paper which Mr. Douglas exhibited for me at the Entomological Society's rooms some time since, I need not say more for his care and skill as an artist. When Mr. Diggles left England Science lost one who could not only paint Natural History, but who knew what he was painting. Such a man seems to be wanted now, and should Mr. Diggles ever return to England I hope he will make London his home, and that London will make him a better home than Birkenhead did: his talents were indeed under a bushel there.—*C. S. Gregson; Edge Lane, Stanley, Liverpool, November 16, 1856.*

Lasiocampa Callunæ.—I have waited a long time in the hope that some able entomologist would take upon himself the task of fully establishing this fine Scottish egger, but, as no one has done so, I beg to give a brief statement on the subject, which is the result of several years' practical observation (I having found the first larva in 1844, on Rannoch Moors), and which will, I think, satisfactorily show the specific difference of this, the largest known British species of the genus. The insect is of a darker colour than *L. Quercus*, and its antennæ are about a third longer, each consisting of eighty-four minute articulated pieces, while that has but sixty-four. There is a more conclusive difference between the larvæ of the two insects, that of *L. Callunæ* being more or less bluish in parts, and the under side being brownish, with a row of large black spots. The cocoon (though larger) resembles that of *L. Trifolii*, being roughish, and of a dark brown colour, and therefore unlike that of *L. Quercus*. I may mention of this interesting species that it always requires two entire years for its transformations. I am fully aware that *L. Quercus* and some others occasionally pass a second winter in pupa; this, however, constitutes the exception, not the rule. In 1854 I sent some of the larvæ of *L. Callunæ* to Mr. Doubleday, with whom an eminent French entomologist was then staying, and both at once pronounced them to belong to an unrecorded species. The name of *L. Callunæ* I have not yet seen in any list of British insects, but it is distinctly named in some of our best cabinets.—*Richard Weaver; 25, Pershore Street, Birmingham, November, 14, 1856.*

Double-broodedness of Notodontæ.—It appears that Mr. Shepherd requires a great deal of evidence to prove dictæa and others of the Notodontæ double-brooded, and the sort of evidence he requires I do not understand. He has bred it double-brooded himself, it appears; but that is no evidence with him, because the larvæ are so well treated in his breeding-cage that he thinks they come to maturity sooner than they would if left to their own resources. Also taking two broods, one in May and the other in August, is no evidence with Mr. Shepherd, unless he receives proof that the insects taken in August are descendants of the May brood: now it appears to me that if breeding them will not prove it nothing will; but, as Mr. S. will not take this kind of evidence, I should like to know how it is to be proved at all (supposing the insects are double-brooded). Should we take the female in May, and breed a second brood in August, it will be put down to their being too well treated and brought to maturity sooner than they otherwise would; and, if we take a second brood in August, Mr. Shepherd says, very coolly, "prove their descent." Now, if breeding them will not prove it, how is it to be proved? and, if it will, I think Mr. Crewe's last letter (*Zool.* 5292) sufficient to do so. The first brood of *N. dictæa* appears here in May, and when they appear first are of course in fine condition; they soon get over-flown, and early in June are not to be met with. In about the last week of July or beginning of August the second brood make their appearance in fine condition, quite as plentiful as the first brood, though rather smaller and paler: I know of at least from thirty to forty

specimens having been taken here last August. Can Mr. Shepherd account for this August brood? Besides *N. dictæa* we find *N. dictæoides*, *N. ziczac*, and *N. camelina* occur in August as well as in May. I fancy it is a long time for a single brood to last from May to September, as both Mr. Naish and myself have taken *N. dictæa* in the latter month this season. Besides, if they are only single-brooded, what becomes of them during the greater part of June and July? Perhaps Mr. Shepherd could enlighten me.—*George Harding, jun.; Stapleton, Bristol, November 12, 1856.*

Double-broodedness of Notodontæ.—Mr. Shepherd says that to complete my chain of evidence that *N. dictæa* is double-brooded I must “prove that the moths which emerge in May are the parents of those found in July.” Now this fact has been so fully proved by Mr. Crewe, with respect to many of the *Notodontæ*, that it hardly needs any further confirmation; but knowing that Mr. Gascoyne had bred *N. ziczac* pretty freely, I wrote to him, asking him if he could confirm Mr. Crewe’s letter. The following is Mr. Gascoyne’s reply, dated November 5th:—“I have no hesitation in answering your enquiry in the affirmative. The correspondence now going on as to the double-broodedness of the *Notodontæ* seems to arise less from facts being questioned than from a difference as to what these shall be called, yet perhaps the following may not be unacceptable. I have at this time two sets of pupæ of *N. ziczac*, probably about seventy in number; these are in direct descent from moths of last May; the first brood of larvæ assumed the pupæ state the middle of July, the moth (second brood) appearing the beginning of August: eggs from those, the produce of two pairs (each set numbering about 110), hatched in four or five days, and the larvæ assumed the pupæ the latter end of September. I feel no hesitation in saying that I could continue to breed moths in May and August for years to come (accident excepted). The dates of the respective states appear thus:—*imago*, May and July; *larva* full-fed, July and September; *pupa*, July and winter. It thus appears that, while the winter pupa remains in that state eight months, the summer one passes it in about a fortnight. I may add that all the July pupæ emerged: none remained over. I am satisfied the same is the case with *N. camelina*: I had the *imago* alive in June last, from larvæ taken the previous autumn, and again bred it in August from larvæ fed during July; part of the latter brood is still in pupæ, doubtless a provision of Nature to meet casualties to the autumn brood.” I may add, with respect to *N. dictæa*, never having bred them from the egg, I cannot from personal knowledge give the required information; but this link in the chain is amply filled up by other gentlemen. The mere fact of many of the pupæ of the *Notodontæ* remaining over from one year to another does not, in my opinion, prove much, as Mr. Gascoyne tells me that he has now the pupæ of *S. Carpini*, which attained that state last autumn. Mr. Shepherd would hardly argue from this fact that *S. Carpini* is biennial-brooded.—*Arthur Naish; Brooklyn Lodge, Ashley Hill, Bristol, November 7, 1856.*

The Notodontæ not double-brooded.—

“Truth can never be confirm’d enough,

Thoughts doubts did ever sleep.”—SHAKESPEARE.

Doubts are considerably troublesome to many people; I wish I had none myself. Those who, on any subject, have no doubt in their own minds are in a very enviable position; and to do anything to disturb such a desirable condition appears ungenerous, if not somewhat cruel. I wish to make a few observations upon the so called double-broodedness of *Clostera reclusa*, *Notodonta camelina*, *N. ziczac*, *N. dictæa* and *N. dromedarius*, insisted on so strongly in the ‘*Zoologist*,’ at pp. 4952,

5148, 5292. As Mr. Harpur Crewe has "no doubt whatever in his own mind" but that this so-called double-broodedness is "a wise arrangement of Providence," I should advise him not to read what follows, lest by possibility it might awaken a doubt in his mind respecting the wisdom of those arrangements, touching the moths above named. The replies of Mr. Doubleday and Mr. E. Shepherd (Zool. 5165) will probably be considered satisfactory by most entomologists, as they are to me. Wishing, however, to confirm the truth of this Notodonta question, I have learned all I can respecting the economy of these moths in Scotland, including the experience of a person who has bred the four species of Notodontæ every year for six years past in considerable numbers. I can find only one specimen was ever seen in the autumn—a solitary *N. ziczac*, which became perfect in captivity on the 15th of August, 1855, out of a brood reared from eggs hatched on the 26th of June; the remainder did not become winged till this year. This summer I collected a large number of larvæ of *Notodonta camelina*, *N. ziczac*, *N. dromedarius* and *Clostera reclusa*, also a few of *N. dictæa*: they were of all sizes; some became pupæ very early, but none have yet become perfect, and I do not expect they will till next May or June, seeing they are now enjoying a temperature of 28° Fahr. I give below the times of the imago appearing, from larvæ that have fed in the previous summer and autumn. The earliest and latest dates are given between which the moths "kept coming out." They are taken from specimens bred during the last five years:—*Clostera reclusa*, May 13, June 20; *Notodonta dromedarius*, May 7, July 1; *N. ziczac*, May 7, June 18; *N. camelina*, June 1, 27; *N. dictæa*, May 13, July 12, and, in the year 1853, so late as July 27th and August 5. I would direct the particular attention of Mr. Naish to the "long range" in the time of appearance of *N. dictæa*, as illustrative of his "stubborn things" (Zool. 5265). I believe some species among the Lepidoptera which appear here only once in a season (though very regularly) appear twice in a season in England: if this variation be owing to the "wise arrangements of Providence" being restricted to the southern part of the island, and not to a difference in climate, it is time the injured animals made known their grievances to the "Scottish Rights Association."—*Thomas Chapman; Glasgow, December 3, 1856.*

Capture of Glæa erythrocephala at Plymouth.—I intend to exhibit, at the January meeting of the Entomological Society, a specimen of *Glæa erythrocephala*, captured at Plymouth: it was taken by myself, at sugar, in November. This has been compared by Mr. Henry Cooke, of Brighton, with the unique specimen in his possession, and, like that, proves to be the *var. glabra* of Duponchel.—*J. J. Reading; 42, Gibbons Street, Plymouth, December 13, 1856.*

Larva of Celæna Haworthii.—In Mr. Stainton's 'Manual,' No. 9, he says "Larva undescribed. On cotton grass (*Eriophorum*)." The larva is gray, spotted with black, feeds in the stems of *Eriophorum*; a small hole is made in the stem, from which the excrement is ejected in profusion; full fed end of July; in pupa three weeks.—*R. S. Edleston; Manchester, November 3, 1856.*

Capture of Heliophobus hispidus in Leicestershire.—In September last I was fortunate enough to procure a specimen of *H. hispidus* from a garden in this place: as the species as been so seldom met with, perhaps the notice of its occurrence in this central part of the kingdom may prove interesting to your entomological readers.—*A. G. Hildebrand; Kibworth, December 10, 1856.*

Eupithecia indigaria.—I met with this very distinct species on the boles of firs at the end of May.—*R. S. Edleston; Bowdon, November 4, 1856.*

Coleophora juncicolella.—This is not an uncommon species here, but, from their small size and colour, exceedingly difficult to secure in the long heather.—*Id.*

Butalis incongruella.—I captured some twenty specimens in April, flying in the sun over heather, on Carrington Moss. I saw none unless birch trees were near; somebody may be fortunate enough to discover the larva.—*Id.*

Diplodoma marginepunctella.—Some ten specimens on the boles of oak and fir in July; the female covers her eggs with a thick coating of fur, in a similar manner to *Porthesia auriflua*.—*Id.*

Nemotois cupreacellus.—A few specimens of this brilliant insect occurred in July.—*Id.*

Tinea semifulvella.—I have taken a few of this fine species at rest on beech trees. I believe the larva will prove to be of a white colour, making galleries during winter and spring in the white fungus substance so often found on beech trees, forming, when full fed, a firm bag-shaped cocoon.—*Id.*

Crambus falsellus.—Occurs freely, but exceedingly local to a moss-covered wall; along with it occurs a *Gelechia*, very like *affinis*, but I think distinct, their habits are so different. *Affinis* is taken in the day time; not scarce at New Brighton: I never met with this species till after 10 p.m., at which time they come out of the crevices, and are then taken to be *in copulâ*: they occur here and also at Conway, N. Wales.—*Id.*

Depressaria angelicella.—I bred a series of this most variable species from larvæ found in the heads of *Epilobium*.—*Id.*

Larvæ of Nepticula at Bowdon, Cheshire.—During the last two months I have devoted some time to collecting the above larvæ: with few exceptions most of the species occur here: on horse-chestnut I found traces of a large miner; the tenants had left: I hope to be more fortunate another season. *Oxycanthella* occurs sparingly on hawthorn, apple and oak; abundant on mountain ash, which appears to be its favourite food: alder, birch, hawthorn, willow, sloe, beech, elm, oak, &c., each have produced their different tenants. On *Vaccinium Myrtillus* an amber-coloured larva makes a small mine at first and then blotches the leaf; when full fed it leaves the mine and spins a mussel-shaped cocoon, of a light brown colour, at the extreme broad end yellow: if I succeed in breeding this species I propose the name *myrtillella*. In the second number of the 'Substitute' is an account, by Mr. Douglas, of a swarm of *Septembrella* met with on the 19th of October: I first met with them on the 1st of October, some very small, others in the cocoon; on the 15th a similar swarm to Mr. Douglas's, and in all stages: they do not appear to frequent places where the *Hypericum* abounds, but prefer small patches. I have seen *malella* and *angulifasciella* swarm in a similar manner.—*Id.*

Captures of Micro-Lepidoptera at Darenth, &c., in 1856.—

Diplodoma marginepunctella. Among wild roses, June 22? two specimens, fine.

Tinea arceella. Old hedges. June 28, fine; July 13, wasted.

Nemophora Metaxella. Flying among low herbage. June 15, fine.

Adela Sulzella. Beat from hazel. June 22, fine.

Nemotois cupreacellus. On flowers of scabious. July 13, two females, fine.

„ *fasciellus*. On thistle blossoms. June 29, fine; July 16, wasted.

Anesychia decemguttella. Among *Lithospermum* (larvæ on same). June 22 and 29, and July 13, fine.

Enicostoma lobella. Among sloe. June 21, fine.

Depressaria carduella. Two specimens bred from larvæ found feeding on the under side of leaves of thistles. July 13.

Nothris durdhamellus. Bred first half of July from larvæ on *Origanum*; found June 22 and 28.

Cecophora tripuncta. Flying along hedges at 6 A.M. June 16, fine.

„ *Panzerella*. By beating. June 15, fine.

„ *tinctella*. By beating. June 15, worn.

Coleophora alcyonipennella. Larvæ on *Centaurea nigra*. June 10.

„ *palliatella*. Imago, July 12 and 16; larvæ spun up on oak and black poplar, June 22 and 29; bred July 12 and 14.

„ *currucipennella*. Two specimens bred July 14, from larvæ found spun up on oak June 22.

„ *albitarsella*. Larvæ plentiful on *Glechoma hederacea* May 11; a few on *Origanum*, June 10. Imago plentiful, June 15, by smoking.

„ ———? * Closely allied to *C. troglodytella*. I took several on the 1st of September among *Solidago virgaurea*, to which plant it is local, perhaps the solution of Enigma 24 in the 'Annual' for 1856: the forthcoming 'Annual' will probably throw some light upon the subject.

Elachista Treitschkiella. Larvæ in leaves of dogwood, July 16 and September 1.

„ *Gleichenella*. June 22, by beating, fine.

„ *Brunnichella*. Bred June 8, from a larva on *Origanum*; found May 4.

„ *albinella*? Among grass by sweeping. June 22, fine.

„ *triatomea*. In hedges among grass. July 13, fine.

Lithocolletis hortella. One on the stem of a cherry tree. May 11, fine.

„ *Nicelli*. Two among hazel. June 10, fine.

Bucculatrix frangatella. Among buckthorn. June 28, fine,

Nepticula Septembrella. Many larvæ in July; bred August 1 and 7, being the summer brood of this species.

Tinea ferruginella. Headley Lane. July 6, beat from juniper, fine.

„ *semifulvella*. On the Dartford Heath fence. June 22, fine.

Cerostoma nemorella. Wanstead Flats. One beat from honeysuckle. July 27, fine.

Gelechia gerronella. Wanstead Flats. Among fern, flying at dusk. July 23, worn.

„ *nigra*. Wanstead Flats. Two on trunks of aspen. July 27, worn.

Parasia carlinella. Bred, beginning of August from thistle-heads collected in the Hilly Field at Headley Lane, April 20.

Sophronia parenthesesella. Wanstead Flats. June 25, one, fine; July 23, many, mostly worn.

Cecophora flavifrontella. Wanstead Flats. Beat from hawthorn. June 1, fine.

Coleophora Genistæ. Wanstead Flats. One specimen by sweeping. July 23, fine.

* Head, face and palpi white; antennæ fuscous, annulated with white to within a short distance of the apex; basal joint slightly thickened. Anterior wings rather narrow, shining, grayish fuscous, with the costa, a streak along the fold, and two streaks towards the costa, rather broadly white. Posterior wings dark gray, with paler cilia. [If this be undescribed I would propose calling it *Coleophora Millerella*.—*Ed.*]

Elachista Poë. Bred, first half of June, from pupæ collected at Temple Mills, May 25.

Lithocolletis emberizæpennella. Common on Wanstead Flats, May 25 and June 1.

Lyonetia Clerckella. Beat from juniper, Headley Lane. July 6, fine.

Opostega crepusculella. Common on Wanstead Flats. July 23, at sunset, running up blades of grass and taking short flights.—*C. Miller*; 17, *Silurian Terrace, Broke Road, Dalston*.

Correction of an Error.—My friend Mr. Stainton informs me my *Gracillaria Haighii* (Zool. 5295) is *Zelleria hepariella* of Mann.—*C. S. Gregson*; *Edge Lane, Stanley, November 10, 1856*.

Captures of Diptera in the New Forest, Hampshire.—As there appears but little notice in the 'Zoologist' respecting Diptera, I submit a list of captures in the neighbourhood of Brockenhurst, between the 8th and 16th of September last: nearly all were taken during sunshine, either on flowers or basking, so that remarks to each species are perhaps unnecessary. The list may include several that are common almost everywhere, but many are omitted for that reason. I did not observe any of the Tabanidæ: possibly I might have had some to record had I adopted a plan which was recommended,—namely, to take a quiet horse into the forest, tie him up to a tree, and stand ready, net in hand, to catch the flies that come to torment the animal!

Sciara Thomæ. Beaten out of oak.

Platyura laticornis. At an old stump, around which were growing some Fungi, inhabited by a species of *Phora*.

Ptychoptera contaminata.

Asilus cingulatus.

Dolichopus brevipennis.

Eristalis similis and *floreus*.

Xylota sylvarum and *nemorum*.

Paragus obscurus.

Melithreptus scriptus and *Menthastris*.

Conops flavipes and *quadrifasciata*.

„ *ceriæformis*. One specimen by Mr. Dyson, soon after I left.

Gymnosoma rotundata. One specimen among thistles.

Bucentes geniculatus.

Tachina fera. Abundant in company with *Sarcophaga carnaria*.

„ *bijuncta*.

„ *neglecta*. Worn.

„ *vulpina*.

Musca illustris, *vespillo*, *nitens*, *corvina*, *maculata*, and a species allied to *stabulans*, but the legs are wholly black; the third joint of the antennæ is ferruginous at the base, second black, and the eyes in the male are closer.

Anthomyia præterita, *testacea*, *depuncta*, *erratica*, *pagana*, *urbana*, *repulsa*, *pluvialis*, *præpotens*.

Dryomyza flaveola.

Tetanoœera aratoria and *sylvatica*.

Sepedon sphegeus and *Hæffneri*. On rushes.

Gasterophilus Equi.

Hippobosca equina.—*Benjamin Cooke*; 49, *Ardwick Place, Manchester, December 4, 1856*.

The Sovereign Bee.—Some time ago I announced, on the authority of a correspondent, the capture of a new species of bee. I was told that five specimens were taken, and that a gentleman gave five pounds for them. Since this announcement I have been constantly applied to by letter for further particulars: as these applications continue to increase, I ask the favour of replying through the 'Zoologist.' I have again applied to my correspondent for information, who says, "With regard to the *Bombus* you enquire about, I can give no further information." Now here is a little information obtained,—I asked about a *bee*, and it turns out to be a *Bombus*. My object in this communication is principally to request the possessor of this valuable species to oblige the Hymenopterists of this country by publishing the name of the species: the possession of such a novelty must be a high gratification, and he may be assured that it will be greatly enhanced by making known to entomologists generally the collection which contains the treasure.—*Frederick Smith*.

Capture of Halictus maculatus at Sandown, Isle of Wight.—When at Sandown Bay, on the 21st of July last, I chanced to obtain *Halictus maculatus* among the Hymenoptera I captured there. I am indebted to my friend Mr. F. Smith, of the British Museum, for kindly naming it: in his 'Monograph' he states, "This very distinct and pretty little bee has only been twice captured."—*W. C. Unwin; St. Ann's, Lewes, December 8, 1856.*

Capture of Peryphus fluvialtilis and Tachys bistriatus.—In October last my brother and myself had the good fortune to capture several specimens of *P. fluvialtilis* on the banks of the Trent below Newark. This species has, I believe, been only once before taken in England, when it was found by Mr. Atfield, of Newark, near the same locality. I also this year met with *T. bistriatus*, in August, near Luccomb, in the Isle of Wight.—*A. Matthews; Market Harborough, November 29, 1856.*

Description of a Species of Bledius new to the British List.—I met with the under-mentioned species in the sands at Exmouth, under marine *rejectamenta*, on the 20th of September; they were found in company with *Broscus cephalotes*, *Calathus melanocephalus*, *Pogonus chalceus*, *Ophonus pubescens*, &c. The *Bledius* appear to be rare, at least I could not find more than five specimens; one male I sent to Mr. Westwood, and two pairs I have by me: it is undoubtedly a very distinct species, and a very rich addition to the small number of British species belonging to the genus.

BLEDIUS HISPIDUS, *Parf.*

Black; head very finely punctured. Thorax and elytra dark piceous, with numerous large shallow scattered punctures, and very thickly and finely punctured between; thorax with a smooth dorsal furrow; the elytra rather flat above, and depressed along the suture, the edges of which are slightly raised into a smooth ridge; apex of elytra slightly truncate. Abdomen margined, shining black, with a few largish depressions towards the apex of each segment, and very finely punctured between, the apex of each segment having a narrow, *smooth*, polished fascia. Antennæ and palpi rusty piceous; the apical joints of the latter having a dark annulus in the centre; mouth, legs and apex of abdomen pale ferruginous; the base of the femora darker. The male has a deflexed, finely punctured sharp horn on the anterior portion of the thorax, projecting slightly beyond the head; the apex testaceous and pilose. The whole insect clothed with short, stiff yellow bristle-like hairs, particularly on the thorax and elytra; those on the margins of the abdominal segments being longer than the rest. Length $1\frac{3}{4}$ line.

Female.—Differs in no respect from the male, with the exception of the thoracic

horn, the puncturing and colour being precisely the same in both. Length $1\frac{3}{4}$ line.—*Edward Parfitt*; 4, *Weirfield Place, St. Leonard's, Exeter, November 8, 1856.*

Capture of Polystichus fasciolatus, &c., near Eastbourne, Sussex.—In August last, whilst searching for Coleoptera near Eastbourne, I had the good fortune to find the rare and apparently very local *Polystichus fasciolatus* beneath a heap of chalk stones near the sea. Stephens records its capture in a similar situation on the Suffolk coast some twenty-eight years ago. I saw three; the first I most unfortunately crushed, in my eagerness to catch it; the next was secured, and is now in the cabinet of a London friend; the third made its escape beneath the stones and *débris*, and, although I searched the spot most diligently, I saw no more of them. Since then I have visited the locality and turned over the same heap of stones on two several occasions, but without any success. *Harpalus pubescens* was abundant in this locality. In addition to the above record, perhaps the following notice of a few captures, made during the past season in the neighbourhood of Lewes, will be acceptable, as it gives a new locality for the species, namely:—

Tarus axillaris, Licinus depressus, Lebia chlorocephala. Beneath chalk stones on the Lewes Downs in April, and again in September. Not scarce.

Stomis pumicatus. Occasionally in an old chalk-pit.

Anchomenus livens. At sugar placed on trees for *Noctuæ*, by a young friend, near the town, in September. Five specimens.

Stenolophus Skrimshiranus. By the side of a ditch, in profusion, near the town, in April.

Ochthebius exaratus, O. æratus. In the same ditch, in April, among aquatic plants.

Colymbetes conspersus. In a brackish pool near Newhaven, in August.

Philonthus corvinus, Erich. From moss near Newhaven.

Bembidium 5-striatum. Two specimens, Winterbourne, near Lewes.—*W. C. Unwin*; *St. Ann's, Lewes, December 7, 1856.*

Intricatus to be exhibited alive.—I propose sending up four living specimens of *Carabus intricatus* for exhibition at the next meeting of the Entomological Society: they were taken by myself under moss, in a wood in the neighbourhood of Plymouth, within the last month. This is one of those British insects captured by that celebrated naturalist Dr. Leach, the authenticity of which has been doubted, but why his word was not taken I am at a loss to know. Who has looked after this species in earnest? The answer is that no one has done so up to the present time. Collectors have paid flying visits of one or two days to this locality without finding it, but such visits without luck do not prove that certain things are not to be found in certain places.—*J. J. Reading*; 42, *Gibbons Street, Plymouth, December 13, 1856.*

Captures of Hydradephaga at York.—I send you the following list of *Hydradephaga* taken by me in Askham Bog, near York, during the present year. I ought to say that nearly all the insects were taken within a very small space of ground in the part more properly called Dringhouses Bog, and that the ponds which they frequent are apparently very old brick-pits. Of course I have omitted those species which are found everywhere.

Hydaticus transversalis. Very sparingly, and only in one spot, in August and September.

Colymbetes exoletus. Frequent.

„ *Grapii.* Frequent.

Ilybius ater. Common.

- Ilybius obscurus*. Common.
 „ *guttiger*. Not frequent.
Agabus agilis. Sparingly.
 „ *uliginosus*. Rare.
 „ *abbreviatus*. Most abundant.
 „ *affinis*. Very frequent.
Hydroporus decoratus. Very abundant during the present year, but hardly to be found last year.
 „ *picipes*. A single example.
 „ *ruffrons*. Frequent during the earlier months.
 „ *nitidus*, *Sturm* (= *oblongus*, *Steph.*). Eight examples have occurred during the present year.
 „ *memnonius*. Rare.
 „ *Gyllenhalii*. Not frequent.
 „ *tristis*. Occasionally.
 „ *umbrosus*. Occasionally.
 „ *angustatus*. Occasionally.
 „ *obscurus*. Occasionally.
 „ *Scalesianus*. Of this insect I have taken more than one hundred examples this year.
 „ *granularis*. Frequent.

The names are according to Dawson and Clark's Catalogue.—*William Hey; Clifton, York, November 4, 1856.*

Note on Tomichus bidens, with a Description of Tomichus bispinus.—Recently, when looking over Mr. Guyon's description of *Bostrichus bispinus* (Zool. 4815), it occurred to me that the species there indicated was not *bispinus*, *Meg.*, but *bidens*, *Fab.* On turning to such books as were within reach I was confirmed in this opinion. Fabricius I have not. Panzer gives a figure of *bidens* (F. 39, f. 21), which, although somewhat rude, has the "claw-shaped" tooth, on the retuse part of the elytra, clearly defined. Gyllenhal, *Ins. Suec.* (iii. 357, 5), distinctly mentions the hook-shaped (*hamato*) tooth of the male. Stephens, both in his 'Illustrations' (iii. 357) and 'Manual' (1636), gives "a single large slightly bent tooth on the upper edge of the excavation," as the specific character. More recently, Bach, in his 'Käferfauna für Nordund Mitteldeutschland' (ii. 129), characterizes this species by the large claw-shaped tooth ("einem grossen, hakenförmigen, nach abwärts gekrümmten zahne"). Panzer, Gyllenhal and Bach alike find it in the bark of *Pinus sylvestris*, Gyllenhal remarking that it is found in the young branches of that tree. *T. bidens* is a common species in our district, principally affecting the Scotch pine, but in one or two instances I have taken it in larch: it prefers the shoots and tops of recently-felled young trees, in which it runs its galleries in all directions, generally commencing at the base of the twigs: a pair, male and female, seldom more, are found in each burrow: it occurs throughout the summer. I have, by the courtesy of a kind friend, a species of *Tomichus*, from the Isle of Wight, which I regard as the true *bispinus*, and not being aware of any English description of that species, I have attempted to supply the deficiency.

TOMICIUS BISPINUS.

Bostrichus bispinus, *Megl., Bach Käfer.*, ii. 129, 9.

Cylindrical, brown, slightly glossy, rather thickly covered by a long griseous

pubescence; head closely and strongly punctured; antennæ pale testaceous; thorax a little broader than the elytra, widest in front, where it is rugose and much punctulated, smooth and less sculptured behind; elytra distinctly punctured, punctures in lines; having a sutural stria, nearly obsolete on the disk, and gradually widening as it approaches the apex, which is rounded in the female; in the male the apex of the elytra is broadly retuse, with two stout acute teeth on the upper and outer edge. Length $1\frac{1}{2}$ — $1\frac{3}{4}$ line.

Differs from *bidens* in being more elongate, paler in colour, more pubescent, without the distinct thoracic line, and the retusion of the elytra is broader, with the teeth acute and further apart.

In the stems of *Clematis vitalba*, rather plentifully. Isle of Wight.—*Thomas John Bold*; *Long Benton*, *Newcastle-on-Tyne*, December 15, 1856.

PROCEEDINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY.

November 3, 1856.—W. W. SAUNDERS, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—‘Papers and Proceedings of the Royal Society of Van Dieman’s Land,’ Vol. iii. Part I.; presented by the Society. ‘Journal of the Proceedings of the Linnean Society,’ Vol. i. No. 3; by the Society. ‘Entomological Papers, being Descriptions of new Ceylon Coleoptera, with such Observations on their Habits, &c., as appear in any way interesting,’ by John Nietner, Colombo, Ceylon, Nos. 1 and 2; by G. H. K. Thwaites, Esq. ‘Bericht über die Oesterreichische Literatur der Zoologie, Botanik und Palæontologie aus den Jahren 1850, 1851, 1852, 1853;’ ‘Verhandlungen des Zoologisch-Botanischen Vereins in Wien,’ Band V.; by the Society. ‘The Natural History Review,’ No. 12; by the Dublin Natural History Society. ‘Entomologische Zeitung, 1856,’ Nos. 7, 8, 9 and 10; by the Entomological Society of Stettin. ‘A Manual of British Butterflies and Moths,’ No. 9; ‘The Substitute,’ Nos. 1 and 2; ‘Elements of Entomology,’ by W. S. Dallas, F.L.S., No. 2; by H. T. Stainton, Esq. ‘The Athenæum’ for October; by the Editor. ‘The Literary Gazette’ for October; by the Editor. ‘The Zoologist’ for November; by the Editor. ‘The Journal of the Society of Arts’ for October; by the Society. A specimen of *Belostoma* sp——? by James Weston, Esq.

Election of a Member.

George Edwards, Esq., of 24, Acacia Road, St. John’s Wood, was balloted for and elected a Member of the Society.

Exhibitions.

Mr. A. F. Sheppard exhibited *Acronycta Alni* and *Phibalapteryx gemmaria*, taken near Brighton.

Mr. Stevens exhibited a fine specimen, in its natural state, of the wax secreted by *Coccus pela*, or wax-insect of China, sent to him by Mr. Fortune.

Mr. Westwood said this *Coccus* was a subject of considerable interest, as we thus were able to see from what the Chinese wax is produced; it is the covering formed by the female of a species of *Coccus* called by the Chinese *pela*, whence the specific name applied to it: its chemical properties had lately been investigated by Mr. Daniel Hanbury, who had recently exhibited some very fine specimens. In some of the wax sent home by Mr. Fortune he (Mr. W.) had found the remains of male insects, and also two species of Chalcidæ, which were doubtless parasites of the *Coccus*.

Mr. Bowring observed that this wax was used in China to coat over the outsides of the candles made from the candle tree, in order to give them a hard surface.

Mr. Stevens exhibited a full-grown larva of *Agrotis Ashworthii*, remarking that it was one exhibited by him at a previous meeting, when but a few days old; also the bottle containing liquorice-powder exhibited at the last meeting, in which were specimens of *Endrosis fenestrella* still alive.

Mr. Stainton exhibited, on behalf of Mr. H. Cooke, a specimen of *Leucania vitellina*, a *Noctua* new to Britain, taken by him in his own garden at Brighton; also *Phlogophora empyrea*, *Leucania musculosa* and *Laphygma exigua*, all taken near the same locality during this season, and a specimen of *Cucullia Verbasci*, reared from larva which had been found feeding on *Budhlæa globosa*.

Mr. Douglas exhibited two specimens of *Brontes planatus*, *Lin.* (*Uleiota planata*, *Steph. Man.*), which he had taken on the previous day under the loose bark of a lime tree, in the neighbourhood of Lee, which had been felled about a year ago; and observed that the species is given by Stephens as "very rare, Hermitage, South Lambeth," and that Shuckard says, "very rare, query indigenous," so that the capture is of interest in more ways than one.

Mr. Stainton exhibited the cocoon of a species of *Tinea*, from Ceylon, attached to a footstalk about half-an-inch long, the cocoon itself being composed of network, similar to those of the European genus *Plutella*.

Mr. Westwood observed that a much more remarkable instance of the cocoon of a Lepidopterous insect being attached to a footstalk occurs in the *Saturnia Cynthia* of India, in which species the footstalk of the cocoon is two inches long.

Mr. Stevens exhibited the following Coleoptera, recently taken by Mr. Arthur Adams:—*Polistichus fasciolatus*, at Sheerness; *Trechus nanus*, at Mickleham; also six specimens of *Drypta emarginata*, and a larva which he presumed pertained to the latter species.

Mr. Westwood observed that the larva referred to *Drypta* was, in reality, that of a species of *Silpha*.

Mr. Weir exhibited a specimen of *Anthribus albinus*, captured at Pembury, Kent.

Mr. Foxcroft exhibited some Coleoptera and Lepidoptera, taken in Scotland and Wales during the past summer, including a single specimen of *Otiorhynchus septentrionis*, from Perthshire.

Mr. F. Smith exhibited a specimen of *Cybister limbatus*, having the head of the larva instead of that of the perfect insect; it was found alive and swimming, in apparent health, by Mr. Bowring, at Hong Kong.

Mr. Westwood said this was the first recorded instance in Coleoptera of the imago being found with the head of the larva; in Lepidoptera, however, instances had

occurred: a specimen of *Nymphalis Populi* was recorded in the 'Memoires de l'Academie Royale de Bruxelles,' having the head of the larva instead of that of the perfect insect.

Mr. Gregson sent for exhibition a pair of *Coleophora vitisella*, and the case of the larva of this species.

Mr. Stevens read an extract from a letter received by him from Mr. A. R. Wallace, written from Lombok, in which he remarked the paucity of insects of all orders in that locality, attributable to the greater part of the island being now devoted to the cultivation of rice.

The Secretary read the following extract from a letter from G. H. K. Thwaites, Esq., Director of the Botanic Garden, Peradenia, Ceylon, to William Spence, Esq.:—

"I have often observed, on the whitewashed walls of the houses here, a whitish-coloured spider stationary for hours, with its head downwards and its legs extended (a pair of intermediate ones much shorter than the others), and two long spinnerets; but it was only a short time ago I had an opportunity of observing the curious mode in which it entraps its prey. When an insect makes its appearance on the wall near it, it commences running round and round it with the greatest rapidity, spinning a web all the time, which confines the legs, wings, &c., of the poor victim most effectually, and has just the effect of a lasso thrown over its limbs. With this knowledge of the spider's habits we can understand the use of the long spinnerets, and that the short pair of legs enable it to make a more rapid and smaller series of turns round its victim."

Mr. Westwood had great pleasure in stating that it was the intention of Messrs. Saunders and Hewitson to commence the publication of a second volume of their splendid work on 'Exotic Butterflies.'

Part II. of Vol. iv. of the New Series of the Society's 'Transactions,' published in October, was on the table.—*E. S.*

Inquiry respecting Serpula contortuplicata.—I should be very much obliged if any of your readers would state whether it is a common occurrence for the *Serpula contortuplicata* to shed, or cast away, the trumpet-shaped operculum with which it is furnished: this happened a week since to a very fine specimen in one of my tanks, and although I feared that it was a precursor of death, as yet the gills protrude as strongly and the animal seems as sensitive as before the loss of the operculum, which now lies at the bottom of the tank an object of great beauty.—*C. R. Lighton; Ellastone, November 29, 1856.*

Proceedings of Natural-History Collectors in Foreign Countries.

MR. A. R. WALLACE.*—"Ampanam, Lombok, August 21, 1856.—Another month has passed since I wrote to you, and there is still no chance of a passage to Macassar; having missed one opportunity by

* Communicated by Mr. S. Stevens.

being away from the village, I am afraid to go out in the country any more, and here there are nothing but dusty roads and paddy fields for miles around, producing no insects or birds worth collecting: it is really astonishing, and will be almost incredible to many persons at home, that a tropical country when cultivated should produce so little for the collector: the worst collecting-ground in England would produce ten times as many species of beetles as can be found here, and even our common English butterflies are finer and more numerous than those of Ampanam in the present dry season; a walk of several hours with my net will produce perhaps two or three species of *Chrysomela* and *Coccinella*, and a *Cicindela*, and two or three Hemiptera and flies; and every day the same species will occur. In an uncultivated district which I have visited, in the south part of the island, I did indeed find insects rather more numerous, but two months' assiduous collecting have only produced me eighty species of Coleoptera! why there is not a spot in England where the same number could not be obtained in a few days in spring. Butterflies were rather better, for I obtained thirty-eight species, the majority, however, being Pieridæ; of the others, *Papilio Peranthus* is the most beautiful.

“The birds have, however, interested me much more than the insects, as they are proportionably much more numerous, and throw great light on the laws of geographical distribution of animals in the East. The Islands of Baly and Lombock, for instance, though of nearly the same size, of the same soil, aspect, elevation and climate, and within sight of each other, yet differ considerably in their productions, and, in fact, belong to two quite distinct zoological provinces, of which they form the extreme limits. As an instance, I may mention the cockatoos, a group of birds confined to Australia and the Moluccas, but quite unknown in Java, Borneo, Sumatra and Malacca; one species, however (*Plyctolophus sulphureus*), is abundant in Lombock, but is unknown in Baly, the island of Lombock forming the extreme western limit of its range and that of the whole family. Many other species illustrate the same fact, and I am preparing a short account of them for publication. My collection here consists of sixty-eight species of birds, about twenty of which are probably not found west of the island, being species either found in Timor and Sumbawa or hitherto undescribed. I have here, for the first time, met with many interesting birds, whose structure and habits it has been a great pleasure to study, such as the Artamidæ and the genera *Ptilotis*, *Tropidorhynchus*, *Plyctolophus* and *Megapodius*.

“The islands of Baly and Lombock are inhabited by Malayan races, closely allied to the Javanese. Baly has several rajahs, who are under the protection of the Dutch; Lombock has one rajah, who governs the whole, and is quite independent. These two islands are wonderfully cultivated,—in fact, they are probably among the best cultivated in the world: I was perfectly astonished when, on riding thirty miles into the interior, I beheld the country cultivated like a garden, the whole being cut into terraces, and every patch surrounded by channels, so that any part can be flooded at pleasure; sometimes a hollow has the appearance of a vast amphitheatre, or a hill-side of a gigantic staircase, and hundreds of square miles of an undulated country have been thus rendered capable of irrigation, to effect which almost every stream has been diverted from its channel and its waters distributed over the country. The soil is a fine volcanic mould of the richest description, and the result of such a mode of cultivation is an astonishing fertility; the ground is scarcely ever unoccupied; crops of tobacco, Indian corn, sugar cane, beans and cucumbers, alternate with the rice, and give at every season a green and smiling appearance to the island: it is only on the summits of the hills and on the tops of the undulations, where water cannot be brought, that the ground is left uncultivated, but in these places a short turf gives food to the cattle and horses, which are very abundant, and clumps of bamboos with forest and fruit trees have all the appearance of an extensive park, and a pleasing contrast to the more regularly cultivated districts. I have been informed by parties capable of forming a judgment that in the best cultivated parts of Java so much labour has not been expended on the soil, and even the industrious Chinese can show nothing to surpass it: more than half the Island of Lombock consists of rugged volcanic mountains, which are quite incapable of cultivation, yet it exports more than 20,000 tons of rice annually, besides great quantities of tobacco, coffee, cotton and hides. Our manufacturers and capitalists are on the look-out for a new cotton-producing district: here is one to their hands. The islands of Baly, Lombock and Sumbawa can produce from ten to twenty thousand tons of cotton annually; it costs here uncleaned about $1\frac{1}{2}$ cent a-pound; the qualities are various,—some, I believe, very good, so it can easily be calculated whether, after cleaning, it would pay.

“A. R. WALLACE.”

Some Remarks on the Skeleton of the Head of the Urus Scoticus.

By R. KNOX, M.D., F.R.S.E., Lecturer on Anatomy, and Corresponding Member of the Académie Impériale de Médecine of France.

THE characters by means of which the illustrious Cuvier established the specific distinctions between the extinct or fossil organic world and that now existing were mainly, if not wholly, anatomical, and were confined almost wholly to the skeleton. So long as the characters had a reference to animals of which no congeners now lived the distinctions were easily made, and admitted of no dispute; but when an attempt was made by the immortal author of the 'Ossements Fossiles' to apply the method to species and genera analogous to many now existing, the method, if it did not wholly break down, even in his hands, became at least uncertain, and could not be trusted implicitly. The genera *Felis*, *Equus*, *Canis*, and several others, as the *Elephas* and *Ursus*, furnished grounds for disputing the universal applicability of the method. Cuvier, it is true, might have objected that, even in the now-existing living world, anatomical distinctions are not required in the discrimination of species; and that, in point of fact, many animals exist of manifestly and notoriously distinct species, in which the anatomical differences in the skeleton are scarcely perceptible, or at least such as might readily be accounted for by accident or individual variety. But this argument Cuvier did not choose to avail himself of, for reasons I have explained elsewhere.

Notwithstanding these objections, some of which are sufficiently strong, I still lean to the opinion that, were our observations sufficiently minute and practical, we should always find in different species anatomical differences sufficiently well marked to characterize these species, not so obvious, it is true, as those we derive from external characters (the horse and ass, the zebra and quagga, the wild and domestic cat, the dog and the fox, present most ample proofs of this fact), yet sufficiently well marked to support the great doctrines of Cuvier; and thus I still feel disposed to think that the fossil horse, bear, and the Carnivora were animals of species wholly distinct from those that now live. But, be this as it may, it is obvious that the distinction and separation of species is an operation in which Nature, when left to herself, never fails; and it is now all but certain that one method at least by which she perpetuates and preserves species is the

non-productibility of any hybrid races,—of at least their non-continuity or non-perpetuity as races.

All admit, however, that, as regards the animals called domestic, there exist anomalies by no means admitting of an explanation, as the production and maintenance of *breeds*, seemingly at the will of man, and the supposed persistency of these breeds.* My views on all these questions have been long before the public, and I need not, therefore, advert further to them in this short notice, the object of which is to call the attention of naturalists and anatomists to some peculiarities in the skeleton of the head of a breed of oxen supposed to be aboriginal, or at the least of great antiquity.

Many years ago I had an opportunity of obtaining a skeleton of the white ox (a young bull) of the breed of cattle preserved by the Duke of Hamilton, in the park of Cadzow, not far from the Clyde. These oxen differ in some respects from those of Tankerville, near Wooler; the latter have horns of some size and red ears; the former, black ears and muzzle, and very short horns. Both breeds are preserved by destroying the calves which are spotted, or which show other colours than their parents; and thus the breed is preserved. What form it would assume if left to itself is not known, the experiment never having been made, so far as I know.

I find by my notes now before me that I visited both parks (Cadzow and Tankerville), and also examined a few of the wild cattle, as they are called, which once existed at Drumlanrig, but which, I think, have been now destroyed. Of those of Tankerville and Drumlanrig I could obtain no specimens; of the breed at Cadzow I procured the skeleton just alluded to and two crania, which I presume also to have belonged to the male. On comparing these crania with the common short-horned bull and with the hornless Galloway breed, I find certain differences, which, if constant and found to prevail extensively in the breed, would be held, I think, by anatomists, to constitute differences amounting to *specific*.

	Inches.
In two crania of equal length, the length of the whole head in the wild ox was	18½
Ditto, in the domestic ox	18½
Length of nasal bones in the Urus	5½
Ditto in the domestic ox	8

These same bones, the nasal, which differ so much in the various races of men, were further characterized in these breeds of oxen by

* See 'The Races of Men: a Fragment,' by R. Knox.

possessing *different forms* and a different arrangement as to their articulations. In the domestic ox the nasal bones articulate with the frontal and inter- or pre-maxillary; in the wild ox they have no connexion with the inter-maxillary bones; moreover, they do not meet superiorly, so that at this point there exists a natural deficiency. The anterior palatine openings are much larger in the wild than in the domestic breed, and are quite differently shaped; the great cavity of the nostrils is broader and more capacious in all its dimensions. When we add to these the remarkable difference in the form and dimensions of the cranial cavity itself, we feel almost warranted in believing that, if such characters are found to be constant, the so-called *Urus Scoticus* must be of a species distinct from the other known domestic breeds. In the domestic ox the greatest breadth of the cranium was $8\frac{3}{4}$ inches, in the wild ox $10\frac{1}{4}$. The base also gave many other differences, which need not be here adverted to.

I had almost forgot to mention that the true turbinated bones, occupying the interior of the nostrils, are much the larger in the wild ox,—circumstances which, taken in conjunction with an increased capacity of the nostrils, would argue a higher development of the sense and power of smell; as the broader forehead and more projecting orbits would indicate an increased activity in the visual and intellectual organs. The illustrious Goëthe thought the domestic ox, with its intelligent look and peaceful habits, to be the gift of domesticity to man; and that the fierce look, savage character and deep-set eyes of the buffalo and aurochs indicated the opposite untamed character. It may be so; nevertheless, it is sufficiently remarkable that it is in the variety or breed of oxen which is generally thought to be the type or origin, and which has undergone the least of that influence, domesticity, to which Goëthe attaches so much modifying importance, that we find the wide, expanded brow, prominent eye and shortened face,—characters which most are inclined to connect with finer powers of observation and a larger share of intellectual capacity.

R. KNOX.

December, 1856.

Dreaming in the Canine Race.—If any of the readers of the 'Zoologist' possess any well-authenticated instances of any animal (the dog excepted) *dreaming*, I should be extremely thankful if they would kindly forward the same to me.—*J. C. Atkinson; Danby Parsonage, Grosmont, York.*

Musical Mice, but not singing Mice.—The subjoined curious paragraph appears in

the 'Devizes and Wiltshire Gazette' of the 6th instant, and would seem worthy of a more permanent record in the pages of the 'Zoologist.' There being so much circumstantial evidence as to names of witnesses, I see no reason to doubt the truth of the story; and, indeed, this strange fascination of animals by the sound of the human voice is hardly more wonderful than the effect sometimes produced by the same cause on birds. A caged bullfinch, for instance, will instantly begin to sing on hearing the voice of a particular individual, though an entire stranger, and this, too, without the sound being heard in song, but merely in the utterance of simple conversation! Are we, then, to reject as incredible this narrative following?—"Musical Mice at a Concert.—The 'Western Flying Post,' in reporting a concert last week, by Miss Louisa Foote Hay, at Colyton, mentions the following singular circumstance:—Soon after Miss Hay had commenced her first song, 'Annie Laurie,' the party occupying the first seat saw a mouse sauntering leisurely up and down close to the skirting of the platform on which she was singing. As the song proceeded the mouse seemed spell-bound; a lady tried to drive it away by shaking her concert-bill at it, but the animal had lost its fear of man and would not retire. At the conclusion of the ballad the mouse vanished, but reappeared, bringing with it a companion, when the next song was commenced. At the end of the second song the two mice retreated to their hole, but made their third 'appearance on the boards,' when the singing was again renewed! Eventually six or seven mice came out regularly with every song, and retired when the music ceased. Whilst the melodious tones filled the apartment all attempts to drive away the mice were vain: these most timid members of the animal kingdom were too fascinated to be in terror of the human family who actually filled the room; and though a fiftieth part of the means used to drive them would, under ordinary circumstances, have been sufficient to have scared them away, they now stood, or slowly glided, so entranced by the sacred melody which pervaded the room, that they were heedless of the presence of their natural enemies. How naturalists may explain this phenomenon we know not, nor shall we swell this article by attempting a solution, but shall simply conclude this strange truth—stranger than fiction—by referring any persons who may doubt our statement to Mr. and Mrs. Kingdon, of Colyton, Mrs. Carew, of Seaton, Mr. Leversedge, of Taunton, and Miss Isaacs, of Colyton, who were in the foremost seat, and who can vouch for the truth of our report." Such is the newspaper account, *quantum valeat*: what verdict shall we pronounce?—*A. R. Hogan; Corsham, Wilts, November 15, 1856.*

Australian Field Rat.—Just after I had seen Mr. Briggs's anecdote of our long-tailed field-mouse (Zool. 5311), I met with the following passage in the journal of a missionary tour in South Australia by the Rev. D. J. H. Ibbetson, missionary at Burra:—"I had scarcely got a mile on my way before I saw a creature draw itself into a crevice in the dray-track, which appeared to me, at first sight, to be a huge species of the Tarantula, with seven or eight long fleshy legs. I instantly dismounted, and commenced excavating it with the hammer at the end of my whip; when I soon discovered a field-rat with ten young ones, each fastened to a separate pap, and which she seemed to be able to transport from place to place by this means without inconvenience. The sight was such a novelty to me, that I cannot omit the mention of the circumstance, as it may prove interesting to those who take delight in studying the habits of these creatures."—*The Mission Field*, Vol. i. No. 11, p. 257.—*Arthur Hussey; Rottingdean, November 3, 1856.*

Occurrence of the Barbastelle Bat (*Barbastellus Daubentonii, Bell*) *in Suffolk and*

Norfolk.—On the night of the 29th of August last, at about half-past 11 o'clock, a bat flew into my bed-room here, which, from its very dark colour, at once attracted my attention. I induced it to enter the adjoining chamber, and, having carefully closed all means of exit, left it until the morning, when I found it suspended, in a dark corner, to a box fixed against the wall. A very slight examination was then sufficient to show that it was an example of that rare British species, the barbastelle, as, indeed, I had suspected from its appearance over night. I proceeded to kill it by compression, and left it, as I thought, dead; but on entering the room about half-an-hour afterwards it was nowhere to be discovered. This somewhat disconcerted me; but, again closing the room, I left it until the following morning, when I found it suspended in exactly the same place as before. I then carefully compared it with the description given by Professor Bell, with which it agreed most accurately; and considering that my attempt on its life had caused it no injury, and that it had undoubtedly earned its right to live, I liberated it without further molestation, and saw no more of it. It was a male specimen, and, though so dark in its general appearance, yet had enough grayish hairs on the lower part of the back to give that region quite a silvery appearance. When taken in the hand it uttered a few faint but shrill squeaks, making, however, no attempt to bite my fingers. Mr. J. H. Gurney has in his collection an example of this species, which, some years since, he took from behind the bark of a hollow tree at Easton, in Norfolk; and this, except the one mentioned above, is the only specimen I have ever heard of as occurring in this part of England.—*Alfred Newton; Elveden Hall, Thetford, December 15, 1856.*

Birds of the Crimea. By THOMAS BLAKISTON, Esq.,
Lieut. Royal Artillery.

(Continued from page 5348).

INSESSORES.

The Shrikes and Flycatchers.

Were I writing a popular history of birds, I might include among these the swallows, bee-eaters and nightjars, and call them the insect falcons and owls, for they occupy much the same relative positions; but in the present case I have followed the latest classification, for, as Gilbert White says, "Without system the field of Nature would be a pathless wilderness."

The lesser gray shrike (*Lanius minor*) was not uncommon about the hills of the Chersonese, where brushwood existed, from the beginning until the end of May; and the redbacked shrike (*Lanius collurio*) was also numerous from the end of April until the end of May, after which I had no opportunity of observing them; but

I have no doubt that they both breed, and remain the greater part of the summer.

I think, however, that the great gray shrike (*Lanius excubitor*) is rather a scarce bird in the southern part of the Crimea, for Dr. William Carte did not obtain a single specimen, and I have not seen another from that country besides the one which I have, which I procured on the 11th of April, soon after the declaration of peace, in the following manner:—I had ridden, with two others, through the Valley of Baidar to the hills on the North overlooking the Valley of the Belbec, returning past a projection of the Mackenzie plateau, the Cape of the Winds; we had just struck the head-waters of the Chului, a small tributary stream of the Tchernaya, the water of which was conducted by an aqueduct eleven miles into Sebastopol, for the supply of the docks; and as we were riding along we observed a light-coloured bird on the top of a tree, appearing like a small hawk. I disturbed it, by which I saw what sort of bird it was, and therefore left my horse with the others; and unslinging my fowling-piece I approached with a view of stalking it. It was, however, very shy, shifting to another tree every time I was getting near enough. At last, taking a chance shot as it was making a flight, I brought it to the ground; but it rose again, and led me a long chase over some enclosed land; and after some search I found it quietly sitting on a bush, where it allowed me to approach close enough to kill it with dust-shot. I carried it for about twelve miles in a small saddle-bag to camp, and skinned it the next day. I never saw another. This was the first bird which I shot within the Russian lines.

Mr. Gould considers that some specimens of the redbacked shrike (*Lanius collurio*), from the Crimea, which he examined, differed in being rather less than British specimens, but sufficiently to be considered distinct. I may here state that nearly the whole of my specimens have been examined by Mr. Gould, who has been kind enough to afford me much valuable information.

I find in my journal, "July 1. There are flycatchers here." This may have been written while resting awhile during the heat of the day when out with my fowling-piece hunting for subjects of Zoology, or it may have been noted in the journal on coming in from a ride, during which I may have made the observation; at any rate, though in so few words, yet it denotes a fact, and helps to assure us that the shortest notes made at the time are afterwards of much value. "There are flycatchers here:" quite right, for two months after I made my first capture of a pied flycatcher (*Muscipapa atricapilla*), which was the only

specimen of the species I obtained, but a few days after I procured the spotted flycatcher (*Muscicapa grisola*), which species was common during the month of May.

Before passing on to a family of birds the migration of some of the members of which is allowed by even casual observers, I may state that the scantiness of my notes during summer, autumn and the beginning of winter is to be accounted for, not only on account of a severe attack of fever, which incapacitated me for duty for between two and three months, but also by my not having a book of reference on birds: I was like a sailor making observations of a coast without a compass. While at Scutari, however, I received from England Yarrell's 'British Birds:' here was my chart and compass; I could without difficulty recognise lands which were well known, and had ideas as to where to look for others. I returned to the Chersonese just before Christmas, with the expectation of being able to make some way. Having previously sent only a dozen specimens of birds to England, I managed, before the end of the next four months, to make the number up nearly five times, almost all of which were distinct species; for in collecting I thought it waste of time to occupy myself about handsome duplicates when I had killed others, although common, of which I had no specimens preserved: many of these I also missed, when pressed for time, because, if they agreed with the written descriptions, I cared not so much for them, but noted any trifling deviation, and then pressed forward to some of more importance; but I should recommend no one to throw away specimens which he has not among his collection, just because they appear to him to agree with descriptions, if he can possibly find time to devote to the preserving of them.

Thrushes.

Of the thrushes we can enumerate five of the true genus and two borderers as Crimean: first, the missel thrush (*Turdus viscivorus*) is most likely resident throughout the year, as it has been observed both in the middle of winter congregated in woods, and in spring about the brushwood on the hills: the specimens which I examined agreed very well.

Of the blackbird (*Turdus merula*) I can only say that I observed it both in winter and spring, when, although it was not numerous, it was not uncommon.

I did not take notice of the song thrush (*Turdus musicus*) before nearly the middle of April, when I saw half-a-dozen together, and afterwards I used often to come across them in about the same

numbers. I suppose it to be a resident, but cannot say from observation.

Dr. William Carte mentions having obtained a specimen of the redwing (*Turdus iliacus*) in January, and the fieldfare (*Turdus pilaris*) in the following month; I also observed the latter on the 12th of January, but cannot find any note about them in the spring, wherefore I suppose that they go North for the summer.

I saw at the end of April, while out early as usual one morning, what I took for a species of thrush, but it was considerably less than any of the foregoing.

Now here is a double instance of the value of books of reference and of observers working together. While out shooting along the cliffs beyond the Monastery of St. George, in the beginning of May, I caught a short glimpse of a bird sitting on the edge of a rock, but on approaching he dropped, as it were, directly down under the cliff, where there was no possibility of getting it. I had since the winter studied Yarrell's work, and looked over the beautiful woodcuts many times, and I felt convinced that I had seen the bird in that work. On returning to my hut you may imagine me turning over the leaves, which I did not long do in vain, for I soon came upon the rock thrush (*Turdus saxatilis*), and settled in my own mind that it was the bird I had seen; however, I never should have had the pleasure of bringing it forward in any other way than as a surmise, had I not mentioned the circumstance to Dr. William Carte, with whom I became by chance acquainted shortly after, when he immediately relieved me of all doubt by saying that he had procured a specimen on the cliffs near the old Genoese castle above Balaclava.

The other borderer of which I have to speak is that gaudily plumaged bird, the golden oriole (*Oriolus galbula*); as of the other I know little concerning him, nor did I take particular trouble to find out much, because his plumage is so attractive that he is often killed by sportsmen, and seldom neglected by mere collectors. It is well that scientific collectors should bear in mind the standing rule, rather to pursue the modest plumaged birds than the more gaudy; and, when speaking of this, there is another rule,—when one arrives in a new country to begin by collecting what appears to be most common, for before you know where you are they may be gone never more to be seen by you.

I shot a couple of the golden oriole (*Oriolus galbula*) on the 4th of September, and I saw a fine male specimen, which a friend of mine had killed on the 12th of May. More specimens

of this bird, I suppose, were brought from the Crimea than perhaps any other.

THOMAS BLAKISTON.

Woolwich, December 3, 1856.

Ornithological Notes from Leipzig.—When writing recently to the ‘Zoologist,’ I was hardly aware that the pied wagtail (*Motacilla Yarrellii*) was so uncommon a bird in Germany, as I am now told it is. The very excellent museum in this town only contains a single specimen, and that from Heligoland: the bird is an old male, and labelled “M. Yarrellii.” I was the more surprised to find the species considered so rare, because I am perfectly convinced that near Greiz I saw at least three pairs, and these almost daily; in no other locality in Germany, however, did they ever come under my notice. *M. flava* I also saw there on two occasions, but there is only one example of this beautiful species in the Leipzig Museum, owing, I suppose, to the arid nature of the surrounding country being unsuited to its habits. The most beautiful series of the latter bird and *M. alba* that I ever saw are included in the collection of the Pastor Brehm, who resides in the little village of Reudendorf, about fourteen miles from Jena. This collection contains about 12,000 specimens, principally of the birds of Europe, but many also from South and North America and Africa. It is remarkable not only for the life-like manner in which the birds are set up, but also for the large number of examples of each species, showing the different sexes, at various ages and in all stages of plumage, an infinite improvement on our English cabinets, which usually possess at most three or four specimens of each bird only, quite insufficient to exhibit the principal varieties and changes of feather. Should any English ornithologist find himself by chance in the neighbourhood of the village I have mentioned, let him by all means avail himself of the opportunity; he will meet with a hearty welcome, and spend a few most profitable hours. I hope that Captain Watkins, whose very interesting article on the birds of Andalusia appears in the November number of the ‘Zoologist’ (Zool. 5312), will shortly send you some account of the different wagtails he observed in Spain, as it will be most interesting to ascertain whether these pied and white species, one or both, visit that country, for, so far as my knowledge extends, they do not proceed far south. I have ascertained that the great bustard (*Otis tarda*), formerly very numerous in this neighbourhood, is annually becoming scarcer, numbers being shot by the peasantry, who, since the year 1848, have been allowed much greater freedom in the use of fire-arms, to the great prejudice of birds, large and small, for to the German sportsman all is fair game, from a black grouse to a chaffinch. Once only had I the pleasure of seeing that rare and beautiful species, the goshawk (*Falco palumbarius*); it flew from a thicket of young firs, near the bank of the river Elsher, close on the borders of Saxony; I had an excellent view of it, as at first it flew rather low and at no great speed. Mr. Hoy speaks of it as breeding in this very locality, and gamekeepers and woodmen will tell you that it is still numerous; but I suspect that, as usual, buzzards and sparrowhawks are confounded by them with this scarce bird; at any rate, notwithstanding a diligent search, I never succeeded in meeting with it a second time.—Henry Swarthwaite; Leipzig, December 4, 1856.

Occurrence of the Whitetailed Eagle near Haslar.—A specimen of the whitetailed eagle (*Falco albicilla*), in immature plumage, was shot by a person in this neighbourhood on the 7th inst., and from whom I obtained it. Extreme length 3 feet 3 inches; expanse of wings from tip to tip 7 feet 5 inches; weight 8 lbs. It proved on examination to be a female, and I have little doubt was a bird of last year.—*Charles Barron; Haslar, January 11, 1857.*

The Black Redstart.—A winter seldom passes without specimens of *Sylvia tithys* coming to hand. It is singular enough that this bird almost always (indeed I do not recollect an instance to the contrary) appears after the autumnal migration, and most frequently in the dead winter months. A male bird, in very beautiful and adult plumage, was captured a few days since in this immediate neighbourhood, and from its very dark plumage must be a bird many years old: the sooty colour on the throat and neck is very pure; the other plumage of that tone of colour have the feathers with gray edges. I have never seen the adult bird in summer plumage, but I presume these gray margins disappear, leaving the general plumage black. From the partiality of this species to open rocky ground, instead of trees and thickets, it seems to show the connecting link between the true *Sylviadæ* and *Saxicolæ*.—*Edward Hearle Rodd; Penzance, December 20, 1856.*

The Greater Titmouse (Parus major).—When walking this afternoon in Summerhill Park, my son directed my attention to a sharp tapping sound proceeding apparently from one of the lofty oaks with which this beautiful domain abounds, and on going with cautious steps to the foot of one of them, I perceived, not a woodpecker or a nuthatch, as I had at first imagined it might be, but a tom tit, clinging to one of the topmost branches, whether hollow or not I had no means of ascertaining, but, judging from the loud vibrating sound, I should conclude it was. That the little creature was endeavouring, after the manner of the woodpeckers, to rouse and bring to the surface its insect-food, there can, I think, be little reason to doubt; but that so diminutive a bird,—or rather, one with so small a bill,—should have the power of making so far-sounding a noise is, I think, somewhat remarkable.—*Henry W. Hadfield; Tunbridge, January 1, 1857.*

Anecdote of the predacious propensity of the Hooded Crow.—In the course of one of those bitterly cold and snowy days which occurred at the commencement of the present month, an intelligent observer noticed a hooded crow (*Corvus cornix*) at Pakefield, near Lowestoft, flying in chase of a small bird, which, after repeatedly darting at it, the crow succeeded in capturing with its bill, whilst both birds were on the wing. The crow subsequently alighted to devour its prey, but, on the approach of the observer, again picked it up in its bill and flew away with it. I have full confidence in the accuracy of my informant, and think the circumstance worthy of record in the 'Zoologist.'—*J. H. Gurney; Catton, Norwich, December 20, 1856.*

Partridge and Hooded Crow.—A neighbour of mine, a few days ago, witnessed the chase of a partridge by a hooded crow: the former was so hard pressed and so terrified that it attempted to seek refuge in the bottom of a hedge at no great distance from the spectator. He went up to the place, and the poor partridge, apparently unhurt, but so utterly terrified that it made no attempt to elude him (which a merely winged bird would have done, and successfully too), was picked up by him, while the disappointed crow still hovered near.—*J. C. Atkinson; Danby Parsonage, Grosmont, York.*

Partridge Swimming and Diving.—About three weeks since I fired a long shot at a partridge, which fell, with a wing broken near the extremity, but otherwise little, if at all, injured: it ran some distance, and sought concealment on the river bank. On approaching with my dog, in its attempt to escape me, it half leaped, half fell into the water. Once there it remained quiescent so long as a somewhat strong stream carried it down, but, on approaching a still part, caused by a partial regression of the current, it began to swim (I know no other word to describe the motion,—it was exactly that of the water bird swimming) towards the bank: it still escaped me once or twice: at last it extricated itself from the water, and was caught by my dog; he, however, put it down before I was quite in a position to lay hold of it, and it got into the water again. To prevent its getting out of my reach I struck it on the head with a small stick I had in my hand, and stunned it: a convulsive motion of both wings and legs ensued, sufficiently strong to send showers of water over me, and before I could seize it, still under the influence of these convulsive struggles, it dived completely, and was under water at least half a minute; and though the water was certainly not less than ten or twelve inches deep, it stirred up quantities of mud from the bottom, so as to make the surrounding water quite turbid. No wonder the dipper and waterhen are able to walk under water, when a partridge's unconscious struggles are so potent.—*Id.*

Note on Pied Pheasants.—The old pied pheasant was hatched in 1846, and was killed on the 22nd of December, 1856, therefore he must have been upwards of ten years old. He was never seen more than two or three hundred yards from the copse, of about twenty acres, in which he was bred. From 1847 to 1854, both years inclusive, a brood or two of pheasants, with pied chickens intermixed, appeared in the copse annually. Few of the pied birds arrived at maturity, and among these only two cocks, neither of the cocks was seen after their first year, as they strayed,—as did most of the hens,—and were killed on other farms in the neighbourhood. Not more than the old cock and two pied hens were ever seen in the same spring. The cock has been saved for the last year, and was shot unintentionally, in consequence of his being obscured by the thick branches of a Scotch fir tree: he was healthy and active to the last. I kept tame pheasants many years, and found that the males usually ceased to procreate at eight years, and the females at the same age, or a year earlier: exceptions, in each direction, occasionally occur in both sexes. A considerable proportion of the old hens, in a state of confinement, assume the plumage of the cock; the change commonly commencing the year after they cease laying.—*W. R. Rogers; Burchetts, Wisborough Green, January 3, 1857.**

Occurrence of Sabine's Snipe (Scolopax Sabini) in Norfolk.—This extremely rare species has just been added to the list of Norfolk birds, a specimen having been killed at Rainham, near Fakenham, on the 17th of October last. This bird was shot in a turnip-field by Martin T. Smith, Esq., M.P., and is now, I understand, in the possession of his son, a member of Trinity College, Cambridge, who has had it preserved by Mr. Baker, of that town. I believe not above five or six specimens of this rare snipe have been met with in England, although more have been obtained in Ireland; but the most curious fact respecting it is referred to by Mr. Yarrell, who says, "Singular as it may appear, this species does not seem yet to have fallen into

* Communicated by Mr. F. Smith, of the British Museum.

the hands of any naturalist out of the British islands."—*H. Stevenson; Norwich, December 23, 1856.*

Note on the Osteology of Cariama.—The sternum of *Cariama cristata* agrees better with that of the common heron and with that of the whole of the *Ardeinæ* than with any other group, though the keel has not such a perfect sweep as it has in the heron, in which bird it forms the segment of a circle. The notches in the lower part of the sternum are similar, but are of greater extent in the *Cariama* than in the heron; the interpectoral ridge observes nearly the same direction in both; but the coracoid grooves in the former are separated by the projecting process of the sternum, whereas in the latter they are confluent. The furculum in *Cariama* bears some resemblance to that of the heron, but, viewing it in profile, we observe that the outline of the former is concave, while in the latter it is convex,—in other words, has a considerable arch outwards. From a front view we see its superior strength and development in the heron where the furculum and keel of the sternum are in close contact at their apices, and are held together by a firm ligamentous union, just as in *Leptotilus*, while in *Cariama* it has simply a membranous attachment to the sternum, the points being separate. It may be as well to remark here that the intimate attachment of the furculum to the keel of the sternum does not exist, to the same extent, in all the herons, for in species of the subgenus *Herodias*, although the union is similar, it is less firm, and in the subgenus *Ardetta* the form of the furculum, and its mode of attachment to the sternum agrees very closely with the same in *Cariama*; but there seem to be considerable differences in the *Ardeinæ* in that respect, for in *Scopus* the furculum is much stouter in proportion than in any other of the group with which I am acquainted, has a considerable anterior curve, and is distant from the sternum at its apex. The coracoids and scapulars in *Cariama* differ from those of the heron; but it is here unnecessary to enter into their detail. The pelvis of *Cariama* agrees pretty well with that of the heron, but differs entirely from that of *Crax*, with which it has been associated by Swainson: it will be here sufficient to mention one important difference. In *Crax* the ilii, as is usual in birds, meet over, unite and become blended with the spinous processes of the sacrum at their upper part, but open lower down, forming on each side the spinous processes of the sacrum a foramen for the passage of tendons, &c.; in *Cariama* the ilii are quite closed over without openings, the same as in the heron.—*Charles Barron; Haslar Hospital, January 15, 1857.*

Occurrence of the Canada Goose (Anser canadensis) at Weymouth.—I beg to record the occurrence of seven of these beautiful birds in Portland Roads, on the 29th of November last. They were shot by W. H. Weston, Esq., of Weymouth, and the finest pair have been added to his valuable collection of British water birds, most of which have been killed in this county of Dorset. I have carefully examined them, and have no hesitation in asserting them to be wild specimens. They were exceedingly wary and difficult of approach, until one of their number was disabled, when the others returned and kept in company with the wounded bird until the whole of them were killed. One of the birds turned the scale at 12 lbs; six of the birds weighed together 68½ lbs. The specimen Mr. Weston gave me was unfortunately too much damaged to be preserved; I therefore had it cooked, and can assure your readers it was excellent, possessing the true wild-duck flavour, and very different from the insipid masses of fat so characteristic of our farm-yard geese; a cross between the two birds would greatly improve our present breed of geese.—*William Thompson; Weymouth, December 21, 1856.*

Occurrence of the Egyptian Goose (Anser ægyptiacus) at Weymouth.—A magnificent specimen of this handsome bird was shot on the 18th of December, 1856, in Lodmoor Marsh, situated on the coast, at about half a mile from Weymouth: this marsh is of large extent, and is separated from Weymouth Bay by a narrow bank of shingle and a turnpike-road; the marsh is cut up by a number of lakes, and is often covered by the water from the high lands; the *Salicornia* herbacea grows in profusion in parts, and this forms a favourite food with both wigeon and teal, especially the latter. The Egyptian goose, the subject of this paper, had been noticed in Lodmoor during several successive nights, coming to feed at the same hour as the other wild fowl; it had been constantly shot at, but escaped. The bird flies very fast, and does not rise like other wild fowl, but towers to some height, and then flies quickly off, in the manner of a pheasant, and this is the reason given by the gunners for its having so long escaped, as, in consequence of the bird towering, they shot under it. Joseph Gillingham, the man who shot it, stripped himself, in order that he might better follow it across the lakes. The bird is an old male, in good plumage: it has been purchased by Mr. Weston for his collection, and is now in the hands of a well-known taxidermist of this place (Richard Rolls) for preservation.—*Id.*

Occurrence of the Eared Grebe and Night Heron in Ireland.—An eared grebe (*Podiceps auritus*) was shot on the coast, near Dundalk, Ireland, on the 13th instant; it is either an adult female or a young bird, and has very distinctly the upturned bill which characterizes the species. In the month of January, 1855, a night heron (*Nycticorax ardeola*), in immature plumage, was killed in the same part of the country, at Inniskeen, County of Monaghan. These notices may perhaps be thought worthy of insertion in the 'Zoologist.'—*Clermont; Ravensdale Park, Flurry-bridge, Ireland, December 23, 1856.*

Occurrence of the Forktailed Petrel (Thalassidroma Leachii) near Helston.—A specimen of this petrel was captured near Helston a few days since, after a gale from the south and south-west of longer continuance than has been remembered for many years.—*Edward Hearle Rodd; Penzance, December 20, 1856.*

Occurrence of the Forktailed Petrel (Thalassidroma Leachii) at Weymouth.—Three specimens of this petrel have been shown me in the flesh during the early part of this month: the weather has been very bad, with heavy gales from the south-west. This species has already occurred to me here, in the winter of 1852, and other individuals have been killed, of which I possess only a general notice.—*William Thompson; Weymouth, December 21, 1856.*

Occurrence of the Forktailed Petrel near Tunbridge.—I have lately seen, at a bird-stuffer's in this town, a very fair specimen of this petrel, which was, I am informed, found dead some three or four years since at Peckham, in this neighbourhood. Respecting the petrel, I observe that Mr. E. N. Bloomfield mentions (*Zool.* 5365) that, several years ago, a storm petrel was found dead at Great Glemham, in the county of Suffolk, a servant boy having previously informed him that "he had seen a swallow fly out of the pond." Mr. Bloomfield thereon remarks, "Whether it is likely that the accounts of the emergence of swallows from the water, in the spring, have arisen from like causes, I am not prepared to say; but I mention this incident, for which I can vouch, as tending to throw some light upon a subject which appears to have attracted considerable interest." I do not exactly see in what way this occurrence can be thought to elucidate this much-vexed question: that an ignorant boy should have mistaken a petrel for a swallow is likely enough, particularly if it

happened to be Leach's, which, having a forked tail, bears a striking resemblance to the chimney swallow. Moreover, petrels are very rarely met with far inland, and when so found, are generally in a dying or exhausted state, so I think it not only unlikely, but highly improbable, that it should have given rise, as suggested by Mr. Bloomfield, to that most absurd notion entertained even by many of the most eminent and scientific naturalists of the last century, with regard to the supposed periodical submersion of the swallow tribe. What peculiarity in their habits may originally have led to this and other ridiculous speculations and fabulous tales, handed down to us by so many of the old authors, I will not undertake to decide; at the same time, I must observe, although I have remarked it before in my notes on the migration of swallows, that they generally, if not invariably, frequent, on their first arrival, the most sheltered and secluded ponds and lakes, where insects, at that early season, are alone to be found in sufficient abundance. I have also noticed their peculiar habit of crowding together on twigs and brambles, when wet or fatigued, so think it not unlikely that, in their awkward attempts to secure a footing, some may get accidentally immersed, when an ignorant lad or peasant might, under the circumstances, be excused for thinking that the poor half-drowned swallows he had seen clinging to the willows or other aquatic trees, had one and all risen from the depths below!—*Henry W. Hadfield; Tunbridge, January 6, 1857.*

Fish pumped out of a dark Well.—On Saturday, August 9, 1856, as my porter was pumping water from a well, situated under and between the foundation walls of my house, a small living fish passed up with the water; it did not long survive, being injured in passing through the pipes and valves of the pump. The well is perfectly in the dark and unconnected with any pure stream or pond from which the fish could have passed into it. The water of the well is merely surface-water, is of a yellow colour, froths much on agitation, and contains organic matter and ammonia. It is possible the ovum of the fish may have passed through some small opening communicating with the well from some neighbouring drain, through which the overflow from a cistern supplied with Thames water may pass; but this I am unable to trace, and the well appears to be far away from any such source. Leaving the mystery of the fish's origin out of the question, the fact is remarkable from the circumstance of its existence in such a situation, quite out of reach of some of the most important of those influences which regulate the healthy development of that class of animals. I know nothing of fishes, but am inclined to think this is a dace or bleak; it is about two inches in length.—*Henry Deane; Clapham Common, December 4, 1856.*

Two forms of Teeth in Sharks.—As the forms of the teeth of sharks are always of importance in identifying the fossil remains of the family, you may perhaps think this worth inserting. In examining the jaws of two large female specimens of the common tope (*Galeus vulgaris*, Cuv.), I found that, besides the usual form of teeth, *viz.* those obliquely triangular, and denticulated of the outer edge alone (see fig. Yarr. ii. p. 510), there is a second distinct form: these are much smaller, very concave, the points being much curved inwards, not oblique, the apex being perpendicular to the centre of the base, and five to seven strong denticulations on either side; they formed a small outer row. I also observed a character not mentioned by either

Yarrell or Jenyns,—a shallow furrow ran along the mesial line of the back, from the second dorsal fin to the origin of the caudal.—*Lester Lester ; Langton Maltravers, December 10, 1856.*

Occurrence of the Short Sun-fish on the Coast of Galway.—On the 3rd of September last, about three miles out at sea from Roundstone, County Galway, Ireland, I met with a specimen of the short sun-fish (*Orthogoriscus mola*), of which I obtained a good view. The fish, which apparently measured about four feet across, was floating at the surface on its side, looking more dead than alive, and my attention was directed to the spot by a large gull, which hovered above, greedily gazing upon the ample space of white belly there displayed. I fired a close shot at the sun-fish, but, owing to the high sea then running, it sunk before I was able to secure it with a gaff. One of my boatmen at once pronounced the fish a sun-fish; he also stated that he had seen many of them in that neighbourhood during his lifetime, and he afterwards drew upon the sand so good a representation of the short sun-fish as to preclude the possibility of a mistake about the species. In Yarrell's 'British Fishes,' I find the following note:—"The sun-fish of the Irish coast, particularly on the west coast, is the basking shark." On the Galway coast the basking shark is certainly known by the name of sun-fish, but it is now evident that, besides the basking shark, one at least of the true sun-fishes frequents the west coast of Ireland.—*Henry Evans ; Darley Abbey, Derby, December 17, 1856.*

A Schoolboy's Amusement in Southey's Days.—One very odd amusement, which I never saw or heard of elsewhere, was greatly in vogue at this school. It was performed with snail shells, by placing them against each other, point to point, and pressing till the one was broken in, or sometimes both. This was called conquering; and the shell which remained unhurt acquired esteem and value in proportion to the number over which it had triumphed, an accurate account being kept. A great conqueror was prodigiously prized and coveted, so much so, indeed, that two of this description would seldom have been brought to contest the palm if both possessors had not been goaded to it by reproaches and taunts. The victor had the number of his opponents added to its own; thus when one conqueror of fifty conquered another which had been as often victorious, it became conqueror of an hundred and one. Yet even in this, reputation was sometimes obtained upon false pretences. I found a boy one day, who had fallen in with a great number of young snails, so recently hatched that the shells were still transparent, and he was besmearing his fingers by crushing these poor creatures one after another against his conqueror, counting away with the greatest satisfaction at his work. He was a good-natured boy, so that I, who had been bred up to have a sense of humanity, ventured to express some compassion for the snails, and to suggest that he might as well count them and lay them aside unhurt. He hesitated, and seemed inclined to assent, till it struck him as a point of honour or of conscience, and then he resolutely said no! that would not do, for he could not then fairly say he had conquered them. There is a surprising difference of strength in these shells, and that not depending upon the size or species, I mean whether yellow, brown or striped. It might partly be estimated by the appearance of

the point or top (I do not know what better term to use); the strong ones were usually clear and glossy there, and white if the shell were of the large, coarse, mottled, brown kind. The top was then said to be petrified; and a good conqueror of this description would triumph for weeks or months. I remember that one of the greatest heroes bore evident marks of having once been conquered. It had been thrown away in some lucky situation, where the poor tenant had leisure to repair his habitation, or rather where the restorative power of Nature repaired it for him, and the wall was thus made stronger than it had been before the breach, by an arch of new masonry below. But in general I should think the resisting power of the shell depended upon the geometrical nicety of its form.—*Life and Correspondence of Dr. Southey.*

To Entomologists, Botanists and others.—It is with feelings of confidence that we call your attention to the following sad case of affliction. John Hemmings, of 2, Bedford Buildings, Brighton, has for a great number of years been a most indefatigable student of Natural History. Although entirely a self-taught man, he has by great perseverance made himself most efficient in Lepidoptera, Coleoptera, &c., and has attained a praiseworthy rank amongst botanists by his researches relative to British mosses and other tribes of plants. Unfortunately he has, by severe study, overtasked his brain; his mind has quite given way, and he now lies stretched on a bed of sickness, wholly unconscious, and obliged to be constantly attended by two men. To share his affliction, he has a wife and seven small children, who have hitherto been dependant on him for support. Hemmings has throughout his life been a thoroughly steady man, and has worked hard at his trade, as a painter; but the requirements of his numerous family have prevented his accumulation of any money. Having been appointed a Committee for that purpose, we take the liberty of asking your sympathy under these painful circumstances, and to beg any little pecuniary assistance it may be in your power to render to an afflicted but worthy individual and his distressed wife and family.

Thomas Thorneroft, 87, North Lane,
H. Cooke, 8, Pelham Terrace,
Samuel House, 82, St. James' Street, } *Committee.*

The above is forwarded to you under the impression that you have known Hemmings as a correspondent.

[Poor Hemmings is since dead; but his widow and small family are much in want of the charity solicited by the gentlemen who have prepared this address.—*E. N.*]

Testimonial to the Rev. Joseph Greene, M.A.—It is proposed to present to the Rev. Joseph Greene, M.A., a silver trowel, as a small mark of gratitude and esteem for his very valuable and detailed information on the subject of 'Pupa Digging' (Zool. 5382), and for the highly important service he has by this means rendered to the Science of Entomology. All gentlemen of the net who sincerely desire to join in the acknowledgment of the same are requested to communicate their intentions to the Rev. J. Johnson, Denby Parsonage, near Huddersfield, as soon as possible.—*The Substitute.*

On Pupa Raking.—In reply to the Rev. J. Greene's question (Zool. 5396), "What is the meaning of the term raking," as the term raking originated with me, I am perhaps the most likely person to explain its meaning. "Raking" or "raking banks," for larva, pupa or imago, is a plan I adopt in districts where pupa digging is

exhausted or impracticable, and is unquestionably the most successful method of obtaining good specimens of the perfect insect which I know. Find an overhanging bank of any sort, a hole where a tree has been blown down, round the edges of a quarry, a landslip on a mountain-face or slope, however small or large, never mind how barren the place is, banks on sand-hills, and particularly banks in lanes caused by cuttings where the soil or gravel has fallen away a little from the vegetation. Having found any such places, first look carefully under the overhanging grass, and, lifting it gently with the left hand, pin and kill the moths and butterflies you find there; peer well into the crevices before using your walking-stick: when you have got all you can see, and also when you cannot see anything, you must draw the point of your stick across the grass-roots, &c., hanging under the bank, and the chances are greatly in your favour that one or more *Noctuæ* fly out, or, what is more general, roll down the bank, sometimes perfectly quiet, at others fluttering very much as they fall; in any case have a small net ready. Repeat this several times, and if windy or wet shake the place well. To follow "bank-raking" requires both patience and perseverance; for, like pupa digging, you do not find nuggets in every hole; and it is no joke walking on sand-banks, where your progress is like lawyers journeying heavenwards; but it has this advantage,—it can be most advantageously practised when pupa hunting is rather out of season, and you get the insects as good as bred without further trouble. Where banks are scarce, as on pasture-lands, I carry small bundles of grass or hay, peg them down, and shake them whenever I visit the ground, and find it answer my purpose admirably. It is true this process produces unlimited quantities of common moths and beetles; but sometimes you get a prize, either for your own cabinet, or, what is quite as pleasing, for a friend. Never pass a "scarecrow," that is, a coat and hat fixed in a field to frighten birds, without ascertaining what insect he has upon him; be particular about his hat, and shake his coat well. This is called "passing the doctor," and is another term which may not be understood in the South. It is a successful plan to take *Plusias* and the genus *Heliothis*, &c.—*C. S. Gregson; Edge Lane, Stanley, January, 1857.*

Ravages of Caterpillars.—In a former volume (*Zool.* 4546) I gave some account of the injury done to the gardens of this village during the summers of 1853 and 1854. My observations were continued as far as practicable in the following season, and I hoped to have communicated the result long ago, but have been disappointed hitherto. However, the completion of the narrative, late as it has been deferred, may not be altogether unacceptable. My first note upon the subject was taken on or about the 21st of September, 1855, at which period, in two gardens to which my attention was particularly devoted, all plants of the cabbage tribe were devoured, or nearly so, with the exception of the large ribs of the leaves. But this food not sufficing for the hosts of the vermin, they had attacked the turnips, the tops of which were rapidly disappearing. Separated from the gardens only by a wall and a path, was a field of rape, upon the first-sown portion of the contiguous side of which, where alone I could pursue my investigations, the caterpillars were most abundant, and the white butterflies persevered in multiplying their broods to a late date. Very many of the larvæ were now fully fed, and were travelling away as usual previous to undergoing their next change. Upon a considerable length of wall, on the face of which this change had heretofore taken place very extensively, I did not on this occasion find more than one, if one, chrysalis of the mottled caterpillar, though many of other sorts, while, of the former, instances were numerous of those which had been victimised by ichneumon

flies. Having been confined to the house, my next observation was made on the 27th of September, when the number of caterpillars travelling and still feeding was much diminished, though of the latter many of different ages were still to be seen. Some preceding days had been cold. In a wide space closely examined I found only three chrysalides of the mottled caterpillar, but several of smaller kinds. On the 1st of October I was informed that the turnips in one particular garden of those under my notice had been greatly infested by a small black caterpillar, of which I that day saw a few elsewhere. These were, I believe, the larvæ of a *Tipula*, and certainly the same with those the performances of which I have before described (Zool. 336—misprinted 326 at p. 4548), but, in the instances now noticed, they appeared to devour only the tender parts of the leaves, whereas in the former case the entire tops of the turnips were consumed. My last note is dated October 8th (my own hybernation having commenced on the following day), when some few caterpillars were still in motion upon their usual track, possibly a dozen and a half at most, the rape in the field being clear of them, so far as examined by me. In the preceding autumn the insects were numerous later than this day, but then the weather had been drier, in 1855 rain having occasionally fallen very heavily, though not accompanied by much cold. The result of what observations I was able to make in 1855 is, that caterpillars were more numerous in that season than they had been in the preceding. I have related (Zool. 4546) that in 1854, when their next change was approaching, they ascended the walls of a large house in incredible swarms; the irruption occurred again in the ensuing year, when, however, more effectual preparations were made to meet the invaders. Ichneumon flies abounded in 1854, being then, so far as noticed, only of one species, and that very small; whereas, in 1855, not only were they in much greater number, but of several sizes. A friend, who resides in the very focus of the late visitation, informs me that, of the multitude of caterpillars he crushed, five in every six were full of maggots. For my own part, I consider the proportion of fly-blown insects was even much larger, and the activity of the ichneumons in pursuing their vocation was remarkable, they being constantly in attendance wherever their proposed victims were to be found. Once, upon the coping of a low wall,—a favourite track of the caterpillars,—I watched what I believe, from the spike at the end of the abdomen, to have been a large ichneumon fly,—reddish black with red wings,—walk up to a “travelling” caterpillar, pass its long antennæ gently over the other’s back for a few seconds, as if in observation, and then turn away. The smallest of the flies, which appeared to be by far the most abundant, were continually visible around and on the caterpillars, especially when they became stationary for transformation, and, in many instances, even upon the chrysalides, their presence evidently causing extreme annoyance, since both the unchanged and the changed were incessantly moving their heads and tails uneasily backwards and forwards, as if in vain endeavours to dislodge the enemy; the consequence being, as I have reason to suppose, that, in one case at least, the chrysalis broke from its moorings and fell to the ground. I have stated before (Zool. 4548) that I estimated the little maggots I had seen emerging from the body of a single caterpillar “at two dozens at least.” I am inclined now to believe the number to have been still more considerable. Also, while in 1854 I supposed (Zool. 4548) the small green caterpillars to have been untouched by the ichneumon flies, I strongly suspect they did not escape equally well in 1855. Besides the hostility of their natural parasites, the cabbage caterpillars were, in 1855, exposed to some other destructive influence. My note of October 8th, reminds me how many discoloured (brown) car-

cases I saw, where the insects, not fly-blown, had died without changing, and the larger portion of those then noticed which had changed (they likewise being much discoloured) were probably diseased, the effect perhaps of the heavy showers. In addition to the species already mentioned I observed, in the autumn of last year, several varieties of "looper" caterpillars, and a very few, perhaps two or three, larger larvæ, possibly immature cockchaffer grubs, all evidently retiring from the same spot where others of their race had been so actively employed. From the preceding account it may be anticipated that, during the summer of the present year, white butterflies, and consequently their progeny, did not appear in unusual multitudes where previously they had proved such a pest. It must, however, be added, that the occupants of two adjoining gardens, warned by the total loss of their crops in 1854 and 1855, varied their system of cultivation in 1856, and the contiguous field did not of course contain rape again this year.—*Arthur Hussey; Rottingdean, December 3, 1856.*

Mr. Stainton's Nomenclature in the 'Manual.'—In p. 171 of the 'Manual of British Butterflies and Moths,' Mr. Stainton informed us that, in his arrangement of the Noctuidæ, he intended to adopt that of M. Guenée, in his great work on the Noctuérites of the whole world. Now I, in common with, I believe, most British entomologists, look up to Mr. H. Doubleday as our Mentor, and as I happen to know that it is the opinion of Mr. Doubleday that all other nomenclatures must bow before that of M. Guenée, it was with no small delight that I hailed Mr. Stainton's announcement. "At last," said I to myself, "there is a chance of our having a nomenclature, in which most, if not all, entomologists will coincide. At last we have got hold of a thread which will lead us out of that seemingly inextricable labyrinth in which, as regards the nomenclature of our British Lepidoptera, we have been so long involved." Judge, then of my surprise and annoyance when, upon comparing the 'Manual' with M. Guenée's admirable work, I found that in no less than seven instances Mr. Stainton has already, in direct defiance of his preliminary announcement, departed from the nomenclature of M. Guenée:—

1. *Acronycta Salicis*, *Curt.*, appears as a distinct species, though M. Guenée expressly states that, in his opinion, it is a variety of *A. Menyanthidis*, *Esp.*
2. *Nonagria paludicola*, *Hüb.*, of Guenée appears as *N. geminipuncta*, *Haw.*
3. *Nonagria lutosa*, *Hüb.*, of Guenée, appears as *N. crassicornis*, *Haw.*
4. *Hydræcia Petasitis*, *Doub.*, retains its old name, though M. Guenée distinctly declares it to be only a variety of *H. vindelicica*, *Frey.*
5. *Miana erratricula*, *Hüb.*, of Guenée, appears as *M. literosa*, *Haw.*
6. *Pachnobia carnica*, *Heer.*, of Guenée, appears as *P. alpina*, of anybody you like.
7. *Xanthia silago*, *Hüb.*, is styled *X. flavago*, *Fab.*, apparently for no reason whatever, except that it may now and then personate *Gortyna flavago*, *W. V.*

Now I have always supposed that when a person adopts a thing, he does so for better or worse, and it seems to me that Mr. Stainton, after distinctly announcing his intention of adopting M. Guenée's arrangement of the Noctuidæ, is bound to take it exactly as it stands, and is wholly unjustified in introducing emendations of his own. Surely the world-wide reputation and vast experience of M. Guenée, backed as it is by so incontrovertible an authority as Mr. Doubleday, ought to be sufficient to prevent

Mr. Stainton from tinkering up anything which comes out of such a workshop. If he is to continue this system, the value of the 'Manual' as a guide to nomenclature is wholly and entirely lost. I had hoped that, after the terrible revolution which Mr. Stainton caused among the Bombyces, and the ruthless manner in which he tore asunder species hitherto united by the tenderest ties, he would have treated the Noctuidæ in a more considerate manner, but I fear that he is one of those persons who experience a sort of piquant enjoyment in flinging the apple of discord around them. I am, however, much comforted by hearing from my most worthy friend Mr. C. R. Bree that he is shortly about to publish a list of the British Noctuidæ, in strict accordance with the arrangement of M. Guenée.—*H. Harpur Crewe; Stowmarket, Suffolk, January 7, 1857.*

Larvæ of Notodonta dictæa, &c.—At p. 113 of the 'Substitute' Mr. Greene alludes to the statement of Mr. Cartmel, at p. 5, where Mr. C. tells us that he once took fifty brown and green larvæ of *Notodonta dictæa* off birch. Now will Mr. Cartmel forgive me if I ask him, not only whether he is quite sure the larvæ were really *N. dictæa*, but also whether he is quite sure that it actually was birch upon which he found and fed them? I have been in the habit of taking the larva of *N. dictæa* for the last twelve or fourteen years, and have had some little experience in its habits. I have taken it upon, I think, every species of poplar which grows in this country, but never in one single instance on birch. I never met with or heard of any entomologist, British or Continental, with the exception of Mr. Cartmel, who had ever taken or seen it upon that tree, and so firmly persuaded am I that it never feeds there, that I should consider it nothing less than a miracle were I to beat or find a larva of *N. dictæa* on birch. Now there is a species of aspen (I am not quite sure which, so will not hazard a botanical mistake), which, in its young sucker state, so closely resembles a rank growth of birch, particularly upon a dry peaty soil, that I am not at all surprised that a moderate botanist should mistake one for the other: I was myself taken in by it, some years since, upon one of our Derbyshire heaths, when I did not know so much of Botany as I do now, and upon this very aspen, which I at first took to be birch, I found nearly eighty eggs of *N. dictæa*, besides larvæ, both of *N. dictæa* and *P. palpina*. Amongst these small aspens there are a number of genuine birches, but though I have beaten these latter again and again I never saw a single larva of *N. dictæa*, though I have not unfrequently beaten that of *N. dromedarius*, and several times *N. dictæoides*. Now I cannot help thinking that Mr. Cartmel has mistaken these young aspen suckers for birch. It is only in quite their young state that they assume this birch-like appearance: in a year or two they become genuine aspens.—*Id.; January 1, 1857.*

Larva and Economy of Taniocampa populeti.—The larva of this species seems to be but little known: it feeds upon the aspen and probably upon other species of poplar, residing between two leaves united by a web: it is very transparent, and always colourless, a sort of yellowish white, with a black head. Many years since I reared a brood from the eggs, and sent larvæ to Mr. Curtis, who, I believe, made a drawing of one of them. I have since frequently found them on tall aspens in our woods, but the greater part are infested with the larvæ of ichneumons.—*Henry Doubleday; Epping, January 13, 1857.*

Eupithecia helveticaria in Britain.—Mr. Logan kindly gave me a pair of *Eupitheciæ*, which he bred from bright green larvæ found upon juniper. I sent them to my friend M. Guenée, and he informs me that it is the *Eupithecia helveticaria* of

Boisduval, discovered by Anderegg in Switzerland, upon *Juniperus Sabina*, and new to this country.—*Id.*

Tortrix latiorana and *Depressaria libanotidella*.—In Mr. Stainton's 'Annual' for the present year a *Tortrix* is described, under the name of *latiorana*, as a species new to Britain. Ten years since I sent specimens of this insect to M. Guenée, and he agreed with me in considering it a pale variety of *Tortrix spectrana*, a variable species, the larva of which feeds upon a great variety of plants, often upon *Ranunculus sceleratus*. *Depressaria libanotidella* is also given in the 'Annual' as British, on the authority of an insect taken by Mr. Turner. I had this specimen in my possession for some weeks, and it appeared to me to be only a slight variety of *D. badiella*. Mr. Stainton's description applies to the true *libanotidella*. Mr. Turner's insect does not at all resemble the specimens of this species kindly given to me by Zeller.—*Id.*

Note on Cheimatobia autumnaria.—There seems to be a prevalent opinion that this insect does not occur in the South of England; I, however, can affirm the contrary, having taken it at Marlow, in Buckinghamshire, at the end of October or early in November, 1854. It accompanied *C. dilutaria*, of which there was great abundance.—*J. F. Brochholes*; 16, *Egerton Terrace, Birkenhead*.

Early appearance of Phigalia pilosaria.—A singular male variety of this species was taken on a beech tree near Manchester on the 2nd of November, being at least three months earlier than usual. I hope no advantage will be taken of this by the "double-brooded agitators."—*Robert S. Edleston*; *Bowdon, January 10, 1857*.

Larva of Nepticula subbimaculella.—When collecting mines of *Nepticulæ* last autumn I observed the larva of the above-named species to be somewhat gregarious; in one blotch-mine were five larvæ, occasionally four and three, repeatedly two. I have not observed the same to occur in any other species. Mr. Stainton, in his 'Natural History of the Tineina,' p. 268, remarks upon the green appearance of the leaf in autumn when tenanted by this larva; the same appears in most autumn leaves, whether tenanted by *Nepticula* or *Lithocolletis*; it is very conspicuous in mountain ash when tenanted by *L. Aucupariella*.—*Id.*

On the Habitats and Food-plants of several of the British Pterophoridae.—I do not intend in this paper to give a description of all the species in this interesting, but much neglected genus, but of only such as have fallen under my own observation. Most of the larvæ are green and hairy, and it appears they prefer feeding under the leaves of their food-plants, seldom appearing on the upper surface.

P. similidactylus I discovered last season, feeding on the under side of the leaves of common wormwood (*Artemisia Absinthium*): its presence is easily detected by the white appearance of the leaves: the larva is light green; full-fed in June; imago out in July: it is very local, and far from common. The name *similidactylus* is not found in Stainton's works, but for what reason I do not know.

P. phæodactylus. This species is also local. Larva green; feeding on the under side of the leaves of birds'-foot trefoil (*Lotus corniculatus*) in June; imago out in July.

P. lithodactylus. This species has become common during the last four years, from its food-plant being discovered to be the common fleabane (*Inula dysenterica*). Larva green; feeding on the under side of the leaves in June; imago out in July.

P. microdactylus. I took a pupa of this in the stem of the common hemp agrimony (*Eupatorium cannabinum*), where it appeared the larva had fed inside the

stem: this is quite at variance with the other species of this genus. The pupa was a dark red, and totally different from any of the Plume tribe I had ever seen. I am quite certain its food-plant is the Eupatorium: I have never taken the insect but where the plant grows.

P. galactodactylus. The larva of this species is common. The perfect insect is rarely taken; its food-plant is the common burdock; found feeding on the under side of the leaves in May; locality woods. The larva is easily detected by the holes in the leaves of the plant.

P. baliiodactylus. Larva green; food-plant *Ononis reclinata*. It is a local species. Larva in June; imago in July. Found on the Kentish coast.

P. tetradaactylus. This species is found with the preceding, and, I expect, feeds on the same plant, but I have not yet found the larva.

P. pentadaactylus. This is a very common species. Larva green; food-plant *Convolvulus arvensis*, but may sometimes be taken on other plants.—*H. J. Harding*; 1, *York Street, Church Street, Shoreditch*.

Description of an Cestrus new to Britain.—The under-mentioned species was captured by Mr. James Cooper in Scotland, in 1854:—

CESTRUS BIANGULATUS, *Cooke*.

Male. Body very stout; head clothed above with black hairs, beneath and behind with red hairs; antennæ black, basal half of the arista red; thorax black, clothed in front with tawny hairs, and yellowish white hairs at the sides; scutellum with tawny hairs, and yellowish white on each side. Wings limpid, clouded with brown along the veins, which are strongly indicated; præbrachial vein with a sharply-defined and very slightly obtuse angle placed beyond the discal transverse, and another at nearly one-third the distance thence to the margin—at the first angle a branch is emitted; discal transverse parted by about its length from the clouded præbrachial transverse, and less than its length from the border; alulæ whitish, bordered with brown. Abdomen black, with yellowish white hairs at the tip. Legs black; tarsi ferruginous at the base of each joint. Length 8 lines; expanse 14 lines.—*Benjamin Cooke*; 49, *Hardwick Place, Manchester*.

A Systematic List of Coleoptera found in the Vicinity of Alverstoke, South Hants. By ARTHUR ADAMS, Esq., F.L.S., Surgeon of H.M. Surveying Ship 'Actæon;' and WILLIAM BALFOUR BAIKIE, M.D., F.R.G.S., Haslar Hospital.

(Continued from page 5302).

24. *Harpalus*, *Latr.*

H. ruficornis, *Fabr.* Extremely common; in fields, under clods, stones and débris, under logs, &c.

H. æneus, *Fabr.* Very common; in fields, &c.

H. honestus, *Dufts.* *H. rufipalpis*, *H. atrocæruleus*, *H. annulicornis*, *H. notatus*, *H. obscuricornis*, *H. nitidus*, *H. maculicornis*, *Steph.* Not frequent; under stones along Stokes Bay.

H. attenuatus, *Steph.* *H. consentaneus*, *Dej.*, *H. picilabris*, *Steph.* Not common; under stones in fields.

H. neglectus, *Dej.* *Actephilus pumilus*, *Steph.* Rare; under stones, usually near the sea.

H. fulvipes, *Fabr.* *H. limbatus*, *Dufts.*, *Steph.*, *H. acuminatus*, *H. lateralis*, *Steph.* Rather rare; under stones.

H. rubripes, *Dufts.*, *Steph.* *H. azureus*, *H. chloropterus*, *H. marginellus*, *H. fulvipes*, *H. subsinuatus*, *H. lentus*, *H. ignarus*, *H. Patisii*, *H. nigro-cæruleus*, *H. punctiger*, *Steph.* Not common; under stones in fields near the sea.

H. depressus, *Dufts.*, *Steph.* *H. semiviolaceus*, *Dej.*, *H. melampus*, *H. thoracicus*, *Steph.* Not abundant; near the sea-shore.

H. tardus, *Panz.* *H. rufimanus*, *H. fuliginosus*, *H. latus*, *Steph.* Common; under stones in sandy places about Stokes Bay.

25. *Stenolophus*, *Meg.*

S. Skrimshiranus, *Steph.* Taken in considerable abundance under loose earth along a damp ditch at Grange, and also at Chark Common.

S. vespertinus, *Ill.* Found with *S. Skrimshiranus*, but rather less abundantly.

26. *Acupalpus*, *Latr.* *Trechus*, *Steph.*

A. dorsalis, *Fabr.*, *Steph.* *A. parvulus*, *Steph.* Rare; only one example taken.

A. meridianus, *Linn.*, *Steph.* *A. suturalis*, *Steph.* Common; under small stones.

A. luridus, *Dej.* *A. flavicollis*, *A. nitidus*, *Steph.* Common; under soil of damp ditches at Grange.

27. *Bradycellus*, *Erich.* *Trechus*, *Steph.*

B. fulvus, *Marsh.*, *Steph.* *B. pallidus*, *B. brunnipes*, *Steph.* Common; along hedgebanks.

28. *Trechus*, *Clairv.*

T. minutus, *Fabr.*, *Steph.* *T. aquaticus*, *T. tristis*, *T. lævis*, *T. fuscipennis*, *Steph.* Very common; under clods and stones in fields, and under heaps of dried sea-weed on Southsea Common.

6. Fam. BEMBIDIIDÆ, *Steph.*1. *Bembidium*, *Latr.* (*Tachypus*, *Meg.*)

B. flavipes, *Linn.*, *Steph.* *B. impressum*, *Steph.* In moss along hedgerows; common.

B. velox, *Linn.*, *B. punctatum*, *Drap.* *Tachypus striatus* and *T. chlorophanus*, *Steph.* (*Leja*, *Meg.*) Among damp grass in hedge-banks at Privet.

B. lampros, *Herbst.* *Trachypus properans*, *T. celer*, *T. acutus*, *T. chalcus*, *T. orichalceus*, *Lopha pulchella*, *Steph.* (*Lopha*, *Meg.*) Very common; ubiquitous and of extreme activity.

B. quadriguttatum, *Fabr.* Under stones along banks of streams near Stokes Bay; tolerably abundant.

B. quadrimaculatum, *Linn.* (*Peryphus*, *Meg.*) Found with the preceding species, but less abundantly.

B. femoratum, *Sturm.*, *Steph.* *B. maritimum*, *Steph.* Common; along muddy banks of ditches.

B. littorale, *Oliv.*, *Steph.* *B. rupestre*, *Gyll.*, *B. ustulatum*, *Jacq.*, *Duv.*, *B. tetraspilotum*, *B. elegans*, *Steph.* (*Notaphus*, *Meg.*) Very abundant; under stones along the sea-shore.

B. ustulatum, *Linn.*, *Steph.* *B. nebulosum*, *B. bifasciatum*, *B. obliquum*, *Steph.* (*Philocthus*, *Steph.*) Plentiful; along muddy banks of ditches, and under stones in damp spots.

B. guttula, *Fabr.*, *Steph.* *B. binotatum*, *B. vittatum*, *B. hæmorrhorum*. (*Tachys*, *Ziegl.*) Tolerably common; along damp banks.

B. scutellare, *Germ.*, *Steph.* Occasional; Salterns, Island of Portsea.

Errata.—Page 5299, line 13 from bottom, for “Fish-hook Bay” read “Gurnard Bay.” Page 5301, lines 1 and 2, read thus:—

“*Pœcilus cupreus*, *Linn.* Very common.

” ” *var. versicolor*, *Sturm.*, *Steph.* Not common.”

Page 5302, line 10 from bottom, for “1853” read “1855.”

Addenda.—The following species of *Geodephaga* have either been determined or have been captured since the preceding part of the List was compiled:—

Dromius 4-notatus, *Panz.*, *Steph.* Occasional; under bark of trees.

D. fasciatus, *Gyll.*, *Steph.* A specimen taken in a hedge-bank at Privet, by H. Adams, Esq., September, 1856.

Dyschirius æneus, *Dej.* *D. thoracicus*, *D. tristis*, *D. pusillus*, *Steph.* On muddy banks of ditches at Privet.

Pogonus chalceus, *Marsh.*, *Steph.* *P. littoralis*, *Steph.* Abundant under *débris* in the Salterns, Island of Portsea, and in a salt-marsh near Fort Monkton.

Curtonotus spinipes, *Linn.* *C. aulicus*, *Panz.*, *C. piceus*, *Steph.* Under stones along Stokes Bay.

C. convexiusculus, *Marsh.* At roots of grass in a damp bank at Grange.

Ophonus pubescens, *Payk.*, *Steph.* Not abundant; under stones on Southsea Common.

O. obsoletus, *Dej.* During September and October this species has been taken by the authors in some abundance in the Salterns, Island of Portsea.

HYDRADEPHAGA.

In this and the following section the authors have to express their obligations to Dr. Power, who has kindly determined for them many of their doubtful species. The arrangement followed is that of Dawson and Clark's recent Catalogue.

I. Fam. DYTISCIDÆ, *Leach.*

1. Sub-fam. *Dytiscinæ.*

1. *Dytiscus*, *Linn.* *Dyticus*, *Geoff.*, *Steph.*

D. marginalis, *Linn.*, *Steph.* *D. submarginalis*, *Steph.* Common; in ponds.

2. *Acilius*, *Leach.*

A. sulcatus, *Linn.*, *Steph.* Abundant; in ponds.

2. Sub-fam. *Colymbetinaæ.*

3. *Colymbetes*, *Clairv.*

C. fuscus, *Linn.* *C. Paykulli*, *C. striatus*, *Steph.* Very common; ponds and ditches.

C. pulverosus, *Sturm.*, *Steph.* *C. conspersus*, *Gyll.*, *C. notatus*, *Lacord.* (not *Fabr.*) Tolerably common; ponds at Hillhead, and in ditches near Portsea Salterns.

4. *Ilybius*, *Erichs.*

I. ater, *Degeer*, *Steph.* *I. quadrinotatus*, *Steph.* Not unfrequent; Gomer pond.

I. obscurus, *Marsh.*, *Steph.* *I. quadriguttatus*, *Lacord.* Not common; ditches.

I. uliginosus, *Linn.* *I. fuliginosus*, *Fabr.*, *Steph.*, *I. lacustris*, *Steph.* Rather scarce; ponds near Southsea.

5. *Agabus*, *Leach.*

A. agilis, *Fabr.*, *Steph.* *A. oblongus*, *Steph.* Not rare; ditches at Grange.

A. uliginosus, *Payk.* *A. dispar*, *Bold.* Found in some abundance in a small quarry on Chark Common.

A. Sturmii, *Gyll.*, *Steph.* Occasional; ditches at Chark Common.

A. chalconotus, *Panz.*, *Steph.* *A. cyaneus*, *A. montanus*, *A. aterrimus*, *A. nigroæneus*, *Steph.* Tolerably common; ponds at Chark Common.

A. maculatus, *Linn.*, *Steph.* Occasional; ponds near Portsmouth.

A. didymus, *Oliv.* *A. vitreus*, *Payk.*, *Steph.* Rather rare; ditches at Chark.

A. paludosus, *Fabr.*, *Steph.* *A. striolatus*, *Steph.* Not common; ditches at Grange.

A. bipunctatus, *Fabr.* *A. nebulosus*, *Steph.* Very common; ponds and ditches.

A. conspersus, *Marsh.*, *Steph.* *A. subnebulosus*, *Steph.* Rare; ditches at Grange.

A. bipustulatus, *Linn.*, *Steph.* *A. Snowdonius*, *Newm.*, *Steph.* Very abundant; ditches and ponds.

6. *Noterus*, *Clairv.*

N. crassicornis, *Fabr.*, *Steph.* Occasional; ditches at Grange.

N. semipunctatus, *Fabr.*, *Steph.* Tolerably frequent; ditches.

7. *Laccophilus*, *Leach.*

L. minutus, *Linn.* *L. hyalinus*, *Steph.* Abundant; ditches, everywhere.

8. *Hyphidrus*, *Ill.*

H. ovatus, *Linn.*, *Steph.* *H. variegatus*, *Steph.* Rather abundant; ditches.

3. Sub-fam. *Hydroporinae*.9. *Hydroporus*, *Clairv.*

H. inæqualis, *Fabr.*, *Steph.* *H. reticulatus*, *Steph.* Occasional; ditches at Chark.

H. decoratus, *Gyll.*, *Steph.* Not common; ditches at Grange and at Chark.

H. 12-pustulatus, *Fabr.* *H. 12-punctatus*, *Steph.* Rare; ditches at Chark.

H. parallelogrammus, *Ahr.* *H. consobrinus*, *H. lineatus*, *Steph.* Not scarce; ditches near Portsea Salterns.

H. confluens, *Fabr.*, *Steph.* Not common; ditches at Grange.

H. erythrocephalus, *Linn.*, *Steph.* Common; ditches at Chark.

H. planus, *Fabr.* *H. ater*, *H. holosericeus*, *H. pubescens*, *Steph.* Tolerably abundant; ditches at Grange and at Chark.

H. pubescens, *Gyll.* *H. melanocephalus*, *H. caliginosus*, *Steph.*, *H. planus*, *Steph. Illustr.* Rather common; ditches at Grange and at Chark.

H. xanthopus, *Steph.* *H. flavipes*, *Steph.*, *H. planus*, *Steph. Man.* In some abundance; ditches about Grange.

H. palustris, *Linn.*, *Steph.* *H. 6-pustulatus*, *H. proximus*, *Steph.* Common; ditches at Chark.

H. lineatus, *Fabr.* *H. pygmæus*, *H. ovalis*, *Steph.* Not common; ditches at Chark.

H. lepidus, *Oliv.* *H. scitulus*, *Steph.* Not rare; ditches at Chark.

4. Sub-fam. *Haliplinae*.10. *Haliplus*, *Latr.*

H. mucronatus, *Steph.* A single specimen taken by one of the authors in a ditch at Chark Common, in September, 1856.

H. affinis, *Steph.* Not abundant; ditches at Grange.

H. ruficollis, *Deg.*, *Steph. Illustr.* *H. fulvicollis*, *H. melanocephalus*, *H. brevis*, *Steph.* Not unfrequent; ditches at Grange.

H. fluviatilis, *Aubé.* Occasional; ditches at Grange.

H. obliquus, *Fabr.*, *Steph.* Not very common; ditches at Grange.

H. lineatocollis, *Marsh.*, *Steph.* Rather common; ditches at Chark.

11. *Cnemidotus*, *Ill.*

C. cæsus, *Dufst.*, *Steph.* Rare; ditches at Chark.

2. Fam. GYRINIDÆ, *Leach*.1. *Gyrinus*, *Geoff*.

G. natator, *Linn.*, *Steph.* *G. substriatus*, *Steph.* Very abundant; ponds and ditches.

G. bicolor, *Payk.*, *Steph.* In the Salterns, Island of Portsea; in some abundance.

PHILHYDRIDA.

1. Fam. HETERO CERIDÆ, *MacLeay*.1. *Heterocerus*, *Bosc*.

H. marginatus, *Fabr.*, *Steph.* *H. flexuosus*, *H. Marshami*, *H. lævigatus*, *Steph.* Rare; on muddy banks at Privet.

2. Fam. PARNIDÆ.

1. *Parnus*, *Fabr*.

P. prolifericornis, *Fabr.*, *Steph.* *P. impressus*, *Steph.* Taken in profusion, in September, among weeds in a wet ditch at Privet.

3. Fam. ELMIDÆ, *Shuck*.1. *Elmis*, *Latr*.

E. æneus, *Müll.* *E. Maugetii*, *Steph.* Rare; in ditches.

4. Fam. HELOPHORIDÆ, *Leach*.1. *Helophorus*, *Fabr*.

H. aquaticus, *Linn.*, *Steph.* *H. grandis*, *Ill.* Tolerably common; pools and ditches.

H. nubilus, *Fabr.*, *Steph.* Rather rare; pools. Occasionally caught flying.

H. griseus, *Herbst.* *H. tuberculatus*, *Steph.* Very common; pools.

2. *Ochthebius*, *Leach*.

O. marinus, *Payk.* *O. dilatatus*, *Steph.* Rare; Salterns, Island of Portsea.

O. æneus, *Waterh.* Rare; ditches at Chark.

O. æratus, *Steph.* *O. nanus*, *O. hibernicus*, *Steph.* Not common; ditches at Grange.

3. *Hydræna*, *Kugel*.

H. riparia, *Kugel*, *Steph.* *H. gracilis*, *H. pulchella*, *H. nigrita*, *H. pusilla*, *Steph.* Rare; Salterns, Island of Portsea.

5. Fam. HYDROPHILIDÆ, *Leach*.1. *Limnebius*, *Leach*.

L. lutosus, *Marsh.*, *Steph.* *L. nigricans*, *L. nigrinus*, *L. mollis*, *L. marginalis*, *Steph.* Rare; ditches at Chark Common.

2. *Berosus*, *Leach*.

B. luridus, *Linn.* Not common; ponds at Chark.

B. æriceps, *Curt.* Not unfrequent; ponds at Chark.

3. *Hydrophilus*, *Geoff*.

H. piceus, *Linn.* Occasional; ponds near Southsea.

4. *Hydrobius*, *Leach*.

H. fuscipes, *Linn.*, *Steph.* *H. chalconotus*, *H. subrotundus*, *Steph.* Very common; ditches.

H. globulus, *Payk.*, *Steph.* *H. minutus*, *Steph.*, *Laccobius limbatus*, *Steph.* Not abundant; ditches at Chark.

5. *Laccobius*, *Erichs*.

L. minutus, *Linn.* *L. bipunctatus*, *L. striatulus*, *L. colon*, *Steph.* Not abundant; ditches at Grange and at Chark.

6. *Philydrus*, *Sol*.

P. melanocephalus, *Oliv.*, *Steph.* *P. testaceus*, *P. ochropterus*, *P. torquatus*, *P. fulvus*, *Steph.* Abundant; under *débris* along margins of salt-marshes and pools.

6. Fam. SPHÆRIDIIDÆ, *Leach*.1. *Cyclonotum*, *Erichs*.

C. orbiculare, *Fabr.* Abundant; among damp weeds, on aquatic plants, and along banks of ponds and ditches.

2. *Sphæridium*, *Fabr*.

S. Scarabæoides, *Linn.*, *Steph.* *S. lunatum*, *S. Daltoni*, *Steph.* Very common; in cow-dung.

S. bipustulatum, *Fabr.*, *Steph.* *S. marginatum*, *S. 4-maculatum*, Common; in dung.

3. *Cercyon*, *Steph.*

C. obsoletum, *Gyll.*, *Steph.* Not common; under stones on Browndown.

C. hæmorrhoum, *Gyll.*, *Steph.* *C. xanthorhæum*, *Steph.* Rather frequent; in dung.

C. unipunctatum, *Linn.* *C. quisquilius*, ♀, *Steph.* In horse-dung; not very frequent.

C. quisquilius, *Linn.* *C. flavum*, *Steph.* *C. unipunctatum*, ♂, *Steph.* Common; in dung.

C. littorale, *Gyll.*, *Steph.* *C. ruficorne*, *C. dilatatum*, *C. binotatum*, *C. bimaculatum*, *Steph.* Banks of ponds; rather common.

C. melanocephalum, *Linn.*, *Steph.* Rather rare; along ditches.

NECROPHAGA.

In this group the species of *Catops* have been obligingly named for us by Andrew Murray, Esq., who by his recent Monograph has made this genus entirely his own.

1. Fam. SILPHIDÆ, *MacLeay.*

1. *Necrophorus*, *Fabr.*

N. Humator, *Fabr.*, *Steph.* Very common.

N. Vespillo, *Linn.*, *Steph.* Common.

N. Vestigator, *Herbst.*, *Steph.* Extremely abundant.

N. Sepultor, *Charp.*, *Steph.* Very rare. Three specimens have been taken, one under a dead snake on Browndown.

N. Mortuorum, *Fabr.*, *Steph.* Rather common, especially in dead fish.

N. interruptus, *Brullé*, *Steph.* Very rare. Three specimens have been taken, one in a dead fish.

2. *Necrodes*, *Wilk.*

N. littoralis, *Linn.*, *Steph.* Rather rare.

3. *Oiceoptoma*, *Leach.*

O. thoracica, *Linn.*, *Steph.* Not common; mostly in dead fish.

O. rugosa, *Linn.*, *Steph.* Very abundant.

O. sinuata, *Fabr.*, *Steph.* Common.

4. *Silpha*, *Linn.*

S. reticulata, *Ill., Steph.* A single specimen obtained by one of the authors in Haslar Lane.

S. tristis, *Ill., Steph.* Tolerably common.

S. obscura, *Linn., Steph.* Very common.

S. lævigata, *Fabr., Steph.* Common.

5. *Phosphuga*, *Leach.*

P. atrata, *Linn., Steph.* Local and not common. Burrows in decaying trees.

6. *Catops*, *Fabr.*

C. angustatus, *Fabr.* About roots of grass in banks at Privet.

„ *var. Cisteloides*, *Steph.* Not common; among grass on banks at Grange.

C. nigricans, *Spence.* Taken from dead moles at Alverstoke.

C. nigrita, *Erichs.* Taken with the last species.

C. tristis, *Panz., Erichs.* In dead moles and in dead fish.

C. pumatus, *Erichs.* Chiefly in dead fish.

C. scitulus, *Erichs.* In dead moles and in decaying fish.

C. sericeus, *Erichs.* Taken usually crawling along field-paths, and also in dead fish.

ARTHUR ADAMS,
WM. BALFOUR BAIKIE.

Haslar Hospital,
November 14, 1856.

(To be continued).

Note on Phytosus spinifer and Phytosus nigriventris.—On examining my specimens of *Phytosus*, I find that I have, from our own coast, both of the species which are found on the Continent, and which hitherto have been regarded as male and female of one species by most collectors. I copy from *Erichson's 'Natur. der Insecten'* the short Latin diagnosis of each:—

1. *PHYTOSUS SPINIFER*, *Curtis, Brit. Ent. t. 718. Erichson, Gen. et Spec. Staph. 178. Fairm. et Laboul. Faune, i. 467. Erich. Nat. der Insecten, ii. 44.*

“*Niger, dense cinereo-pubescens, antennis anoque ferrugineis, pedibus piceis, coleoptris thorace tertia fere parte longioribus, apice rufescentibus. Long. 1½ lin.*”

The large size, broader form and uniform brownish black colour will readily separate this species from the following. Of it (spinifer) I have only one specimen, which I took by sweeping *Cakile maritima*, on the sea-coast near Hartley, Northumberland:—

2. *PHYTOSUS NIGRIVENTRIS*, Chev. *Kraatz, Stett. Ent. Zeit.* xiv. 257, t. 3, f. 6
Fairm. et Laboul. Faune, i. 467. *Erichson, Nat. der Insecten*, ii. 43.
Myrmedonia nigriventris, Chev. *Rev. Zool.* 1843, p. 42.
Phytosus spinifer, mas., *Curtis, Brit. Ent.* t. 718. *Steph. Man.* p. 417.
Phytosus spinifer, fem., *Erich. Gen. et Spec. Staph.* 178, 1.

“*Nigro-piceus, dense cinereo-pubescentis, antennis, thorace, elytris, ano pedibusque flavo-testaceis, coleopteris thorace dimidio fere brevioribus. Long. 1¼ lin.*”

Easily known by its narrow form, pale colour and much abbreviated elytra. I evidently have both sexes; in one the head is large, with the antennæ long, the abdomen shorter and more obtuse at its apex; this, I fancy, will be the male, although MM. Fairmaire and Laboulbene are of opinion that the small narrow individuals are of that sex. Taken, beneath Algæ, on the Durham and Northumbrian coasts.—*Thomas John Bold; Long Benton, Newcastle-on-Tyne, January 12, 1857.*

Capture of Anommatus 12-striatus in the North of England.—In working up some undetermined Coleoptera to-day, I detected a single specimen of *Anommatus duodecim-striatus*, *Müll.*, a species, I think, not hitherto recorded as British. My brother took it on a decaying plant of the cultivated pansy, in a garden at Morpeth, Northumberland, so far back as the 9th of August, 1847. The beautiful figure of Sturm (xxi. pl. 391) and the careful description of Erichson (*Natur. der Insecten*, iii. 286) leave me without a doubt of its specific identity.—*Id.; January 1, 1857.*

PROCEEDINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY.

December 1, 1856.—J. O. WESTWOOD, Esq., Vice-President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—‘*Annales des Sciences Physiques et Naturelles d’Agriculture et d’Industrie, Deuxième Série, Tome vii. Ire Partie*; presented by La Société Impériale d’Agriculture, &c., de Lyon. ‘*Annales de la Société Linnéenne de Lyon, Années 1854, 1855, Tome ii.*; by the Society. ‘*Mémoires de l’Académie Impériale des Sciences, Belles-lettres et Arts de Lyon, Classe des Sciences, Tome v., Classe des Lettres, Tome vi.*; by the Society. M. B. P. Perroud, ‘*Mélanges Entomologiques, 3ième Partie*; by the Author. ‘*Proceedings of the Boston Society of Natural History, Nos. 12 to 21, inclusive*; by the Society. ‘*Report of the Commissioner of Patents for the year 1854,—Agriculture*;’ by the United States’ Commissioner of Patents.

'Proceedings of the Academy of Natural Sciences of Philadelphia,' Vol. viii. Nos. 1 and 2; 'A Notice of the Origin, Progress and Present Condition of the Academy of Natural Sciences of Philadelphia,' by W. S. W. Ruschenberger, M.D., Surgeon U.S. Navy; by the Academy of Natural Sciences of Philadelphia. 'Smithsonian Contributions to Knowledge,' Vol. viii.; by the Smithsonian Institution. 'Transactions of the Linnean Society of London,' Vol. xxii. Part 1; List of the Linnean Society of London,' 1856; by the Society. 'Proceedings of the Literary and Philosophical Society of Liverpool, during the forty-fifth Session, 1855-56,' No. 10; by the Society. 'Remarks on the Habits and Distribution of Marine Crustacea on the Eastern Shores of Port Philip, Victoria, Australia, with Descriptions of Undescribed Species and Genera,' by John Robert Kinahan, M.B., T.C.D., M.R.I.S., Acting Professor Natural History Department of Science and Art, &c. &c.; by the Author. 'Revue et Magasin de Zoologie,' 1856, No. 9; by the Editor, M. F. E. Guerin-Ménéville. 'The Substitute,' Nos. 3, 4, 5 and 6; 'A Manual of British Butterflies and Moths,' No. 10; 'Elements of Entomology,' by W. S. Dallas, F.L.S., No. 3; by H. T. Stainton, Esq. 'List of the Specimens of Lepidopterous Insects in the Collection of the British Museum,' Part 9, Noctuidæ; by the Author, Francis Walker, F.L.S. 'The Zoologist' for December; by the Editor. 'The Journal of the Society of Arts' for November; by the Editor. 'The Literary Gazette' for November; by the Editor.

Election of a Subscriber.

J. V. Yatman, Esq., 2, Bombay Place, Amersham Park, New Cross, was balloted for and elected a Subscriber to the Society.

Mr. Westwood called attention to the excellent descriptions of New Holland and other exotic insects published by M. Perroud in the Transactions of the Lyons Society, and expressed a wish that some of our young entomologists would furnish similar papers, which really are a step in advance of Science: he was also desirous of knowing whether the recent discovery of the larva of *Agrotis Ashworthii* had contributed in any way to the settlement of the disputed question as to the genus to which this species should be referred.

Exhibitions.

Mr. Stevens exhibited a box of Lepidoptera and other insects, taken by Mr. Diggle at Moreton Bay, including *Papilio Anactus*, *M. Leay*; *Eurycus Cressida*, a fine *Bombyx*, allied to *Laria*, of which the female is apterous; *Deilephila Celerio*? and *Deiopeia pulchella*? apparently identical with the European species; and a fine Neuropterous insect, the *Stilbopteryx costalis* of Newman.

Mr. Douglas exhibited specimens of *Gelechia paupella*, bred from the flowers of *Inula dysenterica*: he observed that this species is closely allied to *G. inopella*, and when he discovered it he supposed it was the summer brood of that species; but, being larger, it would have been an exception to the general rule in Lepidopterous insects, in which the æstival specimens are usually smallest, as in the well-known instance of *Ennomos illunaria*: he added that the species exhibited was probably the *Aphelosetia*? *Inulella* of Curtis.

Mr. A. F. Sheppard sent for exhibition specimens of *Ypsipetes elutaria* and

a specimen of *Agrotis cursoria*, received from Mr. J. B. Hodgkinson, who considered they might prove to be distinct species.

Mr. Waterhouse observed that he had received from Liverpool a pill-box containing a quantity of *Aræocerus coffeæ* (*Phloëobius griseus*, Steph.), which had been very destructive to nutmegs: the species had been erroneously included in British lists: he added that he had received it from various parts of both the old and new world, India, Africa and South America.

Mr. Douglas said he had found this species in mace in the London Docks.

Mr. Westwood observed that the *Ptinus rubellus*, *Marsh.*, was very destructive to various condiments.

Mr. Lubbock made some remarks on the reproduction of the *Daphnia*, observing that the females laid two sorts of eggs, one kind being fertile without impregnation: he knew similar cases occurred in Aphides, &c., and wished to hear from the Members present of any instances in Lepidoptera or other orders.

Mr. Westwood said *Lasiocampa Quercus* and *Orgyia antiqua* had been known to produce fertile eggs without male intercourse. Mr. Ingpen had found unimpregnated females of *Psyche fusca* produce fertile eggs, as recorded in Stephens' 'Illustrations.'

Mr. Douglas had known instances of the eggs laid by unimpregnated females of *Fumea nitidella* having hatched.

Mr. Stainton said that Mr. Robinson had had a brood of larvæ hatched from the eggs laid by a virgin female of *Arctia Caja*, but the larvæ did not live many days: in answer to a question, put by Mr. Waterhouse, as to the grounds on which this particular female was asserted to have been destitute of sexual intercourse, Mr. Robinson stated that the fact was most indisputable, as he only had one larva of the species, which was bred alone, and had produced the female in question.

Mr. Hudson said that two of his friends had observed *Liparis dispar* to produce fertile eggs without copulation.

Mr. Westwood stated that a most valuable paper had been published by Herr Lederer in the Vienna Transactions, four years ago, on the investigation of the larva of the *Geometræ*, he considered it would be a great addition to our knowledge of the British *Geometræ* to go through the list and note the characters by which Lederer's genera differed from those of Stephens, and publish the same in our own 'Proceedings' or 'Transactions.'

Mr. Douglas believed that M. Guenée's great work on the *Geometræ* was ready for publication, and might answer the purpose suggested by Mr. Westwood.

Mr. E. Sheppard observed that M. Lacordaire's fourth volume of the 'Genres des Coléoptères' was nearly ready for publication, and that the plates of the first three volumes would be published with the fourth.

Mr. Armitage exhibited some Coleoptera, mostly from the Dardanelles and Mount Olympus, including a *Lethmo*, allied to, but apparently distinct from, *cephalotes*; a beautiful species of *Cardiophorus*; and a fine series of minute *Malachii*.

Mr. Westwood made some observations on the approximation of genera, and remarked that, on the separation of *Megacephala* from the *Cicindelidæ*, the latter became a group by itself.

Mr. Waterhouse denied that any real links existed in Creation between any two well-defined genera. In Mammalia a great many animals were pointed out as links between various groups; but when such animals, with their superficial resemblances,

came to be really examined, they were invariably thrust further away from each other: it was, he contended, the same through the whole of Creation.

Mr. Lubbock could not admit that such links never occurred, and mentioned the two large genera of Crustacea, Calanus and Pontella, as affording species which apparently militated against Mr. Waterhouse's views.

Mr. Wollaston observed that, a few years ago, Carabus and Calosoma were considered as well-defined genera, but of late the discovery of new species had so linked them that it now was impossible to separate them.

A conversation ensued on the variation of species, as apparently produced by climate and lapse of time, in the course of which Mr. Westwood observed that it would be interesting to know whether the animal remains found in mummies, &c., were the same species as at present exist in a living state.

M. Milne-Edwards said that the Ibis found embalmed with mummies was identical with the existing species.

Mr. Stainton read a paper intitled 'Observations on Genera.'—*E. S.*

Note on Serpula contortuplicata and on a Species of Othonia.—The inquiry in the last number of the 'Zoologist' (Zool. 5414) respecting the loss of the operculum in *Serpula contortuplicata* may be readily answered by many persons who have kept this elegant worm in confinement. It is by no means an uncommon occurrence for this species to lose the beautiful stopper with which, by an extraordinary development of apparently one of its tentacula, it is enabled to close its tube on the approach of danger. I have had one instance of this falling off in my own tank, and others have occurred in those of the Zoological Society, as well as in the large collection that Mr. Lloyd, of Portland Road, has generally by him; in some cases a perfect reproduction of the lost parts has taken place after a few weeks, and the animals have continued alive and healthy. I should imagine the cause of this shedding of the operculum to be the weak state of the worm, induced perhaps by an insufficient supply of its natural food, in which case the sudden withdrawal of the body might produce an unwonted strain on the stopper, and a separation would take place. As in most of the lower animals, there would be a tendency to restore the injured parts, and the time taken in perfecting them would probably depend on the strength of the creature. I find that the branchial plumes of the *Serpula* are broken and destroyed in the same manner, and apparently from a similar cause. Anything relating to the habits of a class so little generally understood as the Annelida being of interest, I am induced to mention a circumstance that I observed last week, and which to me was quite new, although perhaps known to others. A little worm of the genus *Othonia*, one of the Sabellidæ, was seen slowly crawling along the front glass of my tank; it gradually ascended to the surface of the water, and, after moving on the top to a distance of about four inches from the glass, began to sink very slowly, the body hanging perpendicularly, with the branchiæ upwards, the plumes being closely pressed together; the similarity of its appearance and manner to a caterpillar hanging by a thread induced me to try if the same means of support existed in the present case, and the passage of a small stick at about two inches above the worm, between it and the surface, at once settled

the question, as the connecting thread was so strong, although quite invisible, that with it I was enabled to draw the animal with some rapidity through the water, and, from its tenacious nature, the stick could only be disengaged by passing it round the edge of a rough bit of stone. I could find nothing on the surface of the water to which the thread might have been attached. Left to itself the worm started off tail foremost on another voyage of discovery, and was soon lost to sight among the crevices of the rock.—*E. W. H. Holdsworth*; 26, *Osnaburgh Street*, January 21, 1857.

Reason and Instinct. By the Rev. J. C. ATKINSON, M.A.

PART THE FIRST.

IN a former paper (Zool. 2341) I stated my impression (reasoning of course from our existing knowledge of, and observations on, the habits of animals), “that the thoroughly developed power”—of reasoning, namely, so far as developed in brutes—is confined “to those creatures which have come into contact with man:” and there is added “the question, How far, or to what degree, are they possessed of the power of reasoning? is one by no means easy satisfactorily to answer. It involves comparisons which require the nicest calculation and considerations of a highly complex character; and perhaps, after all, it might not be practicable to arrive at any very definite conclusion.”

The question mooted above, or at least a modification of it, has been, for some time past, much in my thoughts, and in the present paper I propose to offer something towards an attempt at its discussion.

At the very outset of our inquiry a question of much interest presents itself; *viz.*, assuming that brutes do reason, in what mode do they reason? Are we to say that they reason in a mode analogous to that in which man reasons? or, is it identical with it? In other words, Is the *anima brutorum*, or the intellectual capacity in the brute creation, of the same essence with man’s mind or intellectual powers, or merely resembling it in some parts of its action and manifestations? But, although this question presents itself here naturally and inevitably, we shall possibly be in a much better position for entertaining it when we have arrived at a somewhat more advanced stage of our inquiry.

I am quite aware that many will be ready to suggest a reference to the pages of Holy Writ, for, in some part at least, an answer to the inquiry we are engaged upon; and I do not, for a moment, seek to

question, much less ignore, the existence of certain passages in the Bible which at least seem to bear on our subject, and which therefore certainly (it may be alleged) challenge inquiry and demand consideration. Still, however willing to consent to this course, I desire at once to state my impression that no information or instruction of the kind anticipated will be found in the Bible.

The object with which the Bible was given was to teach men their relations with their Maker, and in such a way that nothing might be more plainly seen than that man's best interests coincided with entire and uncompromising observance of the Almighty's requirements. In order to this, it might be and was necessary that a brief introductory sketch of man's origin and that of the Creation at large should be given, but only so far that man, thoroughly understanding into what an abyss he had "by transgression" plunged himself, might the more willingly, as well as the more readily, comprehend the nature of the means of extrication which it was the business of the Bible, in all its several stages towards completion, to set forth and explain. Room for scientific disquisition or philosophical explanation there was none, in the scope of the volume itself, any more than in the mental culture or intellectual adaptability of those to whom it was progressively delivered, whether it were the Children of Israel under Moses, the Jewish nation in the time of the Prophets, or the "foolish things" and "weak things of the world" in the time of our Saviour and his Apostles. Consequently, when things which are properly the subject matters of scientific and philosophical inquiry and research are mentioned in the Scriptures, whether directly or in the way of allusion, they are spoken of in what we may term a popular manner, with no attempt at, or thought of scientific accuracy or even precision of expression: just as, in fact, we ourselves still speak of the sun as "setting," as "rising," as "journeying towards the west;" or of the dew "falling," or of the "thunder-bolt" striking the tree or the building. No doubt Moses was "learned in all the wisdom of the Egyptians," but to how many, or rather how few, of the Egyptians themselves was this learning common. And much more does this negation apply to Moses' countrymen, oppressed and ill-treated as we well know they were. His miracles might convince them that he was sent to them with a special mission by the great "I am," of whom doubtless they had retained a much more than merely traditional recollection; but not all his miracles could have convinced them that the world was a globe and not a plane surface with only enough inequalities to diversify what otherwise would have a dead level; that the earth was in motion and not the sun; that

there had been geological epochs, of almost inconceivable duration, countless ages before man was sent to be an inhabitant of the globe. All such topics as these—I believe we may use terms much more comprehensive, and say all topics whatever, if properly the subjects of scientific investigation—must have remained, even in the hands of an inspired lecturer, worse than unintelligible, even very “foolishness” to the Israelite of the Exodus, to the Jew of the Empire, or to the Gentile of the infancy of the Christian era; and if so, then, from the very nature of things, a stumbling-block as well; that is, an obstacle and hindrance to that which the Book professed to be and to have for its object. And therefore I expect to find, in the Bible, no information, properly so called, on geological matters, and none in Natural History, or Science, or Philosophy in whatever department. Allusions and references to such topics I may and do expect, but conveyed, notwithstanding, in words uncharacterized by precision or scientific accuracy.

The principal passages supposed to bear on our subject are, I think, the following:—

1. “Who knoweth the spirit of man that goeth upward, and the spirit of the beast that goeth downward to the earth?”—*Eccles.* iii. 21.

2. “Man that is in honour and understandeth not is like the beasts that perish.”—*Ps.* xlix. 20.

3. “Be ye not as the horse or as the mule, which have no understanding, whose mouth must be held in with bit and bridle, lest they come near unto thee.”—*Ps.* xxxii. 9.

4. “Natural brute beasts made to be taken and destroyed.”—*2 Pet.* ii. 12.

5. “Brute beasts” (“knowing things naturally”).—*Jude* 10.

1. With respect to this passage, it appears to me that the utmost we can say is that the writer gives utterance to the expression of a doubt, which is more apparent in the Septuagint, as follows, “And who has seen the spirit of sons of man, *if* it ascends up on high (*εἰ ἀναβαίνει αὐτὸ ἄνω*); and the spirit of the beast, *if* it descends down into (or upon) the earth? (*εἰ καταβαίνει αὐτὸ κάτω ἐπὶ τὴν γῆν*).” One thing at least is clear, that he speaks of “the spirit of the beast” (*τὸ πνεῦμα τοῦ κτήνους*) as a thing having existence; and if we take his words strictly and literally, we shall be obliged to say that, as it is put in contradistinction to the *spirit* and not the *life* of man, it must mean something more than merely the life of the beast.

2. The second passage, to us, engaged in the inquiry we are urging, is less instructive still. In the Septuagint there is no word of "perish:" it is simply, "Man being in honour has no understanding; has been compared to the sense-wanting beasts" (τοῖς κτήνεσι τοῖς ἀνοήτοις, *i. e.* beasts that have no good sense or reason to govern and restrain their appetites and passions; ἀνοήτος as opposed to σώφρων). For if we urge this epithet to its extreme sense,—take it quite literally,—it will prove a great deal too much, *viz.* that no brute, under any circumstances, possesses intelligence, or sense, or reason; which is contrary to fact.

3. This passage simply states that "horse and mule have no understanding" (οἷς οὐκ ἔστι σύνεσις), which, again, if we take it literally or precisely, establishes too much; as the intelligence, the docility of this or that brute are proverbs, and not only so, but are often adverted to in the Bible itself, as, for instance, "The ox knoweth his owner and the ass his master's crib; but Israel doth not know, my people doth not consider" (Isaiah i. 3); where, from the antithetical nature of the verse, the intelligence of the ox and ass are much more than merely inferred or hinted at. The passage now before us reminds man of his vast, his immeasurable superiority, in point of reason and understanding and good sense, by the proper use of which he may restrain and rule himself, over the brutes, and bids him act accordingly,—walk worthily of his superior gifts; but does not deny to the brutes the possession of that which, although it may be only such as not to render unnecessary restraints imposed by others, is still notoriously theirs.

4 and 5. Remarks of a precisely similar character may be made with respect to each of these two passages. If they prove anything in our inquiry they prove too much. If the brute creation,—for St. Jude's words reach to this extent,—be ἄλογον, in the full sense of the word, that is, devoid of reason or understanding, there is no exception to the rule: all beasts are equally understandingless, which is a conclusion simply absurd.

We come now to a passage of a different character: "For the earnest expectation of the creature waiteth for the manifestation of the sons of God. For the creature was made subject to vanity, not willingly, but by reason of him who hath subjected the same in hope, because the creature itself also shall be delivered from the bondage of corruption into the glorious liberty of the children of God. For we know that the whole creation groaneth and travaileth in pain together until now" (Rom. viii. 19—22). Indeed, this quotation seems to me

hardly relevant at all in our discussion, and I only refer to it because some, if not founding their notion on this passage, have at all events sought to confirm that notion by a reference to it,—the notion, I mean, that for the brute creation, as well as for the family of man, the present is not the only existence,—that there is a hereafter of life for the former as well as for the latter. If, however, there cannot be found more countenance for this notion in other arguments besides any which may be afforded by the text in question, it must, I think, remain without either support or foundation. For the whole rests upon the supposed sense of our translation, or rather, of one word in it,—“creature,”—which word does not bear, in the passage, any other sense the least differing from that borne by the expression “whole creation:” the word in the original being the same in each of the four verses quoted, viz. ἡ κτίσις.

On the whole, then, I am of opinion that a reference to the pages of Scripture does not, in the least degree, assist us in the conduct or solution of our inquiry, all that we find being either allusions to man’s immense and unquestioned superiority over the beasts, with injunctions to him, thereon founded, to be careful not in any wise to lower himself toward the level of the beast by unworthy conduct; or else an admission of, or allusion to, the existence of a mystery past solving by human wisdom.

The safer and better and wiser method of conducting the inquiry would seem to be that of considering, as attentively and impartially as possible, the various actions of various species of animals, and then to endeavour, first, to refer such actions to what may reasonably appear to have been their source or influential cause, whether mere instinct or mingled instinct and reason, or what certainly can be no less than reason; and then, in the second place, if reason, to weigh and estimate what degree or kind of exercise of reason, from its simplest manifestation to its somewhat more complicated operation, may be supposed to be betokened by the several actions indicated.

The first part of this process has been already attempted, at least in a measure, in a former paper, and in the present paper we shall not formally retrace the steps then taken.

Now I do not mean to imply that it may prove to be easy, perhaps even possible, in a vast number of cases, to discriminate with absolute certainty between what clearly is instinct, and what, as clearly, is not instinct, as illustrated, I mean, by this or that set of actions possibly supposed to be prompted by it. In the instance of an infant how difficult it is, in its earliest period of life, to trace the difference which

exists in its actions so far as that difference depends on, or is due to, a difference in the source or origin of those actions. Everything done by an infant of a few days old is, no doubt, in its origin, due to an instinct; by instinct it sucks the mother's breast, the artificial nipple, the finger, anything that is presented in proximity to its mouth; and instinctively are all the other functions of its little life fulfilled. Perhaps the first symptom of nascent intelligence is the seeming recognition of the voice of the nurse; but even this is for weeks uncertain, and weeks more must elapse before it may be decisively pronounced that intelligence is fully operative,—that the child understands,—that some of its actions are certainly, though still possibly but in a small degree, under the influence of something decidedly higher than instinct: and this is true in the case of the existence which is under our hourly, our unceasing observation, and which is the object of our tenderest care and most unwearied interest and attention. How much more, then, must we look for corresponding difficulties and most fruitful sources of doubt, when we begin the attempt of assigning the actions of an animal, some of them to one source, some to another; to say of this that it is due to instinct,—of that, that it originates in something that operates otherwise than as instinct operates. No doubt many amid the actions of an animal may be brought, without much hesitation, under the former category; but of those remaining what will be the proportion presenting matter for inquiry, for examination, for much balancing, now on this side, now on the other? And all this, be it observed, is true in the case of those animals with which we are, so to speak, in the habit of intimate association,—the dog and the horse, for instance. We are deficient in means of communication with them, and they, to a much greater degree, with us. We must be close, skilful, accurate, patient, persevering observers, before we can convey new ideas, ideas out of the old, well-beaten track, to the most intelligent animal; and still more, before we can receive ideas they may desire to communicate to us. And if the difficulties be such where the facilities of observation and understanding are out of all measure the greatest, they must of necessity be greatly enhanced when we come to the examination and investigation of the actions of animals, or tribes of animals, little or not at all domesticated or brought under the influence of man. Such considerations are amply sufficient to show the existence of many hindrances in the way of our arriving at anything like an entirely satisfactory solution of the question before us. Still I hope we may find the materials for at the least approximating to such a solution.

I have already, in the preceding paragraph, to a slight degree, anticipated some of the conclusions I have come to in conducting this inquiry, and I may perhaps be permitted here, in some measure, further to anticipate a portion of the argument which, some might think, would have been quite as much in its place in a more advanced stage of the discussion. The author of 'Psychological Enquiries' says (p. 174), "We seldom see animals, in their free and natural state or otherwise than as being cowed and oppressed by the superiority of man;" and Mr. Couch ('Illustrations of Instinct,' p. 187) expresses himself thus: "I have purposely avoided drawing any illustrations of intellect from the history of the dog, because, however sagacious many of its actions are, an objection might be raised that its proceedings are influenced by the long-continued habit of receiving instructions from man." Now I cannot quite go with either of these gentlemen in this matter. I cannot think that a *man*, intellectually inferior to another man, can be properly said to be "cowed and oppressed by the superiority" of the other, even although daily or continually brought into contact with that other, and made to act in concert with or possibly in subjection to him. In fact, the reverse is proverbially true. And therefore I do not see how *animals* should at all suffer intellectually by their habits of association with and subjection to man, always, of course, supposing that they are not cowed or oppressed by something apart from intellectual superiority, such as hard usage, the unyielding fetters of stern discipline,—that, for instance, which elicits the popular air from the piping bulfinch, or produces the "paces" of the "managed horse," and the like. And, so far from thinking the long-continued habit of receiving instructions from man a prejudice to the animal, when made the subject of our special inquiry, or a hindrance and obstacle to ourselves in prosecuting the inquiry, I hold a contrary view. I should as soon think that, if it were my object to ascertain what is the intellectual or mental calibre of the Bushman or the Digger, the said Bushman or Digger would be prejudiced, as to the result of my inquiry, by a course of instruction in a good school, or that the inquiry itself would be, by that process, rendered more difficult, or less satisfactory and conclusive in the results it led to. For surely if it be made to appear not only that an animal, human or brute, has certain faculties, and that these faculties, under certain processes, are capable of being developed, strengthened, improved,—by this very fact the inquiry into the nature or the degree, or the measure of those faculties, antecedently presumed to exist, must be not so much facilitated as resolved, or at least put in the direct and

imminent way of resolution. Let me succeed in proving that the dog or the horse, which has been for three generations, or for ten, or for thirty, brought under the direct influence of the mental superiority of man, has been thereby benefitted in his own intellectual or apparently intellectual qualities, and I think a great step is taken in showing that the original dog or horse was possessed of the same attributes (for otherwise man must have implanted or created them), though we may say that, for all we know, they were originally latent or nearly so. And this argument becomes immensely more conclusive when applied in the case of an animal itself the first in the series of domestication, or the offspring of the first,—a seal, for instance, or an otter.

But to grapple more closely and methodically with our subject:—

I. The metaphysical distinction between what is animal and what is not is stated by Locke as follows:—"The faculty of perception (which he defines as being the first step and degree towards knowledge, and the inlet of all the materials of it) seems to be that which puts the distinction betwixt the animal kingdom and the inferior parts of Nature:" and his arguments in support of the statement are not easily to be answered.

II. "The next faculty of the mind," he continues, "whereby it makes a further progress towards knowledge is that which I call retention, or the keeping of those simple ideas, which, from sensation or reflection, it hath received. And this it does in two ways; first, by means of contemplation; second, by means of memory;" which latter term he takes to signify "that the mind has a power, in many cases, to revive perceptions which it has once had, with this additional perception annexed to them, that it has had them before. This faculty of laying up and retaining the ideas that are brought into the mind several other animals seem to have to a great degree as well as man."

III. "Another faculty we may take notice of in our minds is that of discerning and distinguishing between the several ideas it has.* * How far brutes partake in this faculty is not easy to determine. I imagine they have it not in any great degree. For though they probably have several ideas distinct enough, yet it seems to me to be the prerogative of human understanding, when it has sufficiently distinguished any ideas so as to perceive them to be perfectly different, and so, consequently, two, to cast about and consider in what circumstances they are capable to be compared. And, therefore, I think beasts compare not their ideas further than some sensible circumstances annexed to the objects themselves. The other power of

comparing which may be observed in men, belonging to general ideas, and useful only to abstract reasonings, we may probably conjecture beasts have not."

IV. "The next operation we may observe in the mind about its ideas is composition, whereby it puts together several of those simple ones it has received from sensation and reflection, and combines them into complex ones. * * In this also I suppose brutes come far short of man. For though they take in and retain together several combinations of simple ideas—as possibly the shape, smell and voice of his master make up the complex idea a dog has of him, or rather are so many distinct marks whereby he knows him—yet I do not think they do of themselves ever compound them and make complex ideas."

V. The fifth power or faculty of the mind "is called abstraction, whereby ideas taken from particular beings become general representatives of all of the same kind; and their names general names applicable to whatever exists conformable to such abstract ideas. * * If it may be doubted whether beasts compound and enlarge their ideas that way, to any degree: this I think I may be positive in, that the power of abstracting is not at all in them, and that the having of general ideas is that which puts a perfect distinction betwixt man and brutes, and is an excellency which the faculties of brutes do by no means attain to. For it is evident we observe no footsteps in them of making use of general signs for universal ideas: from which we have reason to imagine that they have not the faculty of abstracting or making general ideas, since they have no use of words or other general signs. * * And I think we may suppose that it is in this that the species of brutes are discriminated from man; and 'tis that proper difference wherein they are wholly separated, and which at last widens to so vast a distance. For if they have any ideas at all, and are not bare machines (as some would have them) we cannot deny them to have some reason. It seems as evident to me that they do, some of them, in certain instances, reason, as that they have sense: but it is only in particular ideas, just as they received them from their senses. They are, the best of them, tied up within those narrow bounds, and have not (as I think) the faculty to enlarge them by any kind of abstraction."

I have thought it best to quote the remarks of the great original thinker thus *in extenso*, but, instead of making a running commentary on them in due sequence, I purpose to examine and possibly demur to the correctness of what has been said under the last head. Because, if it can be shown that brutes, or some of them, do actually possess

more of this power of abstraction than he seems willing to concede to them, the difficulty, if any exists, of establishing a claim, on their part, to the possession of powers of composition and comparison greater than those laid down and defined in the preceding extracts will be greatly lessened.

To proceed, then: and, in the outset, for the object of the simplification afforded of a somewhat hard word, quite as much as for anything else, I extract a few sentences more from a volume already quoted (Brodie, p. 168): "Now, taking it for granted that Abstraction can mean nothing more than the power of comparing our conceptions with reference to certain points to the exclusion of others; as, for instance, when we consider colour without reference to figure, or figure without reference to colour; then I do not see how we can deny the existence of this faculty in other animals, any more than in man himself."

I will next take two or three recorded instances of sagacity or intelligence on the part of the dog or some other animal, and, with their assistance, try the question of abstraction or no abstraction.

"The sagacity of the animal, as shown in the following incident, will be better understood if we consider that it is probable this dog had never before seen an instance of similar danger from fire, and had never before contemplated fire in any other form than as an useful contrivance for his own and his master's comfort. In the spring of the year 1845, a mastiff dog, in Cornwall, having discovered that the roof of his master's house was in flames, ran in doors howling dismally, and, pulling at the garments of the inmates, urged their retreat from the building; and, hurrying out of the house, howled again and directed their attention by his looks to the flaming roof." ('Illustrations of Instinct,' p. 189). Again; a friend of Mr. Jesse's "had been reading a newspaper in bed, with a candle near him, and had fallen asleep. A favourite terrier always slept in the room with him, and he was awoke by the dog scratching him violently with his fore feet. Thus his life was probably saved, for he was in time to call for assistance, and prevent the house being burnt." (Jesse's 'Gleanings,' i. 236). These two instances, and I have a variety of others at command, sufficiently establish the possession, by certain brutes, of the faculty or power of abstraction. If it were not by the idea of danger that the actions of these two dogs were motived, by what were they? Not simply by the unusualness of the appearances they observed, for dogs do not act thus if they see a much fiercer conflagration than was to be beheld in the flaming roof or blazing newspaper and bed-linen. Indeed, no commonly

plausible explanation of the conduct of these two brutes can be given, except that involved in the concession of the idea—the abstract idea—of danger, and of danger, moreover, threatening their master or their master's family.

I will select another instance or two. "Two small terriers were in the habit of leaving their home together and hunting rabbits in a warren at some distance from it. One of them got so far into a rabbit-burrow that he could not extricate himself. His companion returned to the house, and by whining and using many significant gestures, attracted the notice of his master. When he had done this he ran a short way forward and then returned; and, after repeating this some time, his master was induced to follow him. The dog led him to the rabbit-burrow, and he began to bark and scratch violently; and, on procuring a spade, the dog was dug out." ('Gleanings,' i. 230). Again; amid the gloom of a dark night a dog is observed incessantly barking before the leaders of a mail-coach travelling at its usual rapid pace, and jumping up at the horse's heads. Fearful of an accident the coachman pulls up, and the guard gets down to drive the animal away. "The dog, however, ran a little way before the guard and then returned to him, making use of such peculiar gestures that he was induced to take out one of the lamps and follow the dog. About a hundred yards on he found a farmer lying drunk across the road, and his horse grazing by the side of it." ('Gleanings,' i. 235).

How are the actions of these two dogs to be accounted for? To me it appears most evident that there was in the mind of each of them an influential idea at work, and that that idea was there through a process of abstraction. It was with the view of obtaining help or assistance that they acted as they did; and the abstract idea of aid—in the one case needed by the companion dog, in the other by the actor's master—was the influencing motive to the several actions recorded. Indeed, in the second case, there was something more: there was a combination or "compounding" of ideas and motives. Had the coach gone on the master would have been grievously injured, possibly killed. The dog's attempt—I think we may fairly say his thought and wish—was therefore to stop the coach; the attempt and wish to stop the coach originating, of course, in his perception of his master's danger, and his desire to avert it. But when the coach was stopped, he wished and aimed at something more, and that was help; and, therefore, he ran before the guard in the way noted, and otherwise conducted himself so as to induce the guard to follow him to the place where his helpless master lay, and—what his own force

was inadequate to—rescue that master from the imminent danger. At least it is thus we should have reasoned had it been a dumb human being who had acted as these dogs are declared to have done, and we should, moreover, have given him credit for the thoughtfulness and energy he displayed, in spite of the great natural disadvantages he lay under, for giving alarm or soliciting assistance in the alleged case of need. Will it not then be uncandid and unfair if we reason and deal on other grounds with the dumb brute?

Once more: a terrier acquires “a habit of hunting for hares by himself. He soon found that he was labouring in vain, for, with all his hard running, he never could catch one. His master often watched his endeavours to coax an excellent greyhound out of the yard. He at last effected his purpose. The good nose of the terrier soon enabled him to find a hare, which the greyhound killed and brought home. After that the two dogs became the most arrant poachers in the country, and were inseparable till the halter ended their poaching, their friendship and their lives.” (*Gleanings*, i. 25.) A somewhat similar case occurs to my recollection, except that a setter and a greyhound were the parties implicated. To prevent the setter from hunting on his own account, a heavy clog was fastened to his neck. The difficulty, however, hence arising, was surmounted by the greyhound carrying the clog in his mouth until the setter found the game; he then dropped it and began the course. Again; “A raven frequently went hunting with a dog that had been bred up with him. On their arrival at a covert the dog entered and drove the hares and rabbits from the thicket, while the raven, posted on the outside of the cover, seized everything that came in his way, when the dog immediately hastened to his assistance, and by their joint efforts nothing escaped.”

In each of these three cases—the first being particularly interesting from the often-observed process of “coaxing” or invitation—the abstract idea of help, mutual help, was present to the mind of either of the actors; and, moreover, in the first instance, originating in the mind of one, was by him intelligibly and successfully communicated to that of the other.

I pause here to advert to a suggestion which forcibly presents itself to our regard. The animals whose “doings” we have been noticing might not also be able to commend their “sayings” to our attention,—might have no “use of words,”—but can we, in strict truth and fairness, pronounce them to have been also without any other “general signs,” by the use of which they could succeed in

conveying or imparting their ideas? In the case of the fire the dogs succeed in making their meaning evident,—in signifying their ideas,—in conveying the intelligence they wished to impart. Was it not the same with the dog whose canine companion had got himself into such an unpleasant “fix” in the rabbit-burrow?—with him whose master lay, drunk and senseless, in the very track of the rapidly-advancing coach?—with the terrier who coaxed the mentally “slower” but physically faster greyhound into the pleasures of a stolen course?

And this brings me to a part of our reasonings which requires somewhat more detailed notice and elaboration, and which I desire to preface by the simple statement that the entirely and ascertained successful communication of ideas, very various in their nature and origin, by various animals, in a state of domestication, to their fellows, or to animals of a different tribe from themselves, is a fact which rests upon a great number of authentic observations. But, without dwelling upon this at present, I wish to state my firm belief that animals in general have means of intercommunication, that they are able to communicate their ideas to one another, and that some at least of those means and that ability consist in uttered sounds. I do not simply mean that the note or action of alarm of one species of bird or beast is intelligible, to the individuals of various species of both those families who may be within scope of hearing or observation, as well as to its own more immediate fellows; but that, besides this, animals of the same species, or of different species, but adopting similar habits and places of resort, communicate successfully and instantaneously to their companions other ideas beside those of apprehension or alarm. How often have I seen a covey of fifteen or eighteen partridges rise as one bird;* a flock of eighty or a hundred golden plover take wing at the same instant, fly—every bird of them—in the same direction, turn at the same instant, rise to a considerable height all together, wheel round their disturber again and again with one consent, lower their flight as instantaneously, and finally all settle on the spot they seem, by their manner, to choose, or to adopt as chosen by some leader, without one doubtful or dissentient bird among them. Not long since I observed all these particulars in the flight of a large flock of golden plover. Among them I detected one gray plover. He was as much

* Ten days since I marked a covey on the edge of a steep bank of no great height: I came upon them quietly, and saw one bird feeding above the rest, who were out of sight on the bank below, for some seconds before it saw me. After a pause I advanced a step; it raised its head, saw me, and in an instant was on the wing, but not perceptibly before the rest, most of whom certainly did not see me at all before taking wing.

at home with them in all their evolutions as if golden and not gray. How often, too, on the oozes of the Essex coast may tens of thousands of the there-called ox-bird be seen in a flock, and with them redshanks, a few gray plover, ring dotterel, &c. The whole spring together, fly together, wheel together, presenting to the spectator this moment a sheet of brilliant white, and the next, as they execute one of their marvellous turns, nothing but a dusky cloud of rapidly moving dark objects. All this would be not simply unintelligible, but impossible, except on the supposition that they have some feathered fugleman to give the word and the time, and that their code of signals, however expressed, is not only intelligible but thoroughly understood and implicitly acted on by every bird in the flock.

But again; a flock of wild geese alight to feed in a given field; one of the number invariably undertakes the post of sentinel, the others straightway fall to on the corn or pease. How is he appointed,* if they have no means of communication, no language, and no substitute for language? The same of rooks, of deer feeding, indeed, of all gregarious tribes of birds and beasts.

I adduce another instance: in my garden here I grow a good many strawberries, and, from my vicinity to the moors, I am liable to the visits and depredations of a number of ring ouzels, in addition to the customary detachments of blackbirds and thrushes. At first, one bird, or perhaps a pair, appears. If I shoot these first visitors, after a day or two another arrives; and if he, too, is shot, a third and a fourth come straggling in at intervals of a day or so. But suppose I permit the first comers to feast unmolested, in three days I have twenty-five or thirty of the boldest, most persevering, and—as far as ring ouzels prevail amid the numbers—most insolent robbers, always engaged in plundering my strawberry-beds, nor can I succeed in expelling them, save for a short time after the gun has been discharged, as long as I have any fruit which is palatable to them left in the garden. But, further, Bishop Stanley gives the following anecdote, and vouches for its truth:—"At a gentleman's house in Staffordshire the pheasants are fed out of one of those boxes, the lid of which rises with the pressure of the pheasant standing on the rail in front of the box. A waterhen observing this, went and stood upon the rail as soon as the pheasant quitted it; but the weight of the bird being insufficient to raise the lid of the box, so as to enable it to get at the corn, the waterhen kept

* "By what language, or by what instinct, is this bird made to watch for the safety of others, when he was probably as hungry as those which were feeding near him?"—'Gleanings,' ii. 206.

jumping on the rail to give additional impetus to its weight; this partially succeeded, but not to the satisfaction of the sagacious bird. Accordingly it went off, and soon returning with another bird of its own species, the united weight of the two had the desired effect, and the successful pair enjoyed the benefit of their ingenuity." ('Familiar Hist. of Birds,' 309.) How are such facts as these to be accounted for, if not on the ground that, in the one case, blackbirds and their congeners can communicate with each other; in the other, that water-hens can, and with some explanatory matter added to the bare communication, moreover?

I might multiply such instances as those just given indefinitely. I might appeal to the experience of every moderately attentive observer to confirm and add to the number so multiplied. I might produce thousands of recorded facts which must remain inexplicable on any other hypothesis than that animals have some kind of language or substitute for language, immeasurably inferior, of necessity, to that vitalised by articulate speech, but still sufficient, and well adapted to the requirements of those whose lot it is to use it and depend upon its use. But I turn to a different line of argument: how many thousand species of birds and beasts are there in creation, and no one of them dumb, voiceless, unable to utter sounds; and the majority of all these countless creatures are able to utter a variety of sounds. The partridge has five distinct, and, even to the comparatively dull ear of man, quite intelligible notes. The nuthatch has three besides what it may employ with its young. The golden plover four; the blackbird three, besides its song, and all with the same reservation as in the case of the nuthatch. But, as to this reservation, who shall venture to limit, as to number, the modes of expression in use between the mother and her brood of young ones? One short, by no means very loud sound brings them all clustering round her; another sends them scudding in all directions for concealment; a third seems to have stricken them all with instant paralysis, so suddenly do they cower motionless on the spot each occupied the moment before the parent bird spoke to them. Surely it is derogating foolishly and presumptuously from Infinite Wisdom to question or deny, with such facts before us, that animals of various kinds are capable of vocal communications with each other; for it leaves us no alternative but to say, and in despite of the simplest exercise of common candour, that the power to produce these different notes, these various vocal inflections, these diverse intonations and expressions, were given without purpose and with no effect or result.

All this, too, independently of another consideration. The hapless individual of our own, by comparison, exalted species, who has no power of speech and none of hearing, employs signs and symbols to express his ideas, to be the medium of communication not only between himself and his hearing or speaking fellows, but between himself and others, like himself, deaf and dumb. The bird and the beast are no whit behind him in the possession and in the use of the same power and medium. Hear the remarks of a close and most intelligent observer:—"If, when wild geese are feeding, any enemy or the slightest cause of suspicion appears, the sentry utters a low croak, when the whole flock immediately run up to her, and, after a short consultation, fly off.* * Thus also wild ducks, curlews, crows, and almost all birds, when feeding in flocks, leave sentries on whose vigilance the rest entirely depend, taking no heed of anything around them, but feeding in conscious safety. Nor is it necessary for a cry of alarm to be given, as the flock perfectly understand what is going on by the actions or looks of the one who is watching, distinguishing at once whether the sentry is intent on some sound or object at a distance, or whether the danger is imminent and pressing. It is not only by the voice and action of birds of *their own* kind that flocks of wild fowl guide their actions; the startled movement or cry of a redshank or peewit is sufficient to put on wing a whole flock of geese or ducks instantaneously, and also to tell exactly from what point the danger is to be apprehended." ('Tour in Sutherland,' ii. 140.)

On the whole, and giving careful and impartial consideration to the infinite number and variety of facts which bear on this subject, it appears to me impossible to come to any other conclusion, except that animals do possess adequate means of communication with each other; and that many of these means of communication are sufficient to convey precise ideas not only to the fellow-animals of the same species, but to a variety of others of different species, different genera, and even different tribes. It may be quite true that these communications are limited—*so far as we know*—to a small number of subjects,—their food, the approach of danger, the means of escape, the place of refuge, and the like; but, suppose this admitted, I contend that the reasons for such admission are, at the least, fewer, less apparent, and much less cogent and convincing than those for admitting the power of communication contended for, whether we call that power language, or by any other name, or leave it without any specific name whatever.

I now revert, very briefly, to a part of this branch of our subject barely glanced at a few pages back,—I mean the power possessed by

animals subject to the influences of domestication, to impart information or communicate ideas, in a much more extensive sense than we have contended for in the case of animals still in a state of nature, to other domesticated animals, whether of a different tribe or not, which of course includes the converse power of apprehending or rightly conceiving of what is so communicated. Dog communicates with dog, dog with raven and raven with dog, dog with horse, dog with goose, and so on; while, besides all this, they all communicate intelligibly with man, and intelligently receive his communications, whether made by word or sign. Horses employed in farm draught-work are guided and influenced almost entirely by the voice and tones of their driver, to the comparative exclusion of whip and reins; and it is quite worthy of notice that a farm-horse taken from one district of the kingdom to another, where different words or sounds are used by the ploughman or carter in addressing, encouraging, chiding his team, is as much at a loss and as awkward as would be the English labourer under a French foreman or a French recruit with no explanation of the orders of the English drill-sergeant. Still the equine foreigner is not long in picking up the meaning of the new words addressed to him, and soon becomes as habile as the native of his new district. Other instances of the same kind might be given. The following examples of intelligence, too, are very striking:—"The dog that lives with his master constantly, sleeping before his fire, instead of in the kennel, and hearing and seeing all that passes, learns, if at all quick witted, to understand not only the meaning of what he sees going on, but also, frequently in the most wonderful manner, all that is talked of. I have a favourite retriever, a black water-spaniel, who for many years has lived in the house and been constantly with me. He understands and notices everything that is said, if it at all relates to himself or to the sporting plans for the day. If at breakfast time I say, without addressing the dog himself, 'Rover must stop at home to day, I cannot take him out,' he never attempts to follow me; if, on the contrary, I say, however quietly, 'I shall take Rover with me to day,' the moment that breakfast is over he is all on the *qui vive*, following me wherever I go, evidently aware that he is to be allowed to accompany me. * * His great delight is going with me when I hunt the woods for roe and deer. I had some covers about five miles from the house, where we were accustomed to look for roe. We frequently made our plans over-night, while the dog was in the room. One day, for some reason, I did not take him; in consequence of this, invariably when he heard us at night forming our plan to beat the woods, Rover started alone

very early in the morning, and met us up there. He always went to the cottage where we assembled, and sitting on a hillock in front of it, which commanded a view of the road by which we came, waited for us; when he saw us coming, he met us with a peculiar kind of grin on his face, expressing, as well as words could, his half-doubt of being well received, in consequence of his having come without permission: the moment he saw I was not angry with him, he threw off all his affectation of shyness, and barked and jumped upon me with the most grateful delight." ('Highland Sports,' p. 108.) Again; "A shepherd once, to prove the quickness of his dog, who was lying before the fire in the house where we were talking, said to me, in the middle of a sentence concerning something else, 'I'm thinking, sir, the cow is in the potatoes.' Though he purposely laid no stress on these words, and said them in a quiet, unconcerned tone of voice, the dog, who appeared to be asleep, immediately jumped up, and leaping through the open window, scrambled up the turf roof of the house, from which he could see the potato-field. He then, not seeing the cow there, ran and looked into the byre, where she was, and, finding that all was right, came back to the house. After a short time, the shepherd said the same words again, and the dog repeated his look-out. But, on the false alarm being a third time given, the dog got up, and wagging his tail, looked his master in the face with so comical an expression of interrogation, that we could not help laughing aloud at him; on which, with a slight growl, he laid himself down in his warm corner, with an offended air, and as if determined not to be made a fool of again." ('Highland Sports,' p. 111.) If need were, I could parallel these instances by others precisely analogous, from the biographies of different animals who were intimate acquaintances of my own; my old friend Pepper (Zool. 2337) being one of them; a very excellent water-spaniel retriever bitch, belonging to one of my oldest friends and allies with whom I used to spend much time, another; a third, my own property, and so on. But I should only be occupying space and time unnecessarily by so doing.

Now, when we fairly and impartially consider the numerous and unquestionable instances and modes of intercommunication and mutual intelligence possessed by animals, not only, and in a very remarkable degree, among domesticated species, but also by those which are living in their natural wild condition, I am not prepared to assent to the following dogma:—"Men, who through some defect in the organs, want words, yet fail not to express their universal ideas by signs, which serve them instead of general words; a faculty which we

see beasts come short in" (Locke, ch. xi. § 11); unless, that is, we are permitted to take the phrase "come short in" as meaning only "are much inferior" (to man, namely), instead of, as the author most certainly intends, "have no use of," or "are entirely without."

If, then, it be conceded—as I think it will be by any candid and unprejudiced thinker—that, to a certain extent, and under certain limitations, a variety of animals do possess adequate and intelligible means of intercommunication, not only is one chief ground for denying to these brutes the power of "Abstraction, or making general ideas" cut away, but a most conclusive argument for the actual possession by them of that faculty mainly established; and that, altogether independently of the manifold and most striking evidences of the existence and activity of the faculty, as illustrated in countless actions of great numbers of various brutes.

To proceed, then: to whatever extent we may have succeeded in adducing satisfactory reasons for believing animals, or some of them, to be possessed of the power or faculty of abstracting,—to be even capable of carrying on a train, no matter how short, of abstract reasoning; we have, to the same extent, made it unnecessary to go, step by step, through the process of showing them to be endowed, in no inconsiderable degree, with the faculty of comparing and compounding their ideas; for most certainly, here, the less is included of the greater: and, to say the least, it may be quite as interesting instead to adduce a few additional facts in illustration of the workings of brute intellect. "Though dogs often disagree and are jealous of each other at home, they generally make common cause against a stranger. Two of my dogs, who were such enemies and fought so constantly, that I could not keep them in the same kennel, seemed to have compared notes, and to have found out that they had both of them been bullied by a large powerful watch-dog, belonging to a farmer in the neighbourhood. They suspended their own hostilities and formed an alliance, and then they together assaulted the common enemy, and so well assisted each other, that, although he was far stronger than both my dogs put together, he was so fairly beaten and bullied that he never again annoyed them or me by rushing out upon them as we passed by the place, as he had always been in the habit of doing before he received his drubbing." (Tour in Suth. ii. 213.) "I went one morning in July, before daybreak, to endeavour to shoot a stag.* * Just after daylight I saw a large fox come very quietly along the edge of the plantation in which I was concealed: he looked with great care over the turf wall into the field, and seemed to long

very much to get hold of some hares that were feeding in it, but apparently knew that he had no chance of catching one by dint of running; after considering a short time, he seemed to have formed his plans, and, having examined the different gaps in the wall by which the hares might be supposed to go in and out, he fixed on the one which seemed the most frequented, and laid himself down close to it, in an attitude like a cat watching a mouse-hole. * * I watched all his plans; he first, with great silence and care, scraped a small hollow in the ground, throwing up the sand as a kind of screen between his hiding-place and the hares' meuse; every now and then, however, he stopped to listen, and sometimes to take a most cautious peep into the field; when he had done this, he laid himself down in a convenient posture for springing upon his prey, and remained perfectly motionless, with the exception of an occasional reconnoitre of the feeding hares. When the sun began to rise, they came one by one from the field to the cover of the plantation; three had already come in without passing by his ambush, one of them came within twenty yards of him, but he made no movement beyond crouching still more flatly to the ground—presently two came directly towards him; though he did not venture to look up, I saw, by an involuntary motion of his ears, that those quick organs had already warned him of their approach; the two hares came through the gap together, and the fox, springing with the quickness of lightning, caught one and killed her immediately. * * After seeing this I never wondered again as to how a fox could make prey of animals much quicker than himself, and apparently quite as cunning." ('Highland Sports,' p. 164.) "A fox had been partially tamed, and was kept fastened by a chain to a post in a courtyard, where he was chiefly fed with boiled potatoes. But the animal seems to have thought that a desirable addition might be made to his fare from the numerous fowls that strutted round him, but whose caution kept them beyond the reach of so formidable an enemy. His measures were soon taken; and having bruised and scattered the boiled potatoes which he had received for his dinner at the extremity of the space that the length of his chain enabled him to command, he retired in an opposite direction, to the full extent of his chain, and assumed the appearance of utter regardlessness of all that was passing around him. The stratagem succeeded; and when some of the fowls had been thrown so much off their guard as to intrude within the circle of danger, the fox sprung from his lurking-place, and seized his prey." ('Illust. of Instinct,' p. 176.) The following I have from an old and much-valued friend, a good and scientific naturalist and excellent

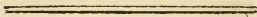
man, resident at Scarborough. Walking with a favourite Newfoundland dog of large size, one frosty day, he observed the animal's repeated disappointment on putting his head down in the attempt to drink at sundry ice-covered pools. After one of these disappointments my friend broke the ice with his foot for his thirsty companion. The next time the animal was prompted by his thirst to try and drink again, instead of waiting for his master to break the ice as before, he set his own huge paw forcibly on the ice, and obtained water for himself. I will give but one more anecdote. An elephant, receiving company, has some eatables given him: one article—if I remember right, an apple or an orange—is dropped, and rolls just out of reach of the creature's trunk, but so that it lies only a short distance from a wall. The elephant, finding himself unable to reach the fruit by the ordinary process, by the forcible expulsion of the air from his trunk drives it so strongly against the wall that it rebounds far enough to be easily within his reach.

To these instances of intelligence,—and I may say, with respect to more than one of them, of sustained reasoning,—I might add a vast number of others, the result of observations on the habits and actions of the elephant, the horse, the cat, the otter, the pig, the seal, the kangaroo, the stoat, the weasel, the fox, the parrot, the magpie, the nuthatch, the ringdove, the flycatcher, &c., &c., many of them to the full as striking and conclusive as the generality of those quoted; but I cannot think it necessary. And with such an array as has been produced, there must be a strange degree of prejudice, or an equally strange unwillingness to admit a fully-warranted conclusion, if we seek to deny the possession by brutes of intellectual faculties capable of the processes of composition and abstraction. Have we never heard the parent or the nurse telling of the quickness, the intelligence, the cleverness of the little child, and, in support of her eloquence, adducing actions done or remarks spoken by her pet that did not evince so much intelligence and reasoning power by one half as some of the “dumb brutes” in the instances recorded above, displayed in the conduct attributed to them? I do not know that I can better close this portion of our subject than by the following passage from Mr. Jesse's ‘*Angler's Rambles*’:—“Although no animal is endowed with mental powers equal to those which the human race possesses, yet there is not a faculty of the human mind of which some evident proofs of its existence may not be found in particular animals. Thus we find them possessed with memory, imagination, the powers of imitation, curiosity, cunning, gratitude, ingenuity, devotion or affection

for their superiors, and other qualities. They are architects, and they dig, wage war, and extract various substances from plants and from the earth and water. They are able to communicate their wants, their pleasures and their pains, their apprehensions of danger and their prospects of future good, by modulating their voices accordingly. Each individual of every species has its own particular language, which is perfectly understood by the rest. They ask and give assistance to each other. They make their necessities known, and this branch of their language is more or less extended, in proportion to the number of their wants. Gestures and inarticulate sounds are the signs of their thoughts."*

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Zoology : its present Phasis and future Prospects. By R. KNOX, M.D., F.R.S.E., Lecturer on Anatomy, and Corresponding Member of the Académie Impériale de Médecine of France.

Section I.

THE section of Natural History which treats of animals, their nature, habits, and uses to man, when they happen to be of use to him, which is but seldom, is now fairly embarked in a new career. Like other arts and sciences, it has become industrial : this is the phrase, I believe—industrial. The greatest, the most accurate of all the observers of antiquity, the man who combined within the compass of his vast intellect a much greater amount of science, literature and art than any mortal since his time—Aristotle—

* I cannot refrain from subjoining the following striking passage, which I take from 'Psychological Enquiries:'—"It is observed by a modern writer 'that there is hardly a mechanical pursuit in which insects do not excel. They are excellent weavers, house-builders, architects. They make diving-bells, bore galleries, raise vaults, construct bridges. They line their houses with tapestry, clean them, ventilate them, and close them with admirably fitted swing-doors. They build and store warehouses, construct traps in the greatest variety, hunt skilfully, rob and plunder. They poison, strangle and sabre their enemies. They have social laws, a common language, division of labour and gradations of rank. They maintain armies, go to war, send out scouts, appoint sentinels, carry off prisoners, keep slaves and tend domestic animals. In short, they are a miniature copy of man rather than that of the inferior Vertebrata."

did not deem it beneath his dignity to compose a history of animals. In what odour Zoology, properly so called, stood with his countrymen, we do not, for certain, know ; but of this we are sure, that during the entire period of Roman dominancy Zoology was of no repute. Yet even then, when, instead of Zoological Gardens and Museums of Natural History, gladiatorial exhibitions, in which brute man opposed to brute beast on their way to the charnel-house, formed the delight of a Nature-despising population, there were to be found a few simple-minded men, who thought it worth while to note what Nature, in some of her unintelligible freaks, had placed on earth in an animal form, in addition to man, oxen, horses, pigs and sheep,—these being clearly all or nearly all that are really useful in animal life to him. Persons there were even then, no doubt, curiously observant of what mankind in the mass very naturally and very properly despises. Such were to be found, also, at work—and this, considering the form of humanity which then prevailed, seems almost incredible—during the middle or dark ages, the most terrible period, seemingly, of human existence, when *feudalité* and *hérédité* had done their best and their worst to debase human nature, by depriving man of all his natural rights,—*feudalité* and *hérédité*, those terrible instruments of evil, those implacable scourges of humanity, and of which we have still, unhappily, a large sprinkling even in England, raged at this period over Europe, extinguishing the rights of man and his claims to be treated as a human being. Yet even then a few naturalists were to be found, even in practical England, where they were naturally and have ever been held in the highest contempt. At last two men appeared whose genius rescued this humblest of the sciences of observation from its degraded and debased condition, restoring it to that position amongst the Sciences in which Aristotle first placed it. These great men were Carl Linné and the Count de Buffon. But this was all they effected ; and Natural History (we allude more especially to Zoology) was fast lapsing into its pristine, anecdotic, puerile, harmless condition, when a genius appeared, destined to revolutionize not merely Zoology, but the human mind itself. That man was George Cuvier, an anatomist. He it was who formed an era not merely in Zoology, but in human history. From that moment Zoology, removed from the school-book and from the pleasant story-telling gossips about “my first tiger” and “my last serpent,” became a fitting study, and a difficult one, too, for the deepest thinkers of the day. Whilst Cuvier lived the phasis of Zoology was wholly and thoroughly scientific ; his vast reputation and unbounded influence prevented all inroads upon it ; the wit of the

bar was silent in his presence ; the church looked on but said nothing, bidding, as usual, "its time ;" smaller wits saw the propriety of exercising their pens on more assailable topics ; Voltaire himself, had he been alive, must have yielded his assent to the truth of Cuvier's demonstration. But, now that Cuvier and the last of the anatomical school of France, DeBlainville, are dead, symptoms of a *renaissance* appear, claiming for certain great men, long forgotten, becoming niches in the Temple of Fame. The chief of these forgotten illustrious is Buffon. Out of the combined labours of the Linnean and Cuvierian eras it is proposed to form a phase distinct from yet not at variance with the hypotheses and views of the illustrious Frenchman. Hopeless as to forming an era, the modern zoologist would yet fain retain his favourite study amongst the living sciences ; he beseeches you not to send it back to the anecdotic and amusing literature of the past.* The history of the dead and extinct zoological world, wonderful though it be, he perceives to be scarcely sufficient to enable it to stand its ground, the living and actually existing world being that alone which interests men. Little avails it to the present generation to be told what kinds of bears and hippopotami, saurians and other reptiles, if they were reptiles, inhabited a land, to call which ancient Britain must unquestionably be erroneous in every sense of the term. An attempt, accordingly, is being made to connect Zoology with the useful and industrial arts,—to hand it over to Boards of Trade ; and as this plan succeeds in England with everything, sacred and profane, a temporary success may be anticipated, and the industrial era of Zoology may flourish even in France for a time. For the honour of Science may that period be brief ! In the meantime we may ask and endeavour to solve the question, What is its present phasis in a scientific point of view ; what its future prospects ?

Ontology, or the science of beings ; Comparative Physiology ; Zoology, in its most extended signification, embracing the existing and the extinct, the living and the dead organic worlds—mean nearly the same thing. The Philosophy of Zoology, a new theory of Zoology, means merely a new "interpretation" of animal nature. No science has in Britain undergone a greater change than this has done during the last half-century, or at least since the times when Smellie wrote and guessed, and the good-natured Goldsmith tried his pen, on what the world was then pleased to call Natural History ; we mean, of course, the English world ; for the writings of the illustrious Count de Buf-

* See Preface to Milne-Ewards's 'Manual of Zoology.'

fon, now about to resume their just position in Science, proved, in France, so long as they were permitted to be read, an insurmountable obstacle to a return to that state of degradation to which the *parti-prêtre* had succeeded in reducing it in England. As that party existed on both sides the Straits of Dover, the question may be fairly asked, Why was not the success equal on both sides? The answer is easily made, and most satisfactorily. On the English side we had no Revolution setting free the human mind from the bondage of ages, and producing such intellects as those of Arago and Cuvier, Laplace and Fourier, Geoffroy and Savigny, Malus and Gay Lussac. With us, on the favoured side of the Channel, Sot George succeeded Idiot George; the English mandarins, with whom, of course, was the English *parti-prêtre*, successfully resisted the claims of men to be free; the progress of Science, especially of zoological Science, was successfully resisted; the labours of the Count de Buffon continued to be scandalously mutilated by English compilers to suit the taste of the English public; Paley's well-written, but superficial, erroneous and piratical compilation was the zoological text-book at the Universities, and by all respectable, correctly thinking people looked on as second only to Scripture; Gibbon's name could only be mentioned in a whisper, and to speak of Voltaire otherwise than to vituperate was sure to entail on the speaker or writer a torrent of abuse. In the meantime what did the great bulk of the people read on Zoology? Goldsmith's 'Animated Nature' and 'A History of the Three Hundred Animals,' that being the limit as to what was "useful to be known," and to which the English mind was permitted to aspire.

That the condition of zoological Science has changed materially since the period we speak of, even in England, is due to the labours of one great mind, George Cuvier, the anatomist. Before his time naturalists were not anatomists; indeed, before his era true anatomy was not understood; what passed for anatomy was as an instrument and method of discovery, wholly valueless in the hands of zoologists. He discovered the *descriptive*, and applied it. The result was—1st, the placing living Zoology for the first time on a sound scientific basis; 2ndly, the discovery of the signification of the fossil organic world,—a discovery which in some respects stands unrivalled in human history; 3rdly, a new "interpretation of Nature," which the philosophic world objected to, even before the death of the immortal author of the 'Ossemens Fossiles.' The facts he discovered are now universally known, and therefore require no special notice here. To these facts he of necessity tacked certain theories, or rather hypothe-

ses, in other words an "interpretation of Nature," which was, sooner or later, sure to be assailed. He resisted to the last the transcendental doctrines of Goëthe; the simple-minded Oken he looked on as a well-meaning, honest observer, but labouring under extreme delusions peculiar to the German or Gothic mind; Geoffroy, who, taking the same view of Oken personally, had yet adopted the greater part of his doctrine, was personally attacked by Cuvier in the Academy, where his great reputation silenced all opponents. With DeBlainville, originally his own assistant, equal to himself as an anatomist, Cuvier was more cautious; and this course was the easier to adopt, seeing that DeBlainville, up to the moment of Cuvier's death, had not committed himself to any theory,—to any interpretation of Nature. He has done so since. His facts are indisputable; but they admit, like most facts, of a variety of interpretations. Since the demise of the illustrious author of the 'Ostéographie,' some of his views have been submitted, with all due caution, to the Academy, for that body would not even now listen to a direct attack on "le grand Cuvier," though backed by the deservedly great name of DeBlainville. Buffon, whom Cuvier so greatly and unfairly undervalued, begins to be mentioned, and zoologists have been found bold enough to speak of him as a great and illustrious man, a profound thinker and original genius. A matchless writer he was ever known to be, scarcely equalled, and certainly not surpassed, by Voltaire himself. But Cuvier had traduced his writings, holding them up superciliously to contempt; sneered at the amiable Daubenton, his anatomical assistant; boldly asserted that Aristotle's account of the elephant was infinitely more accurate than Buffon's, thus indirectly aiding the *parti-prêtre*, who never sleep, and who never, on either side the Channel, forgave Buffon, haters of truth and genius as they must of necessity ever be. By such means the unassailable Cuvier had lowered the reputation of Buffon to that of "a pretty good naturalist, who had described in a pleasing style the history of some mammiferous quadrupeds"!

Thus originated a new era, the Cuvierian. For somewhat more than half a century it has held, and perhaps still holds, undisputed sway over the scientific, I had almost said the intellectual, world. Its importance to man, it is true, has of late received some severe shocks in presence of other grander discoveries; the rail, the screw, the steam hammer, the diggings, the hot blast and the cold blast, the Minie rifle and the Lancaster gun, such things as these unquestionably throw the 'Ossemens Fossiles' into the shade. Let us hope, however, for the honour of humanity, that civilization may never attain

that grand utilitarian climax when a moment's thought thrown away on anything but "the dollar" will be held as time lost, and the human Gorilla everywhere, in imitation of model England and model America, look only to the *essentially useful to be known*. And now, after half-a-century's triumph, the theories (not the facts) of Cuvier are openly canvassed and disputed. It is beginning to be admitted that had Buffon's works been more deeply studied (and, let me add, more fairly dealt with), France might long since have claimed for one of her sons the merit of having discovered the transcendental in Zoology, or, at the least, of dividing the claim with Germany; nay, what is more, of having produced a mind competent to grapple with the most difficult of all questions, the Philosophy of Zoology, that question which Cuvier, in the height of his reputation, declined entertaining, and which, when forced on scientific Western Europe by Etienne Geoffroy (St. Hilaire), caused him so much uneasiness. This question revived, we now purpose examining, aided by the vast discoveries of Cuvier and his school, of whom DeBlainville was the most illustrious, and, above all, by a profounder study of the "thoughts" of the author of the 'Epochs of Nature.'

To some it might seem that a new interpretation of Nature is all that Philosophy requires, and all that merits being considered here. But after the interpretation comes the application,—after the theory comes the practice. If the theory or interpretation be profound and unanswerable, it must, one would think, be universally received. Not so. It must also be in accordance with the spirit of the age, or mould that spirit to it. Even the laws of gravitation as established by Newton, the immutable laws of physics, admitting of no exception, are received as truths only by the thinking part of mankind, not by the mass.* Need we feel surprise at the rejection of the philosophic thoughts of Buffon, unsupported, as they assuredly were, by any material demonstration? The discoveries of Cuvier, on the other hand, were based on physical facts; and many of his deductions from these facts admitted of no sort of doubt. But it was far otherwise when he propounded his views on the structure of the globe, how it had been constructed by successive formations, how the animal kingdom originated in successive creations, implying successive extinctions, both miraculous in their nature, stupendous and beyond philosophy. Such doctrines were sure to be assailed, and, I may add, sure to be refuted. The refutation is still incomplete, but certain to come. But

* With them an appeal must ever be made to the senses.]

before entering on this let me consider some of the laws which we know regulate living beings ; their growth, production, dispersion, before our eyes.

Clever men without a genius for discovery succeed occasionally in giving a new aspect to Science by a dexterous change of terms. The trick is stale enough, but it answers for a time, and this is all that is aimed at or even hoped for. Thus Bichat's classical arrangement of the animal functions into organic and animal become, with the modern physiologist—1st, functions of nutrition, and, 2nd, of perpetuation ; 3rd, functions of conservation.* The terms mean precisely the same as Bichat's ; but they are different terms, at least in appearance and sound ; and this suffices with most. The study of these functions constitutes Physiology, properly so called. The determination of the seat of these functions, or in other words their *localization*, has been attempted in every way, by the anatomy of the dead and of the living, by Pathology, by experiment on the living and dead. This method, the experimental on the living, invented by Galen, perfected by Haller, received from Bichat a scientific character, and was carried to its extreme height by Magendie and his school. It has benefitted Physiology, properly so called, a little ; but as an animal body is one, has general sympathies and cords of unison, so a single pathological fact has occasionally overthrown the finest and clearest of the experimental theories. A disordered liver may give rise to mental aberration, or a blow on the head produce an hepatic abscess. Experimentalism explains nothing of all this, and never will.

The general physiology of animal beings, on the other hand, is different, and has been arranged under four heads:—1st, the specialization of beings ; 2nd, the formation of beings ; 3rd, the diffusion of beings on the surface of the globe ; 4th, the diffusion of beings in time, or in the different ages of the globe ; to this may be added, 5th, the extinction of beings in time, a mystery quite as inexplicable as their formation. The beings referred to here are animated beings, or animals, whether now existing or extinct. To view these, the fossil and the living, as distinct, apart from each other, as Cuvier did, seems erroneous, as well physically as metaphysically. The view implies successive creations or formations, which comes to the same thing, of new genera and new species,—the constant interference of a first cause. So sensible was Cuvier of this violation of the principles of all philosophy that he at times denied, in the most positive manner, that such

* Fleurens.

was in reality his view; but he always clung to or returned to it, and towards the close of life more obstinately than ever. A German by race, a French citizen by the accident of birth, but, above all, an anatomist, sceptical in the highest degree, disbelieving what he could not see and touch, he held in extreme dislike the pantheistic doctrines of Southern or Slavonic Germany, their inventors and supporters. To him the transcendental in any form was odious; and if anything could bring the dead from the tomb it would be the announcement that his anaplothorium was really nothing more than an overgrown baby-ruminant; that much-doated-on skeleton which it was so easy for him to prove belonged neither to a horse nor an ass, a pig or deer, an ox or buffalo, a tapir or rhinoceros, nor anything now alive, or which had lived since man began to notice the difference between a horse and a pig, an era assuredly of no mean date,—that skeleton which, being explained or interpreted, created Palæontology, bestowing on Cuvier an immortal fame. Whilst Cuvier lived no transcendentalist had ever ventured thus to assail the very basis of the doctrine of the great anatomist.

Palæontology derives much of its importance from this,—that many more species and genera of animate beings have been destroyed than now exist. Zoologists admit as lost forty thousand species of shellfish, forty species of the pachydermata, and one elephant at least; of hippopotami seven or eight species have been lost, besides reptiles and fishes innumerable. Now, in what light are these lost species and extinct genera to be viewed? Under what aspect are they to be intercalated with the living? If intercalated as DeBlainville proposes, they fill up the gaps in the scale, and out of the living and the extinct, the present and the past, is formed one great chain of beings. This unity, this scale of beings, Cuvier denied. Assumed by Bonnet and Buffon to exist, its rigorous demonstration was attempted by DeBlainville, a descriptive anatomist equal to Cuvier himself. Giving up as untenable, 1st, the successive creations of Cuvier, and, 2nd, the simultaneous formation and creation of all species at first (a doctrine hinted at by DeBlainville), as doctrines disproved at once by palæontological research, there remain still to be accounted for the existence of certain species and genera in time and space, and the appearance on the earth of species and genera which at one time did not exist. If the descent of the living from the extinct cannot be proved in one form or another, the doctrine of the unity of the scale of beings is a doctrine not worth maintaining. There cannot be two modes of creation or formation of animals,—two principles working the machinery

of the universe. It must be philosophical or nothing, and if philosophical it of necessity excludes the miraculous. An English statesman (such a statesman!) boldly declared, at a public meeting of agriculturists (a class of persons not remarkable for philosophical inquiries), that "the discovery of gold in Australia was simply a merciful dispensation of Providence to meet the wants of a superabundant English population."* But why not go further, and say at once that the gold was formed there, a few years ago, in order that it might be so discovered? And why not say at once, for this conclusion is aimed at, that it was expressly formed for the use of the Anglo-Saxon race? On the other hand, a similar discovery had been made, a few years before, in California, by a section of the same race, a very amiable, Christian, mild and gentle section of the great English family, remarkable, above all, for a truly Christian philanthropy, and who have turned the discovery to the best account. How are we to explain this? There is but one way: reject the hypothesis, and all such, as a scandal to the era in which we live, a libel on human reason and an outrage on common sense. †

In support of the doctrine of a unity of all created beings, an uninterrupted scale of life from the commencement, we have had—1st, the theory that all living things are convertible into each other by external circumstances; ‡ 2nd, the same doctrine formulated in a more philosophical way, § and better adapted to the existing state of Science; || 3rd, the theory that all species were formed as they were, and now are, at first, and perhaps simultaneously, thus constituting *species* everything in Nature, and viewing generic characters merely as the result of modifications of species affected by time and circumstances, or even as being in themselves of little or no moment in philosophy; lastly, ¶ the theory that, admitting species or specialization to be the great aim of Nature in the construction of the organic world, it is not the sole aim, nor do specific beings solely form Nature; that genera or natural families form a portion of Nature's great scheme; that perpetuation by a parentage is *generic* as well as *specific* proved by the fact of certain animals passing their lives and perpetuating their kind,

* Speech of Sir John Pakington, as reported in the 'Times,' 1856.

† Such ideas are peculiar to the Saxon race, and especially to that section of it which we find in England where the "whitened sepulchre," lay and clerical, most abounds.

‡ Lamarck.

§ Goëthe, Oken, Geoffroy.

|| De Blainville.

¶ Knox.

for one or more generations at least, under a *generic*, and not a *specific* form, and by the fact, admitting of demonstration, that, even in the highest forms of the vertebrate animals themselves, the young, up to a certain point, is a *generic* animal in its natural-history characters, and not specific, but with this additional remarkable circumstance, that it combines in itself the natural-history characters of all or most of the species of the natural family to which it belongs.* Adopt this view, and it explains to a certain extent, if not the disappearance of species in time and space, the coming upon the stage of life of other species seemingly new, but which are not so, being merely the development of specific forms which lay concealed in the genus or family. Agreeably to this view, generic creation at least is universal, applicable to countless generations. Specific appearances, on the contrary, are accidental chapters in the history of the globe; species perish, genera persist; the embryo of the future organic world lies concealed in the present, as the embryo of the present lay wrapt up in "the past." The compensation spoken of by some† as a *natural* compensation is wholly *human*. "If species," say they, "die out, individuals multiply; and this compensation is in favour of mankind." The theory has a strong odour of the present utilitarian age; nor is it a fresh theory in any sense of the term. "All things were made for the use of man," to have dominion over and to turn to account; but as most of Nature's productions are useless or even detrimental to man's interests, the way to turn them to the best account is no doubt to destroy them, their existence and his being incompatible, substituting in their place the useful. M. Isidore Geoffroy (St. Hilaire), with the fondness of a naturalist for Nature's works, proposes the naturalization of some of the beautiful and harmless animals with which she has peopled the globe. Not so says his colleague, the more acute, practical M. Fleurens: these things, he remarks, look well in museums and natural-history collections, but are not to be compared with sheep and oxen, horses and pigs. Improve these, says the astute follower (at an immense distance no doubt—so distant indeed as almost to have lost sight of him) of the immortal Cuvier; improve the domestic breeds formed by man; follow the English, the only people who understand the true fattening of domestic animals; extirpate Nature's works which are useless to man, and cultivate henceforward only the flora and the fauna comprised in the scant vocabulary of the farmer and the market-gardener. Alas! for that Academy where sat Geof-

* Knox.

† Fleurens.

froy and Cuvier, Laplace and Ampere! But the *industrial* will have its day, and for the honour of mankind let us hope it may be as brief as possible. Of impure origin, and suited only to the muddy banks of the Thames, let us pray for its speedy extrusion from halls which once echoed to the sublime language of Cuvier and Geoffroy, Arago and Laplace.

The aim and object of the various branches of knowledge now cultivated under the names of Physiology, human and comparative, Anatomy, human and comparative, Zoology, Palæontology, Biology, Morphology, Embryology, Transcendental Anatomy, is one and the same, namely, the Philosophy of Zoology,—the right comprehension and interpretation of the nature of animal beings, their relation to each other and to the globe they inhabit,—their history, in fact, in time and space. This fact has been long recognised and admitted, as also the probability that, in the history of the mutations and transformations of the animal from its embryo to its adult condition, or from its generic,* or perhaps even a still more highly generalized expression, to that specialized form, becoming, as it were, acclimatized and specialized, it assumes a form recognised by man, and all that lives lies the grand secret of philosophical anatomy: thus the great questions of this sublime and mysterious history may certainly be embraced—1st, in the specification of beings; 2nd, the formation of beings; 3rd, the diffusion of beings in space; 4th, their diffusion in time. These truths have been long known and admitted, from the time when Etienne Geoffroy (St. Hilaire) called the attention of the Academy of France to the theories of the transcendental. Goëthe and Autenrieth had done this long before in Germany, but these great men lived unhappily before their time, than which there can be no greater misfortune.

Buffon said that *species are the only beings in nature*; but of this word “species” he made an abstraction: it was the fashion of the day; men were still fond of the metaphysics of the old school, and Buffon was no anatomist. The idea of species is no doubt an abstraction and generalization, but one of the simplest, to which even the lowest animals are equal. To arrive at a practical knowledge of species, as distinct from the individual, is just as easy for the Bushman as for the most learned professor of Natural History, and sometimes much easier; but Science demands a *definition*, and zoological science requires species to be defined; Cuvier’s is known to all the

* Knox.

world ; he defines species to be “ the re-union of individuals descended from each other or from common parents, and of those resembling them as much as they resemble each other.” In a matter so difficult as the definition of species this definition is comprehensive enough, and answers most purposes, but, on analysis, it presents some difficulties, and it has therefore been proposed to limit the definition of species simply to the test which Horace long ago gave us, which the common sense of mankind proclaims and even demands as an inviolable law, namely, to the character of resemblance solely ; others have proposed the leaving out resemblance and confining the definition to continuous uninterrupted descent or reproduction. It has been said that the idea of resemblance is an accessory idea ;* but how accessory ? The idea of reproduction, on the other hand, is said to be a fundamental idea. Would it not be more to the purpose to call the first the sole *practical*, the second the *experimental* ? If, on the field of an unknown land, we meet an animal of the bovine or equine kind, ovine or porcine, would not the most illiterate, if experienced, be in a position to say whether the animal was identical or not with others he had already seen ? But it may be said, the question still remains, as mere resemblance is deceptive, how are we to prove this unknown animal to be of the same species as the already known ? To answer this question the scientific man resorts to the method of experiment : if he observes this new kind of ox or horse to breed freely and continuously with those already known, then it is held to be of the same species. Now, notwithstanding its seemingly strong position, nothing can be more fallacious than this experiment. Mankind is generally viewed as composed of varieties, and not of distinct species or races, yet these varieties, as they are called, have never permanently mingled so as to give rise to a hybrid race. In this view, then, they cannot all belong to the same species : the supporters of the theory may, however, be disposed to concede this, and we must look, then, for another argument, not against the reality of the test by reproduction, but against the misapplication of the doctrine. All the races of sheep are said to breed freely with each other, and therefore are of *one species*. We confess to great doubts on this point : so with the horse and the ox. Race is said to be artificial, species natural : it must be admitted, however, that some races strongly resemble the natural,—have a wonderful power of endurance and of resistance to all external circumstances ; the Negro is precisely what he was when the Egyptian tombs were hewn on the banks of the Nile, some four or five thousand years ago. If there be a hybrid breed of men on the earth it is the modern Turk, and they are fast becoming extinct. The test by reproduction is no doubt the scientific test *par excellence* ; but, in a practical point of view, the test by resemblance is much superior,—not by the resemblance of the interior, of the skeleton, for example, but by the dissemblance or resemblance of the exterior. In as far as the skeleton is concerned, the ass and horse obviously resemble each other,

* Fleurens.

and confining one's views to this, which we might be forced to do were they palæontological subjects, they might be, and would have been, declared to be of the same species: so with the zebra, the quagga, &c. Now look at the exterior, and say where is the possibility of mistake. But it may be said, this idea of resemblance of the interior and dissimilarity of the exterior would not enable you to decide the question as to the identity of the nature of both. No science of mere observation is equal to this; the profoundest zoologist that ever lived could not, by any *à priori* reasoning, have foretold that by the union of the horse and ass we should have a mule, partaking somewhat of the nature of each parent, and that this mule should be barren. It is experiment alone which decides such questions, not Science. The probability is that the product of the ass and quagga, or zebra, of the zebra and the horse, of the zebra and quagga, would, in like manner, prove a barren mule; but nothing of all this is certain until tried. Zoology, or the doctrine of life, must not be mistaken for a fixed Science.

Continuous production is the characteristic of species, but *resemblance* of the product to its parents must also be superadded. The domestic dog differs in almost every country; it has been assumed that all the so-called varieties are reproductive with each other, and are consequently of one species. These assumptions are hasty and gratuitous; the same has been said, on no better grounds, of sheep, oxen, horses and men. Continuous production is easily asserted, difficult to disprove. Since the grand era of Cuvier, naturalists have been anxious to maintain for their favourite pursuits the elevated position bestowed on them by one who worthily contested precedence with the foremost of scientific men. But the Cuvierian era is past and determined,—its position fixed in the *history* of Science; it admitted of few abstractions,—it rejected the transcendental, the transformations of the embryo, and even, in some measure, limited and restrained and defined the powers of Nature: these mistakes are now seen and admitted. Let us proceed.

The dog and the wolf reproduce with each other to the third generation, but no further; they are then of different species: had it been otherwise the world would have been harassed with a dog-wolf, to distinguish which from the pure would have puzzled Linné himself. The dog and jackal reproduce to the fourth generation; “but the dog and fox never have any offspring when united: they are then of different genera.” It would seem, then, that in zoological Science all is experiment and observation. The hyena and dog are in the same category; they belong to different genera, if this test be accepted as certain and real. But a very few years ago mankind was assured by the most distinguished of living zoologists that the idea of species was fast disappearing from human thoughts; now we are told that *species are the only beings in nature*—that they constitute the *primitive forms!* Why, then, have the young *generic forms?* Why have some of them forms which belong to the past or extinct world? Why do individuals grow up to the adult condition, occasionally with forms not constantly found in their species, nor genus, nor even class,

at any period of their growth? Must we, to explain these phenomena, go back to the old *jeux de la Nature*, to accident and chance, to providence and the will of God? What is the meaning of forms, clearly arising from arrested developments, and of others as distinctly traceable to retrogressive developments, but this, that adult species may, after all, be only the individualized expression of certain forms of life alone compatible with the existing order of things, as formed by and out of this order itself; the basis, in the mean time, out of which the living species springs—the *trame*, if we may so say, being but one with the extinct. In no other way can we readily connect the past with the present, the present with that future which is sure to come. The future, it is true, may be a world lifeless, cheerless, rolling through space for millions of years, such as palæontologists supposed it to be at the commencement: we have no faith in either conjecture.

The modern theory, then, is that a continuous fecundity implies species, a limited fecundity genus. All sheep and all cattle are conveniently assumed to possess (although this has never been proved) a continuous fecundity, and therefore are, respectively, of one species; the horse and the ass have a limited fecundity, and are therefore of different species, but of the same genus; the dog and fox do not breed at all with each other; they are, then, of different genera. Beyond these, it is true, there may be no consanguinity by parentage or reproduction; but what is this to Nature? Is it merely by way of amusement, and to display her powers, that the embryo is found to pass through so many of the same forms of life before attaining the higher, occasionally reversing the process, and undergoing a retrograde development? What precise meaning do zoologists attach to the term *parentage*, when applied to different species of the same genus? According to one hypothesis, this is at least comprehensible: "The young of all the species of the same genus possess at first all the specific characters of the different species of the genus."* Unquestionably we have here *parenté* of a deep character, and one which Nature might turn to account. The conversion of one of these species into another cannot be so difficult a matter with Nature, especially when all or most of the specific characters are already present in the young. Thus a given species may perish, but another of the same *consanguinité* takes its place in space: it is a question of time, not of new creations; it is but the successive developments of species from one great family. How that family or genus stands with others has not been as yet explained, and can only be by Palæontology, which gives us the matured specific and individualized forms of what, in the living embryo, we can only guess at. The vertebrate have the most positive relations to each other in the unity of their organization, and especially of their skeleton. Thus *parenté* extends from species to genus and from genus to class and order, in characters not to be misunderstood. Cuvier maintained the doctrine of the *fixity* of species,

* Knox, in the 'Zoologist' of 1856.

and modern zoologists have boldly added, that no *species closes its career naturally*, meaning thereby, that all meet with a violent death :* they would fain go further than this, and hint at their extermination by man,—a dangerous and most improbable doctrine,—a hypothesis unsupported by any proof, even in the case of the dronte, which, we are told, was exterminated by Portuguese sailors.† Species, we are told, have disappeared as a consequence of external violence, otherwise they would have been perpetual, fixed, eternal! Assumption again! for it is not species alone which have perished, but genera and forms of life wholly distinct from the existing order of things. Why perished the ancient vegetation, so unlike the present, and whence came the present, but from the past? That species have remained fixed since the time of Aristotle, and long before, is a fact which must be taken in conjunction with this other, which we owe to Cuvier: “There was a time when the present organic world did not exist, but another, or rather other forms of life wholly distinct.” If species, then, are fixed, historically or in man’s recollections, they are not eternal as regards the past, nor the future if it is to resemble the past: nor can we altogether depend on what we see: it is but the other day when the *tænia* and the *tænioid* forms of animals were declared to be specific forms; now we know that they are not so,—they are *generic*, if we may so say; they can even for a period retain this generic form, maintain an independent position and propagate their young, as if they were individualized, specialized adult forms. These discoveries, the result of direct experiment, are but of yesterday, but their importance in discussing the theory of life is vast, and can scarcely be overrated. The reply of Cuvier to Geoffroy and the German school, who maintained the direct descent of the existing species from the past by a modification or degeneration of the fossil species,—namely, that were it so the modifications ought to have been gradual (*graduées*); “there ought,” said he, “to be a series of shades between the fossil and the actually existing, and traces of such modifications ought to be found in the interior of the earth, yet we find them not:” this objection, which seemed so probable at the time, is being met, and may shortly be fully answered. These *shades* are being daily found, and this has been distinctly proved by De Blainville; 2nd, if we adopt the theory that all generation is *generic*;‡ that specializations of every kind depend on the nature of the existing order of things; that if certain of the modified forms filling up the great scale of beings be not yet found, it may arise from this, that these forms have not yet been called into being, and cannot therefore be found; then the objections of Cuvier, at the best somewhat trivial, as referring solely to historic periods, fall to the ground. The living species, then, are not absolutely new creations; but, in whatever light this may be viewed, one thing seems certain,—the utter falsity of the doctrine of Aristotle, who fancied that Africa’s ever-varied and glorious Fauna arose out of the scarcity of water, which, bringing to her

* Fleurens.

† Id.

‡ Knox.

widely-spread and scantily-supplied springs all species of animals, gave rise to those ill-assorted unions terminating in the production of new species. The *arida nutrix leonum* has, from time immemorial, been celebrated for the production of what was new ;* so said Horace, and the adage is still true, though not in the sense of the illustrious author of the ' *Historia Animalium*.'

The question of the fixity of species first assumed a scientific form in Cuvier's hands ; he based his view on the skeleton, but, as a scientific man, he was candid enough to admit that between the presumed fossil and the living organic world the differences, in many instances, scarcely amounted to specific. This occurs in the horse, dog, ox, elephant, &c. ; notwithstanding, he viewed them as specific and distinct on other grounds, and in this we feel disposed to agree with him : not so De Blainville ; with him the *Elephas primigenius*, the mammoth of Cuvier, is of the same species as the living Asiatic ; the same view he applied to many carnivora, pachydermata, &c. But now one of two things ; the primitive elephant, the mammoth, and the so-called fossil horse, ox, bear, dog, &c., either were identical with those now alive, or they were not. The question of identity, we hold, cannot be decided by any examination of the *skeleton* alone, for who, looking at the skeletons of the horse and ass, the zebra and quagga, and Tsazitai, and observing their strong resemblance, not to say identity, could ever have imagined them to belong to species, perhaps even genera, so distinct from each other as they in reality are, had he not been forewarned of the fact by a knowledge of the entire and living animal ? So it is with the mammoth, bears, &c. ; but let us suppose them to have been of the same species, then it must of necessity be admitted that the dawn of the present order of things, as Humboldt has remarked, must have penetrated much deeper into antiquity than is generally supposed, or, to express it in simple and not mythical language, the appearance on the earth of the existing species of animals counts from an antiquity which upsets not merely Bishop Usher's chronology, but every other hitherto offered,—even the modern and most orthodox palæontological. And here the position of the horse, dog, &c., merits a passing remark : if the presumed fossil are identical with the living, what becomes of the fine-spun theories of naturalists ascribing to man's influence, by domesticity, the origin of the domestic horse, ox, dog, sheep, &c. Goëthe affirmed that the domestic ox was the direct result of civilization and domesticity acting through a million of years. Man, then, lived a million of years ago. Goëthe's theory can scarcely be the true one, in any sense. What has domesticity done for the ass and the elephant,—the camel, and, we may add, the lama ? From the remotest times these animals have been subjected to the influence of man, and yet over them that influence has been pointless. This difficulty Cuvier not only instinctively foresaw, but was forced to listen to towards the close of his great career. The resemblance, not to say identity, of

* " *Aliquid semper novi Africa offert.*"— *Hor.*

the fossil and living horse, the fossil and living dog, &c., was obvious ; so with many of the bears, carnivora, &c. : now this difficulty he might at once have repelled by pointing to the resemblance of the skeletons of the horse and ass, which yet form species absolutely distinct. But to have used this argument was to employ a double-edged sword, to be rapidly turned against himself, upsetting much of his anatomical researches, and his great aim of proving, upon anatomical grounds, that the fossil and living worlds were absolutely distinct. Again, when Huet and other distinguished palæontologists and geologists, pointed out to him the undoubted discovery of the remains of man himself in geological positions, the vast antiquity of which could not be doubted, and the simultaneous occurrence of these remains, both with the recent and the extinct world, thus seemingly uniting all in one series ; Cuvier was silent on such occasions, and his silence was very naturally respected by the Academy. Thus, long prior to his death, the illustrious man must have foreseen that he had opened up a fountain of discovery, to the flow of which man could set no limits. If man succeeds better with the ox and horse, the dog and sheep, the rabbit and pigeon, it is because in these genera there are several species, by the combining of which *breeds* (not *races*) are obtained, showing those numerous varieties which modern naturalists* mistake for races,—which men maintain for a time by force of circumstances,—which, unless thus maintained, have a constant tendency to revert to the primitive species from which they sprang. As with animals, so with man. South America, conquered by Spain and Portugal, in other words, by the Lusitanian, Celtiberian and Iberian races of man, witnessed the growth, for a century or two, of a heterogeneous population, somewhat analogous to our mixed *breeds* of sheep and oxen, horses and dogs ; and now that the European race ceases to emigrate to that land, the artificial, forced, unnatural and unleavened mass frees itself of the accessory and accidental elements,—the Mulatto dies out, as he must always do ; the pure white and the Indian, the Negro and the Carib, return to what they were. If man has reason to boast of his mixed breeds of cattle, the world has but small reason for congratulation in the production of mixed breeds of men. Look at the savage cut-throats who have desolated South America, the so-called Mexicans and Peruvians, the Monte-Vidians and Buenos-Ayreans (as if there ever was, or ever could be, any such races), and admit that, unlike those of the West, whatever be the faults and foibles of the pure races, they are at least intelligible to humanity.

But we have been drawn away from the simple question of fixity of race or species, which Cuvier and De Blainville, though in different ways, maintained, and which Geoffroy and the German school as stoutly denied. The possible existence of a hybrid species was long ago denied in this country,† and the assertion has received the sup-

* Fleurens, &c.

† 'The Races of Men: a Fragment,' by R. Knox.

port of many painstaking naturalists of the United States of America : it is now, we find, beginning to be admitted in France, after a sharp struggle, no doubt, and the limits of fecundity in the hybrid breed are being clearly defined experimentally. It is quite right that such experiments should be made, although they do not lead to any important practical results. To prove a hybrid race to possess continued fertility there must be no return to either of the pure species to which the hybrid owes its origin. The she-male, sterile with the he-male, is said to become fertile by a union with the ass or horse ; that is, by a return to one of the primitive races. Whilst agreeing with modern French authors that more numerous experiments are required on this curious and interesting subject, it may be laid down as a law that no hybrid race is continuously fertile, and that it was not by this means that the world became peopled with the innumerable species revealed to the scientific by the living and fossil worlds. Other causes must, then, be looked for, and there can only be two ; 1st, the influence of the external media on living forms as they then existed ; 2nd, certain unknown laws of life which bring into existence certain forms to the detriment of and the extinction and exclusion of others. The scientific will, we think, excuse us from seriously discussing a third mode as probable or even possible ; the sweeping all living things from off the earth, and the creation of new organic worlds. Even the compilation ascribed to Moses did not go so far as this ; it preserved a stock of pairs, human and brute, out of which the coming races, not new, were to proceed. Cuvier's followers in England made great use of certain expressions in Cuvier's works, expressions which he repeatedly and most formally denied. These ideas remain in vogue even to the present day in model England, where a theory which does not pay is very naturally scouted and laughed at. The theory we allude to, first mooted by Socrates, advocated by Philo-Judæus and the Dutch author whom Paley pirated, worked practically in England, produces to a certain class something like six millions per annum : it must be a good theory, and of this no reasonable man entertains a doubt. The date of the descent from Arrarat is no doubt a puzzling question, but it is only so to those who cannot be made to believe that the electric telegraph equals, if it does not exceed the stupendous miracles of antiquity.* Illustrious theologians ! we wonder how any of you escape the fate of the unfortunate author of 'Geology reconciled with the Chronology of the Mosaic Deluge ;' it must be that you attach no special meaning to your words, and care but little how Science wars against the horrors of ignorance, so long as "the accidents" of your sacred offices are left untouched.

The various species of animals which, since this orb commenced its career in space, have decorated the earth, have not arisen from any mixture of a few primitive species ; from the time they appear on the earth, these species seem unalterable and unaltered until their extinction ; but others appear distinct from the extinct, yet related to them :

* Dr. Cumming's Sermons and Discourses, *passim*.

what is the nature of that relation? Is there consanguinity? This is really the important question, in a philosophic sense, and in its solution is involved that other, namely, the unity of the organic world.

Is *species* always young, or is it *genus*? It must be the latter, if the young be born and partly grow up with *generic* characters; else whence these characters? If the dentition of the young of every species of the Salmonidæ, for example, be identical or nearly so,* that is, if the character of the young be *generic*, in the widest sense of the term, what right has generation to the title of specific? Simply because experience tells us that, whatever be the form of the young, the form it must in time assume will ultimately be that of the parent. This specific influence, always present, does not show its powers suddenly or at once; it strengthens with the growth of the young, and may be, to a certain extent, checked but not destroyed. On this subject we have few observations to be trusted, and still fewer experiments. Travellers still talk coolly enough about the Portuguese, who, living within the tropics, have blackened to a negrine dye; no reasoning person believes in such nonsense now; nevertheless, the story is still repeated. What the European races—the Scandinavian, for example—might become, if located in a tropical country and forced to trust to their own resources, without any draught upon fresh imports from Europe, it were difficult to foretel,—nothing can with safety be predicted in the sciences of pure observation. Such a race would probably become extinct in no long time, together with all the European animals imported into the country. But, in fact, we have no data to enable scientific men to arrive at just conclusions on such points as these. The influence which external circumstances are adequate to exercise on the living organic world must at all times be small, imperceptible, as diffused through countless ages,—lost in the gulf,—the abyss of time. Besides evidences of the most terrible cataclysms, producing no doubt geological epochs, are evident everywhere, and the influence of these cannot be calculated. The conversion of the *generic* product of all animals into the specific is thus a mystery, but it seems to be one which includes, could it be explained, the extinction of certain species and the appearance of others; in other words, it explains the fossil and the present organic world, and their relation to each other.

It may now be admitted that neither man nor accident can form or give rise to any new species, to replace those which—thanks to the illustrious Cuvier—we know to have become extinct. How is it with the productions which naturalists have hitherto called *varieties*, which some are disposed to call *races*, by which no doubt they can only mean *breeds*, the consideration of which they seem inclined to elevate to the dignity of a scientific question. What is a *breed* and what a *race*? Unquestionably a race means a species, implied almost by the popular meaning of the term. When we say Anglo-Saxon race, we

* Knox, in the 'Zoologist' and 'Lancet' for 1856.

mean a collection of men clearly and unmistakeably descended from the English, they again from the Scandinavian; by Celtic *race* we mean a body of men who have never altered in time, nor under any circumstances; we say the same of the Coptic race, for whose perpetuity, continuous fecundity and uninterrupted descent from the earliest of recorded times we have monumental proofs of an incontestable character; nay, what is more, there exists not in the land of Egypt any intermediate race, so that Cuvier might have selected the Copt, just as fittingly as the sacred ibis and the crocodile, as a proof that species or race was fixed and unalterable, at least for the trifling space of 4,600 years, that being the extent to which he carried his view. There is, there can be, no occasion, then, to alter the meaning of the term: race means species. What is the meaning of breed?

That individuals vary in form, in proportions, within certain limits, is what must be known to all the world; that these varieties have a tendency to *hérédité* has also been long known. The tall produce the tall,—the short, the short; but to these laws,—1st, tendency to variety, 2nd, tendency to *hérédité*,—there ought to be added a third, which naturalists and theorists are apt to forget, and even to affect to ignore; it is the tendency to return to the type of the race, or to perish altogether. When the variety proceeds to a certain point, the individual becomes either non-viable or ceases to be productive. Hence the type prevails and is perpetual; varieties perish or cease at least to appear. It has been explained on the principles of the transcendental,* as being a perpetual struggle between the laws of generalization or of unity and the laws of specialization, and until some better reason be assigned there is no occasion to view it otherwise. But still there remains the question, Are such varieties or breeds perpetual? We think not, unless an artificial means be resorted to in order to maintain them. It has been said that they may be maintained by domesticity, but this is wholly artificial: as we know not from how many species these domestic animals spring, and that the action of domesticity never ceases, so it is impossible to say whether men be experimenting on races or their varieties. Who could tell the result of a union of the Asiatic and African elephant, and whether or not there would be any product? what form the product would assume? whether or not it would prove a fertile hybrid, to a certain extent? All such are questions which can be answered in no other way but experimentally. The most remarkable instance of the influence of climate and the removal of the slavery of domesticity over animals, would be the return of the domestic pig to the wild boar and of the domestic sheep to the argali, when abandoned to themselves in the wilds of America; but these assertions are far from being proved. In Zoology all is experimental or the direct result of positive observation. Who could explain or imagine why the pigeon should invariably lay two eggs at a time? that these should as invariably be male and female? and that,

* Knox, in 'The Races of Men' and in 'The Artistic Anatomy.' London: Renshaw.

with almost equal certainty, the male egg should precede the female? Anatomy shows us that varieties of forms in the interior structure of man are exceedingly common, and yet that there is a law to which Nature most generally adheres even in such varieties. Retrograde developments, also—*i. e.* developments of inferior forms—are exceedingly common, perhaps most frequently in man; and here it may be worth while, before proceeding to higher considerations, to larger generalizations, at least in the history of animal beings, to consider the question of Man himself, and his relation to other animals.

Is Man an episode in creation? At first sight he seems to be so, for he is the only animal directly antagonistic of all that lives, adverse to his own interests. Now this includes nearly the entire of Nature's grand scheme in the construction of the animal and vegetable world: of the *wild* as it came from her hands he is the merciless antagonist. But this great question has been treated of elsewhere, and, in so far as we know, the view offered in that work has not been refuted. Of the original species placed on the earth by Nature man selects those adapted by their inherent nature to be useful to him. Sociability is one of the more remarkable of the qualities these species exhibit, but it is not the cause of domesticity, as some have supposed,* for vast numbers of animals are sociable without being thereby domesticable; all the antelopes, for example, the zebra and quagga, numerous species and genera of birds, the seals and dolphins, and many others, all strictly sociable, but not domesticable; whilst of those he has succeeded in domesticating only a few have admitted of those changes which domestic slavery is assumed to occasion, namely, the formation of *breeds*. The ass remains nearly unchanged, so does the camel and the lama, the elephant and some others. His most remarkable conquests in this way are the ox, the horse and the dog; but the question is still an open one, in how far the domestic breeds of these animals are derived from one or from several distinct species. As man is sociable and domestic, these qualities might be presumed deeply to influence his character, to have effected alterations, aided by other circumstances, on his physical structure and moral character; and if the hypothesis be admitted that he is of one species, then all the various forms he presents over the earth must be attributed to these causes. Now the identity of human nature is a grand proposition, as to which all great historians, statesmen and philosophers are agreed, from Herodotus and Xenophon to Voltaire and Gibbon. But the same may be said of most large natural families or genera, as of antelopes, for example, and buffaloes; we do not, however, affirm from this only that these genera are composed of a single species: on the other hand, it has been remarked that all other species of animals have neighbours or relations ("voisines ou de consanguines"), whilst man has not. I know, however, of but one anatomist† who denies the existence of any anthropomorphous apes, that is, who asserts that the supposed resemblance between man and apes arises merely from an incorrect

* Fleurens.

† Myself.

appreciation of human anatomy, and that, in point of fact, no such resemblances really exist,—who has asserted that, anatomically, there is a gap, a link, not yet filled up between the bimana and the highest quadrumana; but he also thinks that, as in Nature's scheme there can be no deficient link, that the *scale* must be perfect, so this gap will be filled up in time by fossil discoveries or by the further development of life on the globe. Close consanguinity, then, between the human kind and any other animal is thus denied, both by the anatomist and the naturalist; by the anatomist, on the ground that the pretended resemblances found by the merely comparative anatomist arise from his ignorance of minute human anatomy; by the naturalist, on other grounds, no doubt, but mainly, I presume, on the fact of infecundity of union between the different species or genera, or (to use the phrase of modern naturalists) there is neither *continuous* nor *limited* fecundity, and so there is no consanguinity; that is, there is no common parentage, either specific or generic. On this latter point we want the evidence both of the anatomist and of experience, and so the question must be allowed to remain where it is; Science offers no aid to its solution. In the matter of experience or direct experiment, it has been said, but on no safe or assured ground, that the opinions of the wild Bosjesmen, natives of the Calihari desert, and of the arid regions through which the beauteous Gariep rolls its silvery stream, are in favour of both forms of fecundity, that is, of the specific and generic, and that the union of the gigantic baboon inhabiting these wild regions with the Bosjesman is prolific. It is a curious fact that, in speaking of this almost incredible circumstance, they (the Bosjesmen) speak of the product as a male, thus in one sense supporting and in another refuting the law established by Buffon, that as regards the product of different species, the male influence predominated to a remarkable extent; but the Bosjesmen affirm that, although the product be male, the form is strictly human or nearly so; also the moral character. On the other hand, we find in a newspaper notice of this day (June 25) that, in the little island of Tristan da Cunha, there are about seventy-two persons, the produce of one English artilleryman and a few men-of-war's-men with some negresses brought from St. Helena. The present progeny are said to show very little of the black blood, but to be a really good-looking, strong race of people. About thirty-five were desirous of leaving the island with their cattle, &c. But it is with regret I have to observe that such observations are in no way to be depended on, and are indeed of little or no value. As neither Science nor experience enlightens us on this extraordinary point, nothing can be said for or against the opinion: the practical view is the safest: go back to the monumental records of Egypt, and you will never find depicted on them any men or any animals which cannot now be perfectly recognised. Had such monstrous unions ever been productive, we have the evidence of Herodotus, to prove to the most sceptical on this point, that the moral code of ancient Egypt was sufficiently lax to have tested the result of such unions in such a way as to leave nothing to be desired.

Buffon, always rising to great ideas, said that man was the same everywhere; to this some have since added that a continuous fertility of all the breeds, races, species or varieties, is proof of the identity of his physical and moral nature.* This I denied long ago, and most American naturalists and anatomists now admit the correctness of my view. It is, then, an open question. Certain West India islands show an alarming tendency to revert to a *black population*; the white blood and the Mulatto must there be becoming extinct. The aboriginal Peruvian and Mexican gain, it is said, unmistakably on the Spanish race; the successive conquering races of Northern Africa have all become extinct or nearly so, and the Tuaric and the Tibboo, and Kabyte or Boobas, return to their primitive abodes. We have no where on the earth any mixed breed of men; all the races are just as easily to be recognised now as they were in the time of the Pharaohs, who lived long before the Mosaic era; you may see them on the Etruscan monuments; it is a historic fact, of which Cuvier made great use in his theory of successive creations and fixity of species. If the fact be admissible as of value when applied to animals, it must be equally so when applied to man; and even if it be asserted that the races of men are *breeds* and not *species*, we only add another Natural History enigma to those already existing, by giving to *breeds* a perpetuity and a continuous productive energy, which we know they do not possess. When *breeds* of animals are transported to foreign climates they invariably alter if allowed to roam at large; man does not do so. The Hollander transplanted to Southern Africa, to Java, or to Northern America, undergoes no change morally or physically; it is the same with the Celt. If these be *breeds*, they have a strange tenacity and fixity of character amounting almost to what we usually term specific. The Gipsies have for centuries wandered over Europe and Asia, exposed to all the inclemencies of the seasons; but they remain precisely as they were originally; of the Jews we need say nothing; they speak for themselves, attesting the indomitable character of race, morally and physically, under every government and every climate. It is the same with all the races of men.

The specialization or specification of beings is the question we have just considered. By some it is referred to a first cause, and considered as primitive, eternal and fixed.† Those who maintain such views must also be prepared to deny the unity of life, of the organic world, the unity of the organization of animal beings, and, in a word, the dependance of the present organic world on the past. But, strange to say, they do not; on the contrary, they seem to think all these hypotheses compatible with each other. Let us follow them through their argument, if they really have one, and endeavour to ascertain their object and views, and especially what ideas they draw from Embryology, that science on which, in all probability, the future progress in Zoology mainly depends. The *formation of beings* is a question calculated to try the consistency of their opinions and their reconcile-

* Flucrens.

† Id.

ment with *facts*, for of these, thanks to Cuvier and the anatomical school, we have some. We need scarcely caution our readers that, on this subject, there can be nothing but hypotheses of the wildest character, but we stand excused for discussing them, seeing that grave men,* geometers and mathematicians have not hesitated to put their names to, or at least to publish extravagancies as wild and untenable as ever came from the pen of Apuleius. Neglecting or despising the sage advice of Comte, to confine their speculations to the earth we inhabit, they have ventured on an ocean as vast as that into which plunged, according to our divine Milton, the author of all our woes, in virtue of which attempt, according to some, they are not unlikely to reap the same reward—the contempt and horror of mankind.

Spontaneous generation was hypothesis first. Aristotle admitted three modes of generation, Harvey one: “*Omne vivum ex ovo*,” was his strong expression. But Aristotle’s view extended even to our days, to Burdach, for example, who admits spontaneity of generation in certain fishes. It was whilst pursuing this inquiry that the extraordinary facts were made out, that certain animals could only receive their full development by being transported to different localities; that some, for example, remain in a vesicular or larva state in the tissue of an animal until this animal be devoured by another, when, seeking their way to the intestines of the animal, forming their new residence, they become developed, acquiring at the same time forms which had been long held to be perfectly independent beings, subject to no such transformations. A Belgian named Van Beneden claims justly the chief merit in these remarkable discoveries; but, notwithstanding their brilliancy, they do not much advance the question of the formation of beings; they rectify mistakes; they add another obstacle to the admission of the doctrine of spontaneous generation in any form—the question of all others the most curious, the most profound: Leibnitz cut the Gordian knot by referring the whole to a *miracle*,—in other words, he adopted the Indian theory, the best and safest; his view led to the hypothesis of the pre-existence of germs, ready formed, awaiting but the circumstances necessary for their development. Admitting the hypothesis, whence came the new species (unless we suppose that all were formed at first) which filled the world after the destruction of the old? The system was, notwithstanding, adopted by Bonnet and Haller, but the latter placed the pre-existing germs in the female, Leibnitz in the male. The immortal Cuvier himself leant to this doctrine, when he condescended to speak of things which could not be demonstrated. Does the following experiment throw any light on this mysterious question? “If a male jackal be united to a female dog, the product is a being half-jackal, half-dog; take this mongrel (*metis*) and mate it with a female dog; this time the product only represents the fourth of a jackal. Again unite this mongrel (fourth jackal) with a female dog; the product represents the eighth of a

* ‘On the Plurality of Worlds:’ by Baden Powell. ‘Are there more Worlds than One?’ by Sir D. Brewster.

jackal. Finally, this mongrel (the eighth of a jackal) with a female dog; the product has nothing of the jackal in it—it is a dog.”* It seems that, if the female jackal had been employed instead of the female dog, the last product would have been a jackal.

We confess that we do not see in such an experiment a refutation of the doctrine of the pre-existence of germs: the product reverted to the species which prevailed; but whether the germ pre-exist or not, it produces a being with generic forms, and these must have a meaning, a signification, it being admitted by all that the productive energy is limited to analogous species and genera. Buffon knew some of these facts, nevertheless he thought it right to offer another system of the origin of beings—the system of *organic molecules*. Voltaire alone could handle such systems; he struck them with a word, and they fell, like the card-constructed houses of children. Life is the most obscure of all mysteries: its results are beings with structures infinitely complex: in the analysis of these beings by observation and dissection we arrive at certain facts, of which the latest discovered are incomparably the most wonderful: they reveal to us the extraordinary and almost incredible fact that the embryos of all animals resemble each other; that, in the progress of the young from the ovum upwards, they assume forms belonging to other species and genera; that the young bird has branchia or gills, as well as lungs—the young fish, lungs as well as gills; that man himself is not exempt from these metamorphoses, which seem regulated by laws as constant and uniform as the specialization of the adult—metamorphoses and transformations as curious as those imagined by Ovid, and far more true. Any system or theory which takes not such facts into account is sure to be unsatisfactory and at fault, if not entirely untrue; they cannot, in fact, be any longer overlooked.

When we consider these facts of embryogeny, combining them with the obvious scale or chain of the animal creation, from the most simple to the most complex, running, as it were, in parallel lines, the reflection deepens, even though we may question that other view (successive creation) superadded to it in modern times by Paleontology, and which seems in course of being refuted. Nevertheless there are many respectable paleontologists, if we may so say, who still hold by the theory, for want, we presume, of a better—that animals have been formed and succeeded each other on this globe, in an order proceeding from the more simple to the more complex, repeating, as it were, the embryonic forms and metamorphoses, as well as the existing chain of beings. These facts, it is true, are not systems nor even theories, but they are the materials out of which future theories must be formed. The philosophy of Zoology must assume a character in unison with the precise mechanical, mathematical and experimental philosophy of the day. The era of ingenious conjecture is passed as regards human physiology and anatomy—it closed with the advent of the illustrious Bichât; as regards Chemistry, with Davy; Hutton

* Fleurens.

and Cuvier put an end to the conjectural in Palæontology and Geology, properly so called : it cannot be again revived, at least for a lengthened period. A cure for the nonsense of a 'Plurality of Worlds' and 'More Worlds than One' may be found any day in the first chapters of Comte. With Bichât and Cuvier closed the era of conjectural physiology and unsound anatomy. It were a waste of time to discuss such theories now, nor does it obscure in any way the grand reputation of Buffon, that he also committed himself to an hypothesis, a system. It was the fashion of his day, and neither the vortices of Descartes nor the hypotheses of Leibnitz and Maupertuis had been fairly withdrawn from the field of Science. But the phasis which zoological Science has now assumed (I mean, of course, in a scientific point of view) does not admit of this : it returns, as we shall find presently, to the grand views of Buffon, but with other objects and brighter prospects of success. That which we now seek for is, what gives the *form* ; the materials of life are found everywhere, and they undergo perpetual change, but the form remains, not for ever, but until their extinction by a cause as yet undiscovered. It is this tendency to specific form, originating in that which is either without form or possessing another, in which is concealed the mystery of life. An independent being which, for a certain time, maintains a certain form, and is considered as a distinct species, suddenly disappears, and seems to have been lost ; soon it is discovered in another locality under another form.* Who shall say how far this principle extends ? The germ, as Buffon said, contains the mould of the future being ; the poverty of language did not enable him to express this great truth in more suitable, more intelligible terms ; but that mould contains more than the outline of the *species*—it includes that of the family, the *genus* : how much more we know not. All that we know is, that, in the existing order of things, as in the past, specific forms exist which maintain their existence in space and time for an epoch ; that these were preceded by others which followed exactly the same course ; these by others. Let us adhere to facts. If in the embryo of the young and in its developments we find *generic* forms as well as *specific*,—the vestiges of the past also and an outline of the present world,—it is surely consistent with legitimate philosophy to inquire into the causes of such phenomena, and even to predict that these forms include the future. They form part and parcel of the laws of life, just as much as the phenomena of the movements of the planets form a portion of and corroborate the truths of the laws of gravitation. Bonnet mistook the laws of growth and nourishment, and he fancied that the molecules contributing to the growth of a bone were intercalated amongst the original, which thus never changed, but grew by a kind of intussusception. Experimenters, from Belchier and Duhamel to Hunter and Troja, have shown that it is not so ; notwithstanding, the expression of Buffon remains substantially correct : "The impress of the mould of each species is the thing the most un-

* Van Beneden on the Tænia.

alterable in Nature, whilst nothing is more variable, more corruptible, than the substance." In this expression we find the result, the *resumé*, of nearly all that zoological science has done; it states simply a fact, and read with the light which the 'Ossements Fossiles' has since thrown on it, tends still more to exalt the reputation of that man whose name, during the Cuvierian era, had all but ceased to live.

The grand generalization of Buffon was simply a lucid statement of a fact, but a fact of the highest signification; nothing is constant, he said, but the *mould*, the *form*, that is, the species throughout all its organs; alter it as you will, the *forms* or *moulds* in which Nature has cast her beings remain as they were—for ever; she alters and modifies them herself: the time was when there were other forms, other species, *other moulds*, and the time will arrive when a new order of things must take the place of the present; but how all this is effected we know not—all that we know is that man cannot do it: we may compress and torture the human brain by artificial means,* crush into a hideous mass the beauteous forms of the human foot for thousands of years,† still he cannot make his odious and detestable mutilations and deformations, hereditary. Hippocrates thought that man could thus alter Nature, but a larger experience tells us that he cannot do so permanently. Modern physiologists, much occupied with little details, offer you certain experiments on bones and on the production of hybrids, in proof that new forms may be created by man, but these very experiments prove the contrary. The hybrid cannot maintain its position on earth, and this is a proof, not that pre-existing germs do not exist, but that the principle of life, derived from the male, modifies that germ or mould for a time, bringing out certain specific qualities appertaining to one or other parent, and distinct and observable, and remarkable in the case where the parents belong to different species, the young of each species containing within it the possible of all its natural family. Thus, in hybridization, at least two principles are at work in each parent, the specific and the generic; forms are affected thereby; but all such deformities of Nature's moulds are notoriously fleeting and have ever been excluded from Nature's great plan. Naturalists also have experimented on living bones,‡ to know how they grow, whether by a kind of intussusception of the molecules or by the superimposition of layers, both in length and thickness: admitting to the full the correctness of their experiments, some of which, and those the most important, could be refuted by facts drawn from the practice of surgery, no other inference can be assumed from them than this,—that the regulating principle of the growth of the bone lies not in the bone itself, but in the surrounding soft tissues. That is all. The experiment enables us merely to localize the regulating principle of the growth or restoration, but throws no light on the nature of that principle itself.

The question we now discuss has in Britain occasionally assumed another form, perhaps for this reason, that sound zoological science

* Chenook Indians.

† Chinese race.

‡ Fleurens.

never really existed here. At no period was it ever strictly anatomical, experimental, practical, but vacillated as Philosophy itself has done (metaphysical, we mean), between the extreme of utter scepticism and the most slavish of doctrines—the theory of final causes. There never was any medium or middle course, for Science and common sense—it was ever Middleton and Tyndall on one hand or Paley and Croly on the other: men were called on to take a side—to stand by the Mosaic deluge or the ‘Vestiges of Creation.’ Continental scientific men look on with wonder, and ascribe it to the climate and to the temper of the islanders: a hypocrisy which has been called “organized,” but which must mean “organic,” has no doubt something to do with it. The question resolves itself into this,—is life an inherent quality of matter from the beginning, an essential to it, and requiring but certain circumstances to call it forth? This is a simple-enough proposition, perfectly intelligible and in every way probable; so soon as it has been demonstrated it will take its place in Science—but not till then.

A word in conclusion of this section of this brief critical inquiry into the present scientific phasis of modern physiology. If the doctrines of the metamorphoses of organs, in the sense given to the term by Etienne Geoffroy (St. Hilaire), ever made any progress in France, we are certain that, with few exceptions (remarkable enough, no doubt), they were never admitted by the transcendental anatomists of Britain; none of them ever believed that branchiæ or gills could be metamorphosed into lungs, or *vice versâ*; that the opercular apparatus of fishes was the metamorphosed *ossicula auditus*; that the prostrate gland and the uterus were analogous or homologous; that the reproductive organs are identical in the embryo of either sex, and are convertible into each other by a law of sexuality applied to both sexes: no such doctrines ever made any progress in Britain. On the contrary, we know* that the whole doctrine was objected to so early as 1821, in the presence of Geoffroy himself, and in his own study; that again in 1827 and 1828 this pretended metamorphosis of organs, the refutation of which M. Fleurens claims in 1844, was distinctly refuted in a Memoir read before the Royal Society of Edinburgh, at that time under the presidency of Sir Walter Scott, and afterwards published in the ‘Medical Gazette.’ In that memoir the theory of *duplicate organs*, in the fœtus, as a type of certain great systems of organs, is explained by a reference to these organs themselves; is supported by embryology, by the discoveries of Rathke, by a history of the ducts of Malpighi and Gærtner, and by dissections of hermaphrodite structures placed before the Society. The term, then, *dedoublement organique*† is not a happy phrase, for, in reality, there is no such thing in one sense, either anatomically or physiologically; the branchiæ of the chick are not the *doublure* of the lungs, nor the

* See ‘Great Artists and Great Anatomists,’ by R. Knox. London: Van Voorst.

† Fleurens.

swimming-bladder of fishes the *doublure* of the gills; they are distinct organs, which in the fœtus may or may not perform a function. M. Fleurens connects their presence with final, that is, mechanical and biological causes, and speaks of them as "constituting the apparatus of fœtal life." This we are compelled to deny as a general rule. The branchiæ of the fœtus in mammals and birds performs no such functions as he seems disposed to assign to them; nay, what is more, he must know that they do not: his theory, then, of "organs of fœtal life" and of adult life, has no basis in fact, unless he includes, or rather rests his doctrine on, those other organs, the corpora wolffiana, suprarenal capsules, &c., organs of whose true character we are still profoundly ignorant. The *doublure* and the *dedoublement organique* theory, then, which is here claimed* as a discovery in 1844, has no basis, if adopted as its author views it; but, separating fact from fiction, we find in it the doctrine of *type*, advocated in the presence of M. Geoffroy himself, and published in 1828, that is, twenty years prior to the appearance of the 'Mémoires d'Anatomie et de Physiologie Comparées.' It has often happened, that the substitution of a happier and more expressive phrase has resuscitated a theory which had been forgotten, and made that appear new which, in fact, was old: in the costume we now discuss the phrase proposed (*dedoublement organique*), it is neither correct nor happy; it is incorrect, in fact, as open to equivocal; type of formation was the one proposed by the anatomist† who first offered the theory to the world; it has at least the merit of implying no false views, being simply a generalization of a series of facts, which may be verified in the embryo—in the adult anatomically and physiologically. "The *type* or *plan of formation* of certain *systems of organs* is *double*; these systems are more especially the *respiratory* and the *reproductive*;"* lungs and gills are present in all, whether aërial and aquatic, not with reference to the fœtus as an individual, but with a view to the future, and to the grand scheme upon which all animals are constructed. If the future animal, when adult, is to be *aquatic*, the gills alone are developed and the lungs disappear; if aërial, the lungs alone acquire their full growth and the gills disappear; if amphibious (*Siren*, *Proteus*, *Axolotl*), both remain. These were the objections made to M. Geoffroy by the author‡ of this view, in 1821; they must no doubt have occurred to others. To refer these structures to pure fœtal purposes and uses is to go backwards in philosophical Zoology; it is no business of ours to trace the causes of such a retrograde step, but, were we inclined to do so, we should unhesitatingly ascribe it to a misapplication of the doctrines of a Final Cause; a misapprehension of the true principles of the transcendental philosophy, which, not being originally a native of France, but an importation from Germany, did not, in that country, meet with a fitting soil for its full development; and yet that country, abounding in genius and originality,

* Fleurens.

† Knox, 'Medical Gazette.'

‡ Id.

produced Buffon and Voltaire,—to the first of whom we owe the theory of primitive moulds, and to the latter an expression he applied to the physical world, far in advance of his age, “the laws of deformation are as constant as the laws of formation.”

R. KNOX.

Meissen House, Upper Clapton,
January, 1857.

Sagacity of the Rat.—Strange stories are often told about the sagacity of the common rat, and most people have heard of the method by which that animal is said to purloin eggs. The following is a true account of the way they defeat an ingenious contrivance of farmers:—A labourer on a farm at Tenterden, observing holes in the thatch of a corn stack, evidently made by rats or mice, was puzzled how to account for the intrusion: the stack being raised more than two feet from the ground, the plunderers must have entered by the roof. The mystery was soon solved: the man came the next morning, and saw a rat carefully balancing itself at the extremity of a branch of an elder tree about three feet from the stack, and crouching down ready to spring on to the thatch. I am told by those conversant in such matters that the raised stand does not protect a stack from mice, which are often carried in the sheaves from the barn, and need not leave their good quarters until the food is consumed. With rats, however, the case is different; they are obliged to go away in search of water; consequently, when the stack is raised from the ground, they cannot return. Our sagacious friends mentioned above were more fortunate; they could eat a passage through their abode, drop out at the bottom, quench their thirst, ascend the tree, and leap home again.—*S. C. Tress Beale; Ivy Court, Tenterden, January 26, 1857.*

Birds of the Crimea. By THOMAS BLAKISTON, Esq., Lieut., R.A.

(Continued from page 5421).

Sylviadæ.

In commencing at the beginning of this numerous family, of which I can name fifteen species as visiting the Crimea, and five of which are included in the Fauna of Britain, the first which I come to is the hedgesparrow (*Accentor modularis*), of which Dr. William Carte obtained a specimen in the month of February, and I killed another early in March.

I have no doubt that the Crimea would be a most interesting field for the naturalist, and, if well worked up, would throw much light on the range of British birds. The character of the country and its situation are peculiar: it is, in some measure, cut off from the mainland to the south and west; and although there is but two and a half degrees of sea separating it from Asia Minor, yet this may limit the

range of some of the winged tribes. One would therefore be led to consider it a turning-point for those which range to the north-east; but we could not deduce anything without observations being made in Western Turkey and the Principalities. However, should these scanty notes serve to clear up anything I shall be satisfied.

The robin or redbreast (*Sylvia rubecula*) is most likely a resident in the country, but not plentiful, or I should have observed it oftener than I chanced to do. This lively little songster our minds always associate with England, and I dare say that the thoughts of many a one who takes little or no interest in birds, on seeing him in a distant land, wander towards that island off the coast of Europe. My first meeting with him was during the armistice previous to peace: it was below the hermit's house, under the Monastery of St. George, on the 15th of February.

Both the redstart (*Sylvia phœnicurus*) and the black redstart (*Sylvia tithys*) inhabit the Crimea: the latter I have on the authority of Dr. William Carte, he having obtained a specimen in April: I observed the former as early as the 7th of March: they were in pairs by the 12th of April, remained during the spring, and were there at the end of September. I have a note of having seen what I thought was a redstart about the end of the first week in February. How could this be if it is only a summer visitor to Britain?*

The whinchat (*Sylvia rubetra*) I procured during the second week in May, and observed that it perched on bushes, at which time a white spot on the wing-coverts was distinctly visible at a distance: I noticed it till the 18th of May. Of this genus there are three more to be mentioned, two of which have not been found in Britain, the russet wheatear (*Sylvia stapazina*) and pied wheatear (*Sylvia leucomela*): I can say but little about them, having only obtained one of the former, which I found among rocks and scrub brushwood, in the middle of April, and the latter in the beginning of the last week of that month

* If in the present account I ask but few direct questions, it is not because I am not anxious to learn as much as possible about the habits or range of the species I enumerate, for I really feel a great desire to know more than, I am afraid, I ever shall on these points, as well as about other species inhabiting the locality of which I am writing; and I shall therefore be most thankful to any persons who will throw out hints, either in print or by letter, and I should take great pleasure in affording any information in my power in answer to questions concerning anything of which I make mention, for of course there are many details here omitted, such as the measurement of specimens, the precise dates of all those procured, &c., which may be useful or interesting to some. The simple address, as the paper is dated, will always find me, in whatever part of the world I may be serving.

and in May: they were all males; but, in company with the second specimen of *Sylvia leucomela*, I noticed what I considered was a female, which appeared of an obscure brown colour, with some dull white about the head. There were a good many about the rocky bare ground near the edge of the cliffs, under which I dare say they retired at night and in bad weather, for, during winter, I occasionally saw small birds make for the same retreat, which is well sheltered from the cold winds of the north and west, and in many parts there are also a quantity of small trees and bushes.

The wheatear (*Sylvia œnanthe*) is a bird of the migration of which much notice is taken in the South of England, whither it comes northward from France, Spain and Africa: we may also suppose that it makes its course to the Crimea about North from Asia Minor, as it has been observed at Smyrna, Trebizond and Erzeroum. One was shot by a friend of mine a few days before the end of March, and I observed a good many about before the middle of April: this, as well as the redstart, appeared to be in pairs; the male bird would mount in the air, almost like a skylark, uttering its note, which struck me as between that bird and the blackbird: they were rather shy of approach. The wheatear seems partial to hopping about old stone walls and the edges of precipices: it continued common until towards the end of September, usually only two being together, after which I took no notice of it. Feeling sure that the absence of any notes on the breeding of the birds here enumerated will be remarked, I may therefore state that I arrived in and departed from the country just at that particular season, and was therefore unable to make any observations concerning those interesting habits.

Of the warblers, more particularly so called, I can enumerate but a few as inhabitants of the Crimea, and in order will commence with the great sedge warbler (*Sylvia turdoides*), which I shot in company with the barred warbler (*Sylvia nisoria*), on the 10th of May: the latter, however, I had observed by itself on the 2nd (and it was plentiful in the middle of the month), about the brushwood on the hills; it would rise in the air for a short distance, in the manner of the wheatear, singing something like the skylark, which it also did when perched on the top of a thorn or other bush, at which time the crest was distinctly visible. Of three male specimens of this bird shot in May, the colour of the eyes were bright yellow, and not white, as has been described; in fact, so striking was this feature, that, not knowing the bird, I noted it in my journal as "yellow-eyed warbler;" the legs and feet were clay-yellow, marked with brown.

At the end of April, while out before breakfast one morning with my gun, my attention was attracted by the beautifully clear song of a bird, such as I had never yet, in my rambles during the spring, heard; it was sometimes so loud as to be considered quite close, and at others appearing at a distance, to so soft and low a warble would it fall; one part was very like that of a canary. I found very great difficulty in getting a sight of the bird among the high brushwood, for, on my approaching close, it would cease to sing, and sneak away; however, after a long hunt, I was fortunate in getting a shot at one, which proved to be a fine male blackcap (*Sylvia atricapilla*): there were two or three others about the same place, but I could not get a close sight of them. This bird was not uncommon during May, but was oftener heard than seen.

I obtained the common whitethroat (*Sylvia cinerea*) at the beginning of May, and it was generally distributed during the month, usually in pairs.

We end this interesting family by noticing the wood wren (*Sylvia sibilatrix*) and willow wren (*Sylvia trochilus*); the former, inserted on the authority of Dr. William Carte, I did not happen to meet with, but found the latter common and very generally distributed, from the 12th of April till the middle of May, after which I do not find a note of it, but think that it did not leave the country during summer: it usually kept about brushwood, and occasionally about small bushes on bare ground, and generally in pairs. I saw a good many among the bushes bordering the lower part of the Tchernaya river in the fourth week of April.

The goldencrested regulus (*Regulus cristatus*) was observed by Dr. William Carte, and he has a specimen which he obtained in the month of March.

Paridæ.

Of this family I can only say that I obtained specimens of the great titmouse (*Parus major*) and blue titmouse (*Parus cæruleus*) during winter and spring, and Dr. William Carte procured ten of the cole titmouse (*Parus ater*) in the month of February, and the long-tailed titmouse (*Parus caudatus*) in June.

Motacillidæ.

I have said before that unless one commences, in collecting, to pick up subjects the most common, it will be found that those which might at one time have been so easily procured are gone, and perhaps

another chance never offers, and ultimately information is wanting on most important points: from committing this error I lost opportunities of obtaining one or more species of black and white wagtails, and now, in endeavouring to throw together these few notes, I find myself deficient, not in the time of having observed these birds, but of the name of the species, and cannot tell whether it was the same bird observed in the Crimea in April and September, or during the winter at Scutari, when they were congregated. There may have been three or more species: I have, however, the pleasure of here recording the occurrence of two species for certain, which I was led to search for, from having seen a yellow-coloured wagtail while riding on the north side of Sebastopol Harbour to Fort Constantine. My next chance, two days after (for a day of duty intervened), I was up by sunrise, and away on my horse across the plain of Balaclava to the Inkermann valley, or lower part of the valley of the Tchernaya: I was very fortunate this morning, for I added to my collection four new species, and for the first time observed two of the Hirundines as well as two species of sandpiper. The two were the grayheaded wagtail (*Motacilla flava*), shot by itself, which proved to be a female on dissection, and the blackheaded wagtail (*Motacilla melanocephala*), a male in fine summer plumage; this was on the 24th of April. On no other occasion did I observe either of these, but Dr. William Carte procured a specimen of the first (*M. flava*) in April, and unluckily committed the same error as myself with regard to the black and white-coloured wagtails, which he often observed.

Anthidæ.

As in Britain, so in the Crimea, the meadow pipit (*Anthus pratensis*) must be a resident during winter and spring, if not for the summer and remainder of the year, as my first meeting with it was on the fourth day of the year, and I kept up a casual acquaintance till the second week in April, when, being out one morning on the hills near the sea, I observed small parties of birds continually coming north from the sea: I shot two out of distinct parties, one of which was the meadow pipit and the other the tree pipit (*Anthus arboreus*). This is the last note in my journal of having seen the former, but there is no reason why it should be put down as not resident in the country during the year, for I was but a single unassisted observer, and at best but a rough field naturalist. Although these two birds are said to have been so frequently confounded together, yet as soon as I picked up the first specimen of the tree pipit its appearance took my

eye, and I said to myself, "This is distinct from the former one;" and, on examining the two together, I observed a marked difference, but it will of course be asked, What was that difference? In answering this question, I must first say that the specimens compared had been just shot—they were fresh: I might then state that one was a trifle larger than the other, that there was a slight difference in the form of the beak, that the tertial feathers were not in the same proportion to the primaries, or that there was some difference in the markings of the breast and under tail-coverts; but these differences might not be constant during the year, and would not be observed, except by comparing specimens of each species, and would therefore be useless in the description of either species, and so I say that the great difference which struck me was that the meadow pipit had the legs and feet of a light brown, under surface of the feet yellow, and bill tinged with yellow; while the legs, feet and claws of the tree pipit were flesh-colour, and the base of the under mandible of the bill the same. I have, however, shot the former in England in November, with the legs and feet orange, but I cannot find that they are ever of a flesh-colour, like the tree pipit.

To Dr. William Carte is due the sole honour of bringing that rare bird, Richard's pipit (*Anthus Ricardi*) before the public as an inhabitant of the Crimea, a specimen of which, together with the remainder of his collection, is at the Museum of the Royal Dublin Society, and I have the satisfaction of being able to state that he will read a paper on the "Natural History of the Crimea" before the Society, on the last Friday of the present month (January).

I have two more, which must not be overlooked, for, being unknown as British, their names will not be so familiar to many readers. I did not notice the first, the tawny pipit (*Anthus rufescens*) until the 23rd of April, after which it was numerous and generally distributed; and, having observed it beyond the middle of May, I consider that it breeds in the country. I usually found it on open parts, sometimes bare and rocky, and one day I saw it catch a large insect, which I think, from having seen several about, was a species of grasshopper without wings; it perches on a twig as well as on the ground, where its movements are something like the wagtails, but its motion in flying is peculiar, and it utters a note like "Tee-twee:" I have noticed two chasing one another about a rocky hill for a long time, quite regardless of my presence. This bird will mount in the air in the manner of a lark singing, and come down very rapidly to the ground, with its wings considerably elevated above its back.

The other is the redthroated pipit (*Anthus rufogularis*), which I found among short rushes on a wet marsh on the 24th of April, when I shot two specimens: I did not observe it again. The bill was dark brown, lighter at the base of the lower mandible; hind claws curved, and about as long as the toe; eye hazel.

Aloidinæ.

In commencing the Conirostres, we come to a family of birds which, if not in species, is perhaps as numerous in individuals as any: with modern systematic authors it stands at the head of this second division of birds. I will here only speak of the species which I know have been observed in the Crimea, the first of which is the common sky lark of Britain (*Alauda arvensis*), which I observed in summer and autumn, but did not examine a specimen until January, which I found to agree with description.

The next is the wood lark (*Alauda arborea*), of which I have seen and compared a specimen, which was brought from the Crimea by an officer who made a small collection.

The only other British species, the shorttoed lark (*Alauda bruchydactyla*), which I obtained in Bulgaria in March, I considered that I observed while riding one day in the beginning of April in the Crimea; however, on the 21st of the month, I shot one out of a flock of about seven; they were common until the end of May, when I observed numbers on the plains north of Sebastopol. I never at any time saw more than seven or eight in a flock, which may be a peculiarity of the species. I have observed one perch on a plant about a foot off the ground, in which position I shot it. On examination of specimens, I found the shaft of the outer tail-feather white, and part of the inner vane of the same colour as the outer; the outer vane of the first primary buff-white, the tertials varying from half an inch short of to level with the end of the closed wing; first and second quill-feathers equal and the longest; and the brown patch on the side of the neck usually distinct, which is well shown in Yarrell's woodcut, but omitted in the written description. I have the third wing-feather of a male specimen, killed on the 18th of May, which shows a marked difference of colour in the half-inch extending beyond the fourth feather, clearly proving that the sun and weather affect the colour of the feathers of birds to a certain degree.

In November I considered that I saw a lark with a decided crest on the high land above the Bosphorus, in Turkey; and Lieut. Irby

includes *Alauda cristata* in his 'List of Birds observed in the Crimea' (Zool. 5353).

I ask any naturalist, Is there any pleasure in for the first time observing a species new to you? Surely you have a peculiar feeling within you,—you eagerly wish for a specimen,—and I will answer for it that you do not rest until you have obtained such. Suppose that you are a field ornithologist, you take the first opportunity, and although the weather is cold and windy, with snow covering the ground, you trudge off with your fowling-piece to where you observed the birds. I did this on the 2nd of January, and found the bird I was in search of on the Karani Hill, within sight of Sebastopol: I soon procured a couple, and, after waiting in the snow behind an old bit of a wall for some time, knocked over six more at a shot: they were larks, but the largest I had ever seen. I had studied Yarrell well, while making out the shorttoed lark. What could they be? To make sure, however, I turned over the leaves again that evening in my hut: they were not there. I was at a loss; "however," said I to myself, "they are larks, but somewhat approaching the buntings:" so I marked them in my journal as specimens of "large lark," and noted the measurements and other points. This was the calandra lark (*Alauda calandra*), as I afterwards learned, from England.

A few days after this, the 5th of January, I was again on the *qui vive*, as a friend told me he had seen some buntings, white below and rusty-colour above: with this hint I made for a camp where he said some had been shot, the ground being covered with snow, and sure enough, on looking over a heap of small birds, I found the calandra lark, common bunting, and another new to me, which I put down, for distinction, as a "lark bunting, No. 20," the skin as well as the sternum of which I preserved. The same officer, a day or two after, kindly sent me a specimen of the same bird, the whitewinged lark (*Alauda leucoptera*), a male, from which I penned the following description at the time:—"Length $7\frac{5}{8}$ inches; closed wing $4\frac{1}{8}$ inches. Legs, toes and claws brown; bill horn-colour, darkest above and at the point; upper mandible overhanging the lower $\frac{1}{5}$ th of an inch; top of the head and ear-coverts chestnut-gray; the feathers on the back dark brown, centres with light edges; lesser wing-coverts, bastard wing and primary coverts chestnut; secondary wing-coverts and tertials reddish brown, edged with light; primaries and secondaries dark brown—the third, fourth and fifth of the primaries tipped with light red-brown, the remainder white inner webs—all the secondaries tipped, for three-fourths of an inch, with white, which is not seen when the wing

is closed; upper tail-coverts chestnut and light brown, with the shafts dark brown or nearly black; one outer tail-feather on each side white; outer web of the next edged with the same, the remainder dark brown, edged with light, except the two centre ones, which are dark brown; centres with light chestnut-brown; outsides lightest at the tips, and appear only as extended coverts; all the under surface of the body white, slightly spotted on the throat and breast with wood-brown, inclining to chestnut on the breast; feathers on the flanks white with brown centres, forming longitudinal streaks; the feathers on the legs brownish white; first and second quill-feathers equal and the longest. Bill thicker, and the ridge of the upper mandible more curved than in the true larks; hind claw quite straight, except the white point, which is slightly bent; in front and rear of the eye is white; feathers on the head capable of being erected as a crest." I have a specimen in my possession which is somewhat darker in colour, the top of the head being quite a decided chestnut. I never observed or heard of this species again: on my return to England, Mr. Gould kindly made this bird out for me.

I was told that the calendra lark bred in the country, and I observed it numerous on the plains to the north of Sebastopol, while riding to the Alma, at the end of May, when it was in pairs: I several times observed a hollow in the sandy earth (from which the birds rose) but no eggs, which may have been only basking-places.

Emberizinae.

The family of buntings, which stands between the larks and finches, and, to a certain extent, partake of the characters of both, is a numerous and well-defined collection of species, which, although so common in many parts of the world, are by casual observers confounded with the finches or sparrows. It is often the beautiful yellowhammer, in his subdued winter plumage, that is seen hopping about the farmyards of England, in company with the sparrow, when he is driven by snow to the habitations of man for his support; yet how few would say that he is the most gaudily-plumaged bird of Britain at other seasons? It was in this state of plumage that the yellowhammer (*Emberiza citrinella*) was seen in the Crimea, my first meeting with it being at the end of December; but I was uncertain as to the species, on account of the very slight descriptions usually given of the winter plumage of land birds which inhabit Britain also during summer: it continued with us through January. Specimens were obtained by Dr. William Carte in March; and I observed either it or the ortolan bunting (*Emberiza*

hortulana) on the 6th and 12th of April, for this latter species having arrived about this time, together with the chirping of the common bunting, my ear was confused as to sounds. However, my first capture of *Emberiza hortulana* was on the 20th of April; for, on coming into camp from a ride, I observed a pair of birds which I took for yellowhammers, but something hinted to me that I ought to make sure; so, fetching my gun, I shot one, which, on examination, turned out not to be my old friend of the cold season, but a new one, the ortolan bunting, which remained common in pairs to the middle of May, and, I suppose, the whole summer. A male specimen, shot on the 2nd of May, had a portion of its ear-coverts, on one side, a green-olive. Now, I had observed the bird just mentioned for some days in pairs, previous to my shooting the specimen, and, considering they were of the former species, I had made the following note in my journal:—"Sunday, April 20th. It is seldom that I get a sight of these birds now, and what I do are in pairs: I suppose that the mass have gone north, but a few remain to breed." I insert this to show how one is liable to be led astray by the gradual substitution of one species for another, until by chance suspicion is roused; and therefore I advise any one who would make full and accurate notes (for truth is the greatest point in Natural History) not to hesitate about the killing of a few birds or the expenditure of a little additional ammunition, for the sake of being certain, for many birds are not unpalatable, and I have found buntings and others very acceptable to make a change from ration-beef and salt-pork. I also find, on the 26th of April, a reference to the note of this bird:—"I think they must just have arrived, for the note is distinct, and I should have noticed so many of them before."

The meadow bunting (*Emberiza cia*), which is said not to go north of the South of Europe, Dr. William Carte obtained in February.

The common bunting (*Emberiza miliaria*), known by its peculiar prolonged chirp, is resident in the Crimea during the year, but I consider that its numbers are greatly increased in the spring: I observed them in small flocks during autumn; a few congregated with other buntings and larks in winter, and scattered about usually among the brushwood on the hills in numbers during spring. I note two out of many which I measured, which appear unusually large, "Shot on the 7th of January, length $7\frac{1}{2}$ inches, closed wing 4 inches; and on the 12th of April, length $7\frac{3}{4}$ inches, closed wing 4 inches."

Lieut. Irby mentions *Emberiza schœniclus* as "common, and seen throughout the year."

Fringillidæ.

The house sparrow (*Fringilla domestica*), which may be seen everywhere in England, from the crowded streets of cities to the most remote farm-house, is an inhabitant of the Crimea, where I compared a couple of specimens. The Russian soldiers on the north side, during the spring of 1856, had a great number of small boxes erected on long poles in their batteries and about other places, for the accommodation, as I supposed, of this social bird, as I never saw any other go into them; but I never made out whether these boxes were for catching the young, or merely as accommodation for the sparrow, put up from disinterested motives.

Two chaffinches (*Fringilla cœlebs*) were shot from a congregation of small birds in mid-winter, which I immediately examined: I also saw this bird in May, and Dr. W. Carte brought home a specimen.

In company with a flock of yellowhammers, I shot a brambling (*Fringilla montifringilla*), on the 3rd of January; also another the next day, which was skinned and preserved.

The greenfinch (*Fringilla chloris*) was procured by Dr. W. Carte and myself during winter.

On Christmas day I saw a hawfinch (*Fringilla coccothraustes*), which had been killed a day or two, and, during the cold weather of January, procured one myself, which I had some difficulty in approaching.

Of the division *Carduelis*, the two well-known British species were obtained, the goldfinch (*Carduelis elegans*), by Dr. W. Carte in January, and myself in the middle of April, and the siskin (*Carduelis spinus*) during winter and spring, till after the middle of May; so we may be led to suppose that both breed in the southern part of the Crimea.

On the 22nd of April I observed a number of what I took for a species of redpole, with the pink breast showing on some of them.

I shot two females of the common linnet (*Fringilla cannabina*) on the 5th of January, one of which came to England, and is now among my other specimens of birds from the Crimea and Bulgaria, between sixty and seventy, in the Museum of the Royal Artillery Institution at Woolwich, where any one is at liberty to examine them.

The bullfinch (*Loxia pyrrhula*) was obtained by Dr. W. Carte: the specimen, being a very fine one, is among his others in the Museum of the Royal Dublin Society.

Corvidæ.

Having glanced over the hopping birds, we now come to those which move on the ground in a different manner, namely, by alternate steps with either leg, like man, and perhaps this is as clear a distinction as could be drawn. It may be seen that these birds pass on to the creepers, which, in like manner, approach what may be called the runners, Gallinaceous, or poultry birds, and I think the difference will be clearly understood when we look at the stately walk of the crow or starling, compared with the crouching run of the partridge; however, in mentioning the partridge as an example, let it not be understood that it always crouches when running, for you will see that a wounded bird, when making off from the dogs or yourself, carries its head as high as possible, and steps out at an amazing pace; but I mean that, in a natural and undisturbed state, it moves about by a sort of run in a crouching position; but enough of generalization.

The common starling (*Sturnus vulgaris*) breeds in the neighbourhood of Sebastopol, where there are many very convenient situations, such as the high cliffs and ruins at the gorge of Inkermann: I find no note of having observed them during the winter, but they were about the first week in April and in the second week gave signs of nesting, at which they were in full work at the end of May; and in returning from a ride to the Alma, I observed one carrying food into a hole in a bank, on the last day of the month. I have always considered that starlings are most interesting birds to observe, and those who have never read Stanley's beautiful description of their habits will do well to do so.

We now notice a bird by no means common in England, the rose-coloured pastor (*Pastor roseus*): it is a summer visitor to the Crimea; the first flock which I heard of in 1856 was about the middle of May, and I observed a large congregation before the end of the month, and by the end they were in flocks about the Inkermann cliffs, apparently going to build: of their stay towards autumn I have no notes, but a specimen was shot by me out of a small flock on the last day of June. A good many specimens of this attractive-plumaged bird came to England from the country.

The crows are birds which, not being shot by the sportsman as game or attractive objects for the cabinet, nor by the fowler for food, are therefore not often closely observed, unless shot by any one for that purpose. From this reason a resident naturalist does not happen to have rare species brought to him by others as singular or handsome birds, on account of their not appearing distinct from others of the same family at a distance, and therefore, as I never chanced to shoot any of them myself in the Crimea, I cannot speak of them with any certainty.

I occasionally used to observe what a friend, somewhat knowing in birds, and myself used to consider, from its hoarse croak, to be the raven (*Corvus corax*), and I have no doubt in my own mind that it was; and I should think it very probable that this bird breeds in the rocky and wild parts of the Crimea.

Of the carrion crow (*Corvus corone*) and hooded crow (*Corvus cornix*) being inhabitants there can be no doubt, for, from their well-known appearance and habits, I think the youngest observer could not help being satisfied. I did not observe many of these birds during the summer, perhaps on account of there being no sandy beach or flat mud coast near, where one would be likely to find them: through the winter they were numerous, and often a good many would be collected on the site of a summer camp, where they would pick up a good deal of scattered barley and other leavings; on such occasions they were often in company with gulls and jackdaws, and it was amusing to see gulls chasing both hooded crows and jackdaws on the wing, but I never chanced to see the operation reversed, the first always appearing to be the strongest. I have observed gulls feeding in company with hooded crows on dead animals.

During the winter I used frequently to observe flocks of jackdaws (*Corvus monedula*) go over the camp in the morning, and they were numerous during the spring and beginning of summer, and must have reared their young about the cliffs. In the beginning of May I observed, what I noted at the time, a white ring was plainly visible below the gray on the neck of one bird; this was at about thirty yards' distance.

The magpie (*Corvus pica*), of which a specimen was procured by Dr. W. Carte, I observed during summer and spring, but never numerous as a species.

The jay (*Corvus glandarius*) was by no means uncommon during the winter, when, as in Britain, it ranged the woods in parties: I observed no peculiarities in the specimens examined, and Dr. William

Carte has carefully compared his with specimens procured in Britain.

THOMAS BLAKISTON.

Camp, Woolwich, January 24, 1857.

Notes on a Female Brambling (*Fringilla montifringilla*).—This specimen was shot in the month of February, when in company with chaffinches, in the neighbourhood of Shanklin, Isle of Wight. Length 6 inches: chin white; throat ferruginous, as well as the breast, which is tinged with orange and pale red; a patch of bright lemon on the sides and beneath the wings, the feathers on the spurious wings being tipped with orange; there is also a patch of light chocolate about the vent, which, being in strong contrast to the white of the abdomen, is very remarkable; there are also longitudinal dark hair-brown spots on the feathers between the vent and thighs, as well as on the sides; the quills are, for the most part, margined with yellow on the outer webs, as are the tail-feathers, more particularly the two centre ones, which are ash-gray on the outer webs, dusky black on the inner; from the fourth to the ninth quill inclusive there are white spots on the outer webs near the shafts, forming, when the wing is extended, a slight bar across it, most of the white being concealed by the primary coverts; the third quill is longest, the first and second are about the same length, the fourth an eighth of an inch shorter than the third. It is not my intention, nor is it necessary, to enter into a minute description of the plumage of the brambling, my object being merely to show in what respect the specimen under examination seems to differ from those mentioned by ornithologists about to be referred to, although I am aware that much variation is said to exist in the plumage of individuals of this species. As my remarks are exceeding the limits I had proposed to myself at their commencement, I shall not venture to give lengthened extracts, as the authors about to be cited can be consulted, if required. Cuvier, in a masterly manner, at once points out what is most remarkable in the plumage, namely, the patch of lemon-colour beneath the wing, which I had in vain sought for in the descriptions given by other naturalists; but neither Cuvier nor any other author that I have been able to refer to says one word about the peculiarly striking patch of pale chocolate near the vent.

Cuvier, 'Règne Animal,' tome i. p. 386:—"Poitrine fauve, le dessous de l'aile d'un beau citron."

Temminck, 'Manuel d'Ornithologie,' tome i. p. 360:—"La femelle devant du cou et poitrine dun roux orange clair."

Pennant (quoting Mr. Johnson):—"The throat is white, the breast and belly waved with flame-colour. At the setting on of the wings, gray."

Montagu, 'Supplement to the Ornithological Dictionary:—'"Female. Chin and throat dirty white: upper part of the breast crossed by a band of dull chestnut, above which the feathers are pale, tipped with dusky, giving a speckled appearance to that part; the rest of the under parts sullied white." In describing the male (in the 'Dictionary') he states that only "on three or four of the primaries a spot of white runs through the whole of the exterior web."

Macgillivray, vol. i. p. 336:—"Female has the throat and breast light reddish brown, the sides paler and unspotted, the abdomen and under tail-coverts brownish white. The third quill longest, the second scarcely shorter."

Stark (quoting Selby), 'Illustrations,' pl. 54, fig. 8:—"Throat, front of the neck,

breast, scapulars and smaller coverts of the wings, orange-red; a narrow orange transverse band on the wings; rump and lower parts white; flanks reddish, with black spots."—*Henry W. Hadfield; Tunbridge, February 2, 1857.*

Occurrence of the Hooded Crow (Corvus cornix) in Derbyshire.—Mr. J. J. Briggs notices (Zool. 5363) the rare occurrence of the hooded crow in Derbyshire. It may be interesting to Mr. Briggs and the readers of the 'Zoologist' in general to know that, for the last five or six years, a pair of hooded crows have frequented the parish of Breadsall, near Derby, during the autumn and winter months. Last winter a beautiful pair were killed in the parish, and I had them preserved by Mr. Cook, bird-stuffer, of Derby. They were replaced by another pair this autumn, 1856.—*II. Harpur Crewe; Stowmarket, Suffolk, January 19, 1857.*

Note on the Robin (Sylvia rubecula) and Butcher Bird (Lanius collurio).—A few Sundays ago, as I was sitting in the vestry between the services, I amused myself with watching a robin, which had taken refuge in the church from the snow. It presently came and sat on a form close to me, and I saw it eject from its mouth a small dark pellet; this I immediately picked up, and found it to consist of the exuviae of blue-bottle flies, with two small gravel stones in the centre. I was not aware that the robin was in the habit of throwing up in pellets the exuviae of the insects upon which it feeds, or any of the indigestible materials which it may take with its food. I have an idea that it is not generally known that the common butcher bird casts up pellets; but that such is the case I had a very interesting proof some few years since. A pair of butcher birds built and reared a brood of young ones in the rectory grounds at Breadsall. After the young birds had flown, the male bird was shot at and winged. We put him into a cage in a summer-house in the garden, and fed him with raw meat, which he ate readily. A day or two afterwards we were astonished to find, lying at the bottom of the cage, a number of large pellets, composed of the wing-cases and other exuviae of beetles, &c. As we had never given him anything but meat or worms, we could not at all account for it. We continued to find the pellets every day, and at last determined to watch, and, having done so, found that the old hen bird regularly fed her mate with beetles and other insects. She continued to do this for a long time, when, his wing having recovered, we released him.—*Id.*

Occurrence of the Firecrested Regulus (Regulus ignicapillus) near Penzance—I examined a female specimen of this regulus a few days since, which was captured within half a mile of this town, having the crown crest lemon-yellow, and the cheeks smoke-gray. I think these characters pretty well denote a bird of the year, for I have reason to think that the crest of the adult female of this species exhibits, more or less, a mixture of orange-red with the yellow, which, in *Regulus auricapillus*, is always lemon-yellow.—*Edward Hearle Rodd; Penzance, February 3, 1857.*

Note on the Common Wren.—As Yarrell writes of the wren (*Troglodytes vulgaris*), that it often endures a frosty winter's night by uniting and roosting in company in some sheltered hole of a wall or under thatch, it may be interesting to the readers of the 'Zoologist' to know that, for some time past, wrens have occupied empty swallows' nests, under the eaves of a house inhabited by a lady, residing in Tenterden, whose love for the feathered race and appreciation of all the works of Nature have not permitted these nests to be destroyed. On approaching a window near which the nests are built, shortly before sunset and again early in the morning, wrens have been seen to quit the nests.—*S. C. Tress Beale; Ivy Court, Tenterden, January 26, 1857.*

Abundance of Wagtails.—Observing an article on the great abundance of the pied wagtail (*Motacilla Yarrellii*) in the 'Zoologist' (Zool. 5363), and having paid some attention to this and the allied species, *M. alba*, for some years, is my reason for offering a few remarks on the subject. I would advise Captain Hadfield, the next time he meets with such a flock, to kill a few of the lighter-coloured birds, more particularly those that fly into trees, and he will probably find himself in possession of *M. alba*. The latter appears here in spring and autumn, and is to be met with in ploughed fields or gardens: should you see one and start it, on rising it often appears to fly over a hedge-row, but, if you watch it closely, you will generally find it in the hedge-row, and often perching. I have never met with or heard of its breeding in this neighbourhood; but I have taken two nests of eggs in Whittlesea Fen, in Huntingdonshire: one nest was in a reed stack, the other was in a mound of peat that had been thrown out of a drain; I also found a third nest under the end of a plank laid across a drain as a temporary bridge: with this I was unfortunate, although I watched it for several days, for, on the day I intended taking it, it had been unfortunately discovered by some children and destroyed. Although I have frequently looked for it, I never met with *M. alba* in the winter season, but *M. Yarrellii* is to be seen any fine day in winter running on the banks of rivers and brooks. On a winter's day, while fishing in the Trent, it has often pleased me to see *M. Yarrellii* running within a few yards of me, and I have as often looked in vain for *M. alba*; but perhaps *M. alba* changes its plumage in winter? Can any ornithologist answer this question?—*Samuel Carter*; 20, Lower Moseley Street, Manchester, January 30, 1857.

Notes on the Great Bustard.—I have lately been enabled to obtain a few particulars with regard to the habits of the great bustard (*Otis tarda*), as observed in this neighbourhood, which may prove interesting to some of your readers: I have derived this information from the dealer by whom the specimens of this noble bird formerly in the possession of Lord Derby, and those at present in the gardens of the Zoological Society, were furnished. He tells me that, notwithstanding the increasing demand for both eggs and the birds themselves, they are still very numerous distributed over the whole of the flat country surrounding Leipzig, more especially so in the vicinity of Halle; and, from their shy habits, and the facility of perceiving the approach of an enemy afforded them by the nature of the country, which, for miles upon miles, is unbroken by hedge or wall, there is every reason to suppose that a long period will elapse before the species be thoroughly extirpated. The eggs are usually laid towards the middle of June, and are invariably deposited in the most sequestered part of a field of grain or clover, sometimes in a hole scratched in the earth, but more generally without an attempt at a nest of any kind. There can be no doubt that numbers annually hatch out their broods in safety, for the finding of the eggs must, of course, be purely accidental. The number of the latter is usually two, but instances occur nearly every season of three being laid; this, I believe, has also been observed in our country, for, if I remember rightly, one or more of the nests found about twenty years ago in Norfolk contained three eggs. These are sold by the dealer I have named at the price of one shilling for a fresh egg, and half-a-crown for one that has been sat on for some time: those in the latter condition are, immediately on their being obtained, wrapped up in wool and sent to different parts of Holland, in which country there seems to be at present a mania for rearing these birds; Herr Richter, however, seemed to have but a faint opinion of the skill employed by the receivers, and informed me that in very few instances were the young produced, and that, when this was the case, they

seldom lived long. In autumn the members of the species are greatly increased by arrivals from other parts of Europe, and at this time many are shot in the great annual hunts which take place in September and October, and, what is rather remarkable, birds of the year are but seldom obtained. Richter has had through his hands during the past season about thirty eggs, every one of which were sent to Amsterdam; my wishes to procure specimens were therefore frustrated.—*Henry Smurthwaite*; 8, *Rosspatz*, *Leipzig*, *January 8, 1857*.

Rare British Birds in Germany.—Towards the latter end of September I picked up, whilst crossing a fallow field, a beautiful adult male specimen of a rare British bird, the crested lark (*Alauda cristata*); it was perfectly fresh, and I could find no wound about the body: I have since seen this bird twice in the vicinity of Leipzig, and am told that it is by no means rare in the breeding season. A few days ago I had the pleasure of seeing, in the cabinet of a collector in this town, a remarkably fine specimen of the egg of the great auk (*Alca impennis*): in common with most eggs of this species, its origin is shrouded in mystery; it was brought, about eighteen years ago, from Iceland by a sailor, and sold by him to an ornithologist in Hamburg, from whom it was received by its present owner: from what part of Iceland, however, is unknown, as also are all particulars with regard to the circumstances attending its discovery: it is a very fine, perfect specimen, blown with a hole in each end, but these are not so large as at all to destroy the symmetry of the egg: it is also very richly and strongly marked: I had previously only seen the fine example in the collection of Mr. John Hancock, of Newcastle, but, having heard descriptions of several others, I am inclined to think that the secondary colour in the specimen I am describing is much browner than usual; this may perhaps arise from partial exposure to light and the length of time which has elapsed since it was taken: the person to whom it belongs wishes to sell it for £15, and, as I am informed that the one belonging to the late Mr. Yarrell, which was slightly cracked, was bought at the recent sale for £21 10s., this appears to be no unreasonable price; a professor of Zoology in Dresden and a Scotch gentleman, whose name I could not learn, have each offered £8 for it, but this sum the owner thought proper to decline. The white stork (*Ciconia alba*) breeds on the outskirts of Leipzig: a nest exists at present in the Rosenthal, a pleasant walk within the gates of the town; it is placed on the summit of a tree, about twenty feet high, and seems to be firmly constructed, as it has resisted with success all the severe storms with which this neighbourhood has been recently visited: another nest, a most interesting object, is built on the roof of a village inn, about one mile from here: from the fondness with which the birds are regarded by the peasantry, eggs are difficult to obtain; I have succeeded, nevertheless, in procuring good specimens, together with those of other rare British birds, such as the common and little bitterns, black redstart, white wag-tail, &c. Since writing the above, I have had the satisfaction of seeing no less than five crested larks in the open street, before the house in which I reside: they were exceedingly tame, and allowed me to approach within a few feet without showing any symptoms of fear: from their plumage they appeared to me to be all males of the past season: the speed with which they run is really remarkable, far exceeding that of any other small bird with which I am acquainted. I may add that the shorttoed lark (*Alauda brachydactyla*) is not uncommon, and also breeds in this part of Saxony. The collection which contains the above-mentioned egg of the great auk may fairly vie with almost any of our most celebrated British cabinets, and the opportunity which I have had of inspecting it has afforded me the greatest pleasure: were I to give a list

of all the rarities it contains I should be thought tedious: I may, however, mention that, in addition to the noble specimen of *Alca impennis*, there are also examples of the golden eagle (*Falco chrysaëtos*), eagle owl (*Strix bubo*), all the rare British warblers, five crested regulus (*Regulus ignicapillus*), shore lark (*Alauda alpestris*), shorttoed lark (*A. brachydactyla*), pine grosbeak (*Loxia enucleator*), crossbill (*L. curvirostra*), white-winged crossbill (*L. leucoptera*), nutcracker (*Nucifraga Caryocatactes*), great black woodpecker (*Picus martius*), bee-eater (*Merops apiaster*), crane (*Grus cinerea*), a beautiful series of the eggs of the little ringed plover (*Charadrius minor*), Bartram's sandpiper (*Totanus Bartramii*), and a great number of others of excessive rarity: all these have been most carefully identified, and are in excellent preservation. The egg of the nutcracker being so little known, it may perhaps not be out of place to observe that the specimen I have examined bears great resemblance to that of the jay (*Corvus glandarius*); it is, however, somewhat smaller, and the ground-colour is more uniform than in most eggs of the above-mentioned bird, being also strongly marked in various parts by thick waving black lines; it has a peculiar character about it, by no means easy to describe. The egg of *Totanus Bartramii* is found in North America, and more like those of the greenshank than of any other bird with which I am acquainted.—*Id.*

Occurrence of the Avocet (Recurvirostra avocetta) and Rosecoloured Pastor (Pastor roseus) near Rochester.—An avocet was shot in the marshes near Rochester, about five weeks ago: it is now in my possession. I have also a rosecoloured pastor, which was shot in Frindsbury, near Rochester: it was shot in the summer, in a cherry-orchard out of a flock of starlings.—*C. W. Shepherd; Trotterscliffe, Kent, January 26, 1857.*

PROCEEDINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY.

January 5, 1857.—W. W. SAUNDERS, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—‘Entomological Papers,’ by John Nietner, Nos. 3 and 4; presented by the author. ‘Revue et Magasin de Zoologie,’ 1856, Nos. 10 and 11; by the Editor, M. Guérin-Méneville. ‘The Journal of the Society of Arts’ for December; by the Society. ‘The Literary Gazette’ for December; by the Editor. ‘The Athenæum’ for November and December; by the Editor. ‘A Manual of Butterflies and Moths,’ No. 11; ‘Elements of Entomology,’ No. 4; ‘The Substitute,’ Nos. 7, 8, 9, 10 and 11; ‘The Entomologist’s Annual’ for 1857, Library edition; by H. T. Stainton, Esq.

Election of Members, &c.

The Rev. D. J. Drakeford, M.A., Churton Mendip, Somersetshire, and H. S. Digby, Esq., Fenstanton, St. Ives, Huntingdonshire, were balloted for and elected Members of the Society.

Edward William Robinson, Esq., 42, Harmeson Street, Kentish Town, was balloted for and elected a Subscriber to the Society.

Exhibitions.

Mr. Stevens exhibited a box of Lepidoptera, chiefly Pyralidæ, taken at Sarawak by Mr. Wallace, amongst which was a beautiful species of *Cerura*, allied to *C. liturata* of India; a singular *Bombyx*, allied to the *Megasoma pardale* of Java; and several Pyralidæ, remarkable for the extraordinary development of the palpi, in one species the terminal joint of the palpi being turned back over the head of the insect, and equal in length to the abdomen.

Mr. Hunter exhibited, on behalf of Mr. Reading, of Plymouth, four living specimens of *Carabus intricatus*, recently found in moss in that neighbourhood; and a specimen of *Glæa erythrocephala*, taken on ivy blossoms, in November last, at the same place, being the second recorded British specimen of that species.

Mr. Smith read an extract from the 'Entomological Magazine' for 1837, in which Mr. Shuckard recorded a specimen of *Carabus intricatus* sent to Mr. Smith amongst a large number of Carabi, collected on Hawley Flat, near Blackwater, Hants, not Horsley Downs, as stated by Mr. Shuckard. Mr. Smith had frequently searched the locality without success, in May and June; but, not knowing the habit of the species, had not thought of hunting for it in the wood which skirts the south-east end of that locality.

Mr. Waterhouse said Mr. Digby had informed him that he found this species in Germany, in the moss and rotten wood on the stumps of trees which had been cut off nearly level with the ground.

Mr. Stevens remarked that he had searched for this species in June in the locality, in Devonshire, mentioned by Dr. Leach, but without success.

Mr. Wollaston said the natural habitat of the species seemed to be in moss during the winter; it probably would be more frequently found, if searched for at this season.

Mr. Stevens exhibited a most beautiful *Callithea*, taken by M. De Gand at Tabalinza, in Peru; and a *Curculio* from Burmah, allied to *Pachymerus*, having very remarkable hind legs.

Mr. Waterhouse observed it was a singular fact that four or five Brazilian species were closely allied to this Indian insect.

Mr. Wollaston exhibited a large box of minute Coleoptera, being a portion of his captures during his last visit to Madeira.

Mr. Lubbock called attention to a remarkable paper lately published by Professor Siebold, entitled 'Wahre Parthenogenesis bei Schmetterlinge und Bienen,' containing some extraordinary theories on the generation of bees and other insects: he stated that an English translation of the work would shortly be published.

The President read an extract from a letter addressed to Mr. W. Marshall by Mr. Monteith on the reported capture of six specimens of *Pieris Daplidice* near Glasgow.

Mr. T. V. Wollaston read a paper on the British Atomariæ, in which twenty-three species are described as natives of this country.

Mr. Pascoe read a paper on Longicorn Coleoptera, being a continuation of that read by him at the Meeting in March last.—*E. S.*

January 26, 1857.—W. W. SAUNDERS, Esq., F.R.S., President, in the chair.

The 23rd Anniversary Meeting was held on the 26th inst., at the rooms of the Society, 12, Bedford Row.

Messrs. J. E. Gray, F. Grut, F. P. Pascoe, and T. V. Wollaston, were elected members of the Council, in the room of Messrs. J. Curtis, J. W. Douglas, F. Smith, and J. O. Westwood. W. W. Saunders, Esq., F.R.S., &c., was re-elected President; S. Stevens, Esq., F.L.S., Treasurer; and Messrs. E. Shepherd and E. W. Janson, Secretaries.

The Report of the Council for the year 1856 was read and received; the abstract of the Treasurer's accounts, as furnished by the auditors, showed a larger balance in hand than on any former anniversary.

The President delivered an Address on the affairs of the Society and the progress of Entomology, for which, and his courteous conduct in the chair, and on all other occasions, the Meeting passed a cordial vote of thanks, with a request that he would allow the Address to be printed.

Votes of thanks were also passed to the Treasurer and Secretaries, and the retiring Members of Council.

Part 3 of Vol. iv., N. S., of the Society's 'Transactions' was on the table.

February 2, 1857.—H. T. STAINTON, Esq., V.P., in the chair.

The Secretary read a letter from the President of the Society, W. Wilson Saunders, Esq. (who was absent through indisposition), in which he nominated as Vice-Presidents for the year Dr. J. E. Gray, H. T. Stainton, Esq., and T. V. Wollaston, Esq.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Memoirs of the Royal Academy of Sciences of Madrid,' Natural Sciences, Tome ii. Part I.; Physical Sciences, Tome i. Part I.; presented by the Academy. 'Exotic Butterflies,' Part XXI.; by W. W. Saunders, Esq., F.R.S. 'Proceedings of the Zoological Society,' Nos. 310—313 inclusive; by the Society. 'Monograph of the Genus *Catops*,' by Andrew Murray, Member of the Royal Physical Society of Edinburgh, &c.; by the Author. 'The Natural History Review,' 1857, No. 1; by the Dublin University Zoological Association. 'Bibliotheca Historico-Naturalis,' Vol. v. Part II.; by the Editor, Herr Ernst A. Zuckold. 'List of the Specimens of Lepidopterous Insects in the Collection of the British Museum,' by Francis Walker, Esq., F.L.S., Part X. Noctuidæ; by the Author. 'The Zoologist' for February; by the Editor. 'The Literary Gazette' for January; by the Editor. 'The Journal of the Society of Arts' for January; by the Society. 'A Manual of British Butterflies and Moths, No. 12; 'Elements of Entomology,' No. 5; 'The Substitute,' Nos. 12—15; by H. T. Stainton, Esq.

Election of a Subscriber.

C. J. Biggs, Esq., of Blenheim Cottages, South Hackney, was balloted for and elected a Subscriber to the Society.

Exhibitions.

Mr. Stevens exhibited some beautiful Lepidoptera, which had lately arrived in this country, taken by Mr. Bates in the Upper Amazons; and observed that although the box containing them had been despatched by Mr. Bates in July last, from Ega, more than 1500 miles from the mouth of the Amazon, yet the insects were in the most excellent condition. Of these he called attention to *Callithea Batesii*, and to a splendid undescribed species, closely resembling it in colour and markings, but presenting a striking difference in the form of the club of the antennæ; also to the extraordinary dissimilarity in the sexes of a beautiful species of *Epicalia*, and to a fine female *Agrias*, probably the female of *A. Phalcidon*, *Hewitson*. In the box were also a fine series of *Erycinidæ*, and some remarkable species of *Tortrices* and *Tineæ*, being the first specimens of these two last-named families which have reached this country from that far-distant locality.

Mr. Janson exhibited specimens of *Bledius unicornis*, *Germar*, from the collections of Messrs. Parfitt and Wollaston, and read the following notes.

“I beg to exhibit *Bledius hispidus*, *Parfitt* (*Zool.* 5409), the pair from which Mr. Parfitt drew up his description, and which he has obligingly transmitted me for examination. This is the insect alluded to by Mr. Westwood at the October Meeting of the Society; and I must express my regret and surprise that the information supplied by Mr. Westwood should have induced Mr. Parfitt to describe it as a new species, when it has been well figured, some thirty years since, by *Germar* in ‘*Fauna Insectorum Europæ*,’ fas. xii. tab. 3, and unmistakably described by Dr. *Erichson* in his ‘*Genera et Species Staphylinorum*,’ both of which standard works doubtless grace the shelves of Mr. Westwood’s splendid entomological library. Complaint is frequently made that the entomologists of this country, satisfied with determining their insects from named collections, never or seldom refer to books, and that thus error is perpetuated. But if those occupying the foremost rank in our Science, with every facility at their command, evince such manifest disinclination to consult books, what can be expected of those who are deprived of these facilities? I would enjoin, at all events, those who, prefixing an asterisk to their names in the authorized ‘*List of Entomologists*,’ proclaim themselves teachers, to bear steadfastly in mind the hackneyed adage, ‘*Example is better than precept*.’

“I may perhaps be permitted to adduce the present insect as a proof of the disinclination to furnish, if not actual disposition to conceal, that information which all must be very well aware is of primary importance to the successful accomplishment of the task which I have undertaken, of drawing up a *Synonymic List* of the British *Coleoptera*, and which, I regret to state, has been most unmistakably evinced by those who were most clamorous for the publication of that *List*, the most invective at the delay in its appearance, and, above all, by those who had promised me their hearty and unreserved co-operation, for which I pledged myself they should have at least the full share of credit, and, failing which, I should certainly not have entered on that arduous, and, I must admit, now odious, task. Of the insect now exhibited Mr. Parfitt captured five individuals, of which he presented three to London entomologists; yet when preparing my notice of new species for this year’s ‘*Annual*’ I was unable to ascertain anything relative to the ‘*new British Bledius*,’ and had not Mr. Parfitt consented to commit his only pair (and which, as the types of his description, were

very valuable to him) to the ruthless custody of the post office, I should not even now have been able to bring under your notice the following illustration of the fate which appears to be the almost inevitable attendant on the ascertained indigenoussness of a species, namely, condemnation to trail evermore behind it an unsightly, trouble-giving train of synonyms. The nomenclature of the present insect will now stand thus:—

Bledius unicornis, Germar, *Erichson, Gen. et Spec. Staph.* vii. 764, 7 (1840).

Oxytelus unicornis, Germar, *Fauna Insect. Europ.* fas. xii. f. 3 (1828).

Bledius hispidus, Parfit, *Zoologist*, 5409 (1857).

Bledius cornutus, F. Smith, *in litteris*.

Hence it is seen that a species universally recognised abroad during upwards of a quarter of a century, well figured and admirably described, is no sooner found in Britain than, in a few short weeks, it is shackled with two synonyms,—a fact which certainly reflects no credit on the entomologists of this country, and which cannot tend to augment the respect of our continental brethren, or to raise Entomology from the low level in the scale of the Sciences which she is doubtless doomed to occupy until her votaries consent to devote some share of that shrewdness and zeal which they so conspicuously manifest in the acquisition of specimens to the arrival at and adoption of a correct and legitimate nomenclature, and the higher objects to which collections should be subservient, and to which this is assuredly the true prelude. In conclusion, I will observe that *Bledius unicornis* was captured by Mr. Wollaston at the Chesil Bank and Exmouth Warrens several years back, and that I long since thus designated the specimens in that gentleman's collection."

Read the following, by Mr. Newman:—

Note on Pairs of Species of British Lepidoptera which are Heterocampous and Isomyious.

"I have endeavoured to prove that Nature has a tendency to assimilate, in the external characters of the adult, certain beings, which, in the earlier, or, as we may express it, preparatory stages of their existence, have little or no apparent similarity to each other. Such assimilations, when they do occur, are always in pairs, and familiar examples will occur to every one in the placental and marsupial sucklers, the hesthogenous and gymnogenous birds, the metamorphic and immutable reptiles, the viviparous and spawning fishes. Descending from larger to smaller groups, we find such pairs becoming still more pronounced, and the supposed law or principle still more strikingly exhibited. It has occurred to me that such a law or principle cannot be partial: if it exist in Nature it must be general, and must descend even to species. After a moment's reflection it struck me, further, that the European, and perhaps even the British, Lepidoptera might afford a ready means of testing the value of my theory. I argued to myself that if such pairs existed in Europe they must be known to a Guenéé; if in Britain they must be familiar to a Doubleday, a Shepherd or a Douglas. Both on the Continent and in Britain, Lepidoptera have been studied with a perseverance and a success that has far outstripped the results arising from attention to any other insects; bees, ichneumons, Brachelytra, Rhynchophora, although the objects of especial research, are literally unknown in comparison with our indigenous Lepidoptera, and this principally because Lepidoptera are studied in all their stages, the others only in one: the study of Macro-Lepidoptera has become deeply philosophical; that of other insects at present remains comparatively superficial. Hence I

can only appeal to the lepidopterist: the general (another term for the superficial) entomologist cannot comprehend my drift. Let a lepidopterist open his breeding-cages, and exhibit to a general entomologist the larvæ of *Acronycta Psi* and *A. tridens* (to him 'familiar as household words'), of *Calocampa vetusta* and *C. exoleta*; and let the lepidopterist tell the entomologist that these four larvæ produce two pairs of moths, of which the individuals composing each pair are so similar that he (the entomologist), with all his knowledge, with all his book-learning, could not distinguish between them; that it required the utmost subtlety in the eye of the lepidopterist himself to distinguish them, and defied the powers of his pen to differentiate them: the entomologist would simply exhort the lepidopterist to greater care in his observations, and caution him against adopting theories which could not be supported by an appeal to Nature; the entomologist, in the most friendly spirit, would point out the differences of form and structure in the larvæ; would probably select *Psi* and *tridens*; would call the lepidopterist's particular attention to the dorsal column on the larva of *Psi*, absent altogether from *tridens*; and, indulging benignantly in improving platitudes about general principles, affinity and analogy, extended range of observations, and so forth, would probably leave the bewildered lepidopterist under the idea that there was something, some unknown property, in Science that entirely superseded truth and fact, and that was far beyond the reach of his limited capacity. To go a step further, if the lepidopterist pertinaciously adhered to the truth, and exhibited the perfect insects of *Psi* and *tridens*, then the entomologist would infallibly turn on his heel, 'more in sorrow than in anger,' and leave the lepidopterist in his error, convinced that it was useless to argue with one whose ignorance was so 'crass.' In all this the lepidopterist is right; he has assiduously worked mines of knowledge, the very existence of which are unknown to the entomologist. Even in our British Lepidoptera there are numbers of pairs which require the most highly educated eye to separate them correctly. Let the inquiry be instituted; and from this inquiry must be eliminated *in toto* all questionable species, all instances of abnormal form and colour; all seasonal, climatal, altitudinal, latitudinal, geographical, geological or other acknowledged sources of variation; all second generations in the same year: those natural witnesses only should be examined which, living on the same spots, at the same time, and under the same conditions, originate from different eggs, differ totally in the larva, and approach almost to identity in the imago. I think it is absolutely impossible to examine a rich collection of British Lepidoptera without being struck with the constant recurrence of such pairs. I will cite a few examples.

Argynnis Adippe and <i>A. Aglaia</i>	<i>Tæniocampa Populeti</i> and <i>T. instabilis</i>
Argynnis Selene and <i>A. Euphrosyne</i>	<i>Glæa Vaccinii</i> and <i>G. spadicea</i>
<i>Sesia bombyliiformis</i> and <i>S. fuciformis</i>	<i>Dianthecia capsincola</i> and <i>D. Cucubali</i>
<i>Anthrocera Loniceræ</i> and <i>A. Trifolii</i>	<i>Xylina petrificata</i> and <i>X. semibrunnea</i>
<i>Procris Staticæ</i> and <i>P. Globulariæ</i>	<i>Calocampa exoleta</i> and <i>C. vetusta</i>
<i>Lithosia complana</i> and <i>L. complanula</i>	<i>Cucullia Scrophulariæ</i> and <i>C. Lychnitis</i>
<i>Porthesia auriflua</i> and <i>P. chrysorrhœa</i>	<i>Catocala promissa</i> and <i>C. sponsa</i>
<i>Clisiocampa neustria</i> and <i>C. castrensis</i>	<i>Brephos Parthenias</i> and <i>B. notha</i>
<i>Notodonta dictæa</i> and <i>N. dictæoides</i>	<i>Tephrosia crepuscularia</i> and <i>T. laricaria</i>
<i>Acronycta Psi</i> and <i>A. tridens</i>	<i>Ypsipetes ruberaria</i> and <i>Y. impluviaria</i>
<i>Caradrina blanda</i> and <i>C. Alsines</i>	<i>Cheimatobia dilutaria</i> and <i>C. autumnaria</i>

I have a list of seventy-four other pairs; but these are sufficient for my purpose, and

I think it will be difficult to explain away their teaching. I have already anticipated some objections: I will allude to others. It is said, in the instance of *Psi* and *tridens*, that on the North-American continent four, that is two pairs, of *Acronyctæ* exist which approach our British ones so closely that a complete series is thus established; there is also a solitary European species, *cuspis*, which seems to be allied to all the others. These facts do not appear to me to militate against the view I have taken of the prevalence of pairs: perhaps one of the North-American pairs may be identical with our *Psi* and *tridens*, and the other pair quite distinct; but I learn that no pains have been yet taken to distinguish the larvæ of these species: the continental *cuspis* standing somewhat isolated is no objection, as I do not say that all species are associated in pairs, but only that some are so. Again, I cannot admit the doctrine of chance, that the correspondence between two species is a mere matter of accident. Finally, to the question of the general entomologist, 'Are these pairs really composed of two distinct species?' I reply that this is established beyond all question by the difference of the larvæ."

Mr. Stainton observed that this theory of pairs would be completely upset if the list were extended to European Lepidoptera, as there would be found in many instances Continental species quite as closely allied to the pairs mentioned as these British species are to each other.

Mr. Westwood said that he had heard, for the first time, a theory proposed, capable, as was asserted, of being tested by the productions of a limited geographical range like Great Britain. He had supposed it to be generally admitted that a knowledge both of existing and extinct forms was requisite for the proposition of natural laws. Was it intended that in each country throughout the world these double species should occur? Was it only in the Lepidoptera they were to be looked for? Was it intended that each species should be thus divided, as it were, into two sub-species? Moreover, in the instances cited, it was evident Mr. Newman had adduced relations of analogy, supposing them those of affinity. No one could support such a theory. Was it intended that each species should be attended by another species intimately allied to it? No one ever doubted such a principle. In the opening part of his paper Mr. Newman had alluded to the binary divisions of the highest groups, such as Vertebrata and Invertebrata, Ptilota and Aptera, &c.; but in the latter part he had confused these relations (vague as they often were) with the closest possible affinity that could exist in Nature, exclusive, of course, of that between individuals of the same species.

Mr. Lubbock considered that binary divisions in classification resulted from the convenience arising to classifiers, and not from any law of Nature, and that the "pairs" mentioned by Mr. Newman could only prove that each species has some one other species more nearly allied to it than are the rest of its congeners.

New Crimean Carabus.

Mr. Douglas read the following paper, intitled 'Characters of an apparently undescribed Crimean Carabus, taken by Lieutenant Thomas Blakiston, of the Royal Artillery; by Mr. Newman:—

"CARABUS BLAKISTONI, Newman.

"*Niger, prothoracis elytrorumque marginibus chalybeo-purpureis: prothorax fere quadratus, lateribus subconvexis paullo dilatatis, paullo reflexis, marginibus antico et postico excavatis, angulis posticis paullo productis, dorso scabro inæ-*

quali : scutellum reconditum : elytris latis, amplis, convexis, utroque 13striato, spatique laterali intus marginem reflexum scabro, striis profunde punctis, interspatiis elevatis carinæformibus, 3tio, 7mo, 11moque foveis nonnullis magnis interruptis. (Corp. long. 1·2 unc. elytrorum lat 55 unc.)

“Colour black, slightly shining, with a steel-blue tint in the furrow, caused by the reflexed margin of prothorax and elytra. The prothorax is almost square, the lateral margins slightly convex, slightly dilated and slightly reflexed, the anterior margin concave, its angles rounded, the posterior margin also concave, each of its angles produced into an obtuse tooth. Scutellum hidden. Elytra ample, convex, each with 13 deeply and regularly punctured striæ, the interspaces distinct, elevated and shining : they are entire, with the exception of the 3rd, 7th and 11th, counting from the suture, and each of these is interrupted by 7 or 8 large deep foveæ.

“Taken in the Crimea, by Lieutenant Thomas Blakiston, of the Royal Artillery, an officer whose exertions in the cause of Natural History are above all praise, and whose admirable papers on the birds of the Crimea are now in course of publication in the ‘Zoologist.’ The specimens will be placed in the cabinet of the British Museum, with the fine series of Russian Carabi, with which they have been already carefully compared.”

Mr. Waterhouse hoped this insect had been very carefully compared with closely allied species, to ascertain if really new, before venturing to describe it under a new name. He considered such descriptions no advancement to Science.

Mr. Wollaston observed that some time since he had discovered, by a mere accident, that black lacquered pins would not corrode when used to pin insects liable to grease, and that Mr. Bond had also used them with an equally satisfactory result. Mr. Baly had received some ants from Vienna impaled with varnished pins ; none of these had corroded, although, as was well known, no insects were more likely to cause corrosion than ants.

Mr. Stainton remarked that lacquered pins had for some time past been in very general use in Germany, and, he believed, were found to answer the desired end.

Mr. Westwood made some observations on mouldiness in insects, and referred to a communication, read at a Meeting of the Society a few years back, on the difficulty or impossibility of preserving entomological specimens in some parts of North America, owing, as was alleged, to everything preserved in closely shut receptacles becoming covered with mould during certain states of the atmosphere. In contradiction of this statement Mr. Westwood observed that the North-American insects collected by Dr. Abbott reached this country in most admirable order.

Mr. Wollaston said he could not keep insects in Madeira shut up in boxes, even for a month, without becoming covered with mould ; nothing would prevent it but constant exposure to the air. He believed this was more likely to occur in small islands than far inland.

Mr. Walker read a paper entitled ‘Characters of undescribed Diptera in the Collection of W. W. Saunders, Esq.’—*E. S.*

NORTHERN ENTOMOLOGICAL SOCIETY.

January 10, 1857.—B. COOKE, Esq., President, in the chair.

Election of Members.

Mr. Thos. Hague, of Stalybridge, and Edwin Birchall, Esq., of Dublin, were duly elected Members of the Society. Jno. Curtis, Esq., of Barnsbury Park, London, was unanimously elected an Honorary Member of the Society, with the same privileges of voting, &c., as any other Member.

Exhibitions, &c.

Mr. N. Cooke exhibited a box of insects sent by E. Birchall, in which was a fine specimen of *Apamea fibrosa*, *Engr.*, var. ? *leucostigma*, *Hüb.*, taken near Killarney, Ireland, and a species of the genus *Homæosoma*, unknown to the Meeting, taken in Dublin.

Mr. Warrington sent a box in which were a series of extraordinarily fine specimens of *Eupithecia succenturearia* and *Gelechia Hermanella*, also a series of *Gelechia fraternella*, all taken at Tranmere.

Mr. Greening exhibited *Noctua ditrapezium*, which he had received from Mr. Bond, and *Eupithecia pimpinellaria*, from Mr. Edwin Shepherd. Both these insects had been kindly presented to him by the above gentlemen.

Mr. Carter exhibited a most interesting box of foreign Coleoptera, all the specimens in which had nevertheless been bred or captured in England, and asked the question, "Are these British?" The reply was, any insect which naturalizes itself and regularly reproduces its species, let it first come from where it may, is and must be considered British; unless it does this, however many specimens may be taken or bred, they must only be placed in foreign collections. The following specimens are the most interesting insects in the box:—

Ptychodes trilineatus. A native of North America. One taken at Manchester.

Plectodera vittator. Campeachy. Three taken at Manchester, one at Barnsley.

Tæniotes scalaris. Brazil. One taken at Manchester.

Acanthocinus nodosus. North America. One taken at Manchester.

Callidium —? Unknown. One taken at Manchester.

Acrocinus longimanus. Brazil. One taken at Liverpool.

Clytus terminans. North America. Liverpool, and at Oldham; many taken.

Elaphidion spinicorne. West Indies. Two taken at Manchester.

Monohammus dentator. This insect is supposed to have naturalized itself near Manchester, so many having been taken; but until the larva is found in growing timber it must remain doubtful. It has also been captured at Warrington and at Birkenhead.

The whole of these beautiful Longicorns were from Mr. Carter's magnificent collection of foreign Coleoptera.

The Secretary exhibited specimens of *Anthrodera Autumnaræ*, *Gregson*, taken by Mr. Almond, near Park Gate, Cheshire, last August; and read a description of this distinct six-spot Burnet. He also exhibited a box of Coleoptera, a variety of *A. Caja* remarkable for the broad dark band across the upper wings, and specimens of *Coleophora solitariella* recently received from Mr. Shield. He then submitted a

sketch intended for the Society's diploma, if approved by the Meeting; it was unanimously decided to accept the design.

Several letters were read from gentlemen who had been elected Honorary Members, thanking the Society for the highly prized honour it had conferred upon them.

The paper of the evening, 'Is *Acronycta Salicis* a distinct Species?' was read by Mr. N. Cooke. (For this paper see the Society's 'Transactions' for 1856—7, now in the press).

The President announced the death of an esteemed Honorary Member of the Society, David Dyson, the Central American traveller, and called upon the Secretary to read a short memoir of his early life; also a letter which appeared in the 'Liverpool Mercury' of December 31, 1856, entitled "Honour to whom honour is due" (signed C. S. Gregson), animadverting upon the neglect of such great men as Dyson by our learned and Natural History Societies; also a letter, in the same paper of January 3, 1857, entitled "Lancashire men of Science in humble life," which it was supposed was intended as a reply to the above. The Meeting could not understand the writer, who signed himself "An Old Naturalist." Several Members requested Mr. Gregson to reply to the letter; but that gentleman declined noticing the attacks of an anonymous writer.

Dallas's 'Elements of Entomology,' which was on the table, seemed to give general satisfaction; whilst 'A Manual of British Butterflies and Moths' was rather roughly handled, especially for its want of synonyms.—*C. S. G.*

Note on a Shark taken near the Land's End.—I observe in the January number of the 'Zoologist' a notice on the white shark "cast up at Herm," in which is expressed a very reasonable doubt whether that fish is fully recognised as British: I am quite aware that my valued friend the late Mr. Yarrell always entertained an objection to admitting it into his work, because the evidence laid before him was not sufficient to convince him of the species; but he was always aware of the existence of a shark in our seas, which either was the white shark or altogether a new one: while he was preparing for the second edition of his valuable work, I again tried to get him to assert positively that it had been captured, but he was reluctant to do so, and, up to a short time before his death, he still continued to doubt the authenticity of the specimens mentioned. But, within the last three years, I have had an opportunity of examining several specimens, two of which were taken at Whitsand Bay, Land's End, and one in Mount's Bay; and, besides these, I have seen others moving about in the same localities: one, at the Land's End, measured rather more than 19 feet, was a stout and powerful fish, and is well represented by Yarrell's figure: it is quite unnecessary to enter into a description of it, unless it should be required for a third edition of the 'British Fishes,' when this, besides three others, would form an addition to our Fauna. I enclose you a figure of one which Mr. Yarrell saw, and which, from its shape, he was inclined to think might be a variety of the blue shark (*Carcharias glaucus*). But last summer I had an opportunity of examining two specimens captured in Mount's Bay at the same time when many scores of the blue shark were also thrown on the beach, so that I had an excellent opportunity for comparison, of which I did not fail to take advantage: the general figure and appearance of both are very much alike, but the

colour is altogether different; in the blue shark, as its name implies, it is of deep blue; in this, it is of a neutral tint inclining to gray, interspersed with red and flesh-colour; the eye is rather larger than in the blue shark, and nostril larger and rather below the level of the eye; the branchial orifices are much nearer the snout, and the pectoral fins are smaller, and also situated more anteriorly than in *C. glaucus*; the dorsal fin is smaller and not elongated posteriorly, and is also more anterior than in the blue shark; the tail is larger, stouter, and the posterior and terminal margin of the upper lobe is very much larger and more falcate than in its congener. This was considered both by my father and myself as probably the young of the white shark, and as such I submitted it to Mr. Yarrell, but, in conversation with him, too many differences were discovered to allow of such a supposition to be again entertained, and he then suggested its being a variety of the blue shark; but this, I think, must yield to the additional examination I have been able to give the subject, and I would venture to suggest the idea of its being new.—*R. Q. Couch; Penzance.*

Notice of the Fox or Thrasher Shark in Mount's Bay.—The occurrence of the fox shark (*Carcharius vulpes*) in Mount's Bay is so rare that a special notice of the fact is worthy of being recorded. This specimen, which is the only one I ever examined, was taken in a pilchard-net in the summer of 1855: it has, however, been captured in Cornwall on several occasions; Dr. Borlase mentions one, and another was taken at the entrance of the Looe river in 1826; the capture was effected in a drift-net, in which the specimen had got entangled, in the eager pursuit of the pilchard, on the last day of September. It does not appear to have been a strong fish, for no sooner was it entangled than it became powerless and was easily secured: the rent made in the net was not large, and even that seems to have been caused quite as much by the men trying to lift the fish in as by any other cause. The extreme length of the specimen from snout to tail was 12 feet, of which the tail was 6 feet 3 or 4 inches; from the snout to the origin of the dorsal fin was 2 feet 5 inches, to the pectoral 1 foot 5 inches; the snout was short, sharp and protruded; the eye was about 6 inches from it, and was perpendicularly oval, bright and large, the iris blue, and pupil an opaque green; the mouth was small, semilunar and apparently very feeble for aggression; the teeth were long, slender, moveable, and in three rows; the nostrils small and not lobed; the branchial orifices were five, and closely anterior to the pectoral fin, which was wide at the base, and about 20 inches long; immediately behind the pectoral fin was a large scale, forming a deep notch, which acted as a protection to the base of the fin; the ventral fin was large; it was a male, and had the large secondary sexual appendages; the length of the tail, or rather of the upper lobe of it, seemed very remarkable, being longer than the body of the fish; the general colour was a dull brownish blue, mottled inferiorly with brown; the abdomen was white, and this last extended from between the pectoral fins to the base of the tail; the smaller or inferior lobe of the tail is white and mottled with brown, and along the posterior margin of both lobes runs a thin, membranous and flexible fin; above and below the base of the tail there were deep depressions. This in its appearance seems to be one of the feeblest of the sharks, and this idea is fully confirmed by the weakness of the resistance it made when captured. It was observed about ten miles off the shore for several hours before it became entangled: it would frequently rise to the surface and occasionally splash with its tail, but would again dive below in pursuit apparently of small fish. In its stomach were eighteen common-sized pilchards, closely packed together. It was rolled up in the net, but both in taking it on board and after it was liberated

its efforts at escape were very slight. Before being opened I took a water-colour drawing of it, half the size of life.—*Id.*

Skenea tricarinata not a *Species*.—I am indebted to the kindness of J. Gwyn Jeffreys, Esq., for permission to send to the 'Zoologist' the following extract from a letter, the result of an examination kindly undertaken by him of the small *Skenea* found by me at Falmouth, which I at first considered a new species, a short account of which appeared in the 'Zoologist' (Zool. 5205) a few months since, and a careful comparison of it with a specimen taken by himself in the Mediterranean, and also a series of the ordinary form of *Skenea rota* taken by me in a living state at the Land's End and other parts of the Cornish coast:—"The result of a careful comparison of these specimens induces me to retain the opinion I at first formed, that your *Skenea tricarinata* is only a variety of *Skenea rota*. Your species appears to differ from *S. rota* in its somewhat smaller size, in the whorls being flatter and more angular (the latter character being probably attributable to the greater prominence and distinctness of the ridges), and in the transverse ribs being less marked and not so nodulose as in the typical form. My specimens from the Mediterranean belong to this variety. All the specimens have these spiral ridges, one of them encircling the periphery and forming an obtuse keel, another on the upper side, and a third on the lower side in the centre of each whorl. The ridges are nearly equidistant from each other, and their direction is marked by a fulvous band: this character has not, I believe, been noticed by any one except yourself. I however give this opinion with some reservation, as I should have preferred to have an opportunity of comparing your specimens with others which I have myself collected from various parts of the British and Irish coasts; this unfortunately I cannot do at present, while I am divorced from my cabinets."—*W. Webster; Upton Hall, Birkenhead, February 9, 1857.*

[On receiving Mr. Webster's specimens I submitted them to Mr. Hanley, who instantly pronounced the same opinion, and intended to correspond with Mr. Webster on the subject.—*E. Newman.*]

A Schoolboy's Amusement in Southey's Days: a new way of proving the Specific difference of Helix nemoralis and H. hortensis.—I was greatly surprised to see a paragraph in the 'Zoologist' (Zool. 5431) with the above heading, for I had imagined that every schoolboy had played at "snail-fighting." I can answer for it, at any rate, that the practice was not confined to Southey's days, but is still a very prevalent one. The species I used to play with as a boy were mostly *Helix nemoralis* and *H. hortensis*, the same as Southey saw used, and sometimes *H. aspersa*. There are many conchologists, however, even some of the best in England, who would learn a lesson by playing at the same game. Let any of your readers who are, in my opinion, so mistaken as to espouse Forbes and Hanley's view, and consider *Helix nemoralis* and *H. hortensis* to be one and the same species, take to "snail-fighting," and they will find the error into which they had fallen; they will find that, in this respect, "unity is" not "strength," for that if they had thrown all the white-mouths away and kept the black ones, they would have ridded themselves of all those soldiers who were only "food for powder," and have kept a phalanx of invincible shell-guardsmen. I throw down my glove, and challenge any conchologist who believes in the unity of these two species to deadly combat,—my black-mouths (*H. nemoralis*) against his white-mouths

(*H. hortensis*),—and will give him odds of ten to one!—*Alfred Merle Norman*; *Kibworth, February 3, 1857.*

Remarks on Henslow's Swimming Crab (Polybius Henslowii).—This very singular crab has hitherto been considered very rare in the British seas, and its habits, if not altogether unknown, have at most been but little observed. Bell says it is very local in its distribution, and probably nowhere existing in great numbers. It was first discovered by Professor Henslow on the north coast of Devon in 1817, where it was captured in the nets employed in the herring fishery in the early autumn: from that time to the present a few have been taken both on the Devon and Cornish shores every year; on the Cornish coasts they are more numerous on the western than on the eastern shores: they are, however, comparatively much less common in the northern waters (extending from Hartland Point to St. Ives) than on the South, reaching from Plymouth Sound to the Land's End. But they are sometimes common, yet most frequently a few only are captured during a whole season of the pilchard fishery, which extends from June to September; but, from my notes relating to the captures of this species, I am inclined to think that their apparent rarity is, in a great measure, accidental, depending more on the localities in which the pilchard is taken than on the absence of the crab: I find, for instance, that when the boats fish near the shores or in the sheltered bays, my captures are rare, and during some seasons, when the pilchards are close to the shores, I have been unable to procure a single specimen, and in proportion as they go into deep water the captures are more common. But even when fishing in deep water the seasons are not equally productive, depending probably on the early or late character of the season, or the nature of the tides, and some years seem to be more prolific than others; but still they are always most abundantly found in deep water, and at considerable distances from the shores. In the years 1855 and 1856 the late summer fishery was carried on many miles from the shore in a south-western direction, in the waters of the Lionessa, between the Scilly Islands and the Land's End: from these localities I obtained great numbers every night; in fact, they became at last so abundant that they almost ceased to be interesting. In order, however, to ascertain the probable number taken, one young fisherman, who feels sufficiently interested in Natural History to bring me everything he considers rare, promised to secure for me the whole captured in his boat; this he did, and for about eighteen days I received from one hundred to one hundred and fifty every morning, and on two occasions the number amounted to more than four hundred. If this can be considered as the average capture of all the boats, the sea must have been swarming with them, for the boats of Mount's Bay engaged in deep-sea fishing are more than two hundred, and to these must be added the fleet from St. Ives, for to the west of the Land's End it is a common fishing-ground. I enquired of the crews of a great many boats whether they had taken any, and they all united in stating that they were so abundant as to injure the pilchard fishery. It is altogether a deep-water species, is very rarely indeed, if ever, found near the shore, and I have never seen it washed up after a storm, and only occasionally have I found it among the trawl refuse. Most of the specimens that I have examined have been captured, either by the hand as they swim at the surface or in the pilchard-nets at all depths from the surface of the

ground. This is the most natatory of all our crabs, which might be expected to be the case, from the oar-shaped character of all the legs. The drift-net fishery allows the nets to drift with the tide as a floating wall, and these crabs are almost always captured on the eastern side, showing therefore that they are arrested in a westerly migration. I regret that we have no spring fishery, that it might be ascertained whether there is a return migration. All the specimens that I have seen are full-grown adults, and what is still more worthy of notice, all are males; out of several thousands I did not discover a single female, so that this species not only migrates, but it is the male alone that does so, so far as my observations go. If the females and males migrated in separate flocks, some of both sexes would be most probably taken, where the boats are so numerous; but every season produces the same result; the males alone being taken. But, from the size of the specimens taken, they are no doubt adults, and are much larger than one season would permit. It may therefore become a subject for enquiry, whether all the males, young as well as old, migrate, or whether the migration is confined to the adults. The females apparently remain in the shallow waters of the channel, and the males must in some way or other return to them in the early spring. Probably, however, as in other species, impregnation takes place one summer, while the ova are shed the next. This point, with many others equally interesting, I have ascertained by direct experiments, and in the lobster, while one set of ova are being shed others are rapidly developing themselves in the ovaries, to be impregnated after the shedding has been performed. During the period of what may be termed gestation, there is no exuviation, but generally within thirty hours after the ova have been all cast the shell is thrown off, and then most commonly impregnation takes place; but if the female be not impregnated, exuviation occurs very frequently during the spring, summer and autumn, varying with the age of the specimen. During the years 1855 and 1856, I kept several specimens alive in my tanks, for the purpose of watching their habits: for several days they kept quiet at the bottom, rarely seeking the shelter either of the stones or sea-weed, and even when stirred they seemed so sluggish that they rarely did more than just move out of the way. On placing a little sand at the bottom, they soon made an excavation, and sank into it, partly covered; towards the evening, however, or if the day was dull, they became more active, crawling rapidly from spot to spot. Sometimes they would creep on the stones and launch themselves off the edges, and at others they would elevate their bodies either against the glass or a stone, and rapidly vibrate the posterior claws; by this they rapidly rose to the surface, and in rising all the claws were frequently in motion; but in their progress, whether round the tank or obliquely, either in ascent or descent, the claws anterior in progress were the only ones used, the posterior ones being merely stretched out: the claws most effectively employed were the posterior two, and hence in progression the posterior part of the body became more elevated than the front. They swam with ease and rapidity, and would continue in motion for hours in a subdued light. Like most other Crustacea, the chief part of their movements take place at night: I have occasionally, by irritating them, forced them into activity by daylight, but their efforts soon cease, and they again sink to the bottom. They are very voracious, as well as active, seizing on the pollack, cod, and even mackerel, but they do not refuse dead food, as they devoured very eagerly bits of whiting which were given them from time to time. Although this species is so very active in its habits, and apparently voracious in its appetite, and is the most natatory of all British species, it would seem that they occasionally may be said almost to hibernate, as in some specimens dredged off Scilly

during the latter part of winter, the back was covered with minute corallines and *Serpulæ*; but during the summer, and during the migratory season, the shell is smooth and clean. The general colour is a light fawn flesh-colour, inclining occasionally to a brown, and in some specimens to a black-brown colour. Several of the specimens while under examination passed through the process of casting their shells, and this was attentively watched: the general mode in which it is effected is precisely the same as in *Carcinas Mænas*. When the process has begun, the crab retires to the shelter of some overhanging rock or imbeds itself in the sand, and becomes entirely helpless; the posterior margin of the carapace gets lifted, and a soft substance protrudes through the opening: this increases, and the carapace gets more and more elevated, the waved margin or suture in front gets loose, and the body is drawn gradually out. Several of these perfected the exuviation in my hand, and, on immediate careful examination of the claws, I found that Réaumur is quite correct in saying that all the claws have a longitudinal slit, to allow of the escape of the broad internal muscular plates; these semicalcareous plates have their fixed part placed distally, their proximate surfaces being free, and affording wide attachments to the muscles of the limbs: in casting their shell these are left behind, which is done by their dividing the edge of each claw longitudinally: this is not only the case in the present species, but also in the *Maia*, in which it has been said not to occur. Immediately they escape from the shell, I have been enabled to separate the edges with a pin on all occasions; but in the course of ten minutes the surfaces become so intimately united as to present no traces of such a fact,—no line, no furrow, nor even a shade whereby the situation of the fissure could be detected,—the shell is entire in all its parts. From Mr. Gosse's remarks, that "neither were the shells split to afford a lateral passage for the limbs," &c., I suspect he has mistaken Réaumur's remarks. The shells are split in no part, but the soft claws of the escaping animal *are*, as, from the circumstances of the case they must be, for how else could such broad disks be drawn from the inside of a claw? In examining the large kind of Crustacea in various stages of preparation for the moult, I find that these large muscular disks undergo a change on both surfaces: the muscular masses are less firmly attached, and this becomes so apparent, that, besides becoming more fluid, they are found to be attached to a stout membrane, between which the solid plates lie, and from which in exuviation they are drawn out: these two membranes finally fall together and form the new plate, by subsequent consolidation.

—*R. Q. Couch; Penzance.*

An Appeal to British Entomologists.—Brother entomologists! The study of Entomology may be said to promote four results: 1st. It is calculated to attract and please the eye—I mean the making a collection. This is the lowest result: in saying this, I am far from insinuating that it is an unworthy result: as well might we object to a traveller experiencing feelings of delight and gratification while he beholds some glorious panorama of nature. If therefore there be no other aim in view in making a collection than the mere pleasure of looking at and examining it, I consider such object highly praiseworthy and commendable. 2ndly. It is calculated to further Science, and, more or less directly, to promote the welfare of mankind, as has been admirably shown in the 'Introduction to Entomology.' 3rdly. It is calculated to elevate the moral tone, by supplying occupation to the idle, and by affording to the

pleasure-seeker a pursuit fully as exciting as that of vice, with this further recommendation, that it is not only innocent, but essentially useful. 4thly. It is calculated to exalt the religious tone. If, as few will deny, the study of Nature tends to the study of Nature's God,—if, when beholding the mightier and more sublime works of creation, we cannot but recognise the hand of the Creator, surely when we examine the wonderful order, arrangement, decoration and mechanism of these, its *minims*, we cannot but be led at times to think of Him who is the sole Maker of all things, whether “in heaven above, or the earth beneath, or the water under the earth.” Now these four results may be termed an “ascending scale,”—*i. e.* the first is likely to create the second, the second the third, &c. I think I am not mistaken in saying that nine-tenths of the lovers of Entomology have been, in the first instance, attracted to the pursuit of it by the marvellous beauty, endless variety and astonishing transformations which characterize these at once lovely and wonderful productions of an All-wise mind and an Almighty hand. A friend comes to look at your collection (possibly with ill-disguised contempt for the collector); but as drawer after drawer discloses its brilliant treasures—as his eye is dazzled with a gorgeous metallic colouring that mocks the hue of the rainbow, or gratified with the most delicate tracery and penciling, contempt merges in delight and admiration. Proceed to tell him of wonderful transformations—of the pleasures of rearing, sugaring, ivying, pupa-digging, &c., and the torch is kindled, and he becomes a collector. Some remain mere collectors all their lives, while others (and, I would hope, not a few) progress in the manner already alluded to: that some do, I know; and I hesitate not to say that it would be strong *prima facie* evidence with me of a man's moral and religious condition that he was a student of some branch of Natural History; but unhappily there is nothing good which cannot be made bad, or used which may not be abused. Those whose progress never extends beyond the first result (making a collection) are too often actuated by a miserable, paltry and contemptible ambition—the ambition of having the “completest” collection: this ambition “grows with the growth” of the collection, *vires acquirit eundo*, and at length attains such a height that the collector at last loses sight of even common honesty: those persons adopt for their motto the advice of the father celebrated by Horace, “rem: si possis, recte; si non, quocunque modo, rem,” which, being translated by the unscrupulous collector, means, “Mr. A. has an Empyrea, I have not, but have it I must,—honestly, if possible,—but, if not, I must still have it, some way or another.” Accordingly, after having tried, possibly for a season or two, to obtain the insect honestly, but without success, he proceeds dishonestly, and buys for threepence or so, an insect, which, if a genuine British specimen, would possibly cost as many pounds,—or obtains the eggs or pupæ from abroad, and having bred the insect in England, attempts in this way to escape the charge of telling a direct falsehood when he asserts that it is an English specimen. Such a man is beneath contempt. Many are the methods employed by these men, but I love not to dwell on them. Suffice it to say that the system is now carried to such an extent that we know not whom to trust or believe, and I therefore now appeal to one and all my brother entomologists to set their face against it. I would appeal to the honourable, the moral, the religious feelings of those who may have been or are guilty of such practices. Do not bring disgrace on yourselves—on the noble and elevating, but abused pursuit you follow—on Him whose creatures you are, in common with those you profess to study! Do not let the entomologist be pointed at with the finger of scorn! Do not give so apt and ready a handle to the derider of our favourite pursuit! It was not such a

principle as this which actuated Linneus, Kirby and a host of others, whose names are reverentially remembered by us, their humble but zealous followers! Oh! then, once more, I would appeal to your better feelings: abjure these miserable and contemptible practices—be honest, just and straightforward! Perhaps in so doing your collection may be smaller, but your peace of mind and self-esteem will be proportionably greater. In all good will and fellowship, your brother entomologist—*Joseph Greene; Playford, Ipswich, February 12, 1857.*

Honesty and Dishonesty.—There is a great deal to be said upon the subject of exchanging or purchasing insects—of honest or dishonest dealers—of honest or dishonest collectors. It is a very sad thing to know that there are men who will prostitute the honour and dignity of Science, and degrade the very name of Entomology, by having recourse to dishonest conduct. Talking to a valued friend last year, in my garden, I was almost horrified by being told that such is the low moral standing among entomologists that, were a new insect to be discovered, there are vast numbers of collectors who would at once doubt the genuineness of the discovery! Such a state of things is not only abnormal—it is positively disgraceful, and it must, if not checked, ultimately destroy that unreserved communication which prevails among the votaries of other branches of Science. Fancy a high-minded, honourable man, devoted to the charming pursuit of Entomology, having even the faintest breath of suspicion thrown upon the successful fruits of his zeal and industry! Fancy the possibility of some vulgar brute getting up in some Societies' meetings, and doubting the genuineness of the said enthusiast's last discovery! Why such a *contre temps* as this would drive nine hundred and ninety-nine out of every thousand gentlemen out of the field of Science in disgust for ever; and yet I am told, and read in publications, that such a thing is more than probable. Now I wish to say a word or two upon such an unsatisfactory state of things: and first as to the cause of the evil. This seems clear enough: there are dishonest dealers and dishonest collectors (I quote from a publication called 'The Substitute'), "simply and entirely on account of the tremendous prices that certain persons will give for rarities, and such prices operate as great temptations to men of small means and principle." I believe this to be perfectly true; and I think the remedy is equally obvious: this "temptation to men of small means and principle" must be at once and for ever removed. There are two ways, in my opinion, by which this can be effectually done, provided British collectors are firm enough and honest enough to adopt either alternative at once. My first remedy was, I think, shadowed forth in one of the leading articles of the 'Intelligencer' of last year: it is that of admitting at once into our cabinets foreign specimens of those insects which are rare here and *desiderata* in our collections, and marking them as such. Thus, if a rare insect is taken, it will continue to be a great prize with its captor, but its money value will be gone, inasmuch as a series may be purchased from any of our respectable dealers for an old song. In my collection of British eggs the majority are of course foreign specimens, but no one pretends that a collection of eggs is deteriorated by this unavoidable necessity. I will anticipate one or two objections to this plan. 1st. It is said our collections of insects will get so mixed that it will, in time, be impossible to say which are English and which foreign specimens. If this objection were sound, the grievance would not be so great as that which obtains by dishonestly mixing up species; but I do not think the objection will hold water: the commonest precaution would prevent a specimen marked "F." from being confounded with one labelled "B." Take away the money value inducement, and depend upon it the insects would keep

clear of each other. 2ndly. It is said such a collection would not represent a British Fauna. This will only apply to the assumed possibility of insects being called British which have no title to the distinction; but if the editor of the 'Entomologist's Annual' would give up, as at present, a page or two every year for the insertion of specimens proved by indisputable evidence to be British, this objection vanishes. 3rdly. It is said that this plan would destroy the interest excited in looking for rare species, and thus reduce the number of our collectors. I am not sure that a great part of the evil complained of—*i. e.* dishonesty—would not be advantageously removed by weeding from our collectors those who follow the pursuit for the mere purpose of getting hold of and keeping those species which other people cannot: these are, *par excellence*, "mere collectors;" the Science would get on a great deal better without them, and they might find a consolation in taking to pigeons or postage-stamps instead. The scientific labourer would be spared the nuisance of being pestered with letters without end and insects hopelessly mity and greasy. It would be a great relief if some of the S's and T's alluded to by a writer in the 'Substitute' would give up collecting. But if, after all, the majority of entomologists objected to the plan of introducing foreign insects, and would rather prefer a limited and pure collection to one illustrated by specimens from other parts of Europe, then I must fall back upon my second proposition; and this is to separate the chaff from the wheat. Let there be a united determination among honest men to have no dealings of any kind with dishonest ones. If we cannot have a republic, let us have an oligarchy. Let the tempter and the tempted—the men with great means, who corrupt the men with small ones, and the men with small means and no honesty—be equally avoided. Let them be tabooed as men who degrade Science into the lowest form of barter. The greatest half of the dishonesty which is staining the fair name of this country exists in men who wear good coats and condone the rascality which is corroding the best principles of the world around us. I shall be glad to receive the opinions of entomologists on my views: if they cannot agree with either, perhaps, from such a correspondence, I may be able to gather the materials for a more practicable proposition than either of mine; if not, and there is no remedy, then, I fear, despite the high names of such men as Haworth and Stephens, of Kirby, of Ray or White, or the *alumni* of modern days, I must confess that I shall request my friends to call me anything but an entomologist.—*C. R. Bree; Stricklands, Stowmarket, February 6, 1857.*

Lepidoptera and their Parasites.—So closely associated are these creatures with the investigations of the Lepidopterist that to me it seems strange no one should have thought of publishing, from time to time, short notices of such species as he may have reared from the larvæ and chrysalides of the various Lepidoptera which has produced them. The Micro-Lepidopterist, especially, who has the time, and pays attention to the rearing of these gaudy atoms, must have remarked the enormous preponderance of the parasites he breeds over the insect itself, and one would think that surely a great portion of these parasites must be new to Science, or, in very many instances at least, rare: their minuteness favours this assumption, as also the comparatively few heads who have hitherto done anything for these families. Then, again, where there are such amongst them as are known to be common, their previous economy has been a matter quite neglected, because of the want of means of knowing where and how to set about looking for them in their earlier stages. Now, however, this can no longer be a hindrance, as probably the investigations in, and real natural history of, the Micro-Lepidoptera are better understood than those of the larger groups, not but what they,

from day to day, are getting more explained and simplified, but the inquiry has not been instituted with such zeal: there have been few Joseph Greenes in the field, laying bare the roots of the trees in winter, and gathering the harvest in the summer time; as a general rule, it has been a matter of procuring specimens—"fine specimens,"—at the cost of postage, and a box of such rubbishy things in return, that the box in which they were sent narrowly escaped sharing the flaming reception of its contents. Owing to the amount of energy which has been and is displayed in working out the transformations of the Micros, both at home and abroad, the thing is beginning to resolve itself into a very small compass, and it is but natural that the inquiring mind should wish for some other channel into which to pass, that it may prosecute researches there as vigorously as it has hitherto done in the group in question. The chances for becoming distinguished in other branches is much greater, and the charms of the species under the new investigation will develop themselves to the mind and the eye as the student advances in his researches; he will find that this new insight into Nature is as replete with beauties as that with which he was previously acquainted; the attractions they offer are quite as great as the Lepidoptera, and if gaiety of colour plays any part in the contemplative pause on the threshold, these possess it in no ordinary degree. Then we want to know something about the act of oviposition; whether it takes place before the larva has attained a certain age or whether all ages are alike favourable, and whether the larva of the parasite itself, thus hatched, is ever pierced by one of its own species. The distribution of species would also be arrived at, for it would be ascertained whether different localities yielded the same parasite from the same larva. I trust the coming season will bring with it fresh hands and hearts, and that our knowledge may be considerably extended over those portions of the insect world which often blight the hopes of the entomologist. Many are the phases to which they will find their thoughts called to dwell on, and if God hath so willed that the bright colouring of the butterfly is the lurement to the study of the insect, may he not also have given compensating qualities, even greater, in the economy of those now in duty bound to prey.—*John Scott; Southfield Villas, January 13, 1857.*

British List of Lepidoptera.—With reference to my friend Mr. Crewe's remarks (Zool. 5436), I beg to say that it was my intention to have published a synonymic list of British Noctuidæ, Deltoides and Pylalites, after Guenée's arrangement, but I have abandoned that intention, in consequence of discovering (which I did with great pleasure) that it is Mr. Doubleday's intention to publish a second edition of his 'List' immediately upon the appearance of M. Guenée's Geometridæ.—*C. R. Bree; Stricklands, Stowmarket, February 9, 1857.*

Pupa Hunting.—The perusal of Mr. Greene's instructive paper (Zool. 5382) has induced me to suggest a locality, in woods, &c., for pupæ, not particularly pointed out by him, *viz.* the tops of moss-covered stumps of trees that have been cut down. On two occasions this week, while passing through a small plantation of larch which has been well thinned by the woodman's saw, rather than his axe, some of these stumps were examined, and a number of pupa-cases (mostly empty, however) were observed, chiefly between the moss and the flat surface of the wood. The moss-covering is easily removed by the hand, and, when dense and thick, its under surface should be looked at, as well as the part of the stump from which it is raised, as it is apt then to carry the pupæ along with it. Some Lepidopterous larvæ were at the same time found in these localities, which, being raised a foot or so above the general level of the damp

ground, have probably been selected as drier and more suitable spots wherein to pass the winter, if not to undergo their transformation. Several species of the more common Coleoptera, among which *Loricera pilicornis* was the most abundant, were found in the same snug retreats; these were a little torpid at first, but yet alive and in good condition for the cabinet, even in this the first month of the year. Neither the number of my visits nor the success obtained on these two occasions can warrant any sanguine expectations from such localities. My purpose is accomplished if this notice shall induce any of your readers to search them when they meet such moss-covered stumps in their hunting-grounds, and to report to you the result.—*G. Gordon; Birnie by Elgin, N.B. January 17, 1857.*

Pupa Digging-round Manchester.—During the last fifteen years this system, apparently so little practised in the South, has been carried to great excess in this district: many thousands of chrysalides are annually procured from the roots of poplar, oak, beech, chestnut, willow, &c.; with the exception of one *Chaouia*, I am not aware of a single rarity bred,—certainly none ever fell to my share; the bulk are composed of *ocellatus*, *Populi*, *bucephala*, *dictæa* (rare), *Populeti*, *instabilis*, *stabilis*, *cruda*, *munda*, *gothica*, *megacephala*, *bidentaria*, *betularia*, &c., of which fifty per cent. are *instabilis*. The amazing labour required to procure a great number of chrysalides, and the result, so far as this district is concerned, is a complete waste of time and exertion. The great point in favour of digging, even in a barren district like this, is that it enables the collector to employ his spare time in the winter and spring months, instead of being idle. Judging from my own, and the result of other, diggings, I have not the slightest hesitation in saying the system must rank far below the usual methods of procuring insects; for instance, compare the result of a few nights' attention to sallow blossoms, if *instabilis*, *Populeti*, *munda*, *stabilis*, &c., are wanted, or a stroll into the woods at night with a lantern in October and November, and again in spring,—he must be an extensive proprietor of boxes, if not fully satisfied with abundance of common species, in the finest condition. A trowel is never used for digging in this district, but a far more effective instrument, in the shape of a small three-pronged garden fork, with the prongs bent downwards, requires less exertion than a trowel in pulling up grass, sods, &c., and, where the surface is free from rubbish, rakes the ground effectually. Some years ago, when the cocoons of *Cerura bifida* were in great demand, our collectors brought the hunting of them to great perfection; there is no "royal way" of finding them,—nothing but practice: the cocoons are placed very irregularly, sometimes on the bark below the soil, others several yards above, the majority from one to five feet: the larvæ occasionally ramble, and form their cocoons on oak, alder, &c., invariably a poplar close by: the most productive trees are those growing on the banks of streams. Perhaps Mr. C. S. Gregson, of Liverpool, will communicate the result of his experience in "raking" the sand hills at New Brighton, and how the different species of *Agrotis*, *Mamestra albicolon*, *Leucania littoralis*, &c., are procured.—*Robert S. Edleston; Manchester, February 2, 1857.*

Correction of an Error in the 'Intelligencer.'—At p. 173 of the 'Intelligencer' is my notice of the capture of *Lathonia*, which I have lately found out (by seeing it in the British Museum collection) to be only *Aglaiia*: it is very much like *Lathonia*, being exactly the same size, of a much lighter colour than *Aglaiia* generally is, and has no green on the under side of its hind wings. As I had never seen *Lathonia*, and relied upon the description, to which I thought it exactly answered, as to the time of its appearance, &c., I hope I shall be excused this mistake.—*Hardinge W. Browne; 1, Wistbourne Street, Hyde Park Gardens, February 21, 1857.*

Butterflies attracted by Sugar.—My attention was directed, in the early part of September last, to a dark, moist substance, on the trunk of an oak tree, and on which were feeding a quantity of *Vanessa Polychloros* and *V. Atalanta*, of which, in less than an hour, I took thirty-five. It struck me that if the insects were thus attracted by this natural discharge, it would prove more so if I dressed the same with my mixture used for taking moths: I dressed the tree, and it was, in a few minutes, covered with the above-named insects, and a female *Apatura Iris* came and partook so plentifully of the mixture as to actually fall on the ground when struck at with my net (quite "buffy"). I feel confident that the same fly may be easily taken as stated in its season, and where they are known to resort.—*A. Russell; Ashford, Kent, February 14, 1857.*

Caterpillar of Phalæna escula.—The caterpillar of *Phalæna escula* commits great depredations in the olive trees. The egg having been deposited in the wood of an olive tree, the grub bores a broad round passage for itself in the length of the branch, beneath the bark. Nothing is seen outside, and an unpractised eye fails to detect even the original aperture (which is closed by a substance resembling the wood). On cutting open this part, a long cylindrical cavity is seen, and by following the direction of it, with a long wire, they destroy the insect, and prevent further injury to the tree. It appears that measures have only been taken of late to kill them, and these grubs have long been allowed to commit their depredations with impunity.—*Sir J. G. Wilkinson's 'Dalmatia,' i. p. 177.**

On the use of the Anal Fork of the Puss Moth (Cerura vinula).—The observations of Mr. Gosse on this subject (*Zool.* 5254), though made with his usual accuracy and minute detail, and therefore very interesting, are not, as he seems to think, new. The same facts have been observed by many naturalists, and an account of them may be found in the entomologist's *vade-mecum*, "Kirby and Spence," in the letter on "The Means of Defence in Insects." As the passage is very concise, I venture to extract it:—"From each of the branches of the tail there issues a long, cylindrical, slender, fleshy and very flexible organ, of a rose-colour, to which the caterpillar can give every imaginable curve or inflection, causing it sometimes to assume even a spiral form. It enters the tube, or issues from it, in the same manner as the horns of snails and slugs. These tails form a kind of double whip, the tubes representing the handle, and the horns the thong or lash with which the animal drives away the ichneumons and flies that attempt to settle upon it. Touch any part of the body, and immediately one or both the horns will appear and be extended; and the animal will, as it were, lash the spot, where it feels that you incommode it."—*Vol. ii. (6th ed.) p. 205.* This account and that given by Mr. Gosse mutually confirm each other in every particular.—*Alfred Merle Norman; Kibworth, January 16, 1857.*

Note on the Economy of Psyche opacella.—In exchanging with Mr. H. Tompkins, I sent him some pairs of *Psyche opacella*. I sent the females to him, just as I had sent them to other entomologists, but Mr. T. said he did not for a moment suppose I was going to take the females out of their cases, as they never left the case: I assured him that I did not do so, but that, as soon as the females deposit their eggs, they become feeble and shrivelled, and drop out of the case. Mr. Tompkins replied that if the fact was as I stated I ought to give some public notice of it, that I

* Communicated by Mr. Walker.

assumed a great deal too much, and that my explanation of how the females get out of their cases is satisfactory, to a certain extent, but that I do not state how the opening in the case by which they drop out is made: he asks, "When do they make it, and for what purpose?" I proceed to give a short account of this curious female: I commence at the time the larva is full-fed: it then finds a suitable locality for fixing the case; and now that end of the case that was formerly the aperture for the head and legs, for the convenience of feeding and crawling about, being no longer wanted open, the larva spins up that end and turns round in the case; in fact, the case becomes inverted, and the larva sets that end of the case in proper order for use, forming another aperture, and that end of the case is lengthened, in the shape of a funnel, it being made soft and elastic, but the end is not quite open till after the female has burst from the pupa. The pupa of the female is thin and pliable, unlike the pupa of the male, and with energetic twists of its body it is enabled to go up and down its gauze-like funnel with astonishing rapidity: the funnel serves for a weather-gauge for both male and female; it serves for the female both in the pupa and perfect states, but for the male only in the pupa state. The female moves up to the top of the funnel when in pupa, and if the sun shines and the time has arrived for assuming the imago, it liberates itself from the case, and just thrusts its head out at the end of the funnel, and there awaits the arrival of the male until night comes on, or the sun is clouded, or it is disturbed: in either of these cases it will move down to what is now the bottom of the case; next day, if all is right, it will be at the top of the funnel again, and until the male finds her; when he has arrived, she goes down the case and raises the lower extremity of her body. The body of the male is somewhat similar to a telescope; it lengthens out between every joint or segment: the male introduces his body into the funnel, and copulation takes place: afterwards the female remains out of sight, laying her eggs, which are covered with a glutinous moisture, within the case; she then falls through the aperture of the funnel, which opens downwards. The funnel of the male is considerably longer than that of the female. It is truly astonishing how fast the pupæ will travel up and down their funnels; they ascend occasionally to ascertain if the sun is shining, and if not they will not burst the pupa-case, as they fly only in the sunshine: they will thrust the pupa one half out, and more if it pleases them to come out and leave it.—*Richard Weaver; 25, Pershore Street, Birmingham.*

Cases of a supposed new Psyche found on Rocks near Conway.—Last summer, when collecting in North Wales, I found several small cases on the rocks near Conway that were entirely new to me: they were covered with lichen, on which very probably the larvæ feed; the cases are round and a little curved, and much longer at one end than at the other. A question at once arises, To what insect do these cases belong? A close inspection shows them to be Lepidopterous. I sent some of them to an entomological friend: his answer was, "Your case-bearers are, to the best of our knowledge, not Lepidopterous." But, shortly after that, I received a second letter from the same friend, saying, "I am happy to inform you that your case-bearers have produced Lepidopterous insects; but the specimens are all wingless females, so that he must indeed be clever who can say what they are." The female bears a close resemblance to the wingless female of *Solenobia inconspicua*; but the cases of the two species differ in shape very widely. Entomologists who may be going to Conway will do well to keep a sharp look-out for the male, and to ascertain its name.—*Id.; February 5, 1857.*

Nomenclature of Noctuidæ.—"I am, however, much comforted by hearing from my most worthy friend, Mr. C. R. Bree, that he is shortly about to publish a list of the British Noctuidæ, in strict accordance with the arrangement of M. Guenée," writes the Rev. H. Harpur Crewe. Very well, say I; they are quite welcome to "comfort" one another, if they like, but I protest against the pages of the 'Zoologist' being made the vehicle for their doing so. Already have more than nine pages been filled up with "fatty" matter relative to the Deltoïdes and Pyralites, of no use to any one professing to be an entomologist, since all such must possess M. Guenée's works, and the volume in question can be had for 4s. 3d. If the same proportion of space is to be applied to the Noctuidæ, your readers must calculate on at least sixty pages of similar matter. I have not the slightest wish to prevent Mr. Bree indulging in the luxury of printing at his own cost, but I think the majority of your readers will not relish the appearance of two or three more double numbers filled with mere copied catalogues.—*George Wailles; Newcastle-on-Tyne, February 10, 1857.*

Pupa of Agriopis aprilina.—At p. 268, No. 12, of the 'Manual,' Mr. Stainton says that the pupa of *Agriopis aprilina* is buried to a great depth. I am utterly at a loss to conceive upon what grounds Mr. Stainton has arrived at this conclusion. I have very frequently dug up the pupa of *A. aprilina*; in fact, it is one of the commonest at the roots of oak, in the early autumn. I have invariably found it immediately below the surface of the soil. All my entomological friends tell me the same thing, and I think that even the most incipient entomologist will be able to confirm my statement. I can only account for Mr. Stainton's remark by supposing that the *Agriopis* larvæ in the neighbourhood of Lewisham are, like the Earthmen of Central Africa, endowed with burrowing propensities uncommon to the rest of their species.—*H. Harpur Crewe; Stowmarket, February 10, 1857.*

PS. Subsequently to writing the above, I find, upon reference to M. Guenée's work, that Mr. Stainton has copied, almost *verbatim*, M. Guenée's remarks on the pupa of *A. aprilina*. My observations will therefore equally apply to M. Guenée.—*H. H. C.*

Pupa Raking.—After reading Mr. Gregson's paper on "raking" (Zool. 5432), I was considerably perplexed to understand how Mr. G. ever came to give the term "raking" to the operation he there describes. The term "raking" appears to me to necessitate the use of a "rake"; but it does not appear that Mr. G. ever uses one: his plan is no doubt a very useful one, and his suggestions valuable to the entomological world; but I should strongly advise him to designate his operation by a more congenial term. Now I had often heard of "raking," and supposed that it meant actually using a "rake." Accordingly, one day last October, I armed myself with a small rake of four or five teeth, and proceeded to a dry, gravelly bank, which, in the summer, is generally covered with the bladder campion (*Silene inflata*) and the common lychnis (*Lychnis dioica*), and where I had frequently taken the larva of *Dianthæcia capsicola* and *D. carpophaga*, and several times that of *Eupithecia venosata*. I steadily "raked" up the soil of this bank for the space of some twenty yards or more. I was at work about an hour, and in that time found five pupæ of *D. carpophaga*, one *D. capsicola* and one *E. venosata*. I left the neighbourhood soon afterwards, and was not able to try the place a second time. The soil of the bank is light and friable, and in the winter tolerably destitute of vegetation. In such localities I have little doubt that "raking," in the literal sense of the word, might be pursued with much success.—*Id.*

Larva of Laphygma exigua.—Mr. Bond having kindly consented to exhibit, at the Entomological Society, two bred specimens of *Laphygma exigua*, and likewise to read a short and imperfect description of the larvæ, with their dates of change, I place at your disposal a copy of the same for the 'Zoologist.' I never myself saw the larvæ: the description was written by a lady. The larvæ were kept separate; therefore, there is no doubt of the correctness of the description.

LAPHYGMA EXIGUA.

Female, captured about July 18, 1856; laid three or more eggs, which hatched in about three weeks, were full-fed, and went down about September 12th; came out October 22nd and 24th.

Description of Larva:—Pinkish brown back, pinkish yellow underneath; a row of black spots down the back; two rows down each side, between which are white spiracles on rather a darker ground than that outside the rows of black spots; head and tail a greenish hue: length of full-grown larva 1 inch. The larvæ fed on plantain, rolled up in the leaves at the roots, concealing themselves from observation. There were five pupæ discovered in all, two of which were each twice as large as either of the other three; these three smaller all came out *L. exigua*, as above; the larger two still remain alive as pupæ. The above description applies to the smaller larvæ; the larger were also described, and differed slightly: their habits being the same, I imagine they were introduced with the food when young.—*Alexander Wallace*; 5, *Green Terrace, Clerkenwell, February 20, 1857.*

The supposed new Œstrus.—I was not a little surprised to see announced in the 'Zoologist' (Zool. 5438) the discovery of a new species of the Œstrus or bot-fly, and as this remarkable family has been an object of my especial care and consideration, as the third and sixth volumes of the 'Transactions of the Linnean Society' testify, I looked at it with no small curiosity and astonishment, and which, so well described, has brought me to the conclusion that it was not a new species, as its ingenious author supposes, but a variety only of that very varying insect, the Œstrus veterinus of my enumeration, which has been the stumbling-block of many; Fabricius, for instance, has made no less than three species out of these varieties, and Dr. Leach has made two, one of which, his Œstrus Clarkii, in honour of my name, I satisfied him was one of this multiform-coloured insect. Linneus himself, who first described it, committed the first blunder, in calling it the Œstrus nasalis, apprehending strangely that it inhabited the nostrils of the horse: as this proved a gross error, I was reluctantly obliged to change its name, and to give it the above, as relating to animals of burthen, from the verbs *veho, vecto*, to bear or carry, and my rectification has been generally adopted on the Continent: other writers have also blundered about it, so that it might very well bear the name of Œstrus erratorum. It has been observed to deposit its eggs on the breast of the horse, and in its larva state, of which I have had many, it inhabits the stomach of the horse, with three other species of this genus. I used to find the chrysalis under dung, in the fields about Worcester. If your obliging correspondent will transmit it to London to my address, as given at foot, I would examine it, and confirm these remarks or otherwise, and send him other coloured specimens of it.—*Bracy Clark*; 18, *Giltspur Street, London, February 2, 1857.*

Capture of Nomada ochrostoma in the North of England.—I have taken a series of the very beautiful *Nomada ochrostoma*, *Kirby*, in the immediate vicinity of this village: they frequent a mixed colony of *Halictus rubricundus*, *Audrena ciucraria*

and *A. albicans*; but I think they are parasitic upon *A. cineraria*. I have also taken a few examples near Heaton, at Mitford, at Gibside, and near Lannercost, in Cumberland; so that it is pretty widely distributed. Both sexes have been captured, but the females in much greater plenty than their partners; they appear early in May, and continue until the end of June.—*Thomas John Bold; Long Benton, Newcastle-on-Tyne, February 27, 1857.*

Note on the Copulation of Bombi.—So little appears to be known of the loves of the Bombi, that I venture to record the only instances when I have noticed them in *coitu*. On the 29th of August I found a pair of *Bombus lapidarius*, in *copulâ*, amongst the grass on the sea-banks, near Whitley, Northumberland. When looking about for insects at Long Benton, on the 25th of July last, the laborious flight of a *Bombus* attracted my attention; of course I at once gave chase, and captured, instead of one, a couple of *B. hortorum*, which, after flying, in *copulâ*, the length of the garden, alighted on a rail, and were, without mercy, consigned to the bottle, thence to be promoted to a place in my collection.—*Id.*

Description of a new Hymenopterous Insect, found amongst Seeds of various Species of Pinus from California.—The insect I am about to describe was found amongst the seeds of *Picea bracteata* and a new species of *Thuja*, and in *Pinus nobilis*, &c. The insect appears to be parasitic on some species of *Cynips*, at least I consider it to be so: I have several pupæ of the *Cynips* (if *Cynips* it be), but they are not far enough advanced to determine that point: I am trying to rear them; if I succeed I will make it known through the pages of the 'Zoologist.' The *Chalcis* is a very beautiful one, and appears to retain its colours after death: the insect is a female; the male I have not been able to meet with, and if the males are as rare as those of our *Callimome Devonensis*, it is not very likely I shall be able to see them. The insect belongs to the genus *Megastigmus* of Dalman: there are but few species belonging to the genus known; I therefore consider this a very interesting addition, and as it appears to be generally attached to the *Pinus* family I shall call it

MEGASTIGMUS PINUS, *Parf.*

Disk of female black; the clypeus a large trifid spot above it, and the sides of the face broadly pale greenish yellow; the mandibles pale testaceous, their tips black; a pale greenish stripe behind the eyes, and a dot at their vertex. Antennæ, the scape yellow in front, the flagellum fulvous beneath. Prothorax subquadrate above, with a transverse greenish yellow macula at its apical margin; a small square spot on the metathorax. The scutellum and post-scutellum orange, forming a large oblong spot; a small green stripe before the tegulæ, and a large one in front of it in the prothorax. Legs pale or honey-yellow, inside of the posterior femora black; the tips of tarsi dusky. Wings hyaline and beautifully iridescent, particularly the posterior pair; the costal nervure and the stigma black. Abdomen, a longitudinal greenish yellow stripe along its sides; the second, third and fourth segments with an oblique triangular greenish yellow spot on each side, uniting to a central honey-yellow, longitudinal stripe above; ovipositor black and pubescent; there are also ten black setæ arising from a small black protuberance in the apex of the abdominal segment above, and quite distinct from the ovipositor; these setæ diverge on each side, forming a sharp angle with the apex of the abdomen. I cannot conceive what these appendages can be for. Length $8\frac{3}{4}$ lines; expanse of wings 4 lines; ovipositor $2\frac{1}{2}$ lines.

It is a very beautiful species: it is very curious how an insect so small can insert its ovipositor between the large scales of the pine-cones, so as to reach the larvæ of the *Cynips* (?) residing in the seeds: the economy of this insect would be very interesting, if any one residing where the species abounds would work it out.—*Edward Parfitt*; 4, *Weirfield Place, St. Leonards, Exeter, February 10, 1857.*

Occurrence of Latridius filiformis, Gyll., near *Exeter*.—I have great pleasure in adding this interesting species to the British list, having been fortunate enough to discover about forty specimens of it in a fungus I had put by in a box and forgotten. As I have been studying the Fungi of Devon for several years, I had collected the one in which this species was found, in one of my rambles last summer; but the *Latridii* had eaten the fungus so much that I was not able to say what species it was. The *Latridius* I very carefully examined under the microscope, and found it was an undescribed British species; I consequently sent some of them to E. W. Janson, Esq., who very kindly informed me it was *L. filiformis*, *Gyllenhal* and *Mannerheim*. I also sent some to F. Smith, Esq., at the British Museum, for him to compare them with the Continental specimens of that species, and he found them to be the same; so there can be no mistake about its being the true species.—*Id.*; *February 11, 1857.*

Capture and Description of Epuræa neglecta.—Lately, when naming a few beetles for a correspondent, I detected a specimen of *Epuræa neglecta*, a species not hitherto recorded as British. As it will, in all probability, be found elsewhere, I have sketched its more prominent characters:—

EPURÆA NEGLECTA, *Sturm, Deutschl. Ins. xv. 63, 8, pl. 295, b. B. = Erichs. Natur. der Ins. Deutschl. iii. 147, 9.*

Nitidula neglecta, *Heer, Faun. Col. Helv. i. 396, 8.*

Short ovate, slightly depressed, sparingly covered with griseous pubescence; blackish brown, with the antennæ, outer margins of thorax and elytra, and the legs pale ferruginous; head, thorax, scutellum and elytra closely and distinctly punctured; thorax nearly twice as broad as long, much narrowed in front, slightly emarginate, the sides dilated and rounded; elytra with the disk a little uneven, broad, narrowing slightly towards the apex, which is truncate. Length $1\frac{1}{3}$ line.

The broad ovate form, blackish brown colour, pale margins, antennæ and legs, will readily distinguish this species from its congeners. The only specimen that I have seen was taken, beneath the bark of a decaying elder, by Mr. Constantine, near Acreington, Lincolnshire, about February, 1856. A. Murray, Esq., informs me that it has also been captured near London, by the indefatigable Dr. Power.—*Thomas John Bold*; *Long Benton, Newcastle-on-Tyne, February 14, 1857.*

Captures of Coleoptera in Leicestershire.—In consequence of a permission kindly granted to me by John Ellis, Esq., to enter many rich and interesting spots belonging to the Midland Railway Company, and owing to the same kindness on the part of the keepers of Buddon Wood, I have been enabled to extend my researches in localities that have not hitherto been examined by the prying eye of an entomologist, and to add to our local Fauna many new and interesting species. In addition to those recorded by Mr. Bates in the 'Zoologist' (Zool. 4437), are the following:—

Calosoma inquisitor. The habitat of this interesting creature is upon the oaks in Buddon Wood, and can be found in May and June in the following manner:—Place your back to one of the large trees, stand perfectly still, watch the upper boughs for a

few minutes, and they will be seen first peeping down, to see that all is right below, running a short distance, and then taking another look below, and so on, over the tree: to capture them, provide yourself with a large stone, and suddenly jerk the bough when they are running. Perhaps the unpractised eye may not at first detect them, as they are careful to keep in the centre of the bough, and, unlike other tree species, they cling to it with great tenacity. I once had to abandon a fine specimen, for fear of separating the legs from the body by trying to push it off the bough with a stick.

Chlænium vestitus. Occurs in two localities in this county,—in an old gravel-pit near to Saddington Reservoir, and in a marshy ground near the railway at Syston,—at the latter place I took seventeen specimens in July and August, 1854. I was greatly surprised and amused to find this insect so readily take to the water: one day, lifting up a tuft of grass that was hanging over the edge of a shallow pool, I found seven or eight specimens basking together; before I could bottle a pair of them, I saw the others scampering across the water with great rapidity, to a sand bank on the opposite side, having no other means of escape.

Bembidium flammulatum and *B. articulatum*. In profusion at Syston pit; previously considered scarce. May to September.

Heterocerus lævigatus. In a muddy bank near the railway at Brooksby.

Hydrochus elongatus. A single specimen, by sweeping aquatic plants, at Syston.

Anisotoma (*Leiodes* of Steph.) *cinnamomea*. Near Sheethedges Wood; rare. October, 1855.

Antheroplagus silaceus. Brazil Wood, in July.

Trogosita mauritanica. A single individual I took from some old palings at Ratby, July, 1856.

Throscus dermestoides. One specimen from the alders in Bradgate Park. September.

Miccotrogus picirostris, *Eriirhinus* (*Notaris* of Steph.) *Scirpi*, *Tanysphyrus Lemnæ*. By sweeping *Lemna minor* and *Valeriana dioica* in a pond at Syston. July and August.

Apion pallipes. Shook off the oak near Cork Hall, in June.

Rhynchites ophthalmicus and *R. Alliarix*. These two interesting and timid creatures are found upon an isolated hawthorn near the centre of Buddon Wood—the only locality in the county, that I am aware of. They make their appearance when the thorn first begins to bud, and appear to possess an acute sense of hearing, for if the slightest noise is made when approaching the tree they will fall suddenly to the ground, and be lost for that day. I captured eleven specimens of *R. Alliarix* and nine of *R. ophthalmicus* between April 22 and May 16, 1856.

Tropideres sepicola, *Herbst*. A new British species. See 'Entomologist's Annual,' 1857, p. 84.

Macroplëa Zosteræ. On the banks of Groby Pool in June, 1856; rare.

Lycoperdina Bovistæ. A single example from Buddon Wood, September, 1856.—*F. Plant; Leicester*.

A Systematic List of Coleoptera found in the Vicinity of Alverstoke, South Hants. By ARTHUR ADAMS, Esq., F.L.S., Surgeon of H.M. Surveying Ship 'Actæon;' and WILLIAM BALFOUR BAIKIE, M.D., F.R.G.S.

(Continued from page 5447).

NECROPHAGA.

2. Fam. ANISOTOMIDÆ, *Steph.*

1. *Agathidium*, *Ill.*

A. atrum, *Payk.* Rare.

BRACHELYTRA.

We have been saved from great trouble and labour in naming our Brachelytra by the kindness of Dr. Power, and of G. R. Waterhouse, Esq., who have most obligingly determined and identified for us a large number of species.

1. Fam. PSELAPHIDÆ, *Leach.*

1. *Pselaphus*, *Herbst*, *Steph.*

P. Heisei, *Herbst.* *P. Herbstii*, *Steph.* In moss; rather common.

2. *Bryaxis*, *Leach*, *Steph.*

B. impressa, *Panz.* In moss; rare.

3. *Tychus*, *Leach*, *Steph.*

T. niger, *Payk.*, *Steph.* Among moss on bark of trees; scarce.

4. *Bythinus*, *Leach.* *Arcophagus*, *Steph.*

B. glabricollis, *Reich.*, *Steph.* *B. clavicornis*, *Panz.* In moss; rare.

2. Fam. STAPHYLINIDÆ, *Leach.*

1. Sub-fam. *Aleocharinæ.*

1. *Myrmedonia*, *Erich.* *Astilbus*, *Steph.*

M. canaliculata, *Fabr.*, *Steph.* On damp banks and under dead leaves.

M. limbata, *Payk.* *M. Pella*, *Steph.* On damp banks and under dead leaves.

2. *Ocalea*, *Erich.*

O. picata, *Kirby*, *Steph.* *O. castanea*, *Erich.* Not common; in moss.

3. *Homalota*, *Mann.* *Bolitochara*, *Steph.*

H. occulta, *Erich.* Under decayed bark; occasional.

H. brunnea, *Fabr.*, *Steph.* *H. zonalis*, *H. atriceps*, *H. thoracica*, *Steph.* *H. cinnamomea*, *Steph.*, *Ill.* Under decaying bark; not rare.

H. validicornis, *Märk.* Under decayed bark.

H. fungicola, *Thoms.* Under decayed bark.

H. analis, *Grav.*, *Steph.* Under decayed bark; tolerably common.

H. vernacula, *Erich.* Under decayed bark; tolerably common.

4. *Oxypoda*, *Mann.*, *Steph.*

O. longiuscula, *Grav.*, *Steph.* Under bark; occasional.

O. brevicornis, *Kirby*, *Steph.* *O. cuniculina*, *Erich.* Under bark; not scarce.

5. *Aleochara*, *Grav.*, *Steph.*

A. fuscipes, *Fabr.*, *Steph.* In carcasses; very common.

A. bipunctata, *Grav.*, *Steph.* In dead eels at Grange.

A. nitida, *Grav.*, *Steph.* *A. bilineata*, *Gyll.* *A. Cursor*, *Steph.* In dead eels and moles.

A. lanuginosa, *Grav.*, *Steph.* In dead fish.

A. mæsta, *Grav.*, *Steph.* In dead fish.

6. *Myllæna*, *Erich.*

M. gracilis, *Heer.* *Centroglossa*, *Steph.* Under decayed vegetable matter.

7. *Hypocyptus*, *Erich.*, *Steph.*

H. longicornis, *Payk.*, *Steph.* In moss; not abundant.

8. *Conurus*, *Steph.*

C. pubescens, *Grav.*, *Steph.* Under loose bark, and in damp places under logs; not very common.

C. lividus, *Erich.* *C. pyrropterus*, *Steph.* Rather rare.

9. *Tachyporus*, *Grav.*, *Steph.*

T. obtusus, *Linn.*, *Steph.* In moss; not plentiful.

T. Hypnorum, *Fabr.*, *Steph.* *T. subtestaceus*, *Steph.* Very plentiful; under heaps of weeds and refuse.

T. chrysomelinus, *Linn.*, *Steph.* In moss; abundant.

T. solutus, *Erich.* In moss; rare.

T. ruficollis, *Grav.*, *Steph.* In moss; rare.

T. brunneus, *Fabr.* *T. testaceus*, *Steph.* In moss; very rare.

2. Sub-fam. *Tachininæ*.

10. *Tachinus*, *Grav.*, *Steph.*

T. silphoides, *Linn.*, *Steph.* One specimen taken in moss.

T. rufipes, *Linn.*, *Steph.* *T. apicalis*, *Steph.* Common; in dead animals.

T. subterraneus, *Linn.*, *Steph.* *T. latus*, *Steph.*

T. humeralis, *Grav.* *T. cinctus*, *T. scapularis*, *Steph.* Rather common; in carcasses.

T. marginellus, *Fabr.*, *Steph.* In dead flat-fish.

11. *Bolitobius*, *Leach.*

B. analis, *Payk.*, (*Megacronus*), *Steph.* Under decaying trees and among grass; rare.

12. *Othius*, *Leach*, *Steph.*

O. fulvipennis, *Fabr.*, *Steph.* Rare; in damp places.

O. læviusculus, *Steph.*, *Kirby.*, *punctipennis*, *Lac.* Under sods in boggy places.

3. Sub-fam. *Staphylininæ*.

13. *Xantholinus*, *Dahl.*, *Steph.*

X. fulgidus, *Fabr.*, *Steph.* Very rare; along the sides of a ditch at Grange.

X. glabratus, *Grav.*, *Steph.* Under dry shards and stones in stubble fields; very common.

X. tricolor, *Fabr.*, *Steph.* Along roadsides, in the sun; scarce.

X. linearis, *Oliv.*, *Steph.* Under stones in fields; abundant.

14. *Leptacinus*, *Erich.*

L. parumpunctatus, *Gyll.*, (*Xantholinus*), *Steph.* Under *débris* in dry ditches.

15. *Staphylinus*, *Linn.* *Creophilus*, *Kirby*, *Steph.*

S. maxillosus, *Linn.*, *Steph.*, (*Trichoderma*, *Steph.*) Very abundant; in carcasses, and in dead fish and cuttle along the coast.

S. nebulosus, *Fabr.*, *Steph.* Rare; in cow-dung.

S. murinus, *Linn.*, *Steph.*, (*Staphylinus*, *Steph.*) Abundant.

S. erythropterus, *Linn.* *S. castanopterus*, *Steph.* Common; alighting in the sun, and in carcasses.

S. stercorarius, *Oliv.*, *Steph.* Along roadsides, in the sun; frequent.

S. fulvipes, *Scop.* Under stones and clods in a damp ditch at Grange.

16. *Ocypus*, *Kirby.* *Goërius*, *Leach*, *Steph.*

O. olens, *Fabr.*, *Steph.* Under logs and *débris*, and in carcasses; abundant.

O. similis, *Fabr.* Along roadsides, and under stones and old logs; common.

O. cupreus, *Rossi.* *Staphylinus æneicollis*, *Steph.* Under stones on commons and waste places.

O. compressus, *Marsh.*, *Steph.* Under logs and stones.

17 *Philonthus*, *Leach*, *Steph.*

P. laminatus, *Creutz*, *Steph.* In dung; occasional.

P. carbonarius, *Gyll.* Not common.

P. æneus, *Rossi*, *Steph.* In dung; not unfrequent.

P. politus, *Fabr.* Very abundant; flies in the sun, alighting on roads and paths; also in dead animals.

P. marginatus, *Fabr.*, *Steph.* In carcasses; frequent.

P. varius, *Gyll.*, *Steph.*, (*Cafius*, *Leach*, *Steph.*) In rotting vegetable matter.

P. xantholoma, *Grav.*, *Steph.* Near the sea-shore; occasional.

P. Fucicola, *Leach*, *Steph.*, (*Bisnius*), *Leach*, *Steph.* Solitary and rare; on a white sandy beach below high-water mark near Lump's Fort, Southsea.

P. fimetarius, *Grav.*, *Steph.* *P. lucidus*, *Steph.* In dead animals.

P. ebeninus, *Erich.* Not common.

P. bipustulatus, *Panz.*, *Steph.* In dead animals.

P. varians, *Payk.* *P. lituratus*, *P. aciculatus*, *P. bimaculatus*, *P. punctiventris*, *P. obscuripennis*, *P. longicornis*, *P. intaminatus*, *P. agilis*, *Steph.* Under refuse on roadsides.

P. discoideus, *Grav.*, (*Quedius*), *Steph.* In vegetable refuse.

P. quisquilius, *Gyll.* In rotting vegetable matter.

P. fulvipes, *Fabr.* *P. coruscus*, *P. rubripennis*, *Steph.* At roots of grass in damp places. Rare.

18. *Quedius*, *Leach*, *Steph.*

Q. cruentus, *Oliv.* Occasional.

Q. impressus, *Panz.*, *Steph.* In dead animals.

Q. molochinus, *Grav.* *Q. picipennis*, *Steph.* Not common; under stones and shards, Salterns, Island of Portsea.

Q. frontalis, *Nordm.* *Q. tristis*, *Steph.* In dead animals; plentiful.

Q. picipes, *Mannh.*, *Steph.* Occasional.

Q. umbrinus, *Erich.* Not common.

Q. boops, *Grav.*, (*Raphirus*), *Steph.* In dead animals; frequent.

19. *Oxyporus*, *Fabr.*, *Steph.*

O. rufus, *Linn.*, *Steph.* A single specimen taken in the grounds of Haslar Hospital, by Mr. C. Barron.

20. *Lathrobium*, *Grav.*, *Steph.*

L. brunnipes, *Fabr.*, *Steph.* Under *débris* and loose soil in damp ditches; rather abundant.

L. elongatum, *Linn.*, *Steph.* *L. atriceps*, *Steph.* Under stones in moist places.

L. fulvipenne, *Grav.*, *Steph.* Under stones in moist places.

L. multipunctum, *Grav.* *L. multipunctatum*, *L. punctatostriatum*, *Steph.* In moss.

L. quadratum, *Payk.*, *Steph.* Under stones in damp situations.

L. terminatum, *Grav.*, *Steph.* Under stones in damp situations.

4. Sub-fam. *Steninae*.

21. *Lithocharis*, *Erich.* *Sunius*, *Steph.*

L. melanocephala, *Fabr.*, *Steph.* In field-paths, under damp leaves and stalks.

L. ochracea, *Grav.*, *Steph.* *L. rubricollis*, *Steph.* At roots of grass in sandy situations.

22. *Stilicus*, *Latr.*

S. affinis, *Erich.* In field-paths, under *débris*; rather common.

23. *Sunius*, *Leach.* *Astenus*, *Steph.*

S. angustatus, *Payk.*, *Steph.* Occasional.

24. *Pæderus*, *Fabr.*, *Steph.*

P. riparius, *Linn.*, *Steph.* Abundant; along banks and in moist ditches.

25. *Stenus*, *Latr.*, *Steph.*

S. bimaculatus, *Gyll.*, *Steph.* At roots of grass in damp places.

- S. Juno, *Fabr.*, *Steph.* In meadows, by sweeping, and in moss.
 S. buphthalmus, *Grav.*, *Steph.* In moss.
 S. Speculator, *Erich.* S. boops, S. nigricornis, *Steph.* In meadows, by sweeping.
 S. nigrifulus, *Gyll.* S. unicolor, *Steph.* In hedges, by sweeping.
 S. binotatus, *Ljungh.* S. lævior, *Steph.* In hedges, and off aquatic plants, by sweeping.
 S. rusticus, *Erich.* S. picipes, *Steph.* In grassy places.
 S. impressus, *Germ.* S. acris, *Steph.* In grassy spots, by sweeping.
 S. tarsalis, *Ljungh.*, *Steph.* S. nigriclavus, *Steph.* In moss.

5. Sub-fam. *Oxytelinæ*.

26. Platystethus, *Mann.*, *Steph.*
 P. morsitans, *Payk.*, *Steph.* In horse-dung; rather common.
 P. cornutus, *Grav.*, *Steph.* In horse-dung; less frequent.
27. Oxytelus, *Grav.*, *Steph.*
 O. rugosus, *Fabr.*, *Steph.* O. carinatus, O. pulcher, *Steph.* In horse-dung.
 O. insecatus, *Grav.* In dung.
 O. sculpturatus, *Grav.*, *Steph.* In dung.
 O. inustus, *Grav.* In dung.
 O. nitens, *Marsh.*, *Steph.* O. luteipennis, *Erich.* In dung.
28. Prognatha, *Latr.* Siagonium, *Kirby*, *Steph.*
 P. quadricornis, *Kirby*, *Steph.* Under damp bark of dead elms in Anne's Hill Lane; rare.

6. Sub-fam. *Omaliniæ*.

29. Olophrum, *Erich.*, *Steph.*
 O. piceum, *Gyll.*, *Steph.* In moss; rare.
30. Omalium, *Grav.*, *Steph.*
 O. rivulare, *Grav.*, *Steph.* O. fuscum, *Steph.* In dead crabs and moles.
 O. florale, *Payk.*, *Steph.* In dead crabs and fish.
31. Anthobium, *Leach*, *Steph.*
 A. triviale, *Erich.* Occasional.
 A. ophthalmicum, *Payk.*, *Steph.* On tops of *Apiaceæ*.

32. *Proteinus*, *Latr.*

P. brevicollis, *Erich.* In dead snails.

HELOCERA.

1. Fam. HISTRIDÆ, *Leach.*1. *Hister*, *Linn.*, *Steph.*

H. quadrimaculatus, *Linn.*, *Steph.* On sandy heaths, and along roadsides near the sea; tolerably common.

H. unicolor, *Linn.*, *Steph.* Very common; under carcasses.

H. cadaverinus, *Ent. H.*, *Steph.* Common; in dead animals.

H. merdarius, *Ent. H.*, *Steph.* Rare.

H. carbonarius, *Ent. H.*, *Steph.* In dead animals; common.

H. purpurascens, *Payk.*, *Steph.* Not common; in horse-dung.

H. stercorarius, *Ent. H.*, *Steph.* Occasional; in carcasses.

H. bimaculatus, *Linn.*, *Steph.* Not frequent; in cow-dung.

H. duodecim-striatus, *Payk.*, *Steph.* Occasional; in dung.

2. *Saprinus*, *Erich.*, *Steph.*

S. nitidulus, *Fabr.*, *Steph.* In excrement; common.

S. æneus, *Fabr.*, *Steph.* Under carcasses; not common.

S. virescens, *Payk.*, *Steph.* Rare; in dead animals and in dung.

2. Fam. PHALACRIDÆ, *Schaum.*1. *Phalacrus*, *Payk.*, *Steph.*

P. coruscus, *Payk.*, *Steph.* On flowers and under bark.

P. Caricis, *Sturm.*, *Steph.* *O. ovatus*, *Steph.* On species of *Carex*; not abundant.

2. *Olibrus*, *Erich.* *Phalacrus*, *Steph.*

O. æneus, *Ill.*, *Steph.* *O. ovatus*, *Steph.* On flowers; common.

O. geminus, *Ill.*, *Steph.* On flowers; common.

3. Fam. NITIDULIDÆ, *MacLeay.*1. *Cercus*, *Latr.* *Cateretes*, *Steph.*

C. pedicularius, *Linn.*, *Steph.* *Anisocerus Spirææ*, *Steph.* On leaves of *Spiræa ulmaria*; frequent.

C. bipustulatus, *Payk.*, *Steph.* On aquatic plants in ditches.

2. *Brachypterus*, *Kug.* *Cateretes*, *Steph.*

B. cinereus, *Heer.* On flowers; frequent.

- B. pubescens, *Erich.* On flowers ; not uncommon.
 B. Urticæ, *Fabr., Steph.* On flowers ; common.
3. Carpophilus, *Leach, Steph.*
 C. hemipterus, *Linn., Steph.* Rare ; in coffee. Introduced.
4. Epuræa, *Erich.* Nitidula, *Steph.*
 E. melina, *Erich.* Under bark ; not common.
 E. obsoleta, *Fabr., Steph.* Under bark ; common.
 E. pusilla, *Ill., Steph.* Under bark ; common.
5. Nitidula, *Fabr., Steph.*
 N. bipustulata, *Fabr., Steph.* In bones ; occasional.
 N. rufipes, *Linn., Steph.* N. obscura, *Germ., Fabr.* In bones ; occasional.
6. Soronia, *Erich.* Nitidula, *Steph.*
 S. grisea, *Linn., Steph.* Under loose bark of willows ; not uncommon.
7. Omosita, *Erich.* Nitidula, *Steph.*
 O. Colon, *Linn., Steph.* In old rabbit-skins ; occasional.
 O. discoidea, *Fabr., Steph.* In bones ; not rare.
8. Pria, *Kirby.* Meligethes, *Steph.*
 P. Dulcamaræ, *Ill., Steph.* On flowers ; occasional.
9. Meligethes, *Kirby, Steph.*
 M. rufipes, *Gyll., Steph.* M. flavimanus, *Steph.* On bramble-blossoms ; abundant.
 M. æneus, *Fabr., Steph.* On flowers ; common.
 M. viridescens, *Fabr., Steph.* On flowers ; common.
 M. nigrinus, *Marsh., Steph.* On flowers ; common.
10. Pocadius, *Erich.* Strongylus, *Steph.*
 P. ferrugineus, *Fabr., Steph.* In puff-balls commencing to decay, in September, at Grange.
11. Rhizophagus, *Herbst, Steph.*
 A. ferrugineus, *Panz., Steph.* In moss ; rare.
12. Trogosita, *Oliv., Steph.*
 T. mauritanica, *Linn., Steph.* In cases which had been lying in Southampton docks. Introduced.

4. Fam. COLYDIIDÆ, *Schaum*.1. *Xylotrogus*, *Steph.*

X. brunneus, *Steph.* *Lyctus parasiticus*, *Steph.* *L. brunneus*, *Wollast.* Captured, at different times, breeding in wood at Haslar, by Mr. C. Barron.

5. Fam. CUCUJIDÆ, *Westw.*1. *Sylvanus*, *Latr.*, *Steph.*

S. frumentarius, *Fabr.* *S. surinamensis*, *Steph.* In coffee and sugar. Introduced.

S. bidentatus, *Fabr.* *S. dentatus*, *Steph.* In sugar. Introduced.

S. similis, *Erich.* In sugar. Introduced.

6. Fam. CRYPTOPHAGIDÆ, *Schaum*.1. *Antherophagus*, *Latr.*, *Steph.*

A. silaceus, *Herbst*, *Steph.* Occasional.

A. pallens, *Oliv.*, *Steph.* Not frequent.

2. *Cryptophagus*, *Herbst.*, *Steph.*

C. Lycoperdi, *Fabr.*, *Steph.* Occasional; in Fungi.

3. *Paramecosoma*, *Curt.*

P. Abietis, *Payk.* *Cryptophagus*, *Steph.* Not unfrequent.

4. *Atomaria*, *Steph.*

A. fuscata, *Schk.* Occasional.

A. nigriceps, *Erich.* Occasional.

5. *Ephistemus*, *Westw.*, *Steph.*

E. globosus, *Waltl.* Not common.

7. Fam. MYCETOPHAGIDÆ, *Westw.*1. *Litargus*, *Erich.*

L. bifasciatus, *Fabr.* Rare.

2. *Typhæa*, *Kirby*, *Steph.*

T. fumata, *Linn.*, *Steph.* Occasional.

8. Fam. DERMESTIDÆ, *Leach*.1. *Dermestes*, *Linn.*, *Steph.*

D. vulpinus, *Fabr.*, *Steph.* In carcasses, sea-shore; rare.

D. murinus, *Linn.*, *Steph.* In dead moles; common.
D. lardarius, *Linn.*, *Steph.* Occasional; in houses, in bacon.

2. *Attagenus*, *Latr.*, *Steph.*

A. Pellio, *Linn.*, *Steph.* In hedges; not common.

A. Verbasci, *Linn.* Rather rare.

3. *Anthrenus*, *Geoff.*

A. varius, *Fabr.* *A. Verbasci*, *Steph.* Not common.

A. musæorum, *Linn.*, *Steph.* *A. varius*, *Steph.* In skins; rare.

9. Fam. BYRRHIDÆ, *Leach.*

1. *Byrrhus*, *Linn.*, *Steph.*

B. pilula, *Linn.*, *Steph.* Roads and pathways; common.

B. fasciatus, *Linn.*, *Steph.* Roads and pathways; rather abundant.

B. dorsalis, *Fabr.*, *Steph.* Not uncommon.

2. *Cytilus*, *Erich.* *Byrrhus*, *Steph.*

C. varius, *Fabr.* *C. sericeus*, *Steph.* Occasional.

3. *Simplocaria*, *Marsh.*, *Steph.*

S. semistriata, *Fabr.*, *Steph.* *S. picipes*, *Steph.* Not common.

WM. BALFOUR BAIKIE.

Brunswick Cottage, Forton, Gosport,
 February 27, 1857.

Notes of an Entomological Excursion from Birmingham to Sutherlandshire.—In June, 1842, I sailed from Liverpool to Greenock, and proceeded by the Caledonian Canal to Fort William, intending to ascend Ben Nevis: on the ascent I found abundance of *Helobia Marshallana* and *H. nivalis*, and two specimens of the rare and beautiful *Leistus montanus*. Leaving Fort William, I passed on to Loch Ness, the steam packet waiting to allow the passengers time to go and see the famous Fall of Foyers: this is a locality which seems to promise good collecting, as it abounds in flowers, woods and vales. From Inverness I proceeded by coach to Dingwall, in Ross-shire, where I stopped for the purpose of ascending the lofty Ben Wivis: on the ascent I came to a flat moor, about two miles wide, and from thence the mountain was very steep to the summit: I began searching for insects: I found four specimens of *Patrobis alpinus*, a species that occurs sparingly on all the mountains of Scotland which I had an opportunity of visiting, but not one could I find on the lower hills or in the glens. At Lairg I found about thirty specimens of *Helobia impressa*; in Stephens' 'Manual,' p. 17, there is a very accurate description of this distinct beetle: the

thorax differs very much from that of all other species of the genus: it is an extremely local insect: I searched for it afterwards in vain, never finding a single specimen, except in that one locality. I travelled on to Inver, on the west coast of Sutherlandshire, and there captured some fine specimens of *Plusia interrogationis*, *Charissa obfuscaria*, *Coremia munitaria* and *Crambus ericitellus*, of which I had never before seen a specimen. I then travelled across the county to Golspie, to try the park belonging to his Grace the Duke of Sutherland, and as the head keeper delighted in the science of Ornithology as well as myself, I found no difficulty in obtaining liberty to entomologize in the park; here I took more specimens of *Plusia interrogationis*, *Thera variaria* and *Eubolia mensuraria*: I captured a good number of the ordinary marked specimens, and also some varieties almost black. I then returned to Tain, and near Dornock Firth I secured eight specimens of *Xylophasia polyodon*, of the beautiful black variety so much prized by our collectors; they were accompanied by others of the usual colouring: in one locality I have captured dark, light and intermediate varieties of *Aplecta occulta*, *Hadena adusta*, *Calocampa vetusta*, and other species. Several theories have been suggested to account for this remarkable variation; one of these is that the Scottish soil contains much iron, which has been supposed to be the cause of the darkness of some of the specimens; but let us examine two or three species, to see how that theory stands; first, *Cabera pusaria* and some other delicate waves, then *Mesoleuca albicillaria* and *M. rubiginaria*; the white portions of their wings are equally as white as in the same species found in England, so that the supposed iron soil does not affect them; neither can we prove that altitude makes the differences in question, which must still remain an enigma that requires solution. Returning from Ross-shire along the Caledonian Canal, I landed at Fort Augustus, on the 1st of August: I ascended a high mountain, and captured *Olisthopus rotundatus*, *Omozeus Bulwerii*, *O. Orinomum* and *Steropus Æthiops*, and on the base of the mountain fine dark specimens of *Erebia blandina* in abundance. I travelled onward along the canal towards Greenock, and passed on to the Isle of Arran, in hopes of obtaining *Erebia Ligea*: I had seen two specimens of this insect in the cabinet of the late Mr. Stephens, which were captured by the late Sir Patrick Walker, on the moors at the back of Brodick Castle, when out one day grouse shooting: I was informed by Mr. Stephens that he received that statement from Sir Patrick himself: I have tried that locality three different seasons without finding the insect, still I do not despair. I found *E. blandina* in profusion, but browner in colour than those taken in the Black Forest, Perthshire: the greater or lesser heat of the sun may perhaps have a powerful influence on the food-plant of those larvæ that produce extraordinary varieties amongst butterflies and moths. I ascended to the top of Goat Fell in a fog, and when this cleared off I captured several specimens of *Coccyx finitimana* and *Pamplusia alticolana*: at the base I captured the first *Oporabia filigrammaria*; I sent specimens to my entomological friends three times over, always receiving them back as varieties of *dilutata*: I was convinced they were not *dilutata*, and I sent them to the late Mr. Stephens, who returned them with the name of *Oporabia polata*, which name they retained some years. I afterwards captured *Electra popularia*, the first I had seen, and on the ragwort I found a specimen of *Graphiphora Dahlii*, the richest coloured specimen that I have ever seen: I also obtained the pupæ of *Dianthecia conspersa* by digging along shore.—*Richard Weaver*; 25, *Pershore Street, Birmingham, February 21, 1857.*

Occurrence of the Rosy Feather-star (Comatula rosacea) in Weymouth Bay.—I have now, in one of my tanks, alive, and at present doing well, a specimen of the above interesting animal: I obtained it on the 19th inst. in Weymouth Bay. This is the third individual I have obtained, and I have heard of another: it appears to possess greater powers of locomotion than do many other genera, due to the greater amount of flexibility in its rays: it is very sluggish, but also very sensitive to the touch. It is useless to give a description, as, if correctly given, it would be identical with that already published by the late Professor Forbes, in his 'British Star-fishes.'—*William Thompson; Weymouth, February 22, 1857.*

Enquiry respecting the Preservation of the Echinidæ.—The species of Echini preserved dry are extremely deciduous; in fact, it is almost an impossibility to keep them perfect,—the slightest damp, and off they fall, of their own accord, and, on the other hand, if kept too dry, the slightest touch breaks them off. Can any reader of the 'Zoologist' tell me how to prevent this? It is very annoying to see good specimens falling to pieces, without knowing how to prevent it. The genera Echinocyamus, Spatangus, and Amphidotus may easily be preserved if a little care is used, but all my attempts to get good specimens of Echinus Sphæra, miliaris and lividus have been in vain, nor have I ever seen any preserved in their natural beauty.—*Alfred Merle Norman; Kibworth, February 3, 1857.*

Proceedings of Natural-History Collectors in Foreign Countries.

Mr. H. W. BATES.—"Ega, July 28, 1856. I now send you another collection from this district, and hope it will be considered a fine one, for I believe there is not any number of any species that I have sent sufficient of before, and some species I send series of, which I hope will be new in London, such as the Allorhina, &c., in the Coleoptera, &c., the Zeonia and an Epicalia in the Lepidoptera. I am sorry I can get no better boxes here to put them in, and I feel very nervous as to the safety of this collection; I have put them up, however, as securely as I can: I filled up one of the boxes with a few Dynastes and birds, and hope to hear that they have arrived safe. Your letter of the 7th of February I received on the 5th of May. It will be very difficult to stay sufficient time to get a good collection at any place above Ega; in some villages existence is scarcely endurable to Europeans, on account of incessant clouds of mosquitos, difficulty of getting anything to eat, and bad feeling of the few inhabitants. Ega is the last place where there are any conveniences for working comfortably: it would be very easy to travel on right through to Quito or Lima, but to stay at a place two or three months is a real difficulty; however, I shall probably try St. Paul's for a few months, as soon as I can hear of a canoe to take my luggage (including provisions for three months), as it cannot be taken by steamer. I received the parcel of books you sent,

together with my brother's, in January. In the present collection there are 158 specimens of Micro-Lepidoptera, collected without giving any close attention to them, and whilst hunting for birds with a double-barrel gun slung at my left shoulder; to do much in them I must know something about them: there need not be any doubt amongst our friends that Micro-Lepidoptera are very numerous in this country,—in fact, there must be several thousand species of Tineina and Tortricina, to judge from the proportion of species to the butterflies that I see in a day's ramble; the Amazonian butterflies known must number now thirteen or fourteen hundred: now Mr. Stainton may calculate,—from the proportion known in England between Micros and English butterflies find the correspondent number to the known number of Amazonian butterflies,—but to collect them perfect is extremely difficult, and probably will not be thought worth while. I am sorry I have no better specimens yet to send of the pale Morpho and the Agrias; the Morpho was rather abundant in April, but rarely descended from its height of twenty feet; there is another species that I expect is the same as I sent *one* of from Parà, *viz.* M. Adonis, which never descended from that elevation; the female of this latter I saw also,—it is orange; the female of the present blue one is a pale lavender colour, and apparently variegated with still paler colours, but I have found it impossible to capture it,—in fact, have only seen two individuals; there is yet a third species of these Morphos, which I have never captured: of the Agrias sent I have seen only five specimens, but have now captured another, very much more beautiful than this one, something like the A. Anydon of Hewitson, but much more crimson in fore wings, and hind wings all blue, beneath much more variegated: I have seen three individuals altogether of this. The Zeonia sent I found a brood of: it must be noted that the pupa-skins sent are bound by a silken thread across the body, as I see it breaks, from extreme fineness, on the leaf contracting. There are two pairs on card of the worker of a new form of ant for Mr. Smith's consideration; I have the winged female of a different species; they are all extremely rare; the neuration of the female is unlike any Myrmicidæ or Scoliidæ I have seen. If I do not find another winged female or male by next collection, I will send a sketch to Mr. Smith: I consider it a very remarkable discovery. I am very glad indeed to hear that the second part of White's 'Catalogue of Longicorns' is on the road to me. Please look out for all cheap books which would be useful to me: is not the concluding volume of Boheman's 'Cassidæ' out yet?

“Ega, September 26. I was ready to go up river by the steamer; but it was so full and the time so short, I was disappointed: I go in

the next. I have had three months' excellent collecting: to give you an idea of the quality, there are five species of Prionidæ new to me, and I think four new to Science. I saw M. De Gand: he spent two months at Tabatinga, and then descended to Parà, and I have heard nothing more of him; he complained much of his sufferings: it is a terrible hard country up river; he complained of scarcity of insects,—showed me all his captures; some dozen good things new to me, *viz.* a Cicindela (fine), a Pelidnota, a Macraspis, a Batonota, some fine Erotyle, &c. Mr. Hauxwell has been with me again; I think he will do nothing more in birds, which is a pity, as no one has the tact with Indians that he has; he could get several faithful hunters, whilst none of the rest of us can get one, and in birds little can be done without them: the bad price given for his fine collection of river Ucayali is the cause.

“H. W. BATES.”

MR. ALFRED R. WALLACE.—“Macassar, September 27, 1856. At length I am in Celebes! I have been here about three weeks, and as yet have not done much, except explored the nakedness of the land,—and it is indeed naked,—I have never seen a more uninteresting country than the neighbourhood of Macassar: for miles around there is nothing but flat land, which, for half the year, is covered with water, and the other half is an expanse of baked mud (its present state), with scarcely an apology for vegetation; scattered about it are numerous villages, which, from their being imbedded in fruit trees, have the appearance of woods and forests, but which, in fact, are little more productive to the insect collector than the paddy-fields themselves. Insects, in fact, in all this district there are absolutely none. I have got a bamboo-house near one of these villages, about two miles from the town, which does very well for my head-quarters: to get into the country is difficult, as it belongs to native princes, and there is no accommodation whatever for Europeans: there is, however, a patch or two of forest about six or eight miles off, and to it I have made several excursions, and got some birds and butterflies, but no beetles, which, at this season, seem altogether absent. I cannot help comparing the facilities of the collector on the Amazon with the difficulties here: whether at Parà, Santarem, Barra, Obidos or Ega, or any other town or village, you may always find good forest collecting-ground within a few minutes' or half-an-hour's walk of the place,—you can live in the town, and collect in the country round. In no place in the East that I have yet seen can this be done: miles of cultivated ground absolutely barren for the naturalist extend round every town and

village, and to get into the country with any amount of necessary luggage is most difficult and expensive: then, too, the necessaries of life, have all to be brought from the town, which renders living very dear; the only way of moving is by means of porters or small carriages, the cost of which is about ten times that of boat hire, and in many cases you must expose yourself to the risk of life and property, being beyond the sphere of any civilized government. However, I hope soon to make arrangements for a small house near the forest I have spoken of, where I can stay a week at a time, and then bring home and store my collections at my house near Macassar: already I can see that I shall get a pretty good collection of birds. Raptorial birds are abundant (the first place I have seen them so in the Archipelago); I have already seven species, one or two of which I have no doubt are new: of the forty species of birds I have already collected none are handsome, but several, I think, are new, among them a Cinyris and a pigeon; the rare parrot, *Prioniturus platurus*, is not uncommon here, though I have obtained as yet only one specimen. Among my few butterflies are two Pieridæ, handsome and quite new, and two or three Danaidæ which I do not remember to have seen: I have as yet got no Papilios, but do not despair of soon obtaining some fine ones. The place where I hope to do best is Bontyne, about sixty miles from here: there is a road or path overland, but it would be very difficult to take all the luggage I require by that route, and by the sea, at the present time, owing to the wind being contrary, often takes from a fortnight to a month. In about January, however, the wind will be fair, and the trip is then only twenty-four hours, when I shall probably go there, as I am informed there is plenty of forest, and the highest mountains in the island are close by.

“The people here have some peculiar practices. ‘Amok,’ or, as we say, ‘running a-muck,’ is common here; there was one last week: a debt of a few dollars was claimed by a man of one who could not pay it, so he murdered his creditor, and then, knowing he would be found out and punished, he ‘run a-muck,’ killed four persons and wounded four more, and died what the natives consider an honourable death! A friend here, seeing I had my mattress on the floor of a bamboo-house, which is open beneath, told me it was very dangerous, as there were many bad people about, who might come at night and push their spears up through me from below, so he kindly lent me a sofa to sleep on, which, however, I never used, as it is too hot in this country.

“ALFRED R. WALLACE.”

REV. HAMLET CLARK.—Petropolis, February 18, 1857. — When my friend Mr. Gray and myself were making arrangements in England for an entomological visit to the province of Rio Janeiro, we experienced difficulty in obtaining information with regard to our proposed collecting-ground: it is true several works of travels in the Brazils have been published; one or two of them valuable, but none of them, except that of Spix and Martius, so far as I know, refer to Entomology: a modern work on the Entomology of Brazil is still a desideratum: in the absence, however, of more extended details and larger experience, perhaps a few notes and memoranda as to our localities, and the degree of our success may, if you can find space for them, be of service to future entomologists visiting this beautiful country.

We arrived in Rio early in December, being the commencement of the rainy as well as hot season; this period of the year was purposely chosen by us, as being, by all accounts, most favourable to insect life. We have now been ten weeks examining the Entomology of different localities in the province, and are able to form some opinion with regard to the climate and insect productions of the country: and first, let me say a few words as to its apparent salubrity. When in England we heard much of the ravages of yellow fever, and since we have been here this fearful disease has been more prevalent than during any previous season since that of its first appearance: its ravages, however, are confined to the unhealthy parts of the city, and especially perhaps to the shipping: it is on this account real cause for anxiety to residents in Rio, and hence fresh comers should at once, for a time, leave the lowlands near the shores of the bay, where little can be done entomologically; but to persons residing in the country or in the Organ Mountains there is as little cause for alarm as if they were in England. In all other respects the country still deserves the character it had before the introduction of yellow fever,—that of being one of the most healthy climates in the world. Let the traveller use only ordinary common sense, let him not expose himself unnecessarily to the rays of the sun, be careful to avoid excessive fatigue, and abstain from ardent spirits, then he will, humanly speaking, enjoy as vigorous health here as he has done at any portion of his life.

The following are localities at present visited by us, which deserve notice as entomological stations:—the Corcovado Mountain, Pijuca, Constançia, Presidencia and Paraihiba: the two first are immediately above Rio, Constançia and Presidencia, in the Organ Mountains, and Paraihiba on the river of that name. An hour's walk from Botofogo,

a suburb of Rio, where there are excellent hotels, is sufficient to reach the foot of Corcovardo, a well-known mountain, some 2,200 feet high; its collecting ground consists of a broad walk at the side of the famous aqueduct, three miles long, which runs for a considerable portion of its extent through virgin forest. Coleoptera are captured here, as elsewhere, by beating bushes, or when flying by means of an ordinary ring-net, although several new species each day were the result of our collecting here, but yet the locality was not so interesting as others, inasmuch as, from its propinquity to the city, it has been more carefully examined, and the species taken better known: on every day that we visited it we met collectors, principally blacks, employed by dealers in Rio; these blacks, without any superfluous clothing, carried in one hand a ring gauze-net on a thin bamboo pole 20 or 30 feet long, in the other a strip of some soft wood, stuck over with rude pins; this was all their apparatus: when they discovered any "bicho," either Lepidopterous or Coleopterous, above the ordinary size, or brilliant in colours, they gave chase, and if successful skewered their capture to their slip of wood, or to the outside of their cap. Many of such collectors we met, but not a single entomologist: Entomology, as a Science, is hardly known; with the one exception of Mr. Fry, whose splendid collections are still spoken of by every one here who knows what Entomology means, we have heard of no one who, either himself or by others, is seeking in any degree to become acquainted with the Fauna of the country. Notwithstanding, however, the number of collectors who are to be met with along the aqueduct, this locality well deserves the careful attention of the entomologist; granted that the larger species are known, and in European cabinets, there remain countless minute species disregarded utterly by those whose only object is to make up show-cases for the drawing-room, many of which doubtless will prove altogether new to Science.

Tijuca is a scattered hamlet, situated at a height of about 1000 feet, on a spur of the Corcovardo range, facing the sea, at a distance of ten or twelve miles from Rio: as an entomological locality it disappointed us: the hills surrounding it are generally cleared of forest, and converted into coffee plantations; owing either to this cause, or possibly to its contiguity to the sea, insects of all orders are scarce, or, in truth, for the most part entirely absent. The labour of several days here failed in securing as many species as could have been collected in the same time in any district in England. There is, however, one locality, within an hour's walk of Mr. Bennett's hotel at Tijuca, which is a

decided exception: a road from Tijuca to the Botanical Gardens near Rio passes through coffee plantations for three miles up to the head of the valley, and then descends through virgin forest towards the sea-coast to the gardens. The part of this road that runs through the forest is so full of insect-life, that of itself it will well repay a week's visit to Tijuca; and this suggests one rule, which, so far as our experience goes, universally obtains: roads through, or the open sides of, virgin forest are *always* good collecting-ground: cleared country, milho or coffee plantations, even the second growth of timber, are seldom profitable, often absolutely barren; we have found everywhere that this distinction holds good. In England fine green luxuriant bushes by the road-side, coppices of wood fifteen or twenty years old, are excellent localities; here such contain next to nothing, compared with what may be found in virgin forests, places where the original growth has never been touched by man.

It is, however, in the Organ Mountains, richest in vegetation, most lovely in scenery, most healthy in climate, that we have found the best stations for the entomologist: such stations may of course be multiplied indefinitely; I notice two, both most excellent, accessible, and, so far as we can learn, both up to this time almost unexplored: Constancia is an excellent English boarding-house, kept by Mr. Heath, in the heart of the Organ Mountains, two days' journey from the city in a northerly direction; and Presidencia as comfortable a home for the English traveller, kept by Mr. Land, thirteen leagues from the city in a north-west direction (three miles from the German colony Petropolis, where the Emperor has his summer palace); both these, at altitudes of about 3000 feet, are in the midst of primeval forest, and would require for their examination months instead of days: I notice these two, not to the exclusion of other equally profitable localities, but because I know how much remains still to be discovered in each, and at the same time that the traveller will in them be sure to meet with English comforts and an English welcome.

Paraihiba is a city three days' journey from Rio, on the Minas road: it is healthy, although its situation is low and the heat intense. The immediate neighbourhood is covered with large coffee and also rice plantations, and consequently an entomological desert. At the time of our visit the fine river was swollen with the recent rains, but doubtless its banks, during the dry season, would well repay research. There are two tolerable hotels; the Hotel Universal, kept by a respectable Englishwoman is the best, but of course with only Bra-

zilian accommodation; and several days might profitably be spent here in making excursions in different directions into the country on either side of the river.

Although every locality seems—as is to be expected—to have its peculiar character of insects, yet generally, through our entire excursion during this, the rainy season, we have found some orders everywhere abundant—some strangely scarce. Diurnal Lepidoptera abound, and are indescribably beautiful: it has been hard indeed to devote one's exclusive attention to any other group, when these exquisite insects are flitting around in the not more brilliant sunshine. I hardly know how far the Papilionidæ of the Organ Mountains have already received attention, but I am sure that if some of our English Lepidopterists could have seen them, in sunshine, in shade,—in masses of tens and twenties by the margins of forest streams,—they could not have been satisfied with simple admiration: words are wanting to convey any impression of their fresh beauty. Moths, especially minute species, are common by beating, and during the short twilight of evening: a little experience that we have had of sugaring by night proved that it was as effectual here as in England. Hemiptera are by no means abundant; Diptera appear to be almost confined to those abominations, sand-flies, musquitos and “Borrachudos,” a very insignificant looking atom, which swarms at Tijuca and elsewhere, but which, by its bite, raises painful inflammations on the face and backs of hands. Hymenoptera are decidedly rare: of bees, although we have been at pains to capture all that we have met with, I do not believe that a dozen species can be found in our united collections: this is perhaps to be attributed to the unprecedented amount of rain that has lately fallen. The ants are very numerous and most interesting: some species construct covered galleries among the branches of trees; others burrow, *for miles*, six or ten feet below the surface of the ground; some are carnivorous, and seem to live principally on insects; others are vegetarians; one species in this neighbourhood is welcomed as a friend to the house-keeper, for when it marches through a house not a single cockroach or spider is left behind it alive; at Constancia and other localities there is a species which, in a single night, will strip a large tree of every leaf. In the forests on the Corcovardo range, we heard of—but could not see—an ant which constructs its nest above ground five or eight feet high; the sides of these nests are constructed of clay, worked up by mastication, so that, after a few years, they obtain the consistency of porous stone: in this state they have a commercial value; they are

cut up into slabs or blocks, and used for the purpose of lining ovens.

HAMLET CLARK.

Petropolis, Organ Mountains,
Province of Rio Janeiro, February 18, 1857.

Reason and Instinct. By the Rev. J. C. ATKINSON, M.A.

PART THE SECOND.

WE will now suppose it conceded that the animals in the instances before cited or alluded to are possessed of all we contend for, but the objection raised that the individuals particularized, in each several species to which those animals belonged, are few—are probably the exceptions among their fellows of the said species; and that, moreover, the different species particularized are so few that they, too, could by no means be looked upon as establishing a law for the whole brute creation,—no, not even if every individual in each distinct species could be shown to be possessed of the full intellectual development and capacity we seem to claim for them:—in what position shall we be then? I think that our argument, notwithstanding such objection, will remain quite untouched. I think one part of the objection is much the same as asserting, and on the somewhat marvellous assumption that Newton's intellectual development was an exception among Anglo-Saxon intellects, that therefore the Anglo-Saxon race generally was not possessed of high intellectual capacity or capable of high intellectual exertion; and the other part seems to me to amount to about as much as would the opinion of a shrewd, intelligent, but uneducated and ill-informed man, who, never having before gone to the distance of twenty miles from his home in the Yorkshire Moors, and whose mind being a mere *tabula rasa* as to everything but the petty interests and experiences of his narrow home-valley, was all at once, by the use of some such improvement upon railways and steamships as Prince Housseyn's carpet, set down for a year or two among Diggers, Bushmen and Australian natives; the opinion, of course, that mankind, out of Yorkshire, were anything but a "canny" lot; that they had no capacity, no cleverness, no sense; that they were, indeed, in these respects, a long way behind the colley-dogs he had left behind in his native dale; an opinion about as reasonable—though to him, no doubt, appearing equally well founded, because equally the result of his own

observation—as his very firm belief that the stars of heaven could not exceed 1,500 or 2,000 at the utmost, or that there was nothing whatever at the bottom of the stable-pail, out of which he had just taken the lock of hay he had dropped into it the preceding day, but a little water not entirely clean. Nothing can be more presumptuous, more rash, or more dangerous intellectually—perhaps even morally and religiously—than to deny the existence of things for no better reason than that we do not know that they exist. It bars the way to all inquiry, and leaves the mind in a state of stagnation, the prey of dull ignorance and growing indifference to progress and improvement. In all tentative learning, in every endeavour after synthetical knowledge, it is the business of the inquirer to record observation after observation, to use every new fact as a stepping-stone to another newer, and to proceed steadily and surely, no matter how slowly, from induction to induction. What we know about that essence or innate quality of the brute creation which is not bodily, is that it adapts its brute possessor, in a mysterious and wonderful manner, to perform certain functions, the performance of which we have learned, instinctively perhaps, to connect with our abstract idea of the particular animal in question. We know further that this essence or quality is found in every individual of every tribe of living creatures; in some, it may be, almost imperceptibly; in others, with a strange intensity and vivacity. But we do not know, we have not so much as the merest approach to reasons on which to found even an inference, that there is not a connexion, a necessary and self-existent connexion, between this essence or quality which we label Instinct and that higher essence or quality which we designate Reason, and the sole possession of which we, rather usurpingly it may chance, arrogate to ourselves alone out of the entire animal family. No doubt we have a labyrinth, by no means without its measure of perplexity and difficulty, to thread our way through the moment we commence the inquiry involved in what is here suggested—the inquiry, *i. e.* whether there truly is such a connexion,—but perhaps, after all, not so very much more intricate than if we limit the inquiry to the human species only. The intellectual difference between man and man in the same highly-civilized, education-pervaded, intellectually-famed community is quite as great, as startling, as incomprehensible, as between the most intelligent and sagacious of any given brute family, the dog, *e. g.*, and that other brute which shows little but mental hebetude, dulness, apathy, immobility. Nor is the immeasurable space between the poor Earthman or Digger and the cultivated, educated Englishman or Frenchman so easily bridged over

as that which exists between the kangaroo* or the booby, and the elephant, the dog or the fox. And yet we can no more, on the one hand, maintain that the whole human race is not, at least, potentially, gifted with reason in its highest sense, than we can, on the other, assert that instinct is not perpetually and powerfully at work in every human being; albeit, in the one direction, little apparent by the side of intellectual lustre, in the other dividing, or, as but too often, even predominating in the empire of the mind. We know that instinct and reason do co-exist in the human being; that the loftiest intellect does not exclude the merest instincts; but we do not know that the co-existence between instinct, wherever met with, and reason is not necessary and inevitable.

For my own part, I incline to the belief that where there is apparent instinct, there is or may be also, in however small a degree, a reasoning power, whether latent or brought out and developed. I see no reason in the nature of things why it should not be so; and I see further that every observation on the habits and manners and actions of animals—few as those observations are, comparatively with what they might be, and with the vast number of living creatures, and few indeed as contrasted with the requirements of the merest empirical knowledge, far more of exact science or accurate discrimination—tends, in its measure and degree, to set up and establish such a theory on a sound and sufficiently broad basis. And in this connexion I think the following considerations (adverted to but postponed in the earlier part of our inquiry) are important and well worth attentive pondering.

The “mental principle” or “mind” either is or is not “of the same essence;” “essentially of the same nature” † in animals not human as in human beings. In what way, and by the use of what arguments, the negative is to be maintained, and, still more, made good, I must say, I do not see. A simple denial, however positive and dogmatical, of the affirmative position cannot but be nonsensically insufficient. No earnest, moderately candid inquirer could for a moment think of proposing that method of solving the question, any more than be satisfied with it if proposed by another. But all the phenomena observed make for the affirmative. Every action performed by an animal, evincing the presence of reasoning faculties in the animal’s mind and the exercise of those faculties, affords a presumption, as it seems to me, not simply that there must be reasoning

* Referred to by Brodie as “having a very low degree of intelligence.”

† See *Psych. Enquiries*, pp. 167, 169.

faculties in that animal, but that those faculties must be, in their essence or nature, strongly resembling, if not identical with, those reasoning faculties we are so well acquainted with in ourselves. They work on the same motives and by the same machinery, so far as we can trace their influence or their operation; and we have no more real or valid reason, *a priori*, to dispute that the origin of the motive power is the same in either case, than we have to question whether the agency which propels the steam-ship, drives the intricate machinery of the great factory, urges on the locomotive in its headlong rush, or puts in motion the mechanism which wields the ponderous Nasmyth hammer, is one and the same in each case. But more than this; physiological researches, so far as they have been already carried on, have shown that, in whatever way and degree the brain of man is connected with his intellectual organization, development or capacity, analogous observations on the brains of animals tend to the establishment of similar theories as regards them. "It being admitted that the brain is the material organ in connexion with the mental principle, and it being also admitted that there is in the different species of animals, on the one hand, a great difference as to the extent of their moral and intellectual faculties, and, on the other hand, a not less remarkable difference in the size and formation of the brain; so we cannot well avoid the conclusion that these two orders of facts are, in a greater or less degree, connected with each other. I do not mean to infer from this connexion that the mind is always the same, and that the greater or less development of it depends altogether on the greater or less perfection of the material organ. It may well be supposed that the original difference is in the mind itself, and that the Creator has so ordered it that the brain, in the different species of animals, should be such as will meet the peculiar requirements of the peculiar mind with which it is associated,—a view of the subject, which, if I am not misinformed, derives no small support from the researches of modern physiologists." ('Psychol. Researches,' p. 170.) Again; "Is it possible, from any experience that we have of the habits and character of a particular tribe of animals, to predicate what kind of brain we should find them to have on dissection; or, from our observations on the latter, to form an opinion as to their moral and intellectual capacities? To a limited extent, this knowledge is within our reach. If two brains were placed before me, in one of which the cerebral hemispheres were largely developed, while, in the other, they were very little developed or altogether absent, I should at once pronounce the former to indicate

the existence of a much greater intelligence than the latter." (Id. p. 172.) Now I do not adduce these remarks and reasonings, in any sense, as proving or tending to prove that because there is a striking analogy between the connexion of the brain and the intellect in man, and that between the brain and "the mind" or "moral and intellectual capacities" in the brute, that therefore this analogy establishes the identity, the oneness, of the intellectual essence of the brute and of man; but simply as considerations tending to the support of such a theory. The arguments by which it is supported are of another description, and may be thus stated: whatever proofs may be alleged that brutes possess something beyond their mere visible, material bodies, are so far proofs that the resemblance and analogy, which, to so great a degree, exists between them and mankind, as to the physical structure of each, and the composition and functions of their several parts, not only may but must extend further yet. If sufficient or reasonable ground can be shown for believing that the "something beyond" which they possess is an immaterial principle, or, in other words, a soul or spirit, by the same process, and to the same extent, reason is shown for believing that the resemblance or analogy increases so far as to extend to—at the lowest statement—intellectual essence as well as physical structure:—so to betoken identity of immaterial endowment (however different in degree), unless it can, at the same time, be shown that there are various kinds of immaterial essence, or at least probable reasons for believing so. Now this process is carried out by Dr. Butler in Chapter I. of his 'Analogy of Religion,' and there would be but little wisdom in any attempt of ours to substitute another in place of his demonstration; but as there is reason to fear his reasonings are too long to be extracted entire, I will endeavour to give an analysis of his argument, and append to it, in his own words, the conclusion at which he arrives, so far as concerns the immaterial principle in the brute creation. He begins by stating that prior to any proofs, natural or moral, of a future life (of mankind, of course) there is no distinct ground or reason, either from the reason of the thing or from the analogy of nature, for apprehending that we (*i. e.* our living powers) must be destroyed by death. For, in the first place, we do not know at all on what the existence of our living powers depends; and this shows further there can no probability be collected, from the reason of the thing, that death will be their destruction; because their existence may depend upon somewhat in no degree affected by death. And, in the second place, we cannot find anything in the analogy of nature to afford us ever so

slight a presumption that animals can lose their living powers—much less that they lose them by death. Death merely removes them from our view, and destroys the sensible proof which we had before their death of their being possessed of living powers. Moreover, the fact that they possessed these powers up to the very period to which we have faculties capable of tracing them, is itself a probability of their retaining them beyond it, especially when we take into consideration the very great and astonishing changes all living creatures actually pass through while yet living.

Further, there is no proof that our organized bodies, the portions of us actually subject to death, are really ourselves, or a part of ourselves, as living agents or beings; and there are presumptions to the contrary, deduced from (1) metaphysical considerations and (2) experimental observations.

1. The living agent cannot be pronounced or believed to be destructible by death, except it can be proved to be compounded and therefore discernible; which it cannot be, as the perceptive power, or power of consciousness, must be indivisible, and therefore also the conscious being in which it resides, or living agents; whence our bodies are no more the living beings ourselves than any other matter.

2. Living agents may lose limbs, organs of sense, even the greatest part of their bodies, and yet remain the same living agents: even had the loss happened in their infancy, when their bodies were so small, still would they have been the same living agents. They may and do undergo a ceaseless change and loss of, or in, their bodies, from natural wear and tear, but their identity as living agents is not affected: and hence we are compelled to distinguish between the living beings ourselves and our material bodies, since these may be alienated and actually are in a daily course of succession and changing their owners; whilst we are assured each living agent remains one and the same permanent being.

Whence it may be observed, I. That we have no reason to think death will be the dissolution of the living being, because we cannot by experience determine that it is larger in bulk than the solid elementary particles of matter, indissoluble by any natural power, into which our bodies are resolved after death.

II. That from our being unaffected by loss and change in those systems of matter, our bodies, which proves they are not ourselves, we have no ground for thinking any other systems of matter, internal *e. g.*, to be ourselves; and therefore have no reason to think that what befalls them at death will be the destruction of the living agents. We

have passed undestroyed through many and great revolutions of the matter appropriated to us: the inference, therefore, is rather that that great revolution which we call Death will not be fatal to the living agents ourselves.

III. That if we consider our bodies as made up of organs and instruments of perception and motion, we shall be brought to the same conclusion. We have no reason to think our organs of sense,—the eye or ear, for instance,—in themselves percipients, but only instruments of our receiving appropriate ideas from external objects, and that in much the same sort of sense as telescopes or acoustic tubes, which are no part of the body at all: an impression confirmed by instances of persons losing some of their organs of sense, the living beings themselves, their former occupants, remaining unimpaired by the loss. It is also confirmed by the experience of dreams. And as regards our power of moving or directing motion by will and choice, it remains unlesened by the loss of a limb or of all our limbs; and there is no appearance of our limbs being endued with a power of moving or directing themselves.

“Upon the whole, then, our organs of sense and our limbs are certainly instruments which the living persons ourselves make use of to perceive and move with; there is not any probability that they are any more; nor consequently that we have any other kind of relation to them than what we may have to any other foreign matter formed into instruments of perception and motion, suppose into a microscope or a staff (I say any other kind of relation, for I am not speaking of the degree of it); nor consequently is there any probability that the alienation or dissolution of these instruments is the destruction of the perceiving and moving agent.

“And thus our finding that the dissolution of matter in which living beings were most nearly interested is not their dissolution, and that the destruction of several of the organs and instruments of perception and of motion belonging to them is not their destruction, shows demonstratively that there is no ground to think that the dissolution of any other matter, or destruction of any other organs and instruments, will be the dissolution or destruction of living agents, from the like kind of relation. And we have no reason to think we stand in any other kind of relation to anything which we find dissolved by death.

“But it is said these observations are equally applicable to brutes: and it is thought an insuperable difficulty that they should be immortal and by consequence capable of everlasting happiness. Now this manner of expression is both invidious and weak; but the thing

intended by it is really no difficulty at all, either in the way of natural or moral consideration. For, first, suppose the invidious thing, designed in such a manner of expression, were really implied, as it is not in the least in the natural immortality of brutes, *viz.* that they must arrive at great attainments and become rational and moral agents, even this would be no difficulty, since we know not what latent powers and capacities they may be endued with. There was once, prior to experience, as great presumption against human creatures, as there is against the brute creatures, arriving at that degree of understanding which we have in mature age; for we can trace up our own existence to the same original with theirs: and we find it to be a general law of Nature that creatures, endued with capacities of virtue and religion, should be placed in a condition of being in which they are altogether without the use of them, for a considerable length of their duration, as in infancy and childhood; and great part of the human species go out of the present world before they come to the exercise of these capacities in any degree at all. But then, secondly, the natural immortality of brutes does not in the least imply that they are endued with any latent capacities of a rational or moral nature; and the economy of the universe must require that there should be living creatures without any capacities of this kind: and all difficulties as to the manner how they are to be disposed of are so apparently and wholly founded in our ignorance, that it is wonderful they should be insisted on by any but such as are weak enough to think they are acquainted with the whole system of things."

Nor are these the only weighty arguments and considerations which tend to establish the doctrine of the possession by the brute creation of an immaterial principle; in other words, that the "spirit of the beast" is really "a thing having existence," and in a sense different from its mere present or visible life. The following remarks (Prichard, 'Nat. Hist. of Man,' ii. 3) are very forcible: after expatiating on the remarkable contrasts and resemblances (and particularly the latter) between mankind and the inferior tribes, he says, "If it be enquired in what the still more remarkable difference consists, it is by no means easy to reply. By some it will be said that man, while similar in the organization of his body to the lower tribes, is distinguished from them by the possession of an immaterial soul, a principle capable of conscious feeling, of intellect and thought. To many persons it will appear paradoxical to ascribe the endowment of a soul to the inferior tribes in the creation. Yet it is difficult to dis-

cover a valid argument that limits the possession of an immaterial principle to man. The phenomena of feeling, of desire and aversion, of love and hatred, of fear and revenge, and the possession of external relations manifested in the life of brutes, imply, not only through the analogy which they display to the human faculties, but likewise from all we can learn or conjecture of their particular nature, the super-added existence of a principle distinct from the mere mechanism of material bodies. That such a principle must exist in all beings capable of sensation, or of anything analogous to human passions and feelings, will hardly be denied by those who perceive the force of arguments which metaphysically demonstrate the immaterial nature of the mind.*

We assume it, then, as established that brutes are in possession of an immaterial principle, a "spirit" or "soul," which is capable, at least in a degree, "of conscious feeling, of intellect and thought;" the existence of which capacity we have found abundant reason for recognising in some of the antecedent portions of our inquiry. It is next for us to ascertain, if we can, whether this capacity is analogous to the same capacity in man or identical with it. In Dr. Prichard's view, "we may venture to conjecture that there may be immaterial essences of divers kinds, and endowed with various attributes and capabilities; but the real nature of these unseen principles eludes our research. They are only known to us by their external manifestations. These manifestations are the various powers and capabilities, or rather the habitudes of action which characterize the different orders of beings, diversified according to their several destinations." (Id. p. 3.) Now these manifestations, considered simply as manifestations of immaterial principles, must of necessity, it would seem, be analogous to the manifestations of that immaterial principle with which we are best acquainted; that is to say, to our own mental proceedings, to the operations of our own intellectual attributes and capabilities. In fact, as much as this is more than implied in our first quotation from Dr. Prichard's admirable book. Bearing this analogy in mind, and rejecting all those of the "various powers and capabilities or habitudes of action

* The author goes on to say, with seeming inconsistency, "There may be no rational grounds for the ancient dogma that the souls of the lower animals were imperishable, like the soul of man." The allusion probably is to the Pythagorean doctrine of the metempsychosis. Certainly the idea of an immaterial principle or essence, subject to the same laws of decay and dissolution as matter itself, is one hard to conceive, and little consistent with "the metaphysical arguments which demonstrate the immateriality of the mind," or, rather, soul.

characterizing the various orders of beings," which do not come under the category,—are not characterized in any degree by the analogy in question,—I doubt whether we shall find any good ground for entertaining the conjecture that there may be immaterial essences of divers kinds. We have, indeed, already adduced certain considerations which would lead us to entertain a very different belief: nor do we, so far, recognise any which are antagonistic to it. It might, it is true, but not very likely, be otherwise were the difficulties and deficiencies in the way, and the means of prosecuting our research considerably lessened in number and magnitude; but, in the present state of our knowledge it seems superfluous to assume the existence of other intellectual essences when such a very large portion of the known or observed actions and capabilities of animals admit of easy and consistent explanation on the principles of the human mind.

The opinion here stated seems to me to receive a remarkable degree of confirmation from the fact that animals dream. I suppose there are very few persons who have been in the habit of seeing a dog asleep who have not also witnessed the most convincing proofs that the animal was in dreamland: he fights his battles over again; he renews the chase of the rabbit or hare with tongue and limb—possibly even is sensible of the seeming pain of an imaginarily renewed castigation or accidental injury. The bird in the cage, too, dreams, and so does the cat on the knee or the hearth-rug. "By dreams," says Butler, "we find we are possessed of a latent and, what would otherwise be, an unimagined, unknown power of perceiving sensible objects in as strong and lively a manner without our external organs of sense as with them." But is there one word in this sentence that we can change, even if we desired, when we begin to speak of the dreams of a brute instead of those of a human being? And if not, on what principle are we to say that this latent power of perceiving sensible objects without the help of our external organs of sense belongs to one kind of immaterial essence in the case of the human subject, to another in that of the brute?

But, again, dreams have been called the imagination of the sleeping man. Is there any impropriety in applying the definition in the case of the dreaming dog? I certainly see none, and for the best of all reasons, that the dog is most assuredly endowed with the faculty or power of imagination; and, with him, almost every other animal we are sufficiently intimate with to be acquainted with a good number of its actions and habits. What is it which makes some nursery tale—'Little Red Riding Hood,' to wit—so attractive to the child? It is

the child's imagination* which makes the scenery, the actors, the incidents, the conversation of the tale, all real : and it is the same imagination which leads the child, in its play, one moment to personate a beast or a bird, and the next its father, or some one else well known to it : and so it is with the dog in its mimic fights or pursuits with its playmates, whether those playmates be canine like itself, or human, or even belong to some other family or tribe of living creatures. The same of the kitten and her fancy-figured mouse, a weakness into which the demure matron tabby, her mother, sometimes descends for a moment ; of the young fox, the lamb, the chicken, and so on without end. Indeed, illustrations of animal imagination are sufficiently numerous and striking ; but what is there in any one of them to lead us to infer that it is a manifestation of an immaterial essence different in kind from that which is the property of man ? I must confess that I cannot see anything which even appears to point to such a conclusion.

It is certainly much more reasonable to subscribe to the sentiments set forth in the following passages :—“ I apprehend that no one who considers the subject can doubt that the mental principle in animals is of the same essence as that of human beings ; so that, even in the humbler classes, we may trace the rudiments of those faculties, to which, in their state of more complete development, we are indebted for the grandest results of human genius.” (Psych. Res. p. 167). And again, “ I am inclined to believe that the minds of the inferior animals are essentially of the same nature with that of the human race, and that of those various and everchanging conditions of it, which we term the mental faculties, there are none of which we may not discover traces more or less distinct in other creatures.” (Id. p. 170).

A brief glance at our position and that of our argument may not now be altogether out of place. In the former part of it, we were led, by a variety of facts and considerations, not simply to see that a vast number of animals are “ no contemptible reasoners,” but to admit that they are so in virtue of their possession of the power of comparing, compounding, generalizing or abstracting, and also of communicating their ideas ; all, of course, within certain limits or boundaries ; those limits or boundaries being possibly somewhat indefinite or indistinct, owing to our imperfect and utterly insufficient knowledge. Later on we have come to a conclusion that would, of necessity, have compelled us to look for just such results as the facts and considerations founded

* Macaulay's Essays, art. 'Milton.'

on the facts before mentioned, and that prepares us to look for further results of the same character and of indefinite number, variety and interest, from the moment abler, closer, more concentrated and better organized observation shall be brought to bear on the field of inquiry; results, in short, precisely analogous to those which have followed in the field of astronomical inquiry, so close and so gloriously on the invention and application of new and improved means of discovery, whether mechanical or mental, or both.

The practical bearing of the conclusion just adverted to on the inquiry we are prosecuting would seem to be something of this sort. If there is a connexion between reason and instinct in man, it is reasonable to conclude there may be the same or a similar connexion between reason and instinct in the brute; and if that connexion always exists in the human species, what ground is there for asserting that it does not similarly exist in the brute family?

It is quite indisputable that instinct and reason do co-exist in mankind, although, at one period—the earliest, namely—of our being, the latter is altogether latent; so much so that instinct may, in a sense, be said to precede reason: while still, no one would ever think of contending that, because for weeks of its life the infant performs and can perform none but purely instinctive actions, therefore it has no share in the possession of the reasoning capacity. But further than this, when the reasoning faculties begin to develop themselves and to be exercised, instinct does not cease to operate. It is instinct which prompts the child, which hitherto has derived its entire sustenance by the act of sucking, to employ its jaws and gums in the attempted action of biting the crust or cake put into its little hands; to drink from the spoon or cup presented to its lips; to use its little limbs in creeping first, and then in its earliest tottering walk; to employ its right hand in preference to its left; and so on. And more than this, other instincts, and of a different character, begin to be developed contemporaneously with the increasingly forcible development of the reasoning or intellectual faculties. What is it which induces the little child to manifest such evident pleasure when placed in company with other children, and by a tacit, but very real, understanding and alliance with them, add to its own resources, hitherto less ample than they might be, of comfort, pleasure and well being? Why, in the words of an author, often referred to already, “the child is led to seek the society of other children by an impulse which he cannot resist, and which is independent of any intellectual operation.” (Phys. Res. p. 197.)

Nor do the instincts peculiar to man ever cease to act as long as our life is continued to us, except, of course, in some abnormal condition of the individual induced by severe mental or bodily illness; more frequently the former. By instinct we appease our hunger and our thirst; by instinct we love our parents and our children; and by instinct we associate ourselves into communities, within narrower or more extensive limits, the end or result of which is "mutual society, help and comfort."*

Yes, we may behold that spark of the Divine, man's intellectual powers, or human reason, shining so gloriously in Newton, glaring so stormily in Napoleon Bonaparte, beaming so nobly in Milton, "paling such ineffectual fires" in the poor Digger or Australian; but we behold, too, that no one of all these, that no one of all the countless myriads of mankind, from the mightiest and most renowned to the meanest and most nameless, but has been, whatever his attributes and endowments of mind and reason, a creature of instincts, from the hour of his birth to that of his death: and, moreover, these instincts preceded his reason in his early infancy, and in multitudes of cases, they outlasted his reason during the closing "days of the years of his life."

And if we are to be guided by analogy in our inquiries and researches, in my opinion the inference or induction to which we are forcibly impelled by what we have, alike by the natural results of thoughtful observation and by a train of independent reasoning, been led to admit as to the identity of essence of the mental principle in man and in the inferior orders of animals, is that, in the brute creation, too, instinct and reason co-exist; that, at least, with certain limitations, and subject to certain definitions, instinct presupposes reason.

And here, possibly, it may serve, partly in the way of illustration, and partly, may be, in the way of confirmation of our inference, if we regard the endowment or faculty of instinct from a somewhat different point of view. In our former paper we considered instinctive actions rather as contrasted with rational actions and with mechanical actions. Let us now consider them as to their own essential character, as to what they are in themselves. We shall certainly not be accused of mis-statement if we allege that, without an exception, purely instinctive actions are directed—not by the intention of the individual agent or agents immediately concerned, but under an immutable law of creation—to the end of promoting the well-being and preservation of

* "The desire to live in society is as much an instinct in man as it is in the bee, or the ant, or the beaver, or the prairie dog."—Phys. Res. p. 196.

the individual or to the continuation of the species. Under this law, the bird of passage migrates as well as builds its nest; the salmon revisits its native streams and deposits its spawn in their head-waters; the young dog or ferret acknowledges the scent of its destined prey, and employs its physical resources in the attempt to capture it. Under this law, too, the bee builds its comb as nicely and correctly as though guided by exact mathematical science and enabled by the highest mechanical skill; the ant-lion constructs its pit-fall; and a third insect, after depositing its egg in the prepared cell, inserts likewise two or three grubs, paralyzed but not killed, lest they should decay and so defeat the object of their captor, to serve as the unresisting food of its offspring until such time as it shall cease to be a grub itself. While to this same law, likewise, must be referred the several instinctive actions, or series of actions continually performed by mankind. But, in the last-mentioned instance, reason, at a very early period, as we have observed, is known to supervene, and, progressively advancing in activity and vigour, ultimately assumes dimensions of such magnitude and so conspicuous that it altogether dominates and throws into shade each of the simple instincts; always excepting the case of the more or less completely uncivilized, or of those in worse condition still for the evolution of the higher characteristics of humanity, the more or less completely demoralized. And why? Beyond all question, because only by the due development of human reason, differing widely, no doubt, both as to original endowment and subsequent cultivation or improvement, in different communities,—and as widely, too, in different individuals in the same community,—can those functions and duties be discharged which it pleased the Creator, after He had made man in His own image, to allot to him as the part he had to fulfil in the great general scheme of creation. And as to the other instances quoted, how stands the matter with them? Is it quite certain there is no analogous or even similar progression of what clearly is not instinct, and as clearly can be nothing short of some degree of reason? Nay, is it even certain that, in the great scheme of the Allwise, there may not exist a necessity, similar to that we have noticed in the instance of mankind, that the inferior orders of animals should be possessed of, and capable of developing and even improving, each of them their own appropriate measure or degree of intellect? As for myself, I feel pleasure in stating the entire coincidence of my own sentiments with those I now proceed to subjoin:—“It is in the proportion which their instincts and intelligence bear to each other that the difference between the mind of man and that of other animals chiefly consists. Reasoning is not

peculiar to the former, nor is instinct peculiar to the latter. Even as regards insects which are generally and properly regarded as being below the vertebrate animals in the scale of existence, and whose nervous system is of so simple a structure as to admit of no comparison with that of the human subject, we cannot well hesitate to believe that they are not altogether deprived of that higher faculty which enables ourselves *to apply the results of our experience to the new circumstances under which we are placed.* * * * We see, among the Mammalia and birds, *even those which are the least intelligent,* nevertheless *availing themselves of the lessons of experience, and adapting their proceedings to the new circumstances under which they are placed.*" (Phys. Res. pp. 189, 194.)

I ask attention to the italicised portions of this extract, in connexion with a very few further remarks. The flycatcher mentioned below* migrated by instinct, paired by instinct, built its nest and incubated its eggs by instinct; but did not frequent its own peculiar post (see Yarrell, *in loco*) or bar or branch by instinct, and still less procure shelter from the scorching beams for its young by its own panting exertions and self-sacrifice by instinct. Experience in the former case—the same experience which leads the human seeker after insects to the places he has found most fertile in producing them—and in the latter, observation and thought or reason, or the results of them, were the motives in operation. Again, the bee might build its wonderful cells by instinct, but it was not instinct which induced it, when the comb, unable to bear the weight inclosed, gave way and began to separate—the lower portion from the upper—to build a pillar of support beneath the portion in danger of falling, and that done, then proceed to fill up the space occasioned by the fracture, making good the rent, and conclude by removing the support when the repairs above rendered it no longer necessary.

A volume of similar illustrations might, with no trouble, except that of selection, be compiled; but, instead of adducing any others, I shall rather remark that most persons, not much accustomed to systematic thought on this subject, and indurated by unquestioning habit in the familiar dogma that mankind act by reason, and by that are

* A spotted flycatcher had built its nest in a grape-vine trained to the wall of a house. By some chance the leaves which screened the nest had died or been removed: the young brood were much distressed in consequence by the heat of the sun, increased as it would be by reflection. The parent bird was observed fluttering for hours together during the hottest part of the day, so as to interpose herself between her fledglings and the sun.

distinguished from the brutes, which act by instinct, would probably be much amazed if they could be induced to sit down, pen in hand, and commit to paper a list of the undoubtedly instinctive actions of any given wild animal or selection of animals,—amazed, I mean, not by the wonderful nature of the actions registered, wonderful as many of them would be, nor yet by the long list made out; but by the very limited number they would be able to insert in the list. Take the fox, the hare, the partridge, the sparrow, for instance,—creatures specified because as familiarly known to us as any in the whole long list of God's creatures,—and how many of their customary and habitual doings may be put down under the head of instinct? By instinct they pair and copulate, they prepare for their young, they satisfy their own hunger and thirst, they supply the similar wants of their young, they dread danger, and so on. But what a countless train of actions (even after setting aside all doubtful cases) is there in the record—imperfect even when kept by the closest, most patient observer—of their lives, in which, if they were human and not brute, we should never for an instant dream of questioning the influential presence of comparison, recollection, consideration, contrivance, calculation and other operations of understanding, of reason, acting in co-ordination with, possibly even in dependence upon, instinct.*

But I turn to a new line of consideration and argument, which also may be found illustrative, and possibly confirmatory, of the doctrine that instinct presupposes reason. In all the observations and remarks hitherto advanced we have dealt with what are simply the every-day actions of the brute, whether living in a state of nature, or more or less influenced by the results of domestication; and we have not so much as alluded to the effects produced on him by special and careful training or instruction. From the moment, however, we enter upon this new topic, strictly germane to our subject, a field of observation and inquiry, of great interest, is opened to our regard. The results of training or education, in the case of every animal on which it has

* I quote the following from Mr. Couch, in illustration of the text, but without intending to imply a perfect accordance of opinion with him all through:—"A predominant error in the minds of those who deny to the inferior animals the capacity of reasoning, is the omitting to take into account a possibility of the existence of instinct in connexion with it; or that it may lie at the foundation of that building of which the rational faculty is the consummation." (*Illustrations,* p. 184.) And again, "In the proportion in which it (a reasoning faculty in animals) exists I shall have to show that its sole appropriation is as the servant of instinct, to guide the latter in its development."—*Id.* p. 163.

hitherto been tried, are simply wonderful. We know, well enough, what education does for our own species: what it does in the case of the lower animals can hardly be said to be less in proportion. To pass by the accounts of the "wonderful fleas," lately, if not still, one of the standard "sights" of the metropolis, and entirely marvellous from the perfect discipline and other results of training induced in what one would unhesitatingly pronounce such unlikely subjects for successful educational experiment; and to pass by, too, the "learned pig," not because unworthy of our attention, or that his feats are irrelevant to the matter at present in hand,—for the converse of this is entirely true,—but because we propose to take our illustrations from another source: we beg attention to the following account of some performances by a "learned dog:"—"The dog was a well-fed, comfortable-looking kind of a bull-terrier, slightly rough about the muzzle. * * * On entering the hall, he cast a kind of hasty look about him, much as you would expect a rogue to do on entering a shop from which he intended to purloin something: however, on the woman producing certain dirty cards, with their corners all worn round by constant use, and marked with numbers, letters, &c., the dog prepared himself for action with a preparatory lick at his lips and a suspicious look at his mistress. The tricks consisted of the usual routine of adding up figures, spelling short words, and finding the first letter of any town named by one of the company. The last trick was very cleverly done, and puzzled us very much, as we—*i. e.* the grown-up part of his audience—were most intently watching, not him but his mistress, in order to discover what signs she made to guide him in his choice of the cards; but we could not perceive that she moved hand or foot, or made any signal whatever. Indeed, the dog seemed to pay little regard to her, but to receive his orders direct from any one who gave them. In fact, his teaching must have been perfect, and his intellect wonderful. Now I daresay I shall be laughed at for introducing an anecdote of a *learned* dog, and told that it was 'all trick.' No doubt* it was 'all trick,' but it was a *very* clever one, and showed how capable of education dogs are—far more so than we imagine. For here was a dog performing tricks so cleverly that not one out of four or five persons who were most attentively watching him could find out how he was assisted by his mistress. The dog, too, as the woman said, was by no means one of the kind easiest to teach."—"Tour in Sutherland," ii. p. 198.

* I scarcely assent to the indubitableness of its being "all trick."

If we desire to multiply instances of this kind,—and without advertent to the multitudes of tricks and performances enacted, some of them quaint, some clever, some almost startling, by pet dogs in almost every village in the country,—we have but to go to the next performance of some tolerably good equestrian *troupe*, and we shall see quite sufficient to convince us that there is scarcely anything which the horse may not be taught; that he is capable of learning almost anything which it may suit the whim of his trainer to teach him.

Nor is this wonderful capacity for receiving and retaining the impressions of teaching or training to be met with exclusively, or nearly so, in animals not only themselves domesticated, but, in addition to that, the descendants of generations of domesticated creatures, and so, it may be said, prepared for the reception of such impressions; but it is common in those of which it can scarcely be said that they are reclaimed in the first degree. The whole science and practice of falconry depended on the successful training of birds reared from the nest and eggs of parents utterly wild. The same, too, of the young otter taught to fish for its master; of the young seal instructed in the same lesson, not an easy one to learn; of the cheetah, or hunting-leopard, of the East; of the cormorant, systematically employed in fishing by the Chinese, and, not systematically, by one here and there nearer home; and so on. Indeed, one might almost say there seems to be no practical limit to the successful teaching or training of animals; for you do not seem to be at all necessitated to confine yourself to the line apparently suggested, as promising most for success, by the animal's natural habits or instincts.

And here another consideration suggests itself rather forcibly to our attention. The result of teaching or training an animal, or series of animals, in a continuous and systematical manner, induces a change in the mind of the said animal or animals so great that new features in the distinctive nature of that class or breed of animals assume existence and become strikingly manifested. What is styled an hereditary instinct* is developed. This is met with in many different animals, but most prominently in the dog. The wonderful and peculiar sagacity of the sheep-dog, the distinctive characteristics of the pointer and setter, to leave unmentioned the peculiarities of other

* "Hereditary instincts may be formed, some animals transmitting to their offspring acquired habits, and the psychical as well as the physical characters of races undergoing variation through the agency of various causes on the breed."—Prichard, p. 40.

varieties of the dog, quite sufficiently pronounced and remarkable, however, to dictate the familiarly specific nomenclature of the animals in question, are cases in point. The result is that the young of these varieties take to their special duties with great ease, or almost naturally, requiring very little teaching or "breaking," and occasioning their trainer comparatively but little trouble. No doubt other dogs besides the pointer and setter may be taught to "stand." I had a large spaniel whom I succeeded in training to do so, and I knew a remarkably sagacious water-spaniel, much shot to as a retriever, who acquired the habit of herself, and pointed with great steadiness. But this, to me, appears to be an additional confirmation of the theory of hereditary instinct, by explaining the way in which the original pointer, setter, springer, turnspit, &c., were formed.

Now it is axiomatic enough that the teacher must have something to work on, or his teaching will come to no result. In the school of boys and girls, we know well enough what he has to work on, and he will tell you that he can do the best with the cleverest or the most attentive; that is, with those whose intellectual faculties are the best adapted for receiving and retaining the impressions it is his object to convey. But the presence of intellectual faculties will be implied in what he tells you of every individual child in the school-room, whether he speaks of the lowest and dullest of his scholars or points out what our Scottish friends call the "dux" of the school. Were he to point out a child incapable of learning, he would add, "but he has no brains, no understanding, no intellectual faculties at all." The very capacity, then, to receive instruction and evince so remarkably the results of training, most manifestly possessed by so many of the brutes, is, in my view, a most convincing proof that they, too, have intellectual faculties to work on, an understanding to conceive, and mental powers to operate the teaching afforded. No doubt some will be easier taught than others,—I mean individuals in a species or family,—just as, indeed, we know that some species in the same genus are more intelligent than others, and some tribes much less gifted with sagacity than others. But our opinion that reason belongs to the lower orders of animals, in virtue of a joint possession with mankind of an intellectual essence, is not hereby shaken. Indeed it is rather confirmed, for we note the same thing as continually occurring in the human family itself, and not at all excluding hereditary peculiarities from the category. It has occurred to me, through a tolerably intimate acquaintance with village schools in many different parts of the kingdom, to become aware that there is a vast difference between the

intellectual condition and adaptability of the children of different districts; and I believe that I am not at all singular in thinking that I could trace out the reason thus: wherever the class of parents were, generally speaking, unintelligent, with minds in a state of immobility and apathy,—whether from the want of teaching when themselves were children, or from other and more physical causes,—then the children were slow, heavy and dull of apprehension, as well as more difficult to train and discipline. On the contrary, when the parents were intelligent and acute, and in favourable circumstances as to self-support and self-respect, and although they might be mainly ill-educated or very little educated, still the children were apt, quick, intelligent and easily taught.

Nor do I think there is anything extravagant or unreasonable in such a theory. For we have but to observe what is the notorious result of no teaching or training at all, or of teaching and training in a downward direction, to become aware what a disastrous shipwreck is made of all the better and nobler attributes of man. Follow the depraved and hardened offender into his dens and hidden places of resort, and you see him a brute in almost all, articulate speech and his hand only excepted. Much as the brute lives, lives he; with the same—nay, worse than the same—instinctive lustings after meat and drink; with the same unconcern as to the concealment of what among the least civilized races of man, if uncorrupted, nature itself is said to wish to hide; with the same passions and desires as animate the beast of prey; and with only much the same acumination of intellect as might distinguish a lion or tiger that had graduated, a “first-class” brute, at some Oxford or Cambridge, the *Alma (?) Mater* of the youthful Felidæ.

Go again, and look at the outcasts of a tribe or people, the Diggers, for instance, the Bushmen and such of the Australian natives as are yet known to us. But I will content myself with an account of the habits of the Bushmen, derived from Dr. Prichard’s book:—“Of all species of men, this race, approaching as it does in its form most nearly to the second genus of bimanous animals, is still more closely allied to the orangs through the inferiority of its intellectual faculties. Happily for themselves, these people are so stupid, lazy and brutish that the idea of reducing them to slavery has been abandoned. Scarcely are they able to carry on any train of reasoning, and their language, as bare as their ideas are scanty, recedes into a kind of murmuring, which bears scarcely any resemblance to the human voice. Of habits so filthy as to render them infectious, always moist with

sweat or reeking with their own urine, * * * * clothed in skins of beasts that have passed through no process of preparation, living upon wild roots or flesh and entrails, not even washed before conveyed to their mouths, spending their life in sleep or squatted and smoking, they occasionally wander with a few cattle which supply them with milk. * * * * They scarcely make any application of fire, except to light their pipes. The domestic hearth is all but unknown among them.”* (Id. p. 514). “No picture of human degradation and wretchedness can be drawn which exceeds the real abasement and misery of the Bushmen, as we find it displayed by the most accurate writers who describe this people. Without houses, or even huts, living in caves and holes of the earth, these naked and half-starved savages wander through forests in small companies or separate families, hardly supporting their comfortless existence by collecting wild roots, by a toilsome search for the eggs of ants, and by devouring, whenever they can catch them, lizards, snakes and the most loathsome insects. It is no matter of surprise that those writers who search for approximations between mankind and the inferior orders of creation fix upon the Bushmen as their favourite theme.” (Id. p. 515.) “The desire of revenge is one of the strongest of their passions: it urges them to the most barbarous acts; they commit the most frightful outrages under the impulse of momentary irritation. * * * * Their eagerness for vengeance is so urgent as to render them indifferent on whom they wreak it, provided the sufferer be of the same country as the offender.” (Id. p. 603.) †

Perhaps this picture is the darkest that can be drawn of a state of abasement and wretchedness to be actually the daily, living experience or lot of human creatures: many, however, of its very darkest lineaments belong to the portraiture of the condition, mental and physical, of several other tribes or communities or peoples. Who, then, can wonder that some philosophers have thought to lessen the great difficulty presented by the existence, the habits, the very language, of such specimens of humanity, by suggesting some origin for them different from that of more intellectual and less brutish nations or tribes. But we believe it is now a very firmly established opinion that their low, miserable, degraded, scarcely human condition, is due to progressive demoralization consequent on their being driven out and treated as

* From the French of M. Bory de St. Vincent.

† I do not avail myself of the accounts given of the race of Dokos or Pygmies, said to inhabit certain forest-lands in Africa, as they are not quite free from doubt; but the narrative is very startling. See Prichard, p. 554.

outlaws by their own people at some remote epoch. "The tests," says Dr. Carpenter, in the introductory chapter of his 'Human Physiology,' "by which we recognise the claims of the outcast and degraded of our own, or of any other highly civilized community to a common humanity are the same as those by which we should estimate the true relation of the Negro, the Bushman or the Australian to the cultivated European. If, on the other hand, we admit the influence of want, ignorance and neglect in accounting for the debasement of the savages of our own great cities,—and if we witness the same effects occurring under the same conditions among the Bushmen of Southern Africa,—we can scarcely hesitate in admitting that the long-continued operation of the same agencies has had much to do with the psychical as well as the physical deterioration of the Negro, Australian and other degraded savages. * * * * All the evidence which we at present possess leads to the belief that, under a vast diversity in degree and in modes of manifestation, the same intellectual, moral and religious *capabilities* exist in all the races of mankind."

Or again; with respect to infants or children deserted by their parents, or otherwise deprived not only of parental but of all human care whatever, and who—the units in thousands—have survived the exposure, and contrived to maintain an existence, however precarious:—with all their human attributes, with all their claims to man's heritage of intellect and reason, they have been no better, for the most part, than "the beasts that perish." They could be taught to speak but, at the utmost, a few nearly unintelligible words. Self-control and self-guidance were as little characteristics of theirs as of "the horse or the mule" mentioned by the Psalmist. In fact, they have been, so far as we are able to judge from what we know of the savage of Aveyron and others in like case, but melancholy monuments of the utter ruin which befalls man's supremacy when he is shut out from a participation in that fostering care and those potential means by which his intellectual superiority is, in the first instance, reared and established, and in the second, secured to himself and his descendants after him.

On the whole, then, our conclusion that instinct, in the case of the lower animals, pre-supposes reason,—understanding by that word an emanation from, or the operation of, an intellectual essence identical with that belonging to man,—appears to us to be not a little confirmed by attentively observing the effects produced, as well by the silent teaching of association as by careful and systematic training, upon the mind, the habits and the nature of the brute creation; effects, moreover, as we have seen, remarkably analogous to what are produced

under similar circumstances in the human subject. While, on the other hand, if it be attempted to raise an objection against our conclusion on the ground, that if the brute family were really endowed with reason, they could not continue in a condition so low as theirs is by contrast with the human family,—we reply that the degree of intellectual hebetude which is induced in man, even among civilized nations, by a low physical condition and the continued want of mental culture and moral training; of utter demoralization, both mental and physical, when that want is assisted in its operation by practical teaching in wickedness, and training of the faculties in a downward direction; or still more of complete degradation, even to the level of the brute, which is the result of utter deprivation of all kind of human care and human intercourse, with its necessary though tacit educational power; at once proves that there is nothing abnormal or even remarkable in the condition of the lower orders of animal creation, as contrasted with their presumed possession of the attributes of reason.

While engaged upon the arguments and considerations, now brought to a close, other questions, at least collateral to that we have discussed, have suggested themselves; such as how far the reason of brutes is to be regarded from Mr. Couch's point of view, namely, that it is simply "the servant of instinct;" in what sense or degree the brain may be considered as the organ by which instinct works; the extent to which instinct works in the human races, civilized and uncivilized, and is susceptible of changes similar to those implied in the words "hereditary instinct," and the like: to which, or to some of which, we may possibly revert in some future paper.

There is another topic on which it may be thought necessary—though, I own, it does not appear so to me—to add a few passing observations; I mean the distinctive difference between man and the brute. Admitting all that we have contended for relative to the intellectual endowments of the lower animals and the corollaries deducible from it, to the very fullest extent, the relative position of mankind and all other animals remains, of necessity, quite untouched. The superiority of man over the mere animal is a fact; and no fact can be touched by any mere process of reasoning. The distinction between the human and the brute families is as broad and as strongly marked as though the object of the Creator had been simply to display that distinction in the most striking manner. By the unalterable fiat of the Great Author of all the one was constituted the sovereign of the other; and the sovereignty so established must abide unassailable so long as the fiat is unrevoked. And, like all other decrees

emanating from that authority, it carries the essential elements of its own completion in itself. Man's hand, no less than man's language, the mechanical engine and the intellectual instrument, each—so to speak—supplementary and auxiliary to the other, effectually maintain,—nay, rather, progressively widen—the impassable gulf fixed from the beginning between man, the ruler, and the rest of creation, the subjects. What has the most sagacious, the most intelligently-acting brute; the dog that almost talks to you and quite understands much that you say; the oran, which has been taught to stitch its own clothes and to sit at table with a propriety and cleanliness never dreamed of in hundreds upon hundreds of not the least refined households, their members not the coarsest mannered, in civilized England or France:—what have they to compare with the hand of man? The various tribes of animals which accompany man in his migrations over the face of the globe, and by their wonderful capability of successive or gradual adaptations to new climate, new food, new circumstances, seem almost to superinduce a new nature; those other animals which hand down through their posterity, and with increasing force, their own peculiarities of habits or instinct, an intellectual property entailed on each of their descendants;—what have they to set against man's supreme faculty of comparing and compounding the elements of knowledge; of imparting to others, his contemporaries, or his successors, after the lapse of centuries, the elaborated results; of transmitting from generation to generation an ever-accumulating immensity of practical experience, experimental knowledge and abstract philosophy of every varied description? And all this, be it observed, quite apart from the contrast involved in the one word “hereafter.” To the mere animal there is the love of life—to man, the desire after immortality: the instinctive longing, or yearning, rather, of the latter is for something commensurate with the capacity and the duration of “the conscious living agent, himself,” and which he feels rather than knows is reserved only, but surely, in the mysterious recesses of Eternity; that of the former reaches no further than food, well-being, safety, the mere requisites of the life that now is.

I will add no more than the following passage from the writings of Sidney Smith, perhaps as appropriate as any that could be written:—“I confess I treat on this subject (the *anima brutorum*) with some degree of apprehension and reluctance, because I should be very sorry to do injustice to the poor brutes who have no professors to revenge their cause by lecturing on our faculties, and at the same time I know there is a very strong anthropical party who view all eulogiums on the

brute creation with a very considerable degree of suspicion, and look on every compliment which is paid to the ape as high treason to the dignity of man. There may perhaps be more of rashness and of ill-fated security in my opinion, than of magnanimity or of liberality; but I confess I feel myself so much at my ease about the superiority of mankind—I have such a marked and decided contempt for the understanding of every baboon I have ever seen—I feel so sure that the blue ape without a tail will never rival us in poetry, painting and music, that I see no reason whatever that justice may not be done to the few fragments of soul and tatters of understanding which they may really possess. I have sometimes perhaps felt a little uneasy at Exeter Change from contrasting the monkeys with the 'prentice boys who are teasing them, but a few pages of Locke or a few lines of Milton have always restored me to tranquillity and convinced me that the superiority of man had nothing to fear. * * * * What have the shadow and mockery of faculties given to beasts to do with the immortality of the soul? Have beasts any general fear of annihilation? Have they any love of posthumous fame? Have they any knowledge of God? Have they ever reached in their conceptions the slightest trace of an hereafter? Can they form the notion of duty and accountability? * * * * Is it no reason to say, that because they partake in the slightest degree of our nature, they are entitled to all the privileges of our nature? because upon that principle, if we partook of the nature of any higher order of spirits, we ought to be them and not ourselves, and they ought to be some higher order still, and so on. * * * * As facts are fairly stated, and boldly brought forward, the more all investigation goes to establish the ancient opinion of man before it was confirmed (?) by revealed religion, that brutes are of this world *only*; that man is imprisoned here only for a season to take a better or a worse hereafter as he deserves it. This old truth is the fountain of all goodness and of justice and kindness among men; may we all feel it intimately, obey it perpetually, and profit by it eternally." ('Moral Philosophy,' pp. 238, 272.)

J. C. ATKINSON.

Danby Parsonage, Grosmont,
York.

Notes on British Bats.—Of the seven species below enumerated, six, it will be observed, were taken in the house (which is only a small one) and the yard adjoining to it. The *Noctula*, being a high-flying kind, and not, I believe, frequenting buildings, I shot about one hundred yards from the house. The occurrence of so many kinds in such a limited space appears to me, according to what I gather in the ‘*Zoologist*,’ to be an uncommon circumstance, though perhaps it might not be so if those animals did not so easily escape observation:—

1. *V. Noctula*. Common.

2. *V. pipistrellus*. Common.

3. *V. Nattereri*. In the spring of 1855 one of this kind, together with *V. barbastellus* and two or three *V. pipistrellus*, were caught in the crevices over an open archway in the buildings surrounding my stable-yard.

4. *V. barbastellus*. One specimen caught as above. Last June I found a small colony of six or seven in the same place: I caught two of them, and did not find the others there again.

5. *V. auritus*. A specimen found on a water-barrel in the stable-yard with one wing injured; another flew into the house one evening last summer.

6. *V. mystacinus*. A specimen caught in the kitchen in August, 1855; another in the dining-room and another in the back-yard last July.

7. *V. emarginatus*, *i. e.* the species described under that name in Jenyn’s ‘*Manual of Vertebrate Animals*,’ but which, it appears, is wrongly named. A specimen of this bat flew into the drawing-room window one evening in July, 1855.

The only book of reference I have had on the subject has been the one above-named, but each kind corresponds perfectly with the particular description there given of it.—*J. H. Jenkinson; Dripskill, Upton-on-Severn, February 24, 1857.*

Anecdote of a Dog.—When paying a visit the other day at a house in this neighbourhood, I noticed the presence of a new inmate, a large, tail-less, rough water-spaniel-looking dog, only with a snout somewhat too acuminate to belong to a water-spaniel. I found there was a history to this dog: he had belonged to a lately-deceased son of the person I was speaking to, and had, after his master’s death, shown much unwillingness to leave what had been the scene of his life and occupation. His master had been a butcher, and had trained his dog to watch his shop for him when he himself was forced to be absent for a time. The dog was rigidly faithful and honest on all such occasions; but more than this—he was customarily shut up all night in the shop with the meat, and was never known to have failed in the slightest degree in his honesty and abstinence. As to his tail-lessness, there was no appearance of his ever having had that wonted appendage to a dog’s hind-quarters, a tail. Bell, in speaking of the shepherd’s dog, says, “The tail, in some individuals, is very short,—a peculiarity which appears to be perpetuated from parents whose tails have been cut.” This dog had not so much as the apology for a tail which a stump or even a scar might have presented. I was, by this little narrative, reminded of a somewhat similar, but still more remarkable, account given me by the officer in the Indian army I have in a former paper referred to. He said it was customary with hunters in Newfoundland when out on a hunting expedition, previously to setting forth on the serious business of the hunt, to leave part of their equipments, &c., at some hut or shanty in the woods, under the charge of one of their

dogs; that they left the dog's food, divided into as many portions as they expected to be days absent; and that on no occasion, if they happened to return before the allotted days were expired, did they fail to find the right number of portions of food remaining: the dog had taken his meal per day, and no more, although, in all probability, had he only obeyed his instinct or his appetite, he might have eaten two or three portions and still have been not insensible to the seductions of a few tit-bits, had a dog's-meat man been there with his stores to seduce him. I thought the account afforded a very singular illustration, not simply of the intelligence of the dog, but of his capacity to apply as well as receive and understand the directions of his master. I believe, in the case of a human guardian, whether of the butcher's meat or the hunter's equipments, we should be apt to say, if as much could be said of him as of these dogs, that his "moral sense" was no mean one.—*J. C. Atkinson; Danby Parsonage, Grosmont, York, February 10, 1857.*

Singing-Mouse.—Some years ago I remember having heard of a singing-mouse: I fancy it was exhibited somewhere in London; I certainly then had doubts as to the truth of the report, but must confess since then my opinion is greatly changed. Some short time since I met, at a friend's house, a gentleman who asked me the question, "Did you ever hear a singing-mouse?" I said "No." He answered, "I have one: I will tell you all about it. Two or three months ago I had occasion to go into my game-larder one morning, and was surprised to hear a singular, low, warbling kind of note proceed from the corner of the room; I asked one of my servants, who was there, if he knew what it was: his answer was, 'No, sir; it is something in the wall: we often hear it.' I suggested 'Surely, it might be a singing-mouse,' and it appeared to be in a meal-tub, which I was told was quite full; however, I had the tub moved, and, from underneath it, started a mouse, which escaped by getting into a hole in the wall. That night I had a trap set, and caught the mouse, which proved to be the singing-mouse, for, on being brought into my room, he commenced his warbling, and has continued to do so (of course with intervals of rest) ever since." Last Monday a brother clergyman and myself drove to Captain Mead's, of Earsham Hall, Bungay, Suffolk, to see his mouse, and moreover we heard it sing, that is, upon being stirred up and driven from its nest of wool, it commenced a low, warbling, chirping kind of noise, quite loud enough to be heard across the room; it reminded me much of the note one sometimes hears of the hedgesparrow when singing or commencing to sing in early spring, buried in the ivy of an old fence. The butler informed me that, as the day was cold, the mouse would not sing half so loud as he did sometimes. I must confess I was agreeably surprised; the mouse certainly did what I never heard a mouse do before. Now my impression is, this extraordinary noise is made by the grinding of the teeth, and yet, on looking close, you might observe a heaving of the throat, as if it were a guttural sound, yet I was told he sings particularly when feeding. It strikes me it is not caused from any pleasurable account, for when driven from his nest, and evidently frightened, still the singing continued, but that is just as curious with regard to some of our warblers: if you want to find whereabouts the nest of the reed warbler is situated, a stone or two thrown into the reeds soon causes the male bird to sing, and the nest is sure to be within ten or a dozen yards of the place. But I must conclude, as I am running away from my subject: first, I must just say another mouse has been heard in the same place. In appearance it is, I should say, rather larger than the common mouse; the tail longer, thicker and more blunt at the tip, and the nose less pointed, more snoutish or pig-fashioned.—*John Farr; Gillingham, Beccles, Suffolk, February 6, 1857.*

Occurrence of the Harvest Mouse (Mus messorius) in Cornwall.—Neither Mr. Bell nor Mr. Jenyns record the harvest mouse as having been found in Cornwall: it is found in this neighbourhood, and I yesterday caught one from a corn mow: it was very active, and showed no symptoms of torpidity.—*Edward Hearle Rodd; Penzance, February 21, 1857.*

Note on Parus major.—I have often observed tom-tits tapping, as noticed by Captain Hadfield (Zool. 5426). They are not like the woodpecker when thus engaged bringing to the surface insect-food, but they are actually cracking nuts, which is a much more difficult proceeding. The stone of a haw-berry or some other small fruit is carried by Tommy into the tree, and being fixed in some convenient niche, he brings down upon it the full weight of his sharp beak in repeated taps until he breaks the shell and gets at the kernel. Any day in autumn he may be found thus occupied; I have often observed the whole process, and some years ago sent an account of it to the 'Gardener's Chronicle.'—*C. R. Bree; Stricklands, Stowmarket.*

Occurrence of the Tree Sparrow in Devonshire.—A few days since, when examining a lot of small birds exposed for sale in the Plymouth Market, I was much pleased to find among them two specimens of the tree sparrow (*Fringilla montana*), never having before observed the species in Devon. I ascertained that they were killed among other small birds on a farm in the neighbourhood.—*John Gatcombe; Wyndham Place, Plymouth, March 28, 1857.*

Note on the Black Redstart.—In some remarks on the black redstart (*Sylvia tithys*), in the 'Zoologist' (Zool. 5426), Mr. E. H. Rodd seems to suppose that the gray margins disappear from the feathers of an adult male in summer plumage. During the time I have spent in Germany, I have had numerous opportunities of examining specimens of this pretty bird, and although in some examples the gray margins were much less strongly defined than in others, in no instance were they altogether wanting. I quite agree with Mr. Rodd in believing that *Sylvia tithys* exhibits very closely the connexion between the Saxicolæ and Sylviadæ: a link still more conspicuous, however, is found in the bluethroated warbler (*Sylvia suecica*).—*Henry Smurthwaite; 8, Rossplatz, Leipzig, February 7, 1857.*

PS. In my notice of the wagtails (Zool. 5425), for "Reudendorf," read "Rendendorf," and for "Elsher," read "Elster."—*H. S.*

Occurrence of the Blackcap Warbler, throughout the Winter Months, near Penzance.—The blackcap warbler has remained with us, in sheltered valleys near by, all the winter: two days ago it was seen in full activity, searching for food, but without music.—*Edward Hearle Rodd; Penzance, February 21, 1857.*

Change of Plumage in Motacilla alba.—In reply to Mr. Carter's query with respect to the change of plumage in *M. alba* during the winter season (Zool. —), I may observe that in the female such a change does take place, and in a very decided degree: the whole plumage is at that time considerably lighter in colour, and the rich black which, in the breeding season, covers the upper part of the breast and throat, is in winter much diminished, both in extent and depth of hue, assuming then the form of a crescent, the outer feathers of which are of a dull gray. With regard to the male bird, I am not enabled to speak with certainty, but have no doubt that some change takes place in its plumage also.—*Henry Smurthwaite; 8, Rossplatz, Leipzig, March 17, 1857.*

Occurrence of Rare Birds near Plymouth in 1856.—During the past year the following rare birds have been obtained near Plymouth:—In October the great snipe (*Scolopax major*) was captured by a labourer, at Slade, the residence of Captain Podge; during November four specimens of the black redstart were killed, and more seen; in December the little auk, forktailed petrel and several common bitterns were obtained. I have noted, for many years past, that the black redstarts appear on the coasts of Devon and Cornwall invariably the first or second week in November, and leave at the end of March or the beginning of April: these birds closely resemble the wheatear in their actions, and, as it were, take the place of that species during the winter months on the coasts, but of course they are not nearly so numerous. I once took from the gullet of a black redstart a large specimen of *Ligia oceanica*, an animal much resembling the common woodlouse, but larger, and which may be seen creeping on the rocks near the sea.—*John Gatcombe; Wyndham Place, Plymouth, March 28, 1857.*

Note on the Sabine's Snipe killed in Norfolk.—Having had the opportunity of examining the Sabine's snipe mentioned by Mr. H. Stevenson (Zool. 5427), whilst in the flesh, I venture to send you the following additional particulars, as many well-founded doubts have of late subsisted, questioning the title this snipe holds to being a distinct species from *S. gallinago*. I was especially careful to take the measurements, &c. before the bird was skinned; in doing so, every facility was afforded me by Mr. Baker, the naturalist, of this town: these measurements I give below in detail, in order that any reader of the 'Zoologist,' who may be interested in the bird, may have an opportunity of comparing them with those of *S. gallinago*, and thereby see for himself the close structural similarity that exists between the two; not that any satisfactory conclusion could be arrived at by merely taking one of the common species, but by taking a series, say of five or six, or even more, it will be found that there will be as much variety between any two of the series as between the measurements of this bird and any one of them. I have not been able to see more than one other specimen, and therefore am unable to see, from the birds themselves, whether they are subject to any variety, but, from a comparison of the coloured plates and descriptions given by various authors, it would seem that such is the case. Mr. Vigors (Linn. Trans. xiv. p. 556), in describing the original specimen, says that "this species is at once to be distinguished from every other European species of *Scolopax*, by the total absence of white from the plumage, or any of those lighter tints of ferruginous-yellow which extend, more or less, in stripes along the head and back of them all:" to which I may remark, that the tip of each feather of the back is of a much lighter colour than the other transverse bars, which are chestnut; in every other respect the plumage agrees with the description given by the late Mr. Yarrell ('British Birds,' iii. p. 23), the only addition to which I can make is, that the under surface of the wing is of an uniform dusky black, without spot or marking, and the colour of the leg is an olive-green, not "very dark chestnut-brown," which probably was taken from a stuffed specimen. Mr. Gould, in his 'Birds of Europe' (vol. iv. pl. 321), figures *S. Sabini* with traces of the longitudinal marks which run from the beak under and above the eye; the upper plumage of his drawing is not so distinct in its general character. The bird figured in Jardine and Selby's 'Illustrations of Ornithology' (pl. 27) is lighter and browner about the head and back of the neck; the tail also is of a light colour at the tip, much resembling, in this respect, that of *S. gallinago*. That figured by Meyer (pl. excii.) is lighter on the breast, and the markings of the lesser wing-coverts are not

so strictly lateral. Macgillivray (Brit. Ornith. p. 377) says, in his description, that the upper part of the head and hind-neck are brownish black, spotted with dull chestnut-brown: in the present bird the brown spots do not exist. The above differences are slight, it is true, but all tend to show that the plumage is not constant, and when we consider to how much variety *S. gallinago* is subject, especially the under surface of the wing, which presents every variety of marking, from white to the other extreme, it requires no very wide gap in the chain of the series to suppose *S. Sabini* to be the result of an excess of colour, in the same way as the cream-coloured varieties, which sometimes occur, may be said to be due to an absence of colour. The measurements rather exceed the corresponding ones given by Thompson, in his 'Birds of Ireland' (vol. ii. pp. 274 and 276), but the present specimen being a female, and consequently larger than the male, may account for the difference; they are as follows:—Weight 4 oz.; whole length $11\frac{5}{12}$ in.; length of wing from flexure 5 in.; stretch of wings $16\frac{9}{12}$ in.; beak, measured along the ridge, $2\frac{1}{2}$ in., along the edge of the under mandible $2\frac{3}{8}$ in.; tarsus $1\frac{5}{8}$ in.; middle toe $1\frac{7}{12}$ in., its claw $\frac{5}{24}$ in.; outer toe $1\frac{1}{4}$ in., its claw $\frac{2}{3}$ in.; inner toe $\frac{2}{3}$ in., its claw $\frac{2}{3}$ in.; hind toe $\frac{1}{2}$ in., its claw $\frac{3}{4}$ in.; tibia bare for 3 lines above the tarsal joint; toes all separate; first and second primary quills the same length; number of tail feathers 11; colour of the legs olive-green; iris dark hazel. Of the colour of the beak I regret I can say nothing, for the bird having been killed five days when I saw it, had faded apparently in this respect, as also the legs and iris, though the above colours, doubtless darker in the case of the legs than when alive, were quite distinct. The bird had not quite got over its autumn moult, which may account for the first and second wing-feathers being of the same length, and also for the number of tail-feathers, the full complement of which is fourteen, as I was able most satisfactorily to detect the loss of three. I was unable to obtain, while the skin was fresh, a fresh specimen of the common snipe, in order to compare the respective thickness of the tarsi, but, from the dry leg, if any existed, the difference must have been slight: and, lastly, in drawing a comparison between the sterna of the two, I am able to state that no specific difference, or rather no difference at all, exists; the length and breadth of the sternum, the curvature and depth of the keel, and the curvature of the furcula, all correspond exactly in each; in fact, it is impossible to distinguish them, and this is testimony in favour of the species being the same of no small value, for Mr. Alfred Newton, whose valuable collection of breast-bones exhibits specimens of several species of *Scolopax*, assures me that a very marked difference subsists between the sterna of every member of the genus with which he is acquainted, and made special reference to those of *S. gallinago* and *S. Wilsonii*, species which, he it remembered, were for some time confounded: he also showed me the sterna of *S. major* and *S. gallinula*, which differed materially from each other and from either of the above. Further anatomical comparison, I regret to say, is beyond me, but, should such be deemed necessary, I have preserved the body. Taking into account the rare and casual occurrence of this bird, and the fact of its never having been noticed out of the British islands, as well as our total ignorance respecting its breeding locality, the ground of colour alone seems insufficient to establish it in the rank it holds; but it is for more able hands than mine to decide its fate, whether it maintains its present position or takes its place as a highly interesting variety of the common species.—*Osbert Salvin; Trinity Hall, Cambridge, February, 1857.*

Occurrence of the Bittern in Derbyshire.—This bird is becoming a rather rare visitant in this county: one was killed on the 3rd of March last, in the parish of Mel-

bourne, and was presented to me by the gentleman who shot it. Two young gentlemen, Thomas Briscoe and John Deans, Esqrs., were beating over some sedge which fringes an outlet of the Trent near Weston Cliff, when their dog made a stand, and, upon close inspection, it was seen that a bird was near: the bird did not seem inclined to quit his quarters, but as the dog approached him threw himself upon his back, and erected the feathers upon his neck, making a frill as starched as Queen Elizabeth's: after some little time, up rose the bird,—a bittern,—and instantly fell before the gun. It is a rare circumstance to find a bittern in Derbyshire so late in the season: when found it has usually occurred in mid-winter and in severe weather. The bird was remarkably fat: in the stomach were the bones of frogs, the remains of small fish and water-beetles, a black substance resembling peat, and a frog divided down the middle. The bird was a female, and the ovarium contained very small eggs.—*John Joseph Briggs; King's Newton, Swarkeston, Derbyshire, March 7, 1857.*

Mute Swans in Dundalk Bay.—I have to inform you that, on the 27th of February last, a flock of six swans was observed by a wild-fowl shooter in Dundalk Bay, on the north-eastern coast of Ireland, flying a long way out at sea; he saw them alight on the water, about a mile from the shore, and then, from a boat, shot one, which he brought to me, and which proved to be the mute swan (*Cygnus olor*). It was well-grown, measuring 5 feet from beak to tail, and weighing 21 lbs., but still gray on the head and parts of the back. The shooter says that all the swans in the flock had some gray plumage: they were doubtless of the same species. In Belfast Harbour and Strangford Lough small flocks of mute swans have appeared now for three successive winters, beginning with the severe weather of February and March, 1855, and many have been killed. As I have not seen any modern record of the occurrence in the British Islands of this swan in a truly wild state, although such may easily exist unknown to me, these notices may be of some interest. The bird has appeared wild on a few occasions on the north coast of France.—*Clermont; Ravensdale Park, Flurry-bridge, Ireland, March 11, 1857.*

Occurrence of the Pinkfooted Goose (Anser brachyrhynchus) in Derbyshire.—On the evening of December 7th, 1856, a large flight of wild geese was seen slowly making its way over the river Trent, in the direction of Weston Cliff: they were journeying southwards, and seemed much fatigued. When they reached the village of Weston, several persons who had been warned of their approach stood armed with guns, and as they flew low, nearly touching the houses, they fired into the flock, and, I believe, brought down seven. One shot by Mr. Beck, of Weston, came into my hands, and proved to be an individual of the pinkfooted geese. Upon inquiry what became of the others, I was quietly told that "they had all been roasted!" I never heard of any other specimens having been taken in Derbyshire.—*John Joseph Briggs; King's Newton, Swarkeston, Derbyshire, March 7, 1857.*

Occurrence of the Longtailed Duck (Anas glacialis) at Weymouth.—I have lately seen a specimen of the longtailed duck; it was sent me in the flesh, on the 2nd of this month, for identification, by Mr. Weston, who shot it in the backwater of this place: it was a female, as I proved by dissection; the windpipe, as stated by Mr. Yarrell, was of the ordinary form, that is, without any enlargement at the base. The bird was very fat, and its gizzard was crammed with broken shells of the young of different species of *Littorina intermina*, with which I found three *Rissoa labiosa*, and nothing else: nothing but the shell remained, and this was broken into small pieces, and so completely had it been effected that, in many cases, the polished lining of the shell

had been scaled off the remainder. A male bird was shot here some few years since by the late Mr. Wardell: these are the only well-recorded instances that have come to my knowledge. The male bird is now in the possession of Douglas Legg, of Weymouth, who is a preserver of, and dealer in, objects of Natural History.—*William Thompson; Weymouth, February 14, 1857.*

Occurrence of the Bridled or Ringed Guillemot near Penzance.—Mr. Vingoe obtained a specimen of this bird a few days since, in what is termed summer plumage, *viz.* without any portion of white on the throat or neck. The similarity of this species with the common guillemot, both as to size and general character, makes it doubtful how far the particular local markings, which give rise to its name, support its title to specific difference; however, it must be remembered that, when Nature adheres to particular marks, colours and conformations in the same parts uniformly, the characters shown by this uniformity generally aid and confirm the impression as to the specific intention of Nature. This does not always hold good to the full extent, and I may instance the ring-necked variety of the common pheasant as having the ring always in the same part of the neck, but without the deviation having the slightest claim to being specific.—*Edward Hearle Rodd; Penzance, February 21, 1857.*

Note on the British Skuas, genus Lestris.—There appears to be some obscurity about the smaller species of the British skuas, both as to the number and also as to certain characters. I remember corresponding with the late Mr. Yarrell upon this subject some years since, on receiving a very small specimen of skua in adult plumage, having the neck-feathers straw-yellow (as is the case with Richardson's and the Pomarine) and with the central tail-feathers elongated beyond the others from six to eight inches. I was induced to pronounce my bird, from the above characters, to be the true Arctic jager. I have a specimen of the *L. Richardsonii* also in adult plumage at least one third longer than my smaller bird, and in the same state of plumage, but the tail-feathers, which in the other were produced six or eight inches, in this do not exceed the others more than two inches. Mr. Yarrell's opinion, however, as to the identity of my two birds was at that time very decided, and he rested his conclusion upon the middle tail-feathers of both my birds being graduated in breadth from the roots and tapering to the ends, which he said was never observable in the Arctic jager, the middle tail-feathers of which are of equal breadth all along, from the roots to their tips, a character which he has delineated in its figure in his 'British Birds.' It would appear very evident, from a comparison of my two birds, from their great disparity in size, and from the difference in the characters of their tail-feathers, that they are different species; and the question is whether there is a fifth species, answering the description of the characters of Mr. Yarrell, or rather whether my smaller bird is not a distinct species from *L. Richardsonii* and the Arctic jager.—*Id.; Penzance, March 11, 1857.*

Birds of the Crimea. By THOMAS BLAKISTON, Esq., Lieut. R.A.

(Continued from p. 5522).

Scansores.

On one of those clear, frozen mornings, at the close of the year, when the whole country was covered with snow, having found my way across the plain of Balaclava before sunrise, and having breakfasted at Kamara with a friend, the two of us started on our horses, with the intention of going to Phoros Pass, where the Woronzoff Road descends to the far-famed South Coast. We found the road, on account of ice, such bad going, besides my mare having thrown a shoe, that on reaching the dividing ridge between the valleys of Varnutka and Baidar, we determined on striking off through the woods for the district of Laspi. I think I shall not easily forget the view, as we then saw it: it was the Valley of Baidar, of which so much has been said, with a perfectly horizontal mist hanging over the distant part, cutting the mountains in the background, and with Petrouski's villa appearing above the trees in the foreground. By steering about south we came to the cliffs near the sea, and having fed our horses and rested for awhile we turned our heads for camp. During our ride over the wooded hills we observed a great number of missel thrushes, and, as we were going up a steep path, we caught sight of a woodpecker, on which I dismounted, and crept within ten yards of him, when I could distinctly see the bright red vent and under tail-coverts, and the back black, with white on either side of it: this, I had no doubt, was the great spotted woodpecker (*Picus major*), and afterwards Dr. Carte informed me that he obtained a specimen in March, and I saw several skins which were collected in the Crimea. We passed a little inland of Cape Aia, and, as we descended into the Valley of Varnutka, a thick fog came on, and so we had to steer across the valley by instinct, which we luckily did in a good line, and hit off the road over the hills back to Kamara. The next morning, soon after daylight, I had cleared the Sardinian camp, and was making my way across the plain for Kadakoi.

The wryneck (*Yunx torquilla*), another bird which may be here referred to, I first procured in the third week of April, and again in the beginning of the next month, up to which time I never observed two in company. Should curiosity or accident cause any one to pull this bird's tongue out of its mouth to the full extent, it may astonish him,

as it did me, and on measurement I found that it extended $2\frac{3}{4}$ inches beyond the point of the bill. I have seen a young American brown bear suck molasses from the bottom of an ordinary quart wine bottle, which I thought rather wonderful: there is but little difference in the use to which the tongue of each is applied.

We now come to the little wren (*Troglodytes europæus*), so universally known in Britain; he braves the cold and snows of the Chersonese during the winter, and I observed him till near the middle of March, after which I did not notice him, but perhaps he was not absent, but probably the leaves kept him from my view.

There was also a bird, who is oftener heard than seen, and who announces summer by a note, which, in the temperate zone, where we are used only to hear croaking, chirping or whistling sounds from birds, appears singular; this bird, the common cuckoo (*Cuculus canorus*), was heard on the south coast the first week in May, and I saw a couple which a Frenchman turned out of his haversack the fourth week of September. I had not a chance of examining one minutely while in the country, but I saw a specimen which was procured in the Crimea after my arrival in England.

Tenuirostres.

I can only here enumerate one species of this tribe, the same which is the sole representative in England, the hoopoe (*Upupa epops*), of which a specimen was shot two or three days before the end of March, after which time these birds were not uncommon till near the end of August. Many specimens were brought to England by those who picked up a few birds for the cabinet.

Fissirostres.

One who has simply examined a skin or dead specimen of the roller (*Coracias garrula*) in the hand, would not form so high an opinion of his colours as another who had seen the bird on the wing; it is at that time that he is seen to advantage, the wings are expanded, exhibiting the deep blue, and altogether the colours, which appear perhaps coarse on close inspection, blend beautifully together at a distance. The person who has seen him on the wing would be apt to class him differently from the other, and possibly place him following the jays, and I am not sure that he would be badly placed, for he has a good deal of the character and appearance of the jay about him. My first meeting with this bird was early one morning in August, when I had a great hunt for a couple near our camp, which, at that

time, was on the bare hills, no great distance from the sea: my gun unluckily having missed fire with both barrels, I was disappointed in obtaining a specimen at that time, as I had no idea what they were. Early in the next month, however, I shot a specimen, which was not in very good plumage, but was very fat, and I preserved it. An officer, who made a trip along the south coast, told me that he saw a good many, which must have been during the last few days of April, and I observed them in May, and by the end of the month they were numerous on the plains and river valleys between Sebastopol and the Alma.

If, as is said by former travellers, the South Coast of the Crimea is as mild as Southern Italy, may not many of the birds which leave the steppes and mountainous part of the country on the approach of winter, spend that season there, in a warmer climate than if they crossed the Black Sea to Asia Minor? A visit to that interesting district during winter would well repay the naturalist, who, I have no doubt, would clear up many points of which we are at present uncertain, and might throw some light on local migration.

Although the bee-eater is not included among the swallows, yet in habits and motions it approaches very near to some of the tribe: it may be said to be one of those connecting links in the great "chain of Nature" which a human being has not the chance to see in its perfect completeness, but can only imagine it from seeing the less links deficient the more species that are discovered. I had the long-wished-for satisfaction of riding to the Alma and back, a distance of about fifty miles, on a hot day at the end of May, and it chanced to be my last opportunity of observing several species of birds, as, not long after, I left the country; among them was the bee-eater (*Merops apiaster*), and I only wish that it was in my power to describe the graceful motions and beautiful appearance of the bird; I thought at the time that it was the nearest to perfection, in flight and plumage combined, that I had ever seen. There were numbers about the rivers Belbec, Katcha and Alma, which we crossed on the way, and at the second I observed some going in and out of holes in the high river bank, evidently their nests: they perched both on the ground and on trees. I remained watching their beautiful motions for some time; they would at times hang on the wing without an apparent motion: there were numbers about the same place, and I did not observe any pairs separate from the others. I first heard of this bird being seen in the spring, about the 4th of May, when there were numbers in the Valley of the Belbec.

The kingfisher (*Alcedo ispida*) I never observed, but Dr. William Carte procured a specimen in May, and I saw another which had also been obtained in the Crimea. These specimens do not differ materially from others killed in England.

We now pass on to a favourite tribe, the swallows, and to commence, I will take the first to arrive in the spring, after the dark season, when vegetable life may be said to be asleep. This bird, the white-bellied swift (*Cypselus alpinus*), which has in such few instances been observed in the British islands, is by no means uncommon in the Crimea, where, last year (1856), it was observed on the 2nd of April, though I did not notice it till the 6th in the Inkermann Valley, where I also saw the swallow (*Hirundo rustica*) on the 8th, which I noted "common" on the 12th, when I also observed a migration southward of the former. I fancied that I observed a pair of martins (*Hirundo urbica*), on the 4th of April, and am certain of having seen a congregation of them flying about the camp rather low on the evening of the 18th. From observation, I can say that all three species remained in numbers till the end of May. I also observed the martin and white-bellied swift in July of the year previous, and think that the latter took their departure about the end of August: they were building on the Inkermann cliffs on the 2nd of May.

The first supposed sand martin (*Hirundo riparia*) I saw on the 24th of April, among a great number of Hirundines, about a swamp at the lower part of the Tchernaya. I also observed the swift (*Cypselus apus*) at the same time, and while fishing higher up the same river, among the rocky hills, I heard a good many uttering their wild shrieks. The sand martin I have placed among the doubtful, because I only on one other occasion saw what I took for it on the wing, and never killed a specimen for comparison.

Now I have only to finish up with the latter part of the swallows' visit: they were numerous during summer, and by the middle of September had given no signs of migration, but I think that soon after the mass of them took their departure. I observed some on the 27th, but, though on the look out, none on the two following days, and I concluded that I had seen the last of them for the year: however, on the 2nd of October I saw a large assemblage hawking about in the vicinity of our camp, which I supposed were some which had bred northward.

Circumstances prevented my making any observations for a month after this. Specimens of *Hirundo rustica*, *H. urbica* and *Cypselus alpinus* were brought home by Dr. William Carte.

Birds of the evening or night, when disturbed during the blaze of day, are no doubt as much out of place as the sloth on the ground, which that field naturalist, Mr. Waterton, has so admirably shown in the 'Wanderings;' among such are the Caprimulgidæ, which may well be called "insect owls." Most readers know of the nightjar's habit of sitting lengthwise on a limb of a tree or rail, and many, I have no doubt, have observed this peculiarity; but, as no two people see with the same eyes, the mean of descriptions given by many will approach nearest a true general view, therefore I have, in these notes, noticed some facts that may appear trifling, but which I hope may be of more use than had I only drawn up a stiff catalogue. I have little to say of the nightjar (*Caprimulgus europæus*), the last of the Insectores, beyond that I shot specimens as early as the 10th of May and as late as the 27th of September, one of which came to this country. There were no peculiarities about the few specimens examined by me, either in size or colour; but I counted the number of stiff hairs or bristles, which was seven on each side of the upper mandible of a female killed in May, which, in all other points, agreed accurately with Yarrell's description. I found a fly, resembling a small horse fly, on this bird, which, I should say, was one of its parasites.

Rasores.—Columbidæ.

I have little to say of the birds of the dove kind: the turtle dove (*Columba turtur*) was numerous during summer and spring. There was another species, which I took for the rock dove (*Columba livia*), which was common, and, I think, bred in the high cliffs of the Chersonese; there were also numbers about the same situations during winter. This bird, although I obtained a specimen in Bulgaria, which I preserved, I placed among the doubtful birds of the Crimea; since doing so, however, I have seen in the 'Zoologist' (Zool. 5353), a "List of Birds observed in the Crimea," by Lieut. Irby, in which is included this bird and also *Columba palumbus*, but, as it appears that specimens of neither were brought to this country, I do not feel justified in advancing them to the true list. Those, of course, who commenced to read these notes must also have observed the note to the pheasant in the list above mentioned, which states that it is probably found in the Crimea; however, I have made all inquiries, and cannot find of its having been observed in a single instance, and therefore I cannot even include it among the doubtful; and I think that it could not have been Lieut. Irby's intention that the list should be taken as positive information, because, having corresponded with

him on the subject, he has kindly given me information concerning those which neither Dr. William Carte nor myself had observed, which, in many cases, was only what he had been told by others who had killed or only seen the birds; there were also a number of others which he observed, but of which he did not obtain specimens, and therefore I say that, although Lieut. Irby's list contains much valuable information, still all the birds included in it cannot be taken as certain, so that, in drawing up my notes, I can notice those only which appear well authenticated.

Tetraonidæ.

Now, although I have on many occasions, while in the Crimea, observed what I considered was the partridge (*Perdix cinerea*), and moreover have been told by many that they had shot this bird, yet I would not stake my life upon the fact of its being an inhabitant of the Crimea, for fear that the bird which I had observed, and of which numbers were shot by casual observers at Kertch, might be only a closely allied species, and therefore I could not include it in the true list without having closely examined and compared specimens.

I was told by a friend of mine that, in April, he saw a Frenchman with some redlegged partridges, which he said that he had shot near the Mackenzie Heights. Of course I am in doubt as to which of several species this was, but Lieut. Irby says that he is certain of *Perdix rubra*.

I heard that several officers had observed what were said to be sand grouse on the plains to the north of Sebastopol, and in "Russia, on the shores of the Black Sea and Sea of Azof," Seymour says that "the 'Streppet,' of larger size and lighter hue than the grouse, the only English bird to which it can be compared," is to be met with on the "steppes of the Crimea in numbers." What can this be?

The quail (*Perdix coturnix*) is but a passing visitor to the southern extremity of the Crimea, although some may remain to breed on the plains in the interior. In August the flights of cranes drew my attention to migration, and happening to think of the quail I was ever on the look-out for their arrival from the north, and the first I observed was on the 13th of September, when one flew past me, but at the time I was not aware what it was; however, my doubts were cleared up the next morning, by my putting up a couple within a few yards of my tent; I therefore started off with my gun, and soon procured two couple: all I found rose singly from almost under my feet, some on

the open, stony ground, and others from bushes. I never chanced to get any very good shooting at the quail, owing to not having a dog, and the difficulty of procuring shot. An officer who had a dog, I believe bagged twenty-two couple, in about four hours, near Balaclava. The old vineyards were favourite resorts of these birds. They continued numerous until the end of September. The first which I heard of in the spring was on the 25th of April; I shot one, which I preserved, in the beginning of May, and I observed them in pairs at the end of the month, on the plains to the north of Sebastopol; they were not observed in numbers as in autumn.

I now come to the bustards, birds which British naturalists so seldom see in the wild state. I expect that both the great bustard (*Otis tarda*) and the little bustard (*Otis tetrix*), breed on the steppes of the Crimea, for I heard of the former being seen as late as the beginning of May, and I myself saw the latter at the end of that month; in the one day, however, I only saw one pair, all the others being single birds. All who were in the camp near Sebastopol during the cold weather, towards the end of the year 1855, will remember the enormous flight of bustards which passed over: they usually flew high up in the air, and, seen from the ground, they appeared quite white. Many were killed by Minie bullets fired up at them, and others when they alighted on the hills about Balaclava; they were observed first on the 19th of December, and continued flying over in great numbers for three days. The country being covered with snow, together with the presence of the army, will account for so few alighting in the Chersonese, which Seymour describes as a great resort for them during winter, when the plains to the north are covered with snow, and that they used to be a cheap and favourite article of food in Sebastopol. On arriving at Balaclava, after a bad passage from the Bosphorus, on the 21st of December, I observed these birds, which appeared to be all, or nearly all, flying over high in great numbers from the north, but there had been many more the day previous. Whether they crossed the Euxine to Asia Minor I cannot say, but the greater part steered away towards the south coast beyond Cape Aia. I saw a couple that day, which weighed about $16\frac{1}{2}$ lbs. each, and I heard of one which came into the possession of the renowned Mrs. Seacole, which was said to weigh 22 lbs., and another I was told of only came up to $13\frac{1}{4}$ lbs.: they were thought by many at first to be turkeys. A break up in the weather occurred shortly after this; and afterwards a few were occasionally observed of the large species. The little bustard was not nearly so plentiful; they were occasionally shot during winter and spring until

near the end of April, and I examined some specimens minutely. Some of each kind came to England.

THOMAS BLAKISTON.

Camp, Woolwich, February 21, 1857.

Erratum.—For “great sedge warbler (*Sylvia turdoides*)” (Zool. 5504), read “thrush warbler (*Sylvia Philomela*).”

Birds of Andalusia. By CAPTAIN CHARLES W. WATKINS.

Redstart (*Sylvia phœnicurus*). Arrived in the spring and remained to breed.

Black Redstart (*Sylvia tithys*). I observed this bird on two or three occasions just outside the Spanish lines, during the winter months, but it entirely disappeared about April.

Stonechat (*Sylvia rubicola*). Very numerous, and remains during the whole year, breeding very early in the spring. I have seen the young birds able to fly well early in May.

Blackcap (*Sylvia atricapilla*). I occasionally observed this beautiful warbler, but it was, I consider, rare. I do not think it winters in the province: I first observed it in March.

Nightingale (*Sylvia luscinia*). I have observed before; particularly numerous, arriving in spring.

Chiffchaff (*Sylvia rufa*). Heard for the first time on the 28th of February, early in the morning, when coming off guard. I concluded it had just arrived, but it appears I was wrong, as Don Aulorico Macleado says it is very common, and remains in the province during the whole year.

Wheatear (*Sylvia œnanthe*). Arrives in March in considerable numbers, and remains to breed.

Black Wheatear (*Saxicola leucura*). Arrived about the same time as the former, and remained to breed: I never observed it in any numbers, although it was by no means rare, frequenting rocky mountain-sides, and being difficult of approach: when disturbed it took long flights.

White Wagtail (*Motacilla alba*). This species was very plentiful during the winter, particularly on the sands at low water, on the road to St. Roque. I never observed it after the hot weather commenced, and feel satisfied myself that it migrated during the summer months, although the same authority quoted before says it is a constant resident in the province, but adds that it returns to the mountains and other cool places during the heat of summer; but as the heat and drought on the mountains in summer is extreme, every stream being dried up, I should think the bird must seek more suitable quarters

than an arid mountain. I do not of course mean to state positively that the bird migrates, but simply that such is my impression.

Gray Wagtail (*Motacilla boarula*). Arrived and took its departure with *M. alba*.

Of the Paridæ I observed three, the blue titmouse (*Parus cæruleus*), great titmouse (*Parus major*) and the cole titmouse (*Parus ater*); the latter by no means numerous, the two former abundant.

Meadow Pipit (*Anthus pratensis*). Occasionally met with.

Skylark (*Alauda arvensis*). Very common, congregating in large flocks during winter, as in this country.

Crested Lark (*Alauda cristata*). Was also numerous.

Calandra Lark (*Alauda calandra*). Arrived in spring, and remained to breed; it was very numerous.

Common Bunting (*Emberiza miliaria*). Very abundant, more so, however, towards spring, from which I conclude that it is partially migratory.

Chaffinch (*Fringilla cœlebs*). Common, and very numerous everywhere.

House Sparrow (*Fringilla domestica*). Common, and as fond of and confiding in man as its family is in this country.

Greenfinch (*Fringilla chloris*). Very plentiful in the spring; occasionally seen during the winter. I fancy that many of the birds of this province, although not wholly migratory, cross the Straits of Gibraltar in winter (which would not take more than a quarter of an hour at most), and thus enable themselves to enjoy whatever climate they like: by travelling a few hundred miles they can enjoy the snows of Algeria or the burning suns of the interior. Immense numbers of these birds are taken annually with bird-lime, with the goldfinch (*Fringilla carduelis*) and siskin (*Fringilla spinus*), and exposed for sale in the shops of Gibraltar, the Spaniards being extremely fond of pets, almost every house having one or other of these birds hanging in a cage outside the window.

Linnet (*Fringilla cannabina*). Plentiful during the spring, when it is gregarious.

Wryneck (*Yunx torquilla*). I saw this bird, for the first time, exposed for sale in the Gibraltar market, together with numbers of greenfinches and other small birds. Almost every kind of bird seems to be considered good eating in Spain, and perpetually in season, if one may judge from appearances. I saw, at the latter end of May, quails, turtle doves and partridges (although they must then have been in the midst of their domestic duties) exposed for sale in the market of Cadiz, in considerable numbers.

Cuckoo (*Cuculus canorus*). Arrived in early spring, and plentiful.

Great Spotted Cuckoo (*Cuculus glandarius*). Plentiful, but not migratory, I believe.

Swallow (*Hirundo rustica*). A few of these birds winter on the Rock of Gibraltar and its immediate vicinity (I have seen them continually on the wing throughout the winter). The main flight arrives early in March, and immediately commence nesting, building in great numbers inside the numerous "ventas," and being much pelted by the inmates. Early in April I saw nests with young in them.

Martin (*Hirundo riparia*). Also winters in small numbers on the Rock. The spring flight arrives about the same time as the swallow, and breed in great numbers on the Mediterranean side of the Rock.

Swift (*Cypselus apus*). This bird arrives much later than the two former, but in immense numbers; they remain about the Rock the whole summer, leaving about November. It is most amusing to watch these birds; immense flocks of them chasing each other round the house-tops, and screaming to such an extent as at times to drown all other sounds.

Whitebellied Swift (*Cypselus alpinus*). Arrives about the same time as the former, but is rare. I only saw a few pair, and always about the higher parts of the Rock. What appeared to me strange was that from their first arrival I always saw them in pairs.

Of the Columbidae I observed three varieties, the rock dove (*Columba livia*), which was very numerous, breeding in the caves on the eastern side of the Rock; the ring dove (*Columba palumbus*), which was very plentiful in the cork-wood in spring (although only occasionally seen in winter), and breeds there; and the beautiful little turtle dove (*Columba turtur*), which arrived early in April, and remained during the summer for breeding: great numbers of them are shot on their arrival, and sold in the markets, they being much esteemed for the table.

Redlegged Partridge (*Perdix rubra*). Plentiful. I am inclined to believe that this is the only species of red-leg found in this part of Spain. I diligently searched the markets for the Barbary partridge, but without success, although great numbers of the common red-leg were always to be found for sale, and if any other species had been in the province I think they would occasionally have graced the dealer's stall.

Quail (*Perdix coturnix*). Very numerous in September, when the "Intrada" (as termed by the Spaniards) arrives: a few remain during winter, but the majority, by the end of October, are either killed or have passed on their journey. A few breed in the country.

Andalusian Quail (*Hemipodius tachydromus*). Frequently met with, but by no means numerous, seldom finding more than two or

three together: I only shot six or seven during the whole season. They may possibly be more numerous than they appear to be, from the difficulty of finding them, as they delight in rocky mountain-sides, among palmetto bushes.

Sand Grouse (*Pterocles arenarius*). Common, as I learned from Fevier, of Tangier, in the South of Spain; also very numerous in North Africa, from which locality I possess a specimen.

The Great Bustard (*Otis tarda*) and Little Bustard (*Otis tetrax*) are still numerous (or said to be so) in many parts of the province. I never had the good fortune to meet with one.

Stone Curlew (*Ædicnemus crepitans*). Occasionally met with.

Golden Plover (*Charadrius pluvialis*). Seen in small flocks during the winter, but only occasionally.

Ringed Plover (*Charadrius hiaticula*) and Little Ringed Plover (*Charadrius minor*). Were both numerous, and breed in the salt marshes. I saw some young of the former as early as May; they were unable to fly, but ran on the sand with amazing rapidity: I caught one, and the old bird, which at first did all in her power to mislead me by feigning lameness, &c., on my capturing her offspring, flew round me so closely as almost to touch me: after I had satisfied my curiosity in examining the downy little creature I released it, much to the joy of the parent. I may add that I only saw one old bird with the young ones, two or three in number.

Lapwing (*Vanellus cristatus*). Common during the winter.

Heron (*Ardea cinerea*). Common in the marshes round the Carthian Hills, during the winter; as also was the bittern (*Ardea stellaris*).

The Squacco Heron (*Ardea ralloides*) and Night Heron (*Nycticorax ardeola*) are both to be met with in the country. I obtained fine specimens of each, killed on the African side of the Straits.

Curlew (*Numenius arquata*). Common during the winter, as also the redshank (*Totanus calidris*).

Woodcock (*Scolopax rusticola*), Common Snipe (*Scolopax gallinago*), and Jack Snipe (*Scolopax gallinula*), were all met with, at times plentifully, during the winter.

Spotted Crake (*Gallinula porzana*). This elegant bird was very numerous in the marshes in winter.

Water Rail (*Rallus aquaticus*). Frequently met with, but not so numerous as the former.

Red Flamingo (*Phœnicopterus roseus*). Flocks of from ten to twenty of this magnificent (and in Barbary still sacred) bird cross the Straits in spring. I obtained two very fine specimens, beautifully shaded with red on the neck and breast, being, I conclude, old males

in full plumage. In Barbary it is quite as much as a man's life is worth to shoot either a flamingo or stork.

CHARLES W. WATKINS.

Buddy House, near Daventry,
March 26, 1857.

Occurrence of the Butterfly Blenny (*Blennius ocellaris*) *in Weymouth Bay*.—This pretty fish was formerly, and until the severe winter some three or four years since, tolerably plentiful in this bay; since then it has totally disappeared: I have the last week, however, obtained two specimens. I hope we shall have them again plentiful.—*William Thompson; Weymouth, February 22, 1857.*

The Blackbellied Flounder.—Yesterday I obtained two specimens of the *Platessa melanogaster?* considerably larger than any I have previously seen. The same characters, described by me in the 'Zoologist' (Zool. 4596), are again present. I have examined the notch carefully with a powerful lens, and cannot detect the smallest sign of a cicatrix, which assuredly would exist if the notch had been artificially formed.—*Edmund Thomas Higgins; 1, Brook Terrace, Birkenhead, March 11, 1857.*

Occurrence of the Little Gurnard on the Coast of Lancashire.—On the 7th of August, 1856, while staying on the shores of Morcombe Bay, I obtained a small fish which corresponded in many points with the description given by Mr. Yarrell of the little gurnard; it was not much more than an inch in length, and was captured by some shrimpers whom I noticed working with hand-nets in shallow water, as the tide was coming in. I kept it alive for several hours in a vase of sea-water, and before death the colours were very brilliant, but after being immersed in spirits of wine they rapidly faded. I neglected to note down the tints at the time, and did not happen to have Yarrell's work with me, but on looking over his description, after my return home, the colours appeared to correspond with it: I could not find, however, the white spots mentioned by him on the inner surface of the pectoral fins. The form and arming of the head resemble those of the figure given in his work. As I have but little knowledge of Ichthyology, I forward the specimen with this notice, and shall be obliged if the learned editor of the 'Zoologist' will give his opinion regarding the species to which it belongs: should my surmise turn out to be correct, and it prove to be the *Trigla pœcilopectera* of Cuvier and Valenciennes, its capture will be worth recording, as at the date of the publication of Mr. Yarrell's second edition of the 'British Fishes' it had only once been noticed on the shores of the British islands, *viz.* at Youghal, in Ireland, in the year 1815, and I am not aware that there is any record of its appearance since.—*R. H. Meade; Bradford.*

[As Mr. Meade wishes for my opinion on this little fish I am quite willing to give it, but I cannot think it of much value, seeing that no British specimen of the same species is accessible for comparison: the colour described by Yarrell has entirely vanished,—there remains not a trace; the armature of the head is figured but not described by Yarrell, and the specimen placed in my hands agrees sufficiently well with the figure to induce a belief in the identity of the species. It should be observed, however, that the figure is not made from the only British specimen ever recorded, but is copied from a drawing sent to Mr. Yarrell by M. Valenciennes.—*Edward Newman.*]

The Carp at Charlottenburg.—In the large fish-pond of the Royal Park of Charlottenburg, near Berlin, are some immense carp (*Cyprinus carpio*), which are celebrated throughout Germany. These fishes are great favourites with the Berliners, who flock to this and similar places on Sundays and holidays, generally taking a supply of bread and biscuit for the purpose of deriving amusement from watching the huge creatures rolling over one another in their endeavours to catch the food. The fishes usually collect in certain spots which are easily accessible to the people, who throw to them pieces of bread half the size of the fist: these morsels are too large to be readily gorged, and the sight of the wide mouths vainly endeavouring to seize the food, together with the frequent appearance of a “back like a saw,” affords high amusement to the spectators. The keepers assert these fishes to be of a great age, none less than fifty or sixty years, while they will not hesitate to assure you that some patriarchs of the pond have completed their second century, in confirmation of which they point to their backs, which often present an appearance not unlike the growth of *Achyla prolifera*, that *Conferva* so inimical to piscine longevity. This is commonly believed by the populace to be moss, and the presence and abundance of it to be indicative of age; so that it is not uncommon when an extra large fish, with an unusual amount of this wavy confervoid-looking substance on his back, appears, to hear the wondering exclamation, “Look now, at the moss on his back! What an old fish he must be!” followed by speculations as to the number of half-centuries the venerable monster may have attained. In more than one place a bell is hung, which, if it ever were used to call the fish to dinner, is certainly superfluous now, for no restriction is placed upon the ringing of it, and it may be heard at all hours, particularly on holidays, when dinner-time is all day long, and the bell accordingly rings from morning till night.—*Cuthbert Collingwood; Blackheath Park.*

Notes on the Oxfordshire Shells. By the Rev. ALFRED MERLE
NORMAN, B.A.

(Continued from page 4129.)

SINCE the publication of my “Notes on the Oxfordshire Shells” in the ‘Zoologist’ for 1853 (Zool. 3764, 4126), I have only spent about three weeks in the county, and therefore have had little opportunity of adding to my list personally. Mr. J. F. Whiteaves, however, has during the last three years given much time and trouble to thoroughly examining the neighbourhood of Oxford, with regard to its Conchology; he has consequently met with much success, and added many interesting species to the local Fauna. While at Oxford, during the autumn of 1855, I had the pleasure of visiting, with Mr. Whiteaves, two of the spots he had found most productive, namely, Stow Wood and Woodeaton: on those occasions I took alive many mollusks I had not before met with in the county, but they are Mr. Whiteaves’ discoveries, not my own.

Mr. Whiteaves has lately read before the Ashmolean Society an interesting paper, embodying all that has been done by himself and others: this paper ("On the Land and Freshwater Mollusca inhabiting the Neighbourhood of Oxford") has just been published in the Society's 'Transactions,' and, with Mr. Whiteaves' leave and wish, I shall make a few extracts from it.

Mr. Stretch has sent to the 'Zoologist' (Zool. 4540) a catalogue of the shells which have been met with in and around Banbury.

In the 'Naturalist' for 1855 (vol. v. 200) there is also to be found a list of shells found near Oxford by "J. D." [J. Dalton]. Mr. Dalton collected in company with Mr. Whiteaves, and all that is contained in "J. D.'s" notes is repeated in the fuller catalogue of Mr. Whiteaves.

The Rev. A. Matthews has recently given a few shells to me, which were collected by himself some years since at Weston-on-the-Green; and in this fresh part of Oxfordshire shells thus turn up which have either not occurred at all or are rare in those portions of the county previously examined.

Since I am about to mention what others, rather than myself, have done, I shall refer to the Mollusca previously alluded to (Zool. 4128) as having been found at Henley-on-Thames by Mr. Hugh E. Strickland (Loudon's 'Mag. of Nat. Hist.' vol. viii. 494).

For the sake of uniformity I continue to use the nomenclature of Gray's 'Turton's Manual.'

Valvata cristata. I have met with this species in the brook that runs at the foot of Woodeaton Hill, as I have already casually mentioned in another paper. "Occasionally met with in peaty ditches with *Valvata piscinalis*; it has a much wider distribution, but is scarcer. As localities I may cite Yarnton, near Summertown, and near Watereaton," *Whiteaves*. It also is to be found in Mr. Stretch's list.

Limax carinatus. Among the Limaces which were given me by Mr. Matthews there were two or three undoubted shells of this slug.

Helix fusca. "Fawley Woods; very rare," *Strickland*.

„ *aculeata*. "Moss and fir leaves, Fawley Woods," *Strickland*. When at Oxford I took two or three specimens at the outskirts of Stow Wood, among moss, it having been previously taken there by Mr. Whiteaves. Another locality is Weston-on-the-Green, where Mr. Matthews informs me it was not uncommon. A fourth is Banbury, *Stretch*.

Zonites umbilicatus. Abundant at Woodeaton and on many old

walls round Oxford. Specimens occur among the Weston-on-the-Green shells. Banbury, *Stretch*.

Zonites pygmaeus. There is an old ivy-covered wall surrounding the grounds of a house at Woodeaton, of which, however, I neither know the name nor the owner; among the decaying leaves in the interstices between the stones of this wall *Z. pygmaeus* may sparingly be found, together with many other good shells. Mr. Strickland records it as found at Henley among "roots of grass and wet leaves." Banbury, *Stretch*.

Pupa umbilicata. Woodeaton. "Common on old walls, perhaps most abundant where *Sedum acre* grows. In profusion on an old wall at Ferry Hincksey," *Whiteaves*. Banbury, *Stretch*.

Vertigo edentula. This has been taken by Mr. Whiteaves and myself at the outskirts of Stow Wood. From the proportionate number of specimens of this species which occur among the Weston-on-the-Green shells, it would seem to be not uncommon in that neighbourhood. "Under stones, Henley Park," *Strickland*.

„ *palustris*. I am glad to be able to add this species to the Oxfordshire list, having found it among the shells collected at Weston-on-the-Green by Mr. Matthews.

„ *pusilla*. Abundant among the decaying leaves on the old ivy-covered wall at Woodeaton. Banbury, *Stretch*.

Balæa perversa. "Thames rejectamenta," *Strickland*. "Found under the bark of old pollard willows, generally huddled together in a mass. It is also sometimes taken on old walls," *Whiteaves*. "Sibford and Astrup," *Stretch*.

Clausilia dubia. "I have met with two or three specimens of this shell on the road between Elsfield and Stow Wood," *Whiteaves*.

Azeca tridens. "Roots of dog's mercury, Pinning Bottom in Fawley Wood," *Strickland*. "I have taken one dead specimen of this shell at Headington Quarry," *Whiteaves*.

Acme fusca. "I have taken one living example of this rare shell in a mossy bank near Stow Wood, but have repeatedly failed to meet with more specimens," *Whiteaves*. "In moss, at Pinning Hill, Fawley Woods; very rare," *Strickland*.

Limnæus glaber. "Very rare; I took two specimens from a trench near Kennington, in which there were no plants growing, but which was full of the decaying leaves of the elm. This trench has since been cleaned out, and the species is apparently lost," *Whiteaves*.

Amphipeplea glutinosa. "Mr. Miller * * abundant near Oxford * * ditches:" among my manuscript notes I find these words, copied

from some author, but I cannot recollect to mind from whom they came. Mr. Whiteaves also says of this beautiful shell, "Very rare. I have taken one fine specimen from a clear brook communicating with the river, on the right hand side of the path between the Railway Lake and South Hincksey. Mr. Baxter has informed me that the late Mr. Miller, of Bristol, found it at Godstow. I have repeatedly searched for it there, but have always failed to find it."

Planorbis imbricatus. Many specimens among the Weston-on-the-Green shells. Mr. Strickland met with this species in a pond near Henley.

„ *lævis*. Mr. Stretch's list. I wrote to Mr. Stretch to inquire about this and two or three other species: he tells me that "the specimens were collected some years ago by a friend in the town; he believes them to be what they are called, but has not met with them himself," *Stretch in litt.*

Cyclas lacustris (*C. caliculata*, *Drap.*). Weston-on-the-Green; among Mr. Matthews' shells. "Ponds at Fawley," *Strickland*. Hanwell, *Stretch*. "Very local; found abundantly in a railway lake at Wolvercot, chiefly at one end, which is choked up with a profuse growth of *Ceratophyllum demersum*. It also occurs in peaty pools near Headington Wick Copse, in which the prevailing plant is *Chara hispida*," *Whiteaves*.

Pisidium obtusale. "A stream at Botley," *Whiteaves*.

„ *pulchellum*. Specimens from Weston-on-the-Green; and I also took a few in the Woodeaton Brook. "Not uncommon in gravelly ditches. A good locality for it is a ditch near Cowley, in which *Samolus Valerandi* grows," *Whiteaves*.

„ *nitidum*. "Very rare. I have taken two specimens from a ditch near Summertown, communicating with the Cherwell, in which *Ranunculus lingua* and *Utricularia vulgaris* grow," *Whiteaves*. Mr. Stretch informs me that this *Pisidium* was inserted in his list of Banbury shells by mistake, as was also *Pisidium cinereum*, *vide* "Correction of an Error" (*Zool.* 4635).

A few words must be said respecting *Unio pictorum*, which is contained in the catalogues of Mr. Strickland and Mr. Stretch. Mr. Whiteaves says, in reference to *Unio tumidus*, "Both Mr. Strickland and Mr. Stretch have mistaken this for *Unio pictorum*." I do not know the grounds on which Mr. Whiteaves bases this positive assertion: the following reasons have, however, always led me to think that such a mistake may have been made:—1st. Neither of these two lists contain *Unio tumidus*, which is certainly common in

the rivers Isis, Thames and Cherwell, in suitable localities, apparently throughout their whole length; in the place of *Unio tumidus* we find *Unio pictorum* inserted, which I have never seen in Oxfordshire. 2ndly. Specimens of *Unio tumidus* were, until quite recently, in the Ashmolean Museum labelled *pictorum*. 3rdly. I have repeatedly known these two species mistaken the one for the other.

As *Pisidium* is a critical and extremely difficult genus, I think the following extract from a letter of Mr. Whiteaves of value; it was in answer to a request that he would kindly send me specimens of those species I had not myself taken in Oxfordshire:—"The *Pisidia* are in the possession of my friend Mr. Dalton, with whom I collected them, and were named by Mr. Jeffreys, to whom he sent them. *Obtusale* is, however, on Mr. Pickering's authority."

These additions to the Oxfordshire Mollusca make this the fullest local catalogue published.

ALFRED MERLE NORMAN.

Kibworth, Leicestershire.

Observations on the Mollusca to be found on the Coasts of Cornwall.

By WILLIAM F. TEMPLER, Esq.

Psammobia tellinella. Single valves. Port Curno Cove, near Penzance.

„ *costulata*. Single valves. Port Curno Cove.

Tellina pygmaea. Whitesand Bay and Port Curno Cove.

„ *incarnata*. Pentewan Bay, by dredge, *Fowler*.

Syndosmya alba. Mount's Bay, Penzance, by dredge.

Ervilia castanea. Single valves. Whitesand Bay and Port Curno Cove.

Macra helvacea. This fine shell may at times, after rough weather, be found on the Hayle Sands.

Cytherea Chione. Hayle Sands. They have much lustre and depth of colour.

Tapes aurea. Very frequent in Falmouth Harbour and at Helford river, where the shells are more produced in shape and more elegantly marbled than the ordinary run of specimens. At times on the Hayle Sands, *Millett*.

Lucinopsis undata. Hayle Sands, *Millett*.

Lucina borealis. Fine specimens, but without the mollusk, are at times abundant on the Hayle Sands.

Turtonia minuta. Not uncommon, among the small sea-weeds, between tide-marks at Mousehole, near Penzance, and the Land's End.

Pisidium obtusale. Ponds, Chyan Hall Moor, near Penzance.

„ *pusillum*. Near Penzance.

Crenella costulata. Long Rocks and St. Michael's Mount, Penzance, and Mousehole.

Nucula nucleus. Mount's Bay, Penzance, by dredge.

Pectunculus Glycimeris. At times on the Hayle Sands, *Millett*.

Chiton cinereus. Penzance.

Patella pellucida. Attached to *Chondrus mamillosus*, near low-water mark, Mousehole, near Penzance, and to stalks of *Laminaria digitata*, St. Michael's Mount.

Acmæa virginea. Near low-water mark, Battery Rocks and Long Rocks, Penzance.

Dentalium tarentinum. Sandy ground, three or four miles from shore, Mount's Bay.

Fissurella reticulata. Whitesand Bay, near the Land's End, and Port Curno Cove.

Trochus zizyphinus. Penzance and Mousehole.

Phasianella pullus. Fine and not uncommon, feeding on *Chondrus mamillosus*, obtainable at low-water spring tides at Mousehole.

Ianthina communis. Has been found at Whitesand Bay, near the Land's End, Hayle Sands, St. Ives Bay and Bude Haven.

Rissoa punctura. Tolerably plentiful among shell sand, Whitesand Bay, near the Land's End.

„ *striata*. Abundant in sea-weeds at Penzance and the Land's End.

„ *parva*. Most abundant in the small sea-weeds, Mousehole and other places at Penzance, also at the Land's End.

„ *semistriata*. In June, 1853, I found a few beneath stones, St. Clement's Isle, near Penzance, but they were not abundant.

„ *rubra*. Mousehole, near Penzance, and the Land's End in sea-weed.

„ *fulgida*. Sea-weeds, Mousehole, near Penzance.

Jeffreysia diaphana. Sea-weeds, Mousehole, near Penzance.

Skenea planorbis. Abundant in the small sea-weeds, Mousehole, near Penzance, and the Land's End.

„ *rota*. Mousehole, near Penzance.

Cerithium reticulatum. Penzance and the Land's End.

„ *adversum*. St. Clement's Isle, near Penzance; sea-weeds, Penzance and the Land's End.

- Aclis unica*. From a sponge, Hayle Sands.
- Odostomia plicata*. Beneath stones amongst *Serpula*, Penzance.
- „ *rissoides*. Beneath stones amongst *Serpula*, Penzance.
- „ *cylindrica*. Mousehole, near Penzance, amongst the smaller Algæ.
- Lachesis minima*. Sea-weeds, Penzance; not common.
- Nassa incrassata*. Rock pools, among Algæ, Penzance.
- Mangelia linearis*. Beneath stones, between tide-marks, Penzance.
- „ *costata*. Rock-pools, Penzance.
- Cylichna truncata*. Sea-weeds, Penzance, and much finer at the Land's End.
- „ *obtusa*. Sea-weeds, Penzance.
- Amphisphyræ hyalina*. Sea-weeds, Penzance.
- Philine scabra*. Mount's Bay, about a mile from shore, in mud-sand, by dredge.
- Aplysia hybrida*. Penzance, Mousehole and the Land's End.

PULMONIFEROUS MOLLUSCA.

- Helix arbustorum*. Penzance, *Millett*.
- „ *pisana*. St. Ives, feeding on the *Eryngium maritimum*, *Millett*.
- „ *revelata*. Land's End, *Millett*.
- Bulimus acutus*. On the sand-hills, Bude Haven.
- Balea fragilis*. On walls, St. Michael's Mount.
- Planorbis vortex*. Abundant, about Lennen, near the Land's End.
- Lymnæus glaber*. Very abundant in ponds about Lennen Church, near the Land's End.
- Conovulus denticulatus*. Near Penzance, *Millett*.

WILLIAM F. TEMPLER.

Charmouth, Dorset, April 5, 1857.

Notes on the Habits of the Nipper Crab (Polybius Henslowii).—The nipper crab is in captivity by far the most amusing of British Crustaceans; and as, when kept a little moistened, it will long survive its capture, it is in the power of an observer to study its habits with greater certainty than we can those of the larger portion of its fellows: with a little attention it is probable it might even be sent a long distance without injury; and, confined in a tank, it does not require such frequent renewals of water as other species. The following notes, which are written from frequent observation, are intended to form a supplement to the more extended remarks on the habits of this crab (*Zool.* 5531). The nipper crab is most frequently caught in the summer and

autumn; but I have a note of one which was taken entangled in the drift-nets employed in the mackerel fishery, in the first week of April. It keeps for the most part in the deeper water of the channel; and a remark of Mr. Johns, in his book 'A Week at the Lizard,' is not a contradiction to this, when we consider how far this most southern point of land in all England projects into the ocean: he mentions having seen this crab swimming there at the surface, and that he enticed it to his boat with a bait. All that I have seen, however, have been caught at a good distance from land, in the drift-nets employed for mackerel or pilchards, and in confirmation of the remark already made all have been males. I am informed, however, that a female has been caught, but not under the same circumstances with the males, in comparison with which most of its habits appear to be different. As the nets are hauled into the boats for the most part by night or very early in the morning, these crabs are taken on board with them, and they will often remain thus wrapped up in the wet twine with little harm for many hours. Transferred to a tank, it immediately shows signs of its agility, by darting round its prison with the activity of a fish, nor does it sink to the bottom until the discovery is made that this great exertion of energy is in vain. It is this power of active motion which has obtained it a local name in the West of Cornwall, where, as crabs in general are termed "cankers," this species is distinguished by the name of "flying canker." In confinement it is very vigilant, and, like the other swimming crabs (*Portuni*) shows a readiness to defend itself against threatened danger: its nipper claws are then held aloft, and it seized a hand that was pointed against it, holding it fast with great tenacity. When engaged in swimming the claw-legs are held extended in a straight direction, above the level of the carapace, and the intermediate legs are rowed like oars; but the hinder legs are lifted above the level of the back, and bent forward over it, their flattened extremities being engaged in very rapid motion. On close examination those hindmost legs are found to be capable of very free and extensive bending forward over the carapace; but the motion is in two portions chiefly or only: one of those is at the insertion of the coxa, by which the limb is permitted to be thrown up over the carapace towards its outer border, but it is checked in other directions: the other and more active motion is in the two outer joints, which are more especially the propelling oars; their action is in the plane of their compression, and they have a point of support in the two middle phalanges, which move but little, and which, from their more rounded form, contain a larger bulk of muscle. Thus the outer phalanx of this hinder and chief propelling leg is very broad, with a narrow hinge, and admits only of extension to a right line and bending inward: the next or penultimate joint is limited to rotation only, or at least with very little power of extension or bending; and then again the next inward is moved by extension or bending only, and very little by rotation. The coxæ of all the legs allow of free and extensive motion. It clearly prefers to feed on living prey: when a living fish was placed in the tank the crab gave chase, and soon seized it with both its claws, killed it, devoured the belly and lower part of the head, but, perhaps being satisfied, rejected the rest. It took a fly that chanced to alight on the water, but lived in peace with a Montagu's sucker for several days, although this fish was also its prey at last. It fed on a dead fish that was thrown to it and lay at the bottom of the tank; but the death of the individual was probably owing to some dead fish which it did not eat, and which lay for a little while in the water. It appears to remain at the surface only by the energy of its powers of swimming, for no organs of suspension beside the legs have been discovered, and its absolute weight is not less than that of a common

harbour crab (*Carcinus Manas*) of the same dimensions: when fatigued, therefore, it descended to the bottom; but I conclude it will readily use any floating substance to relieve its swimming powers and prevent the necessity of sinking, for when a stone was placed in the tank it mounted to where it nearly touched the surface, and when the shannies (*Pholes*) in the tank attempted to get on it, the crab repeatedly drove them away: it was, however, quite alive to the danger of its position, and when it perceived itself observed, presently left its lofty rock. For a considerable time the sea-water in which this crab was preserved maintained its sweetness without taint,—longer, it was supposed, than under ordinary circumstances; but the presence of a dead fish was fatal in a very few hours.—*Jonathan Couch; Polperro.*

Description of a new British Species of Shrimp.—This hitherto undescribed species of Crangon is clearly allied to the common shrimp (*C. vulgaris*, Fab.), differing in one or two well marked characters, as the following description shows:—

CRANGON ALLMANI.

Specific characters:—Carapace smooth, armed with three spines, one on the median gastric region and one on each branchial region; the sixth segment of the abdomen is deeply channelled above through a well-marked carina which borders it on each side; the seventh segment is also channelled. The anterior pair of legs are moderate in length, the arm smooth, and entirely free from spine or tooth; the second pair of legs are slender, and slightly longer than the third; the external footgerms are similar to those of *C. vulgaris*, but their superior articulation slightly more elongated; the rostrum is triangular and longer in proportion than in *C. vulgaris*. The sternal spine is very short in the males and altogether absent in the females; each segment of the abdomen is, however, armed with a short spine between the origin of abdominal false feet. The external antennæ, the antennal scales, the external natatory plates of the tail all resemble *C. vulgaris*; the middle plate is more acuminate than in that species, and armed with twelve teeth, *viz.* four lateral, two inferior terminal, and six terminal. The length of my specimens vary from 0·5 inch to 3 inches. Colour bluish gray, with golden, black and red dots scattered through it.

The most obvious characters which distinguish this from all described species are the sulcate, sixth and seventh segments of the abdomen, the smooth arm and the three-spined carapace: it is an interesting species, as containing the characters of two distinct types, *viz.* *C. sculptus* and *C. vulgaris*. It has occurred to me first in December, 1856, in fishermen's boats along with *C. sculptus*, *C. vulgaris*, *Hippolyte Cranchii*, *H. Thompsoni*, *H. varians*, and some of the lesser *Paguridæ*; on a subsequent occasion, in February, I dredged a female loaded with ova in twenty-five fathoms off the coast of Wicklow. It appears to be a plentiful species: six specimens occurred in the first instance. The species must be local, as it is too remarkable in its appearance to have been lightly passed over if observed elsewhere. In selecting a specific name for it, I have taken that of an Irish naturalist, to whose labours, in every branch of Zoology, Irish Natural History is indebted for many and valuable additions, George James Allman, M.D., Professor of Natural History, Edinburgh.—*John Robert Kinahan; Donnybrook, Dublin, March, 1857.*

Sketch of a short Arachnological Excursion.

By R. H. MEADE, F.R.C.S.

HAVING, during the summer of 1856, made a short arachnological excursion into Oxfordshire, I have drawn up a list of the spiders which I captured there, together with a few observations respecting their habits and haunts, in the hope that they may not be devoid of interest to some of the readers of the 'Zoologist.' The locality which I visited was a quiet rural district, situated midway between Buckingham and Bicester, just within the borders of Oxfordshire. The country around is thickly wooded, and the geological formation the great oolite.

I left home by the mail train on the evening of June 23rd. The previous few days had been dull and damp, but the glass was rising, so I hoped the weather was clearing up; and my prognostications proved true, for, though there was a slight drizzling rain in the morning when I arrived at my destination, it soon cleared off; and by the time I had breakfasted at my friend's house, and was ready to start on my rambles, the sun burst out, and there was every prospect of a glorious summer's day.

The house was seated in a pretty garden, and partly covered with creeping plants; and before going further I took a rapid glance among the leaves and stems of the creepers, and the shrubs in the garden, to see if they would yield anything of interest. The most abundant spider that I here noticed was *Tetrax lycosina* (*Tegenaria lycosina*, *Walck.*), a pretty species, which is tolerably common in most parts of Great Britain, and chiefly found in the crevices of rocks or loose stone walls. Its superior spinners are triarticulate and very long, with the spinning-tubes arranged on the under side of the terminal joint, and they are employed in the construction of its snare, which consists of a large sheet of web stretched over the stones or plants, and connected with a cylindrical tube extending to the spider's retreat. In a corner of the ceiling of the porch over the door, I found an adult female of *Philodromus dispar*, sitting near its cocoon, which it had constructed in that situation. I noticed on the shrubs in the garden several specimens of that pretty, green, round-bodied spider, *Epeira cucurbitina*, which so closely resembles in colour the leaves of the plants among which it resides that it is not easily seen; it is best detected by shaking the boughs violently, when it falls to the ground, always, however, spinning a thread by the way, up which

it soon clambers again if undisturbed. The web of this species (one of the geometers) is frequently placed in a horizontal position, but not always so, as has been stated, it being often extended vertically or obliquely.

After leaving the garden I found several spiders secreted beneath some loose pieces of bark on some old palings near the village church. One, occurring here in considerable abundance, was *Epeira umbratica*, a fine spider, having very much the aspect of a small, flattened toad; it is not uncommon in various parts of England, but is strictly nocturnal in its habits (preying chiefly upon moths), and therefore not often seen; it constructs a large, strong web, having wide intervals between the radii, which it frequently fixes between posts and rails, in a vertical position. I here found also an adult female of *Clubiona epimelas*, a species closely resembling *Clubiona amarantha*, but larger in size, darker in colour, and much less common. I now extended my walk towards some thick woods, at a short distance from the village, and soon came to a still piece of water, partly surrounded by wood, and covered with floating plants. In the bushes and trees bordering and overhanging the water I noticed numerous specimens of *Tetragnatha extensa*, a common spider in the neighbourhood of water, which constructs a delicate geometric web of moderate size, formed of large meshes, and having a circular aperture in the centre. This species is said mostly to wait for its prey stretched out in the centre of its web; but I often found it concealed beneath a leaf in the vicinity of its snare. I noticed one individual lying in its usual extended position (whence its specific name), upon the upper surface of the floating leaf of a pondweed (*Potamogeton natans*), a short distance from the bank.

A small brook issued from the pond, and meandered across a neighbouring field, passing through and forming a considerable piece of swampy ground. The surface of this marsh was literally swarming with different species of *Lycosa*, the females of which were running about with their egg-sacs or cocoons attached to their spinners. The most plentiful species was the common *Lycosa saccata*, which, though frequently met with in dry and elevated localities, also frequents watery places. I here discovered a new British species, *Lycosa piscatoria*, *Koch*, a pretty aquatic spider, bearing a considerable resemblance to *L. piratica*, but darker in colour, and rather differently marked. I also found the pretty little *Lycosa latitans*, *Blk.* (*L. palustris*, *Koch*), which I had never seen before, except in the valley of the Conway, in Wales, while on a visit to my friend Mr.

Blackwall. In some bushes near the swamp I captured two specimens of *Epeira scalaris*, one of the largest and most showy of our British spiders: neither of them was quite fully grown, and they were each of them concealed, near their webs, in the middle of a folded leaf, one having selected a leaf of *Tamus communis*.

On my way back to lunch, having now been out four or five hours in a hot sun, I noticed an adult male of *Philodromus cespiticollis* hunting about with great agility on the trunk of a large elm tree, and after some trouble I managed to secure him.

During another walk which I took in the afternoon the only object of interest which I noticed was a female of *Lycosa saccata* carrying its young in a mass upon its back, and also retaining the empty cocoon attached to its spinners, which is generally detached as soon as the eggs are hatched and the young leave it.

On the following day I examined some of the country near Bicester, but met with very few interesting spiders, with the exception of a pair (male and female) of very strongly marked specimens of *Salticus frontalis*, a pretty little species, which appears to be generally distributed in England, though it is not very common.

During my walk I was much interested by watching a colony of wild bees, which had constructed a number of circular burrows in a mud wall by the side of a farmyard. I noticed three different kinds, some of them busily chasing each other, and all of them going in and out of the same holes. I captured several of each kind; and on submitting them to Mr. F. Smith, of the British Museum, he kindly named them for me, when I found two of them to be the male and female of *Anthophora acervorum*, the sexes of which greatly differ in appearance; and the third was *Osmia rufa*, a species evidently parasitic upon the former.

Among the other objects of Natural History which fell in my way (besides spiders) on this occasion was a small fish, which I noticed in a pool of water by the roadside. On capturing it in a little hand-net I found that it was a ten-spined stickleback, a species which I had never seen in the North of England. I carried it home with me in a wide-mouthed bottle, and kept it alive between two and three months in a large fresh-water aquarium, where it became so tame that it would leap three or four inches out of the water to take anything from my hand.

On the third and last day of my excursion my friend took me to a large piece of waste or forest land in the neighbourhood, covered with scrub or brushwood, called Mixbury Wild, which he thought would

be a good locality for a naturalist; and so it proved, for I there found several rare spiders, and an unrecorded British one. I here noticed numerous specimens of *Dolomedes mirabilis*, a fine, large species, not uncommon in well-wooded districts, though I never found it in Yorkshire. Many of the females which I saw were running about carrying their cocoons (which are large, globular sacs made of yellow silk) with them. By this habit of carrying their eggs about with them they closely resemble the *Lycosæ*, but present some interesting points of difference: one is that the cocoon is carried beneath the sternum in *Dolomedes*, and held there by the falces and palpi; while in the genus *Lycosa* it is attached to the spinners by lines of silk. In the *Dolomedes*, again, the mother constructs a large, dome-shaped web among bushes before the eggs are hatched, beneath which she retires with her cocoon, on leaving which the young cluster together on lines of their own spinning, where they remain, under the care of their mother, until they are able to provide for themselves: the different species of *Lycosæ*, on the contrary, carry their cocoons about with them until the young are extricated, which then cluster together upon their mother's neck, and travel about with her.

On the gorse and other bushes I saw many species of *Epeira*. I observed numerous colonies of young specimens of *E. diadema*, of different sizes and ages, but all immature. The adult females of this species, as well as those of *E. inclinata* and some others, deposit their eggs in a cocoon, in the autumn, which is secreted beneath a stone; the mother then dies, and the young escape from their nest in the spring, when they climb into a neighbouring bush, and spin a few lines, on which they congregate together into a compact mass, and remain in society until they attain some size. I may here allude to the widely different points which occur in the economy of spiders: in many, I may say most, species the females show great attachment for their young, and remain with them for some time after they leave the cocoon; while in others the young are left to shift for themselves, the eggs not being hatched for some months after the death of the parents. This difference seems to depend in a great measure upon the season of the year at which the different species arrive at maturity and deposit their eggs. The males and females of some may be found in an adult state early in the spring, when the young are generally brought up, in the early part of the summer, under their parent's care. The same thing happens with those whose eggs are hatched during any part of the summer or beginning of autumn: but in those spiders which do not arrive at maturity until late in the season

(having been hatched the same spring) the eggs remain during the winter in the cocoon, and the parents die after they are deposited. There appears, also, to be a great difference in the relative length of life in different species of spiders, some, as *Epeira diadema* and *E. inclinata*, living but a single season, while others appear to live through two or three; but this subject requires further investigation. Besides *E. diadema*, *Epeira quadrata* was here very common, though all the specimens I noticed were immature. I saw many half-grown individuals of this species seated in the midst of their snares, and making a violent vibratory or dancing movement, the object of which I do not understand. While looking about I observed another smallish spider, seated in the midst of its web; and on capturing it found that it was an adult female of *Epeira acalypha*, a species not previously known to inhabit Britain, though common on the Continent.* By carefully looking about I succeeded in finding five or six more specimens of it; they were all seated in the centre of their webs, and all females.

Among other rare and interesting spiders I here met with *Theridion carolinum* and *T. variegatum*. The female of this last species constructs a very curious and pretty little balloon-shaped cocoon, about an eighth of an inch in diameter, composed of soft silk of a loose texture and pale brown colour, which is enclosed in an irregular network of coarse, dark red filaments, which unite together at the smaller end of the cocoon, and form a slender stem, from half an inch to an inch in length, by which the cocoon is attached to the surface of a stone or the bark of a tree, where it has something the appearance of a minute plant, as it is often placed in an erect position. I found one of these pretty little nests here, the stem of which was fixed to the leaf of a moss. I also obtained two other small cocoons, very similar in structure to the above, but differing in form, being elongated and fusiform, tapering to each end, and covered with a paler-coloured and more delicate network of red filaments. These cocoons were probably constructed by some species of *Theridion* closely allied to *T. variegatum*; but they were new to me; and on transmitting them to Mr. Blackwall I found that they had not previously been observed by that eminent arachnologist.

On the summit of one of the topmost branches of a tall furze bush I found a large, compact cell of white silk strongly secured to the

* In a fine collection of spiders made in Dorsetshire, by Mr. Pickard-Cambridge, and transmitted to me for examination last autumn, I found several specimens.

stem. In this cell was an adult female of *Clubiona erratica*, a fine, handsome spider. She was seated together with her cocoon, which she was taking care of; and Mr. Blackwall says that after the deposition of her eggs the female of this spider does not appear to quit the cell even for the purpose of obtaining food.

While looking about for spiders I noticed, in a dry, sandy spot, several small, round holes in the earth, which on close examination I found to be retreats of the larvæ of the tiger beetle (*Cicindela campestris*). I watched several of them seated, or rather fixed, at the entrance of their burrows, where they were watching for their prey. Upon disturbing them they immediately disappeared, finding their way to the bottom of their holes, from whence I dug out one or two with my walking-stick, and found that their retreats extended to seven or eight inches in depth. I never saw any of these curious larvæ before, though they cannot be uncommon, the perfect insects being plentiful in so many localities.

I much regretted that I could not further extend my researches in this neighbourhood, as I should probably have met with other new and rare spiders; but business obliged me to return home to Yorkshire this evening, after a short but very pleasant excursion. I subjoin a list of the principal species which I found.

List of Spiders captured near Bicester, Oxon, in June, 1856.

Lycosa ———	Philodromus dispar	Theridion variegatum
„ rapax	Drassus sericeus	„ carolinum
„ saccata	Clubiona holosericea	Linyphia marginata
„ exigua	„ amarantha	„ fuliginea
„ latitans	„ epimelas	Neriere munda
„ piratica	„ comta	Epeira diadema
„ piscatoria	„ accentuata	„ quadrata
Salticus scenicus	„ erratica	„ scalaris
„ frontalis	Agelena labyrinthica	„ umbratica
Dolomedes mirabilis	„ brunnea	„ cucurbitina
Hecâerge spinimana	Textrix lycosina	„ acalypha
Thomisus incertus	Theridion lineatum	„ antriada
„ atomarius	„ denticulatum	„ ornata
Philodromus cespiticollis	„ varians	Tetragnatha extensa

R. H. MEADE.

List of new and rare British Arachnidans.

By R. H. MEADE, F.R.C.S.

SEVERAL interesting native spiders having fallen under my notice during the last eighteen months, some of which have not previously been recorded as inhabitants of Britain, I subjoin a list of them, with references to the principal works in which they have been figured or described, together with a brief notice of the localities where they were found.

ARANEIDEA, or true spiders.

1. *Atypus Sulzeri*, *Latreille, Genera*, tome i. p. 85, tab. 5, f. 2; *Hahn und Koch, die Arachnidea*, Band I. p. 117, tab. 31, f. 88; Band XVI. p. 72, tab. 562, f. 1547. *Oletera atypa*, *Walckenaer, Hist. Nat. des Insect. Apt.* tome i. p. 243, pl. 1, f. 5.

I received an adult male of this interesting spider from O. Pickard-Cambridge, Esq., of Bloxworth House, near Blandford, Dorset, in the beginning of January last. He said it was taken a few days before, from a rabbit-earth while ferretting in his neighbourhood.

Dr. Leach captured specimens of this spider in Great Britain; but since his time it had not been seen again until the summer of 1855, when Mr. Brown, of Cirencester, found several females, with their tubular nests, in the neighbourhood of Hastings. Mr. Newman read an interesting account of this discovery at the Linnean Society, on the 5th of February, 1856 (*Zool.* 5021). Mr. Brown did not find a male, and wondered where they secreted themselves; the capture, therefore, of that sex by Mr. Pickard-Cambridge in a rabbit-earth is very interesting.

2. *Lycosa piscatoria*, *Koch, die Arach.* Band XV. p. 6, tab. 506, f. 1417—1419.

I found several adult males and females of this species, which has not previously been noticed as an inhabitant of Britain, in some marshy ground at Newton Purcell, near Bicester, Oxon, on June 24, 1856. This spider bears a very close general resemblance to *Lycosa piratica*, and appears to have much the same habits; it differs from that species, however, in being darker in colour, in having the legs and palpi more distinctly annulated with brown, and the abdomen differently marked and spotted.

3. *Thomisus sabulosus*. *Xysticus sabulosus*, *Koch, die Arach.* Band. XII. p. 64, f. 999.

Four specimens of this spider, which is also a new addition to the British Fauna, were contained in an extensive collection of Arachnida, sent to me for examination in September, 1856, by O. Pickard-Cambridge, Esq., the whole of which had been found by him in Dorsetshire during the two previous seasons, and which comprised many rare and interesting species, all in excellent preservation.

4. *Philodromus pallidus*, *Walck. Hist. Nat. des Ins. Apt.* tome i. p. 554. *Artamus griseus*, *Koch, die Arach.* Band XII. p. 81, tab. 415, f. 1013, 1014.

Several specimens of this new British spider were included in Mr. Cambridge's collection, and were taken, he tells me, in May and June, 1854, having been beaten out of Scotch firs at Morden Park, near Bloxworth, Dorset. Before seeing Mr. Cambridge's specimens I had received an adult female of this spider from S. C. Tress Beale, Esq., of Ivy Court, Tenterden, Kent, who captured it on the 5th of June last (1856), on the trunk of an ash tree, "which" (he says) "it so closely resembled in colour, that had it not been devouring a *Phryganea* I should not have detected it." I received it alive, and the abdomen was distended with eggs, which it deposited, in a few days, in the box in which it was confined. After this act the abdomen was much altered in size and colour, becoming darker and shrivelled.

5. *Drassus lucifugus*, *Walck. Hist. Nat.* tome i. p. 613. *Drassus melanogaster*, *Latr. Gen.* tome i. p. 87. *Pythonissa lucifuga*, *Koch, die Arach.* Band VI. p. 54, tab. 194, f. 468—470.

This spider had been included in the list of British species upon the authority of Dr. Leach, who stated, in the Supplement to the 'Encyclopædia Britannica' (article "Annulosa"), that it had been found in England, under stones; but it had never been seen since his time until I had an opportunity of inspecting Mr. P. Cambridge's fine collection in September last, when I found a well-marked adult female specimen.

6. *Epeira acalypha*, *Walck. Hist. Nat.* tome ii. p. 50. *Epeira genistæ*, *Hahn, die Arach.* Band I. p. 11, tab. 3, f. 7. *Zilla acalypha*, *Koch, die Arach.* Band VI. p. 139, tab. 213, f. 530, 531.

Several females of this pretty spider, which is also new as British, were captured by myself, in June last, near Newton-Purcell, Oxon; several more were also contained in Mr. Cambridge's Dorsetshire collection, which he tells me were beaten from Scotch firs at Morden Park, near Bloxworth, in May and June, 1854. All the specimens that I have seen have been females; and Koch remarks that though this is not a very rare spider in Germany, the male is very seldom found.

7. *Epeira angulata*, *Walck. Hist. Nat.* tome ii. p. 121; *Hahn, die Arach.* Band II. p. 19, tab. 44, f. 108. *Epeira Schreibersii*, *ibid.* p. 20, f. 109. *Epeira regia*, *Koch, die Arach.* Band XI. p. 88, tab. 380, f. 899.

We are indebted for this fine, unrecorded British species to Mr. P. Cambridge, several specimens having been captured by him in Dorsetshire, and forwarded to me, with the rest of his collection, in September last.

8. *Epeira tubulosa*, *Walck. Hist. Nat.* tome ii. p. 86. *Singa hamata* et *Singa melanocephala*, *Koch, die Arach.* Band III. p. 42 et 44, tab. 88, f. 197—199, titulus 7; *Lister, Hist. Animal. Angl. de Aran.* p. 40, tab. i. f. 7.

Since the year 1678, when Dr. Lister published his 'History of English Animals' (including a treatise on spiders), in which he says that this species is common in wet meadows and among rushes, its capture has never been recorded; I was therefore much pleased to see a fine adult female specimen in the collection made by Mr. P. Cambridge in Dorsetshire.

PHALANGIDEA: *Harvest-men*, &c.

1. *Phalangium minutum*, *Meade, Monogr. on British Phalangiida*, *An. & Mag. of Nat. Hist.* ser. 2, vol. xv. p. 405.

When I published a description of this minute harvest-man I had seen but two specimens, which had been mixed with other species, and the locality in which they were obtained forgotten. I was, however, so fortunate as to meet with another in a collection of spiders made in the neighbourhood of Dublin, and obligingly sent for my inspection in December, 1855, by E. Percival Wright, Esq., of Trinity College, Dublin. I think it very probable that the other two specimens also came from Ireland, as I have received numerous

species of Arachnida collected in that country on several former occasions, both from Mr. Wright and the Rev. A. R. Hogan.

2. *Ophilio histrix*, *Samouelle, Ent. Comp.* p. 120; *Meade, Ann. & Mag. of Nat. Hist.* ser. 2, vol. xv. p. 407, pl. XI. f. 6.
Phalangium histrix, *Latreille, Hist. Nat. des Fourmis*, p. 376.

I included this fine harvest-man in my paper on the British Phalangiidæ (published two years ago) upon the authority of Samouelle, though I had not then seen an English example. In November, 1856, however, I received a fine adult female specimen from the Rev. A. M. Norman, of Kibworth, in Leicestershire, who said, "I was this morning (Nov. 4) moving a mat which lay before a window opening down to the ground into the garden, when under it I saw a Phalangium-like spider, which at once struck me as differing from any I had ever before seen." Mr. Norman at once identified the species from my description, and was so obliging as to present me with the specimen.

R. H. MEADE.

Note on the Centipede.—I send an extract from a letter just received by me from my friend Lieut. and Adjutant Rainier (St. Helena Regiment), regarding the centipedes and scorpions found on that island:—"Concerning the centipede that I caught, I observed a fact that I have heard of, but never seen before: I and my wife saw it distinctly, when put into gin, turn its head and seize its own body with its nippers, and sting itself to death, which happened in two or three seconds. Many people here say that they have seen this before, both in the case of the scorpion and centipede."—*John M. Jones; April 11, 1857.*

On introducing Foreign Specimens into British Collections.—At p. 5535 of the 'Zoologist' Mr. Bree proposes to introduce Continental specimens into collections of British insects: I sincerely hope this proposal will not be adopted; it would destroy a great part of the interest now attached to our collections, and would not represent a British Fauna, if every species introduced was really a native of Britain. Mr. Bree seems to have forgotten that the same species varies greatly in different parts of its geographical distribution, the variations produced by climate and locality being often greater than that between really distinct species: in proof of my assertion, let any one compare specimens of *C. Xerampelina* from the South of France with our British specimens: most persons, at first sight, would consider them distinct species. It would not do to trust to labels: when a collection changed hands they might be lost, misplaced, or purposely removed by unscrupulous persons. The main cause of the evil which Mr. Bree proposes to remedy is the absurd eagerness of many collectors to

obtain any new or rare species which may be discovered. Certain dealers, taking advantage of this, have imported Continental specimens by wholesale, and passed them off as British to those who were foolish enough to place confidence in their assertions. Most of the species which are rare here may be purchased upon the Continent for threepence each, or, at the most, sixpence; and hundreds of specimens were set in the British style upon the Continent last year for a dealer who is constantly advertising his rarities. The parallel drawn by Mr. Bree between a collection of British insects and a collection of birds' eggs will not hold good: a large proportion of the birds which annually visit us at the period of the equatorial migration never breed here, and it is manifestly impossible to obtain eggs of those species which were actually deposited in Britain, and of course these must be obtained from their breeding stations; with insects the case is totally different.—*Henry Doubleday; Epping, April 14, 1857.*

The new Noctua.—According to promise, I now proceed to give you a few particulars concerning the reputed new Noctua at Brighton, and, although at the risk of being tedious, perhaps I had better state the facts precisely as they came under my observation. On looking over the collection of the Rev. J. Image one day, I saw an insect which at once engaged my attention; after a short examination I pronounced it to be a species of *Xanthia* new to this country, and evidently closely allied to *gilvago*: on inquiry I found that this insect was taken, or said to be taken, by George Smith (a dealer, living at 8, King Street, in this town), on the 4th or 6th of October last (at this moment I forget the precise day), on the open Downs near Brighton. Mr. Image's attention was called to the insect in this way:—Hemmings saw it in Smith's possession, and thought it was *C. Xerampelina*; knowing that Mr. Image wanted that species, he at once informed that gentleman that Smith had a specimen for sale. Mr. Image called on Smith, and saw this insect on the setting-board, but, finding it was not *Xerampelina* he refused to purchase it. Hemmings again called on Mr. Image, and said, "if this insect was not *Xerampelina* it was something as good," and Mr. Image then went and bought it. After it was in the hands of Mr. Image Hemmings again saw it, and he then said he had made a mistake, and it was only a variety of *Cerago*: there the matter ended, and the insect had been quietly stowed away for some months when I saw it. Mr. Image was under the impression that Hemmings saw the insect alive; if such was the fact there would have been an end of all dispute, for Hemmings was most scrupulous in keeping clear of foreign insects. Assuming that Hemmings did see this creature alive, I packed it up and sent it to that prince of entomologists, Mr. H. Doubleday, for identification. In my letter I stated the facts of the case, and also that I did not place the slightest reliance on anything Smith said, but that I risked the claim of this insect to a place in the British list entirely on the supposition that Hemmings saw it alive. Well, with his usual kindness, Mr. Doubleday speedily replied that this insect was *Xanthia ocellaris*, a species closely allied to *gilvago*: I was pleased at my opinion being verified by such an authority; then followed a paragraph that was "a regular settler," *viz.* "You appear to be quite certain that this insect was captured near Brighton, or I should have said unhesitatingly that it was a foreign specimen: it precisely agrees with several I have seen in London, French attempts at the English mode of setting." I may here remark that this insect is set in a most peculiar manner, and totally different from Smith's usual style of setting. Mr. Image saw this insect on Smith's setting-board; but that amounts to nothing.—*H. Cooke; 8, Pelham Terrace, Brighton, April 4, 1857.*

Captures of Lepidoptera recorded in the 'Intelligencer.'—

1. *Gastropacha ilicifolia*.—Ten bred: [where were the larvæ or pupæ obtained? ED. ZOOLOG.]—*R. Weaver, Birmingham*. Two bred: [same query, ED. ZOOLOG.]—*E. S. Bonney, Churchdale House, Rugeley*. Three bred: [same query, ED. ZOOLOG.]—*F. Bonney, Marlborough College, Wilts*. One bred on the 25th March, from a larva found on Cannock Chase.—*T. G. Bonney*.

2. *Endromis versicolor*.—One male in St. Leonard's Forest, Sussex, on the 10th of April.—*William Jeffrey, Reigate*. Nine in Tilgate Forest, Sussex.—*Mr. Price, 3, York Road, Hove, Brighton*. Several: [where and when? ED. ZOOLOG.]—*Samuel Howse, Brighton*. Two in Scotland.—*H. J. Harding*. Two, and saw several on the wing, in Tilgate Forest, Sussex.—*Percy Andrews, Brighton*.

3. *Petasia nubeculosa*.—Six: [where and when? ED. ZOOLOG.]—*H. J. Harding*. Four.—*J. Foxcroft*.

4. *Notodonta carmelita*.—One bred in April.—*S. Stevens*. One bred on the 18th of April, from a larva found at West Wickham, in July last.—*H. Nicholls, Islington*.

5. *Dasycampa rubiginea*.—One taken [where? ED. ZOOLOG.] on the trunk of an oak tree, on the 28th of March.—*S. Bingham, Bank, Newnham*.

6. *Aleucis pictaria*.—Five, at Dartford Heath, Kent, on the 21st of April. Five subsequently at the same place.—*E. G. Baldwin, Albany House, Barnsbury*. One, same locality.—*Samuel Stevens*.

Hyponomeuta vigintipunctatus bred.—In 1848 (Zool. 2272) Mr. Stainton called the attention of entomologists to the habits of this ermine. Last autumn I had the pleasure of finding two fine broods of its larvæ, which have this day begun to make their escape from the pupa state. I expect to have more to dispose of than will supply my regular correspondents, and shall therefore be happy to assist as many other applicants as I can.—*P. H. Newnham; Guildford, March 21, 1857*.

Narycia elegans a Lepidopterous Insect.—Dr. Hagen, the well-known Neuropterist, is now in London, and inspecting the British collections of Neuroptera. He has seen the original specimens of *Narycia elegans* of Stephens, described by that author as trichopterous, and pronounces them, without hesitation, to be truly lepidopterous. The pretty little *Acentria nivea*, placed by Stephens as one of the Perlidæ, will of course share the same fate, a conclusion at which I had previously arrived from an examination of a series of specimens most kindly transmitted me by Mr. Brown, of Burton-on-Trent. The propriety of making this last-named change had previously been guessed at, but no sufficient arguments induced in its support. It is curious that the basal segments of *Acentria nivea* become greasy very shortly after the insect has been shut up in a camphored drawer, exactly in the same way as some of the Tineadæ. Entomologists will find the benzine colos, an article to be purchased at any chemist's, a much better preservative than camphor, the use of which I have entirely discarded.—*Edward Newman*.

Corrections of previous Errors.—Zool. p. 5375, line 2 from bottom, for "Gurn." read "Guen."; p. 5379, bottom line, for "Edulea" read "Ebulea"; p. 5380, line 11 from bottom, for "Meayna alsinalis" read "Mecyna Asinalis"; p. 5382, between "Muralis" and "Mercurialis" insert "5. Linealalis, St. p. 300, Wood, 1446."—*C. R. Bree; Stricklands, Stowmarket, February 2, 1857*.

Correction of previous Errors.—In the description of *Megastigmus Pinus* (Zool. 5543), first line after the name of the insect, for "Disk of female black" read "Description of female. Black; the clypeus," &c., &c.; 7th line down, for "and a large

one in front of it, *in* the prothorax," read "*on* the prothorax"; 5th line from bottom, for "there are also ten black setæ" read "there are *two* black setæ"; bottom line, for "8 $\frac{3}{4}$ lines" read "2 $\frac{3}{4}$ lines."—*Edward Parfitt; Weirfield Place, St. Leonard's, Exeter, April 4, 1857.*

Further Note on the supposed new Œstrus.—It is all come out and made clear about the new Œstrus; and I hasten to give you the particulars, as they are somewhat singular. I yesterday went to the British Museum, and was most kindly received by three or four of the heads of the Linnean Society and of the Museum; and I am happy to say that the species to which Mr. Cooke's Œstrus must be referred is no longer a mystery; for the intruder is now found to be not a denizen of this country, but a native of the Arctic regions, the country of the reindeer. The moment my eye alighted on it I exclaimed, "Why, this is a foreigner, and is the male of the Œstrus Tarandi, a very old acquaintance of mine," and a source of plague enough to that animal; and of its history some of the details may not be altogether uninteresting. I visited Copenhagen in the year 1797, to see "le grand chien Danois" of Buffon, that I might afford my worthy friend Sydenham Edwards a true account of this magnificent animal; and I went northward about forty miles above Copenhagen, to a palace there, on purpose to see the creature. On my return to Copenhagen I inquired what insects were to be seen amongst them, and found the chief collection belonged to a Mr. Sehested, and went accordingly to visit him. He very obligingly showed me his collection. My eyes of course fixed on the Œstri, having just before published my essay thereon in the 'Linnean Transactions;' and what was my astonishment to see six or seven very large species, of the existence of which I had not the least previous idea. I returned to England, and had almost forgotten them, when a few years after poor Sehested died, and his insects were brought to London, it being supposed they would sell better here than in the poorer country where he resided: they were purchased by Mr. Children, who, after some time, not caring to keep them, had them put up for sale at King Street; I bought the whole lot, and at the pressing solicitation of Dr. Leach made him a present of a pair of them for the British Museum. When I first became acquainted with the male of Œstrus Tarandi I could not learn anything of its country; but determined, as there he was before my eyes, to afford him not a "local habitation," but "a name," I had him drawn and engraved; and the name I gave him, as having reference to the whole family of disturbers of the poor reindeer, was Œstrus stimulator (see p. 69 of my Treatise, and for the figure Pl. I. fig. 28). Fabricius, not knowing what it was, had previously denominated it Trampa, or rather pecorum. The way in which I discovered that this was the male of Œstrus Tarandi may be briefly stated thus:—One day, examining the male of Œstrus Bovis, which is so unlike the female, I observed that its palpi were clavated, a character not found in the female. This induced me to examine the female of Tarandi, and compare it with the newly-discovered male; and I found exactly the same discrepancy to obtain between them as between the well-known males and females of Bovis. The question still remained, How comes this Arctic insect to be considered an English, or more properly a Scottish, species? "Why," observed my friend White, at the Museum, "I can explain that: some of our noblemen having parks in Scotland ornamented their domain with a few reindeer, and with them came the said animal; and so the whole mystery is unravelled."—*Bracy Clark; 18, Giltspur Street, April 23, 1857.* N.B. This is written without glasses. [Mr. Clark is in his eighty-seventh year.—*E. Newman.*]

New Helophilus.—Last summer I was so fortunate as to find, in my own immediate neighbourhood, a species of *Helophilus* which is not described either in Mr. Walker's 'Insecta Britannica,' Professor Loew's 'Monograph of the Genus *Helophilus*,' or the works of Meigen and Macquart. I propose to call it *Helophilus Clarkii*, as a compliment to my highly esteemed friend Bracy Clark, who has so admirably elucidated an obscure family of British Diptera.—*Edward Newman*.

Capture of a Fossorial Hymenopterous Insect, new to the British Fauna, in the North of England.—Amongst my Cumberland captures of last season (1856) were one male and ten females of a fine black Crabro, which a careful examination led me to believe was the species indicated by Wesmael as *melanarius*. On submitting an example to Mr. F. Smith, he at once confirmed my opinion, and informed me that it had not before been taken in this country. I append its synonyms and give below Dahlbom's diagnosis, which will facilitate its identification, if met with elsewhere:—

CRABRO (CROSSOCERUS) MELANARIUS, *Wesmael, Rev. Crit. Fouis. Belg.* 133, 9; Crabro leucostoma, *Zett. Ins. Lapp.* 444, 9, var. b; Crabro (Crossocerus) podagricus, *Dahlb. Hymenop. Europ.* 1, 339, 222.

"*Medius robustus* 3—3½ lin. long.; palpis pedibusque nigris, vertice thoraceque nitidis metanoto opaco rugoso aut coriaceo crenaturis normalibus crassis, tibiis posticis clavato obconicis spinosis, margine occipitali mutico. (♂ ♀)."

This species is very distinct from Crabro podagricus, *Van der Lind., Shuck., and St. Farg.*, and appears to be a northern insect, Wesmael (l. c.) remarking, "Je n'ai pas trouvé cette espèce en Belgique, et elle paraît être surtout répandue au nord de l'Europe." I took my specimens in the early part of July, near Lannercost: the first I took were burrowing in a very hard thorn post, but I afterwards found them in a partially decayed stump of a tree—a sycamore, I believe. One of the females, when captured, was carrying a small brilliant blue-green Dipterous insect.—*Thomas John Bold; Long Benton, Newcastle-on-Tyne, April 6. 1857.*

Rare British Coleoptera.—The present season has been remarkably productive in some of the rarer British beetles. Mr. Douglas had the good fortune to find a pair of *Brontes planatus* under the bark of a decaying lime tree at Shooter's Hill; he has also taken *Bostrichus bispinosus* out of the shoots of *Clematis Vitalba* in the same neighbourhood. *Lebia crux-minor* has been taken in the neighbourhood of Brighton, but perhaps not so abundantly as last year. Dr. Power has taken a single specimen of *Chlænium holosericeus* in the London district, and thirty or forty of *Drypta emarginata* in the Hampshire locality: at the last Meeting of the Entomological Club he exhibited this magnificent series, a sight that had never before gladdened the eyes of an English Coleopterist; he also brought to the Meeting one living specimen, and allowed it to march deliberately over Mr. Marshall's table, to the intense delectation of all beholders. Does not Dr. Power's success proclaim, far more than words, the advantage of perseverance and industry? No one ever laboured more assiduously or more successfully.—*Edward Newman*.

A List of the British Species of Aleocharidæ.

By G. R. WATERHOUSE, Esq.

FEELING convinced that, in order to obtain a tolerably perfect Catalogue of the British Coleoptera within a reasonable time, much research, and that of many entomologists, is required,—and, further, believing that the end in view would be more quickly attained were each of the workers to make known the results of his labours from time to time,—I beg to offer the following list of such of the British Aleocharidæ as have come under my notice, as a contribution of the kind alluded to. It is necessarily very far from perfect, and what there is of it is no doubt incorrect here and there (though I have taken much pains to avoid inaccuracies); but it will, I hope, serve as a nucleus around which better material will collect. I shall hereafter furnish some remarks on the species contained in this list, and in the meantime I will only observe that all the species that have no asterisk attached to the name have been found by myself, nearly the whole of them during the last two years, and, with few exceptions, within short distances of London.

The arrangement adopted is that of Kraatz, whose work on the Aleocharidæ is by far the most complete hitherto published. This author has had before him, and named, the species of the genus *Homalota*, and some of those of allied genera, contained in the collections of Mr. Wollaston and Mr. Janson, both of which gentlemen have most kindly placed their collections in my hands; and as without this help I think I could scarcely have succeeded in producing this list, I am anxious to convey, in the warmest manner, my gratitude for this very kind assistance.

Family ALEOCHARIDÆ.

AUTALIA, *Leach, Steph.** *Er.*

- 1 *impressa, Oliv., Gr., Er., Steph.*
- plicata, Steph.*
- ruficornis, Steph.*
- 2 *rivularis, Gr., Er., Steph.*
- aterrima, Steph.*
- angusticolle, Steph.*

FALAGRIA, *Leach, Steph., Er.*

- 1 *sulcata, Payk., Er., Steph.*
- cæsa, Er. Col. March., Ste.† Man.*
- 2 *sulcatula, Payk., Gr., Er., Ste. Ill.*
- confinis, (Kirby), Ste.*
- sulcata, Er. Col. March., Ste. Man.*
- polita, Curtis*

* "*Steph.*" = Of Stephens' works and collection.

† "*Ste.*" = Of Stephens' works, and *not* of his collection.

- 3 thoracica, (*Kirby*), *Steph.*, *Curtis*,
Er.
- 4 obscura, *Grav.*, *Er.*, *Steph.*
flavipes, *Steph.*
nitens, *Steph.*
floralis, *Steph.*
- BOLITOCCHARA, *Mannerh.*, *Er.*, *Steph.*
- 1 lucida, *Grav.*
lunulata, *Ste. collection.*
- 2 bella, *Märk.*, *Kz.*
lunulata, *Kirby collection.*
- *3 obliqua, *Er.*, *Steph.*
- PHYTOSUS, *Rudd*, *Curtis*, *Steph.*, *Er.*
- *1 spinifer, *Curtis*
- *2 nigriventris, *Chev.*
spinifer, ♂, *Curtis*, *Steph.*
spinifer, ♀, *Er.*
- SILUSA, *Er.*
- 1 rubiginosa, *Er.*
- OCALIA, *Er.*
- 1 picata, (*Kirby*), *Steph.*
castanea, *Er.*
- 2 rivularis, *Miller*, *Kz.*
- 3 badia, *Er.*
prolixa, *Gyll.*, *Mannerh.*
- ISCHNOGLOSSA, *Kz.*
- Oxypoda, (pars), *Er.*
- 1 prolixa, (*Grav.*), *Er.*
elegantula, *Sahl.*, *Er.*
corticalis, (*Kirby*), *Ste.*
- LEPTUSA, *Kz.*
- Oxypoda, (pars), *Er.*
- 1 fumida, *Er.*
- *2 ruficollis, *Er.*
- THIASOPHILA, *Kz.*
- Aleochara, (pars), *Er.*
- 1 angulata, *Er.*
- HOMŒUSA, *Kz.*
- Euryusa, *Märk.*
- 1 acuminata, *Märk.*, *Kz.*
- HAPLOGLOSSA, *Kz.*
- Aleochara, (pars), *Er.*, *Steph.*
- 1 pulla, *Gyll.*, *Er.*, *Ste.*
rufipennis, (*Kirby*), *Ste.* ?
puncticollis, (*Kirby*), *Ste.*
villosula, (*Kirby*), *Ste.*
- 2 prætexta, *Er.*
- fulvicornis, (*Kirby*), *Ste.*
erythroceras, *Ste.*
- ALEOCHARA, *Grav.*, *Er.*
- *1 ruficornis, *Grav.*, *Er.*
Daltoni, (*Kirby*), *Steph.* (*Ceranota*)
- 2 fuscipes, *Fab.*, *Grav.*, *Er.*, *Steph.*
- 3 bimaculata, (*Kirby*), *Ste.*
nigripes, *Miller*, *Kz.*
tristis, *Ste.* ?
- 4 bipunctata, *Ol.*, *Er.*, *Ste.* ?
terminata, (*Kirby*), *Steph.*
celer, (*Kirby*), *Ste.* ?
- 5 brevipennis, *Grav.*, *Er.*, *Ste.* ?
carnivora, *Gyll.*, *Ste.*
concolor, (*Kirby*), *Ste.*
mæsta, *Ste. Man.*
- 6 lanuginosa, *Grav.*, *Er.*, *Steph.*
sericea, *Steph.*
- 7 obscurella, *Grav.*, *Er.*, *Steph.*, (*Poly-*
stoma)
micans, (*Kirby*), *Steph.*
- 8 Kirbii, *Steph.*
dubia, (*Kirby*), *Steph.*
grisea, *Kz.*
- 9 mæsta, *Grav.*, *Er.*
nigrina, (*Kirby*), *Ste.* ?
rufipes (*Kirby*), *Ste.*
cursor, (*Kirby*), *Ste.*
- 10 mycetophaga, *Kz.*
- 11 sanguinea, (*Kirby*), *Ste.*
brunneipennis, *Kz.*
- 12 bilineata, *Gyll.*, *Ste.*, *Kz.*
nitida, var., *Er.*
immaculata, (*Kirby*), *Ste.*
agilis, (*Kirby*), *Ste.*
- 13 nitida, *Gr.*, *Er.*, *Steph.*
velox, (*Kirby*), *Steph.*
cursor, (*Kirby*), *Steph.*
dorsalis, *Steph.*
- 14 morion, *Gr.*, *Er.*, *Ste.*
exigua, *Steph.*
- DINARDA, *Mannerh.*, *Er.*
- Lomechusa, *Curtis*
- 1 Mærkellii, *Kiesenw.*, *Kz.*
dentata, *Ste.*, *Curtis*
- LOMECHUSA, *Gr.*, *Er.*
- Atemeles, *Steph.*

- *1 strumosa, *Fab., Er., Ste.*
ATEMELES (*Dillwyn*), *Steph., Kz.*
Lomechusa, (pars), *Er.*
 1 paradoxus, *Gr., Er.*
 2 emarginatus, *Payk., Er.*
 acuminatus, *Steph.*
 paradoxus, *Ste.*
MYRMEDONIA, *Er., Kz.*
 Sect. 1. (*Zyras, Steph.*)
 *1 *Haworthii, Steph., Kz.*
 fulgida, var., *Er.*
 elegans (*Bolitochara*), *Heer*
 Sect. 2. (*Bolitochara, Steph.*)
 *2 *collaris, Payk., Er., Steph.*
 Sect. 3. (*Pella, Steph.*)
 3 *humeralis, Gr., Er., Steph.*
 4 *cognata, Märkel, Kz.*
 funesta, Heer
 5 *funesta, Gr., Er., Steph.*
 crassicornis, (Kirby), Steph.
 6 *limbata, Payk., Marsh., Er., Steph.*
 divisa, Marsh., Steph.
 7 *lugens, Gr., Er.*
 8 *laticollis, Märkel, Kz.*
 Sect. 4. (*Astilbus, Dillwyn, Steph.*)
 9 *canaliculata, Fab., Er., Steph.*
ILYOBATES, *Kz.*
Calodera, (pars), *Er., Steph.*
 1 *nigricollis, Payk., Er., Steph.*
 2 *propinqua, Aubé, Fairm. et Laboulb.*
 3 *forticornis, Boisd. et Lacord., Er.*
CALLIGERUS, *Curtis, Steph., Kz.*
Homalota, (pars), *Er.*
 1 *obscurus, Gr., Steph.*
 callicera, Gr., Er.
 ♂ *Spencei, (Kirby), Curtis, Steph.*
 ♂ *caliginosa, Steph.*
 ♀ *hybridus, Curtis*
 2 *rigidicornis, Er., Kz.*
 fusca, Heer (Semiris)
CALODERA, *Mannerh., Er.*
 1 nov. sp. ?
 2 *æthiops, Gr., Er.*
 3 *umbrosa, Er., Kz.*
ISCHNOPODA, *Steph.*
Chilopora, *Kz.*
 1 *longitarsis, (Kirby), Steph.*
 attenuata, Steph.
TACHYUSA, *Er.*
Ischnopoda, (pars), *Ste.*
 *1 *constricta, Er., Steph.*
 2 *scitula, Er. ?*
 *3 *leucopa, Marsh., (Kirby), Steph.*
 flavitaris, Sahlb., Kz.
 chalybea, (Rudd), Steph., Er.
 4 *atra, Gr., Er., Ste.*
 aterima, (Kirby), Steph.
 5 *uvida, Er.*
 6 *sulcata, Kiesenw.*
OCYUSA, *Kz.*
Oxypoda, (pars), *Er.*
 1 *maura, Er.*
OXYPODA, *Mannerh., Er., Steph.*
 1 *ruficornis, Mannerh., Er., Steph.*
 2 *luteipennis, Er.*
 lata, Steph.
 acuminata, Steph.
 Sheppardi, Ste. ?
 lividipennis, Steph.
 emarginata, Steph.
 3 *vittata, Märkel, Kz.*
 4 *opaca, Gr., Er.*
 umbrata, (Kirby), Steph.
 5 *longiuscula, Gr., Er., Ste. Man. 2916*
 nigrofusca, (Kirby), Ste. Man. 2910
 6 *brevicornis, (Kirby), Steph.*
 cuniculina, Er.
 7 *exigua, Er.*
 8 *præcox, Er.*
 9 *alternans, Gr., Er., Steph.*
 concinna, Ste.
 cingulata, Ste.
 10 *formiceticola, Märkel, Kz.*
 11 *hæmorrhœa, Mannerh., Kz.*
 promiscua, Er.
 myrmecophila, Märkel
 12 *annularis, Mannerh., Kz.*
 helvola, Er.
 testacea, Hardy & Bold
 13 *brachyptera, (Kirby), Steph.*
 ferruginea, Er., Kz.
HOMALOTA, *Mannerh., Er.*
Bolitochara, *Steph.*
 *1 *currax, Kz.*
 *2 *debilicornis, Er.*
 3 *fragilicornis, Kz.*

- 4 pagana, *Er.*
 5 vestita, *Gr., Er.*
 quisquiliarium, *Gyll.*
 elongata, (*Kirby*), *Ste.*
 sericoptera, (*Kirby*), *Ste.*
 6 nitidula, *Märkel, Kz.*
 7 vicina, (*Kirby*), *Steph.*
 femorata, *Steph.*
 umbonata, *Er.*
 8 graminicola, *Gr., Er., Steph.*
 foveola, *Steph.*
 9 languida, *Er.*
 10 sulcifrons, (*Kirby*), *Ste.*
 pavens, *Er.*
 11 gregaria, *Er., Kz.*
 immunita, *Er.* (*Tachyusa*)
 ruficrus, (*Kirby*), *Ste.*
 longiuscula, *Ste. Ill. v. sp. 27*
 pallipes, *Ste. Man. 2187*
 foveolaris, (*Kirby*), *Ste.*
 quisquiliarium, *Ste.*
 12 elongatula, *Gr., Er.*
 microcephala, *Steph.*
 nigripalpis, (*Kirby*), *Ste.?*
 13 terminalis, *Gr., Kz.*
 tricolor, (*Kirby*), *Steph.*
 14 hygrotopora, *Kz.*
 15 luridipennis, *Mannerh., Kz.*
 *16 fragilis, *Kz.*
 17 labilis, *Er.*
 18 subpubescens, (*Kirby*), *Steph.*
 ripicola, *Kiesew.*
 carbonaria, *Ste. coll.*
 carbonaria, (*Tachyusa*), *Hardy &*
 Bold
 unicolor, *Ste.*
 19 fallax, *Kz.*
 20 puncticeps, *Thomss., Kz.*
 Algæ, *Hardy & Bold*
 elongatula, (*Kirby*), *Ste.*
 21 occulta, *Er.*
 foveata, (*Kirby*), *Ste.*, (*Ischnopoda*)
 assimilis, (*Kirby*), *Ste.*
 22 monticola, *Thomss., Kz.*
 *23 excellens, *Kz.*
 24 incana, *Er., Steph.*
 25 nigella, *Er.*
 26 æquata, *Er.*
 27 angustula, *Mannerh., Er., Steph.*
 28 linearis, *Gr., Er.*, (*Kirby*), *Steph.*
 *29 pilosa, *Kz.*
 30 debilis, *Er.*
 31 deformis, *Kz.*
 32 plana, *Mannerh., Er.*
 *33 immersa, *Er., Hardy & Bold*
 34 cuspidata, *Er.*
 plana, *Er. Col. March., Steph.*
 35 analis, *Gr., Er., Ste.*
 inquinula, (*Kirby*), *Ste.*
 foveolata, (*Kirby*), *Steph.*
 nigrofusca, (*Kirby*), *Ste. Man. 2795*
 Boleti, *Kirby, Steph.*
 apicalis, *Steph.*
 36 soror, *Kz.?*
 37 exilis, *Er.*
 38 inconspicua, *Er.*
 39 flavipes, *Gr.*
 40 confusa, *Märkel, Kz.*
 41 anceps, *Er.*
 42 brunnea, *Fabr., Er., Kz., Steph.*
 depressa, *Gr., Er.*
 zonalis, (*Kirby*), *Steph.*
 atriceps, *Ste.*
 nigriceps, *Marsh., Steph.*
 thoracica, *Steph.*
 *43 hepatica, *Er.*
 44 xanthoptera, (*Kirby*), *Ste.*
 foveatocollis, (*Kirby*), *Ste.*
 merdaria, *Thomss., Kz.*
 socialis, var. *b.*, *Er.*
 sericans, *Steph.*
 consobrina, *Steph.*
 45 euryptera, (*Kirby*), *Ste.*
 validicornis, *Märkel, Kz.*
 sericans, *Er.*
 46 trinotata, *Thomss., Kz.*
 socialis, (*Kirby*), *Steph.*
 testaceipes, *Ste.*
 47 triangulum, *Kz.*
 48 nigricornis, (*Kirby*), *Ste.*
 Brassicæ, (*Kirby*), *Ste.*
 fungicola, *Thomss., Kz.*
 nigripalpis, *Ste.?*
 49 sublinearis, *Kz.*
 50 nigrifula, *Gr., Kz.*
 51 sodalis, *Er.*

- 52 nigricornis, *Thomss.*
 53 coriaria, *Miller, Kz.*
 54 variabilis, *Kz.*
 conformis, *Muls.*
 livipes, (*Kirby*), *Ste. ?*
 55 nigra, *Kz.*
 56 cinnamomea, *Gr., Er., (Kirby), Steph.*
 pallipes, *Ste. Ill. sp. 132*
 57 hospita, *Märkel, Kz.*
 58 scapularis, *Sahlb., Kz.*
 axillaris, *Mannerh.*
 ochracea, *Er.*
 59 liturata, (*Kirby*), *Ste., ♂*
 pyrrhoceras, (*Kirby*), *Ste., ♀*
 ochropa, (*Kirby*), *Ste.*
 nigritula, *Steph.*
 60 oblita, *Er.*
 61 amicula, (*Kirby*), *Ste.*
 picipennis, (*Kirby*), *Ste.*
 sericea, *Muls., Kz.*
 62 sordidula, *Er.*
 63 inquinula, *Er.*
 64 putrida, *Kz.*
 65 longicornis, *Gr., Er., Steph.*
 antennata, (*Kirby*), *Ste.*
 66 villosula, *Kz.*
 67 atramentaria, *Gyll., Er.*
 ænescens, *Zetterst.*
 consimilis, (*Kirby*), *Steph.*
 atricornis, *Steph.*
 68 palustris, *Kiesew., Kz.*
 currens, *Wollast.*
 admota, (*Kirby*), *Ste. ?*
 69 sordida, *Marsh., (Kirby), Steph.*
 lividipennis, *Mannerh., Er.*
 curvipes, *Steph.*
 70 melanaria, *Mannerh., Kz.*
 testudinea, *Er.*
 71 aterrima, *Gr., Er. ? Kz.*
 obscurata, (*Kirby*), *Ste.*
 livipes, (*Kirby*), *Ste.*
 brunnipes, *Steph.*
 72 pygmæa, *Gr., Kz.*
 aterrima, var., *Er.*
 obfuscata, *Gr.*
 similis, (*Kirby*), *Steph.*
 tenuior, (*Kirby*), *Steph.*
 73 laticollis, (*Kirby*), *Steph.*
 vernacula, *Gr., Kz.*
 fuscula, *Steph.*
 74 castanipes, (*Kirby*), *Ste.*
 subsinnuata, *Er.*
 75 parvula, (*Kirby*), *Ste.*
 cauta, *Er.*
 76 picipes, (*Kirby*), *Ste.*
 77 Fungi, *Gr., Er., Steph.*
 obfuscata, (*Kirby*), *Steph.*
 infuscata, (*Kirby*), *Ste.*
 78 clientula, *Er.*
 *79 tibialis, *Heer., Kz.*
 nivalis, *Kiesew., Hardy & Bold*
 80 circellaris, *Gr., Er., Steph.*
 rufescens, (*Kirby*), *Steph.*
 contigua, *Ste. Ill. sp. 64, Man. 2784*
 *81 cæsula, *Er.*
 PLACUSA, *Er.*
 1 infima, *Er.*
 PHLÆOPORA, *Er., Steph.*
 1 reptans, *Gr., Er., Ste.*
 confinis, *Ste.*
 2 corticalis, *Gr., Er.*
 HYGRONOMA, *Er., Steph.*
 1 dimidiata, *Gr., Er., Curtis, Steph.*
 basella, (*Kirby*), *Ste.*
 SCHISTOGLOSSA, *Kz.*
 *1 viduata, *Er., (Homalota)*
 OLIGOTA, *Mannerh., Er.*
 1 pusillima, *Gr., Er.*
 *2 inflata, *Mannerh., Kz.*
 subtilis, *Er.*
 EUCEPHALUS, (*Kirby*), *Westw., Steph., Kz.*
 Gyrophæna, (*pars*), *Er.*
 1 complicans, (*Kirby*), *Westw., Steph., Er.*
 GYROPHÆNA, *Mannerh., Er., Steph.*
 1 affinis, *Sahlb., Mannerh., Er.*
 2 nana, *Payk., Er., Ste.*
 marginata, *Steph. ?*
 3 fasciata, *Marsh., (Kirby), Steph.*
 congrua, *Er.*
 pallicornis, *Steph.*
 4 lucidula, *Er.*
 5 minima, *Er.*
 6 strictula, *Er.*
 MYLLÆNA, *Er., Ste.*
 Centroglossa, *Matth., Steph.*

- | | |
|---|--|
| *1 dubia, <i>Er.</i> , <i>Kz.</i> , <i>Ste.</i>
conuroides, <i>Matth.</i> , <i>Steph.</i> | 7 infuscata, <i>Kz.</i> |
| 2 intermedia, <i>Er.</i>
attenuata, <i>Matth.</i> , <i>Ste.</i> | GYMNUSA, <i>Karsten</i> , <i>Er.</i>
1 brevicollis, <i>Payk.</i> , <i>Er.</i> |
| 3 minuta, <i>Er.</i> , <i>Matth.</i> , <i>Ste. Man.</i> 2932
and 2936 | *2 variegata, <i>Kiesenv.</i> , <i>Kz.</i>
DINOPSIS, <i>Matth.</i> , <i>Steph.</i> , <i>Kz.</i>
Gymnusa, (<i>pars</i>), <i>Er.</i> |
| 4 gracilis, <i>Matth.</i> , <i>Ste.</i>
forticornis, <i>Kz.</i> | 1 erosus, (<i>Kirby</i>), <i>Steph.</i>
fuscatus ("furcatus" in MS.), <i>Matth.</i>
<i>Ste.</i> , <i>Kz.</i> |
| 5 elongata, <i>Matth.</i> , <i>Kz.</i> | laticollis, <i>Er.</i> |
| 6 brevicornis, <i>Matth.</i> , <i>Ste.</i>
gracilis, <i>Heer.</i> , <i>Hardy & Bold</i> , <i>Kz.</i> | |

G. R. WATERHOUSE.

Note on the Dromius glabratus of British Cabinets.—My attention has been lately called by Dr. H. Schaum, of Berlin, to the fact that there are two well-defined Dromii confounded under the specific title of glabratus,—not merely in England, but throughout Europe generally. True it is that they were originally recognised as distinct both by Megerle and Sturm, the latter of whom gave very excellent figures of them in the second volume of the 'Deutschlands Fauna,' in 1812, which it is surprising should have been afterwards so universally ignored. Never having myself critically investigated the British Dromii, and having, moreover, only taken the smaller one of the two species in question, I had never had reason to suspect that there might perhaps exist in this country a near ally to what we had always been accustomed to regard as the (minute) *D. glabratus*; and it was therefore with the greater pleasure that I received Dr. Schaum's communication, because it undesignedly confirmed my own independent views long ago arrived at in Madeira, where the two species under consideration also occur, and where it had never once entered into my mind (whilst overhauling them most carefully) to cite them as identical. During four successive visits, indeed, to those islands I have taken them abundantly, and they have been before me now, at intervals, for upwards of ten years; and yet I have never met with a single example which left me in doubt as to which of the species it should be referred to; and I confess I should not have hesitated to identify them with the glabratus and maurus of Sturm had I not been aware that those two insects (so admirably expressed in the figures above alluded to) were looked upon as coincident by European Coleopterists, whereas my Madeiran ones I could not but regard as truly distinct *inter se*. Assuming therefore that entomologists were not mistaken in their hypothesis, I concluded (as a matter of necessity) that one of my Madeiran species must be new; and since the smaller of the two was clearly identical with what we have always acknowledged (though wrongly) as the glabratus, I retained it as such, and called the larger one "negrita." Dr. Schaum, however, having lately informed me that he had observed exactly the same characters in Continental specimens as I had pointed out in my 'Insecta Madeirensia,' he suggested that the two Madeiran species were probably the same as those figured by Sturm, and as those (confounded under the name of glabratus) which he had been recently examining in Germany; and, with the view of inquiring into this still further, he requested me to inspect carefully the

Stephensian specimens of glabratus, femoralis, angustatus and maurus, in order to ascertain whether the two former were not referrible to the larger species (or glabratus proper), and the two latter to the smaller one (or maurus). This I accordingly did, and found that it was as he suspected; and in order therefore to clear up the synonymy of the two, I would record them as follows:—

DROMIUS GLABRATUS.

- Carabus femoralis, *Marsham, Ent. Brit.* i. 463 (1802).
 Lebia glabrata (*Meg.*), *Dufts., Faun. Austr.* ii. 248 (1812).
 Dromius glabratus, *Sturm, Deutsch. Faun.* vii. 54, tab. 171, f. c (1827).
 „ „ et femoralis, *Steph. Ill. Brit. Ent.* i. 25 (1828).
 „ „ (p.), *Daws., Geod. Brit.* 13 (1854).
 „ negrita, *Woll., Ins. Mad.* 9 (1854).

DROMIUS MAURUS.

- Dromius maurus (*Meg.*), *Sturm, Deutsch. Faun.* vii. 55, tab. 171, f. d (1827).
 „ „ *Steph., Ill. Brit. Ent.* i. 176 (1828).
 „ „ et angustatus, *Steph., Man.* 8 (1839).
 „ glabratus, *Woll., Ins. Mad.* 9 (1854).
 „ „ (p.), *Daws., Geod. Brit.* 13 (1854).

I may state that the former of these species may be readily known from the latter, not only by its uniformly larger size, somewhat less intensely black and not quite so brilliantly polished surface, but likewise by its elytra being proportionably less abbreviated and with their striæ more apparent, by its prothorax being rather more quadrate (or less narrowed behind), and by its head and antennæ being longer and more robust. Dr. Schaum also remarks (which I had not observed until he called my attention to it) that the claws of the glabratus are more powerfully denticulated than those of the maurus,—a structure which is very perceptible when viewed in Canada balsam, beneath the microscope. Whether the larger species is rare in this country, I am not able to say, considering that I have never taken it; but the smaller one (the true maurus) is abundant everywhere, darting across foot-paths in corn-fields and gardens, and teeming in gravel-pits and by the sides of dusty roads, in most parts of England. Even in Madeira it occurs in every island of the group, though it is there somewhat scarce; but in Madeira proper the larger one (or glabratus) is extremely common, though apparently confined to that island. We may just remark that the specific name of femoralis, *Marsham*, has in reality the priority over glabratus, *Dufts.*; nevertheless, since the diagnosis of the former was founded on an immature individual, and is so utterly worthless and undecypherable that it ceases to be a diagnosis at all, it can scarcely be allowed to supersede that which was afterwards given,—in conjunction with a correct description and from proper data.—*T. Vernon Wolleston*; 10, *Hereford Street, Park Lane.*

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ENTOMOLOGICAL SOCIETY.

March 2, 1857.—W. WILSON SAUNDERS, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—‘The Journal of the Royal Agricultural Society of England,’ Vol. xvii. Part 2; presented by the Society. ‘Proceedings of the Royal Society,’ Vol. viii. Nos. 23 and 24; by the Society. ‘Entomologische Zeitung,’ 17th Annual Part (1856), and Nos. 11 and 12 for November and December of the same year; ‘Linnæa Entomologica,’ Vol. ii.; by the Entomological Society of Stettin. ‘Monographia Cassidarum,’ auctore Carolo H. Boheman, Tomus tertius; by the author. ‘Anniversary Address delivered to the Berwickshire Naturalists’ Club, at Berwick, January 30th, 1856, by Robert Embleton, Surgeon, President;’ by the Club. ‘Nouvelles Considérations sur la Nidification des Guêpes,’ par H. De Saussure; by the Author. ‘Über eine neue Fliegengattung: *Raymondia*, aus der Familie der Coriaceen, nebst Beschreibung Zweier Arten derselben, Von Georg Frauenfeld;’ by the Author. ‘The Zoologist’ for March; by the Editor. ‘The Journal of the Society of Arts’ for March; by the Editor. ‘The Literary Gazette’ for March; by the Editor. ‘The Athenæum’ for January; by the Editor. ‘Elements of Entomology,’ No. 6; ‘A Manual of British Butterflies and Moths,’ No. 13; ‘The Substitute,’ Nos. 16—19; by H. T. Stainton, Esq. ‘Revue et Magasin de Zoologie,’ 1856, No. 12; 1857, No. 1; by the Editor, M. F. E. Guérin-Méneville. A cabinet containing British and foreign insects; by T. F. Dillon Croker, Esq.

Election of a Member.

T. F. Dillon Croker, Esq., F.G.S., of 6, Strand, was balloted for, and elected a Member of the Society.

Exhibitions.

Mr. Wallace exhibited two specimens of *Laphygma exigua*, bred from eggs laid by a female taken in the Isle of Wight, in July last; and read the following description of the larvæ:—

“Pinkish brown on the back, pinkish yellow underneath; a row of black spots down the back, two rows on each side, between which are white spiracles, or rather a darker ground than that outside the rows of black spots; head and tail greenish. Length, when full-grown, about 1 inch. Fed on plantain, remaining during the day rolled up in the leaves or roots. The eggs were laid about July 18, and hatched in three weeks; larvæ full-fed about September 12; and the perfect insects now exhibited emerged October 20.”

Mr. Douglas exhibited some small lepidopterous larvæ found at the roots of grass. He stated that he had lately taken a number of larvæ and Coleoptera, especially Staphylinidæ, in marshy ground at Hammersmith, by cutting off grass below the surface of the ground, and shaking it over a sheet of paper. Great numbers of insects

appear to hibernate in such situations. Amongst the Coleoptera thus taken were several specimens of the rare *Anchomenus Thoreyi*.

Mr. Stevens exhibited some drawings of larvæ of Natal Lepidoptera, made by Mr. R. W. Plant, and also the perfect insects bred from the larvæ represented, amongst which were several fine species of Bombyces and a new species of *Acraea*, the larva of which was represented armed with long, branched spines, and is interesting from the fact of the larvæ of this genus having hitherto been unknown.

Mr. Were read the following, by Mr. Newman, exhibiting the specimen described:—

Remarkable Variety of Arctia Caja.

“Sex male. Head, antennæ, tippets and abdomen have the normal colouring; all the other parts and colours abnormal; the prothorax, mesothorax, fore wings and entire disk of the hind wings an uniform brown, of that character which is frequently called mouse-coloured; there is not the slightest trace of the four colours (velvety umber-brown, cream-colour, intense purple-black and bright red) which usually adorn this beautiful insect; at the base of the hind-wings and along the abdominal margin are long, hair-like scales, of the normal red colour; beneath, the same uniform mouse-colour pervades the entire surface of the wings, except the base of the hind-wings, which is paler, and has the same long, red hairs which I have described on their upper surface. The wing-rays are remarkably prominent, and appear of a darker brown than the interspaces; but this apparent difference of colour I attribute solely to their prominence.”

Mr. Westwood exhibited a large larva (apparently of a *Sphinx*) preserved in spirits. The species is said to cause great injury to the maize crops on the Parenia River, in South America. He also exhibited a *Nonagria*, from the collection of Mr. Wollaston, the larva of which is very injurious to the sugar-cane in Madeira. Mr. Westwood observed that this insect is quite distinct from the species which damages the cane in the West Indies, which latter was originally introduced from Ceylon.

Structure of the Tarsi in Insects.

Mr. Westwood exhibited an extremely minute species of Coleopterous insect, of which several specimens were captured in the Island of Madeira by T. V. Wollaston, Esq., who had placed them in his hands for examination. The species belonged to the same small group as the genus *Orthoperus* of Stephens, and several other minute genera illustrated in Mr. Wollaston's '*Insecta Madeirensia*,' all of which were interesting on account of the structure of their tarsi. After referring to the additional interest attaching to the study of the modifications of structure of insects, or indeed of any other tribe of animals, consequent upon the investigation of homologies and the tracing of various structures to some normal type, Mr. Westwood referred to the modifications in the structure of the tarsi of Coleopterous insects, which he considered typically to consist of five joints; it was consequently interesting to know how one or other of these joints became lost in certain beetles whose tarsi possessed fewer than five joints, and whether this loss was effected either by the absolute want of a joint, or by its existence, in a coalesced state, with one or other of the existing joints. The great division of pseudotetramerous Coleoptera was then referred to by Mr. Westwood, who considered it an excellent and natural division, sufficient of itself to prove

the excellence of the tarsal system. This division contains the great mass of vegetable-feeding insects, consisting of the three great families of Longicorns (*Cerambyx*, *Linn.*), with a long body and long, straight antennæ; the weevils (*Curculio*, *Linn.*), with a short body and generally elbowed antennæ; and the Phytophagous beetles (*Chrysomela*, *Linn.*), with a short body and short, straight antennæ. The intimate connexion between the families Curculionidæ and Chrysomelidæ was proved by such genera as those described by Lacordaire, as Phytophagous; and by Schönherr, as Curculionideous; as well as by *Carpophagus* and *Rhæbus*; whilst the connexion between the Longicorns and Chrysomelidæ was effected by the Australian genus belonging to the Acrocerides, but having entirely the appearance of the Lepturides, as well as by *Donacia* and its allies. All these insects, from the nature of their mode of life on plants, require a firm footing, and their tarsi are consequently dilated, and furnished beneath with pads. This is the case with the three basal joints; but the fourth joint, either on account of the large size of the three preceding joints, or in order to strengthen the terminal claw-joint, was of a very small size, and was generally soldered to the base of the claw-joint. Here, then, could be no doubt that the fourth joint was becoming, as it were, obliterated; so that it would be easy to conceive a pseudotetramerous insect in which the soldering of the two terminal joints had become so close that all trace of the articulation would be lost; and if this occurred simultaneously with the narrowing of the basal joints we should have before us the hind-foot of a heteromerous insect. The insect under examination presented a different mode of the gradual top of a joint. The tarsi consisted of a short joint, rather swollen at the base of the foot, having several bristles placed obliquely at its extremity beneath. This is followed by a long, simple joint, obliquely truncated at its tip, with several bristles inserted obliquely at its extremity beneath, and having a very indistinct trace of articulation across the middle; it is nevertheless, however, furnished on the under side, at the point where this central articulation should take place, with one or two fine bristles, like those at the extremity of the basal joint. There then follows a small but distinct joint, at the end of which the long claw-joint is fixed. Here, therefore, the apparent loss in the number of joints was caused by the soldering together of the second and third normal joints. In its general form, and the number of joints and form of the antennæ, the insect is closely allied to the genus *Orthoperus*; there are, however, certain modifications of structure in the palpi which require further examination before we can definitely refer the insect to that genus. It was, however, important to determine what bearing this structure of the tarsi would have upon that of the genus *Orthoperus*, more especially since it was from various observations on this part of the structure of that genus that it had been regarded as a separate genus by Heer, who had named it *Pithophilus*, and by Redtenbacher, who called it *Microsphæra*. On examining some specimens of the legs of the common British species of *Orthoperus*, mounted in Canada balsam by Mr. Wollaston, we found the same general proportion of the joints; but the articulation between the short basal joint and the long second joint was almost lost; whilst the almost obsolete articulation in the middle of the long second joint, in the Madeira species, was quite distinct, the two terminal joints being alike in both. Although, however, the basal joint appeared lost by coalition with the second joint, there still remained evidence of its existence, in the presence of a small, oblique bristle on the under side of the foot, just where the extremity of the basal joint might be looked for. The two structures, therefore, illustrated each other, proving that these insects, and also leading to the belief that many

other anomalous and supposed tetramerous beetles, are in truth pentamerous insects disguised by the soldering together of two of the adjacent joints of the tarsi.

Mr. Waterhouse said that in some Coleoptera he had frequently observed bristles, such as Mr. Westwood had spoken of, in the middle of an articulation, more especially of the claw-joint in *Homalota*; and that therefore the presence of a bristle must not be taken as a certain indication of the existence of a joint.

Mr. Wollaston said that the bristles alluded to by Mr. Waterhouse, which occurred in the middle of the articulations, were very different from those at the joints. A moderate magnifying power would at once show the difference.

Effects of the Sting of a Scorpion.

Mr. Westwood communicated an extract from a letter of a correspondent in India relative to the effects of a sting of a scorpion. It is described as very severe, resembling the pain of a dozen wasp-stings concentrated in the same spot. The finger began to swell, and the whole arm pained excessively, with a feeling of sickness. Ipecacuanha powder was applied, in the form of a paste, to the sting, and brandy and water taken liberally. A native doctor, on being sent for, after rubbing the arm, at length suggested a native remedy, namely, a small pan of live charcoal, upon which were occasionally, as they melted, thrown pieces of wax, the smoke from which was allowed to arise over the wound, and which allayed the pain to such a degree that in about an hour and a half the patient was able to smoke. The stung finger was still insensible to the touch and very much swollen, the arm cold as ice, although it had been rubbed for two hours, whilst the sound hand and arm were hot. More brandy and water, with cigars, were tried. The patient fell into a long sleep, and awoke next morning with but slight remains of the pain of the sting.

Mr. Stainton called attention to a paper by F. Bashford, Esq., read before the Meeting of the Society of Arts, on the 4th ult., on certain experiments made with a view to improve the present silk yieldings of India.

Mr. Douglas read the following:—

Cicada hæmatodes.

“In the December number of the ‘*Entomologische Zeitung*’ is a note by Dr. Hagen, supplementary to his former papers in that journal on the singing *Cicadæ*. As the following has especial reference to English entomologists, I have translated it, with the hope that it may fall under the notice of some one who will render the desired service:—

“Concerning the types of *C. hæmatodes*, Herr Baron von Osten-Sacken wrote to me on the 27th May, as follows,—

“Three examples stand under this name in Linné’s collection. The one bearing the ticket, and the second, agreeing with the first, are both, to my view, not *C. montana*. Both of them are unspread, and have on the fore margin of the upper wings a brown cross vein, which is wanting in the examples of *C. montana* to be seen near them. Otherwise it seems to me the size is much the same, but the abdomen, as in *C. montana*, with reddish margined rings; the base of the upper wings yellowish. The third example is different from both of the others. All the veins are broadly brown, which gives the wings a variegated appearance; the abdomen on both sides

broadly red. In Mr. Westwood's collection is an English *C. montana*. He at first described it as new, but afterwards named it *C. hæmatodes*, though he did not recollect whereon he had founded the name.'

"It is not unlikely, according to this communication, that the two first specimens belong to the above-mentioned variety of *C. montana* with brown-bordered subveins, or to *C. adusta*. About the third I abstain from making any conjecture. Extremely desirable is it that some English entomologist would undertake a new examination and determination of the *Cicadæ* in Linné's collection."

Mr. Westwood considered that *C. hæmatodes* ought not to be placed amongst the singing *Cicadæ*, as it appeared that no one had ever heard it sing.

Dr. Gray observed that a lady of his acquaintance had captured two examples on the window of a house in the New Forest, which were quite mute.

Mr. Stevens said he had entomologized a great deal in the locality for the species, but never heard any sound produced by it.

Mr. Douglas had made particular inquiries of residents in the New Forest, where the species occurred, and all agreed that the insect never sung nor produced any sound whatever.

Mr. Baly read descriptions of twenty new species of *Doryphora*, &c., and exhibited some beautiful drawings of the insects.

Mr. Smith made some remarks in reply to Mr. Janson's observations on *Bledius*, read at the February Meeting.

Mr. Westwood and Mr. Janson spoke on the same subject.

April 6, 1857.—DR. J. E. GRAY, V.P., in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—Dr. Jacob Sturm's 'Deutschland's Fauna,' *Die Insecten*, Vol. xxiii.; presented by Dr. J. K. C. F. Sturm and Dr. J. W. Sturm, through W. Spence, Esq. 'Exotic Butterflies,' Part XXII.; by W. W. Saunders, Esq. 'Revue et Magasin de Zoologie,' 1857, No. 2; by the Editor, M. F. E. Guérin-Méneville. 'The Zoologist' for April; by the Editor. 'The Athenæum' for March; by the Editor. 'The Literary Gazette' for March; by the Editor. 'The Journal of the Society of Arts;' by the Society.

Election of a Subscriber.

G. Lewis, Esq., of 6, Kidbrook Place, Blackheath, was balloted for, and elected a Subscriber to the Society.

Exhibitions.

Mr. Foxcroft sent for exhibition two pairs of *Petasia nubeculosa* recently taken at Rannoch.

Mr. Stevens observed that last autumn he had reared some larvæ of this species from the eggs, but none of the perfect insects had yet emerged, although the pupæ appeared to be healthy.

Mr. Douglas exhibited a specimen of *Ancylocheira aurulenta*, taken alive at Forest Hill, but a native of North America, and not unfrequently sent in collections from Canada.

Mr. Syme exhibited two specimens of *Deilephila Galii* which he had lately bred. The pupæ had been exposed by him to a heat of 57°, during the day time, from the 26th January last; and the moths emerged on the 20th and 23rd of March.

Mr. Fortune exhibited samples of the article known as "musquito tobacco" in China. He stated the composition to be the saw-dust of pine and juniper, with the powdered roots of a species of *Artemisia* and a small quantity of arsenic. These are formed into a paste, and coated over slender sticks, of about two feet in length, which are burnt as candles, and never fail in driving the mosquitos from the room. Mr. Fortune added that the *Artemisia*, which is a species growing wild on the Chinese hills, is employed to fumigate bee hives, in order to take the honey without killing the bees.

Mr. Westwood remarked that he could do almost anything with bee hives without danger, by merely smoking a cigar during the operation; indeed, he had occasionally cut combs from a hive without even that protection.

Mr. Newman read the following paper, intituled

What is the Scutellar Depression?

"Every day we meet with people astonished at the vastness of their own knowledge. From old 'Katterfelto, with his hair on end, at his own wonders wondering for his bread,' to the modern pedagogue, whom we find in every 'twopence-a-week' day school, paralyzed by the idea 'that one little head could contain all that he knew,' there seems a well-connected series of egotists, indigenous, exotic, living and extinct, who are most complacent touching the subject of their own attainments. This complacency (I may as well plead guilty to its possession) received a rude check in my own instance when, two years ago, joining the rush of Coleopterists to that oasis in the desert of British Coleopterology, Dawson's 'Geodephaga,' I perceived that here and there, among the species which their reverend sponsor has so ably differentiated, there existed a character which, in common with my beetling brothers, I had entirely overlooked. This character is a most conspicuous depression at the base of the elytra, a sort of wide, shallow pit, reaching almost from shoulder to shoulder, and often extending down the suture to full one-third of its length without any compensating elevation of surrounding regions. At the bottom of this depression is the scutellum; and the depression, thus embracing the scutellar region, I have ventured to call the 'scutellar depression.' Such, then, being the scutellar depression, the question I would next ask is this,—What is its teaching? At first I plumed myself on having discovered a new species; but when I found that sixteen well-marked species had each a scutellar-depressed counterpart I relinquished this idea, as entailing too extensive an exercise of our cherished prerogative of name-giving: I thought it would be riding the pairs-of-species hobby a little too hard. Next I conjectured it might be sexual, and hoped to find it a ready mode of distinguishing the lady Carabs from the gentlemen; but the examination of more individuals threw this conjecture overboard. For my third guess I tried the wing difference, knowing that there were in some species winged and wingless individuals; but this failed: the depressed and elevated were equally provided with wings. I submitted them *seriatim* to the process of gently

raising the elytra, and peeping beneath them; but no secrets were concealed there, and, as may be assumed, none were revealed. One 'refuge for the destitute' still remained—immaturity; but even this would not do: the depressed individuals were alternately hard and soft; and this last guess neither elevated their spirits nor mine. The phenomenon, in fact, was purely exceptional, and its occurrence governed by no law that I could enunciate. The following list will show, in a tabular form, the result of the examination of fifteen species, thus afflicted, in the cabinets of Dr. Power, Mr. Douglas, and the Entomological Club. I have only to add that I sincerely hope that Mr. Westwood may give us an explanation, at once logical, luminous and conclusive, like that he has appended to my paper on heterocampous pairs of Lepidoptera. To have elicited those brilliant observations is, indeed, a high reward for my having jotted down a few passing thoughts. We cannot but admire, in Mr. Westwood, that more than Roman virtue which is ever ready thus to immolate his dearest friends on the altar of Science,—to drown them, as it were, in a flood of light.

Names.	Number of individuals examined.	Number of males depressed.	Number of females depressed.
<i>Elaphrus multipunctatus</i>	thirty-two		six
<i>Chlænium nigricornis</i>	twenty-three	two	
<i>Badister unipustulatus</i>	ten		four
<i>Anchomenus pallipes</i>	thirty-six	three	three
„ <i>oblongus</i>	thirty-eight	two	two
„ <i>marginatus</i>	thirty	one	
„ <i>viduus</i>	eighty	fourteen	thirteen
„ <i>fuliginosus</i>	forty-two	twelve	ten
„ <i>Thoreyi</i>	fifty-three	four	four
<i>Pterostichus erythropus</i>	fifty-two		one
„ <i>minor</i>	thirty-six		three
„ <i>nigrita</i>	sixty-one	four	
„ <i>anthracinus</i>	thirty	two	two
<i>Stenolophus vespertinus</i>	twenty-one	two	one
<i>Bembidium doris</i>	sixty	two	one

Mr. Westwood had considered the depression of the scutellar region alluded to was in some way connected with the presence or absence of wings, but on examination had found wings in both depressed and non-depressed specimens. He regretted that Mr. Newman had not investigated the subject in that point of view.

Mr. Wollaston thought the depression in question to be a malformation, arising from accidental causes, probably the result of some injury received during the earlier stages of the insect, as in all the species exhibited it was the exception and not the rule.

Mr. Lubbock called attention to one of the binocular microscopes which he placed on the table, and explained the advantages this construction is considered to possess over ordinary instruments.

Mr. Wollaston could bear testimony to the excellence of the object-glasses. He considered that, as so many persons have eyes of different focus, the eye-pieces of the binocular microscope should be so constructed as to meet this difficulty.

Grooves in the Eyes of certain Coleoptera.

Mr. Wollaston called attention to the existence of grooves in the eyes of certain Coleoptera, adducing as an illustration the genus *Trixagus* (or *Throsucus* of British cabinets), in which four out of five species with which he was acquainted possessed this structure, more or less developed, and which he had not seen anywhere alluded to. He stated that the impression was usually of a somewhat curved form, and extended, from the edge nearest to the insertion of the antennæ, across the centre of the eye, but that it seldom reached the opposite margin, becoming gradually evanescent as it approached it; that in the common *T. dermestoides* it was continued but little more than half-way across, in the *elateroides* of Heer it occupied at least two-thirds of the entire distance, whilst in the *gracilis* of his 'Insecta Maderensia' it very nearly touched the opposite part of the circumference. The antennæ of *Trixagus* being implanted very near to the inner margin of the eye, he believed that this *sulcus* had reference to the lodgment of those organs when the insect was in a state of partial activity, and had removed them from out of the grooves of its anteriorly produced prosternum,—an hypothesis which was rendered the more probable since the only species in which he had as yet remarked the impression to be totally absent was one from Madeira (which he had lately described under the name of *integer*), in which the antennæ are inserted further from the eye than in the normal members of the group, and in which, consequently, any such ocular receptacles would be superfluous.

Mr. Tapping communicated some notes by Mr. Fedarb, of Dover, on Acari found in a photographic portrait-case, alluded to by that gentleman at a former Meeting of the Society; and also a notice, by the same, of the ravages committed by a species of *Atropos* on the Barbadoes nut, accompanied by drawings of the insects.—*E. S.*

 ZOOLOGICAL SOCIETY.

May 12, 1857.—DR. GRAY, F.R.S., in the chair.

Exhibitions.

Mr. Tegetmeir exhibited to the Meeting a very large adult cranium of the great chimpanzee (*Troglodytes Gorilla*). This specimen, which was brought from the Gaboon by Captain Simmonds, is larger than any of the casts in the College of Surgeons, or the cranium belonging to Dr. Savage, of America, which was described by Professor Owen and figured in the 'Transactions' of the Society, and appears to be the most mature specimen known.

Mr. Sclater exhibited specimens of two undescribed species of the Tyrannine genus *Todirostrum*, from a collection received by Sir William Jardine from the Rio Napo, and proposed to call them *T. calopterum* and *T. capitale*; also two specimens of an apparently hitherto unnoticed bird of the same genus, from his own collection, which he characterized under the name of *T. exile*; the latter species was from New Granada. Mr. Sclater also called the attention of the Society to specimens of the N. American *Parus atricapillus* and *Parus meridionalis* from S. Mexico, and pointed out the distinguishing characters of these two closely allied species.

Mr. F. Moore communicated a paper 'On the Habits of some Birds observed in the Plains of N.W. India in 1849,' by the Rev. T. Philipps, Baptist missionary. The names of the birds described in this paper (sixty in number) had been determined by comparison with specimens in the museum of the Hon. East India Company.

Mr. Moore read a paper containing descriptions of some new species of Lepidopterous insects from Northern India, characterized as follows:—*Pieris Nama*, *E. Doubleday*, *MS.*; *P. Seta*, *Moore*; *P. Sanaca*, *Moore*; *P. Indra*, *Moore*; *P. Durvasa*, *Moore*; and *Papilio Janaka*, *Moore*.—*D. W. M.*

NORTHERN ENTOMOLOGICAL SOCIETY.

March 14, 1857.—B. COOKE, Esq., President, in the chair.

Election of Members.

The Rev. P. H. Newnham, of Guildford; William Simmons, Esq., of Wentworth; John Angelo Wasse, Esq., of Manchester; and — Linton, Esq., of Manchester, were elected Members of the Society.

Exhibitions.

The Rev. H. H. Higgins brought for exhibition two of the drawers belonging to the local cabinet of the Liverpool Royal Institution, filled with Diptera and Hymenoptera which he had captured within fifteen miles of Liverpool. The manner in which the collection was got up elicited great admiration, and the extent of the collection took some of the members by surprise. The whole were collected, named and arranged, by Mr. Higgins, in two seasons.

The President exhibited a box of Diptera which he had been naming. They were collected by Mr. Birchall, in Yorkshire.

Mr. Simmons sent a large packet of the larvæ of *Depressaria assimilella* for distribution.

Mr. Gregson exhibited a box of Tineina which Mr. Buxton had kindly sent to the Meeting. Amongst them were several interesting species.

Mr. E. Birchall brought several large boxes of South-American Lepidoptera, principally butterflies and Sphinges, containing many hundreds of specimens, which he distributed amongst the members. They were collected by Mr. Henry Birchall, in the last week in July, 1856, during his ascent of the river Magdalena, principally at the stations where the steamer called for fuel, &c. Amongst the Sphinges were many rare species, nine being quite new to Mr. N. Cooke's already extensive collection of the Sphinges of the world.

Mr. Birchall also brought a large box full of beautiful bird-skins, principally humming birds, for distribution; and afterwards exhibited a box of British Lepidoptera, in which was *Dasyampa rubiginea*, taken on ivy, last season, near Dublin, being a new locality for this species, hitherto considered rare. An interesting discussion ensued, in which a member observed that he had no doubt *rubiginea* might be taken freely near Conway, and called the attention of the Meeting to Godarth Wood, between Conway and Llandudno, as a most promising locality for that and other

species. In the box was a fine *Acronycta Alni*, also from Ireland; and a *Noctua* never before taken in Britain, *Agrophila Leo*, *Gu.* ii. p. 205, a native of America. The specimen was taken by Mr. Birchall, in his garden near Leeds. He observed that there were many American plants growing in the grounds and in the greenhouses, and it had probably been imported with them.

Mr. N. Cooke exhibited the whole of his foreign Sphinges, observing that, in addition to the nine species before named, Mr. Birchall had enabled him to complete several series and to improve many specimens.

Mr. Cooper observed that amongst the humming birds Mr. Birchall had given him for the Warrington Museum were many rare and interesting species.

The Secretary read a summary of the 'Transactions' of the Society for the year 1856, from which it appeared the Society was in a most flourishing and satisfactory condition.—*C. S. G.*

"*Reason and Instinct.*"—Having read and re-read Mr. Atkinson's paper, intitled as above, I am also of opinion that "the subject has never been so lucidly treated before." Nevertheless, I must demur to the following passages:—"And therefore I expect to find, in the Bible, no information, properly so called, on geological matters, and none in Natural History, or Science, or Philosophy, in whatever department. Allusions and references to such topics I may and do expect, but conveyed, notwithstanding, in words uncharacterized by precision or scientific accuracy." Surely the writer, when he penned these lines, must have forgotten the words of Jeremiah, "Yea, the stork in the heaven knoweth her appointed times; and the turtle and the crane and the swallow observe the time of their coming." Now what says Montagu, in his 'Dictionary,' to which I beg to refer the author of "*Reason and Instinct*:"—*The Crane*: "It is said to fly remarkably high in its passage, even out of sight." And what says Temminck, in his '*Manuel d'Ornithologie*,' ii. p. 557:—*Grue Cendrée*: "Mais le plus souvent les volées ne font que passer rapidement en se rappelant par un cri très sonore, qu'on entend lors même que la bande est élevée à perte de vue." But to return to Montagu; let us see what he has to say about the coming of the dove:—"The turtle visits the southern parts of England in the spring, and re-migrates the beginning of September." White's '*Natural History of Selborne*,' p. 40 (note by editor):—"The turtle dove (*Columba turtur*, Linn.) is common enough in the southern counties of England, arriving in the end of April or beginning of May, and departing in September." With regard to the "coming" of the swallow, I may perhaps be excused for referring to my own notes, published in the '*Zoologist*' (*Zool.* 4994), where it will be seen that, in the year 1839, the first swallow "came" on April 21st; in 1840, April 15th; 1841, April 27th; 1842, April 23rd; 1853, April 12th; 1854, April 15th. What is this but to "observe the time of their coming?" What naturalist, may I ask, in conclusion, could have told us more in four lines than the inspired writer?—*Henry W. Hadfield; Tunbridge, March 7, 1857.*

Proceedings of Natural-History Collectors in Foreign Countries.

REV. HAMLET CLARK. — Rio Janeiro, March 14, 1857. — In my last communication (posted on February 25th) I pointed out the localities around Rio that we had visited. I will now notice the modes of collecting Coleoptera that we found profitable, and one or two other points that to a future tourist may be useful.

MODES OF COLLECTING COLEOPTERA.

It is impossible for any one, without much larger opportunities than we have had, to speak with decision as to the best modes of obtaining species; different localities and different seasons of the year would demand, doubtless, different treatment: the following are, however, generally the results of our collecting experience during the hot season through the different Serras.

The herbage and undergrowth of plants in tropical countries are, as might be expected, entirely different from what we see in England: there grass and vegetation are short, easily commanded by a sweeping net; here we find it rank and luxuriant and gigantic, so that a sweeping net has as little value in obtaining species as it would have among branches of oak or pine at home: some larger substitute must be found. I used at Constanca, and with some success, a large sheet with two poles, for beating; but this was heavy and cumbersome, and required one or two assistants. The best instrument was an umbrella inverted; this is light and portable, of easy application, and on the whole the best instrument for collecting. Three well-made, steel-ribbed alpacas will, with care, suffice for an expedition of three or four months; the seams well stitched, and handles curved (for pulling down branches), and of the same wood as the stem.

Sugaring by night is certainly very profitable for Lepidoptera, ants and cockroaches; probably, also, for Coleoptera. Mr. Fry was very successful in attracting insects by the light of a strong lamp, and the species that we have taken by this means are a sufficient proof of its value, although if a coleopterist has his days for collecting he will find it better to spend his nights in rest. Decaying timber is of course valuable; many species of the fine genus *Brenthus* are found under the bark of felled *Canella Batella* (a species of tree remarkable for its hard and heavy wood); the diamond beetles on the leaves of, and on the ground under, a wild orange tree, "*Larangeira do Mato*,"

easily recognised by the sharp spurs on its bark; and on the leaves of some tree allied to the orange are found several species of *Cassidæ*.

Milho, if in the sunshine, deserves examination for the insects that bask on its broad leaves. Coffee produces nothing, and seems to permit nothing even in its neighbourhood. Felled trees often harbour on their under side, shaded from the glare of the sun, several species; but logs of wood and stones on the ground are generally unproductive, probably not affording sufficient protection from the fierce heat of mid-day. Of water insects I much regret to say I know nothing, assuming, which I do not believe, that species are abundant here. To collect them is at present impossible: the torrents of rain have turned each brook into a formidable stream, and every valley into a quagmire. I have hardly seen a pond or a ditch since I left England.

TRAVELLING APPARATUS.

All insects must be kept in tin cases, as the only means of protection from their three formidable enemies, "barratas" or cockroaches, ants and damp. It will add much to the convenience of travelling if these cases are made in pairs (about $2\frac{1}{2}$ by $1\frac{1}{2} \times 1\frac{1}{2}$ feet, or to hold sets of Downie's middle-sized boxes), one pair to be the cargo of each mule. Two pairs of these will contain boxes, cases of card-frames, bottles of gum, chloroform, spirits of wine, &c., sufficient for a single coleopterist for a journey of four or five months, for a lepidopterist for three. Each entomologist can best tell what details of apparatus he will require; he should, however, certainly possess an etna for killing insects by hot water (ours, that we obtained from Messrs. Adams, Haymarket, are strong and serviceable), a couple of short, stout chisels for bark and decaying wood, and a small tin box for keeping insects relaxed and damp, and at the same time secure from cockroaches. Whatever he will be likely to want must be brought from England: nothing, not even gum tragacanth, can be obtained here, except at a vast outlay of patience.

As to other matters, he will have to walk over all sorts of ground, with a temperature of from 90° to 120° or even more; therefore stout shoes (or boots, as a protection against snakes, which abound) and light dress will be appreciated.

Should the entomologist be disposed to travel into the interior, he should, if possible, obtain and follow the advice of some friend who knows the country. Travelling is perfectly safe; it supplies a never-failing fund of objects of interest; it presents no serious inconve-

niences. Let him satisfy himself that he can live upon the fare of the country, black beans, farhino, and carre secca or jerked beef, with occasionally, as a treat, bacon or an old hen; then he will require only time, patience and money to make his expedition both profitable and delightful.

Assuming that the two former are not wanting, I will notice the third. I suppose that two entomologists are fellow-travellers. They will require six mules; two saddle mules for themselves; one for their black, who attends to the mules;* and three cargo mules, one carrying a couple of trunks for linen, &c., the two others entomological boxes and stores. These mules must be bought, at prices ranging, according to the locality and demand, from 150 to 300 milreis. I say they must be bought; for if hired (as they *may* be) the amount of hire for a journey of three weeks will *exceed* the amount of purchase-money; but when bought they will fetch at the end of the journey, however long, supposing that they have been tolerably cared for, at least two-thirds of the sums that were originally paid for them.

With the mules must be bought, also, bridles, saddles and knee-boots (if not brought out from England), and pack-saddles, hide-coverings and halters for the cargo mules. The outlay account then will stand as follows:—

	Milreis.
2 saddle mules, at 250 milreis	500
1 saddle mule, at 180 ditto	180
3 cargo mules, at 200 ditto.....	600
Mule furniture.....	100
	1380

making a total of 1380 milreis, or about £150. Of this at least £100 will be repaid at the end of the journey by the sale of the animals, leaving £50 as the amount of the purchase account. The daily expenses will be on the average

	Milreis.
Food, milho and grass for mules	6
Dinner, supper and bed for two	6
Black's food and bed	1
	13

* The choice of a proper person as servant will be the only serious difficulty likely to present itself. As a general rule it will be better to have a freed black, and not a

Of this, which is a high estimate, the expenses of personal board and lodging may with ease be saved, if any sort of introduction is carried to the proverbially hospitable Brazilians of the interior. I have been assured by many that often they have found it to be impossible to spend any money at all.

HAMLET CLARK.

MR. A. R. WALLACE.*—Macassar, December 1st, 1856.—After this you will probably not receive another letter from me for six or seven months, so I must give you a full one now. I am busy packing up my collections here, but have been unfortunately caught by the rains before I have finished, and I fear my insects will suffer. The last four or five days have been blowing, rainy weather, like our February, barring the cold. In a bamboo house, full of pores and cracks and crannies, through which the damp air finds its way at pleasure, you may fancy it will not do to close up boxes of insects in such weather. However, as the wet season has not regularly set in, we may expect a little sun and dry air soon, and then I am ready to pack and close everything. The neighbourhood of Macassar has much disappointed me. After great trouble I discovered a place I thought rather promising, and after more trouble got the use of a native house there, and went. I staid five weeks, and worked hard, though all the time ill (owing to bad water I think), and often, for days together, unable to do more than watch about the house for stray insects. Such a weakness and languor had seized me that often, on returning with some insects, I could hardly rise from my mattress, where I had thrown myself down, to set them out and put them away. However, now that I am back at my cottage near Macassar, with a few of the comforts of civilized life, I am nearly well, and will tell you what I have done.

My collections here consist of birds, shells and insects. In none of these, I am sorry to say, have I got anything very remarkable. The birds are pretty good as containing a good many rare and some new species; but I have been astonished at the want of variety com-

slave, as the latter, at a distance from his master, may turn indolent and refractory. However, the traveller should obtain the advice and aid of some resident Englishman. Mr. Bennett, of Tijuca, the proprietor of the boarding-house there, would be well competent, and I doubt not willing, to render any assistance.

* Communicated by Mr. S. Stevens.

pared with those of the Malayan Island and Peninsula. Whole families and genera are altogether absent, and there is nothing to supply their place. I have found no barbets, no Eurylaimi, no Trogons, no Phyllornes; but, what is still more extraordinary, the great and varied family of thrushes, the Ixodinæ and the Timalias, seem almost entirely absent; the shrikes, too, have disappeared, and of flycatchers I have only seen one small species. To supply this vast void there is not a single new group, the result of which is that in about equal time and with greater exertions I have not been able to obtain more than half the number of species I got in Malacca. Indeed, were it not for the raptorial and aquatic birds I should not have one-third. You hint that in Borneo I neglected Raptores. They are too good to neglect; but there were none. Here in two months I have got fifteen species, many more than all my collections of the two preceding years contain. Of these six are represented by single specimens only; but of the rest I send you thirty fine specimens, and they will, I doubt not, contain something new. Among my rare birds I may mention the two hornbills peculiar to Celebes (*Hydrocissa exarata*, Tem., *Buceros cassidix*, Tem.); the anomalous Scythrops Novæ-Hollandiæ, *Lath.*; the handsome cuckoo, *Phænicophaus callirhynchus*; the *Pica albicollis*, *Vieill.*; and the remarkable *Pastor corythaix*, *Wag.*, which unites the characters of the starlings with the form and compressed crest of the *Calypomena* and *Rupicola*.

My collection of land shells is at present very scanty; but then I have only been in one locality. It consists of five species of *Helix*, six of *Bulimus*, and one *Cyclostoma*. Of these I hope some will be new. There is a pale purplish *Helix* of the form of *H. glutinosa*, but in most specimens thickly speckled with blackish dots. Besides the common *Bulimus citrinus*, there are two closely allied species, one lightly marbled with brown near the base only, the other all over richly marked in a kind of zigzag pattern. Of both these I send a pretty good series. There are also, I think, three other small species, rather pretty, but very scarce. The *Cyclostoma* appears to be the same as the small, transparent, white one which was scarce at Sarawak.

Now for the insects, which are the most interesting to so many of my friends. They will, I fear, disappoint you, as they have, with a few exceptions, disappointed me. But you must remember the circumstances. Almost all the good insects have been collected during a five weeks' stay at a tolerable place in the interior, during which

time, however, I was so unwell as not to make more than five visits to the forest, to be near which was the especial purpose for which I went there. It was also the very end of the dry season, which I have always found the worst time for insects. Notwithstanding these drawbacks, my collection presents some features of interest. To proceed in order, the Coleoptera shall be first considered. The number of species yet obtained is only 254, some groups being rich, others very poor. My favourite Longicorns were so scarce as hardly to be worth looking for; yet among the few that fell in my way I have a new *Agelasta*, a fine *Astathes*, and a very curious insect with dilated thorax in the male, which will form, I think, a new genus, near *Temnosternus*, *White*. The *Geodephaga* are proportionately my richest group, as since the rains have commenced I have taken many curious small *Carabidæ*, among them three species of *Casnoniæ*. I am rich in *Cicindela*, having six species, but of *Colliuris* and *Therates* only one each. *Cicindela Heros*, *Fab.* (which I believe is rare) is my largest species. In Boisduval's 'Faune de l'Océanie' it is said to come from the isles of the Pacific. *Therates flavilabris*, *Fab.*, is also said to inhabit New Ireland, but it is found here, with the var. *T. fasciata*. The habitats given to insects in that work, indeed, from the French voyagers, appear so liable to error that little dependance can be placed upon them. They seem to have been trusted altogether to memory, or perhaps ticketed on the voyage home. For example, to *Scarabæus Atlas* is this remark, "It is noted as from Vanikoro I., but M. D'Urville is certain that it was taken at Menado in Celebes;" again, to *Tmesisternus septempunctatus*, "If there is no mistake on the ticket, this species is from Amboina;" *Lamia 8-maculata*, "It is ticketed as coming from Vanikoro, but I believe it is rather from N. Guinea or Celebes;" and *L. Hercules*, "It is found in Amboina," while on the plate it is said to be from Celebes. Other examples of a similar kind are to be found; and they lead me to suppose that voyagers and amateur collectors seldom ticket their specimens *at the time of collection*, but trust to memory in a matter in which no memory can be trusted. Even after making a collection at two localities only, and of only a hundred species each, I would defy any one to ticket the whole correctly: how, then, must it be when dozens of places are visited in succession, and the species taken at each vary from perhaps a dozen to a thousand. But we must return to our collections. In *Lamellicornes* I have been tolerably successful. I have found ten species of *Cetoniadæ*; a *Tæniodera*, common, I think; and the other nine all *Protætias*, a closely allied genus. All except one

are small, and of that one (an inch long) I have only a pair, differing in colour, one black, one dark green, but, as they are marked with red exactly alike, I suppose them to be male and female. Among the smaller ones are some very pretty species and varieties, and of some of these I have a tolerable series. They are very local. All the best I got off one flowering shrub, which I visited daily for a week, when some heavy rains destroyed the remnant of the blossoms; and I never found another equally productive. There is also a curious little brown thing, like a *Trichius*, which eats away roses and orange-blossoms. I have two *Euchloras*, which I think are rare, *E. dichropus*, *Blanch.*, and a large one, very like *E. viridis*, but which seems to agree best with *E. Dusumieri*, *Blanch.* Besides these I have only a lot of obscure *Melolonthidæ*, *Aphodii*, &c., &c. I had quite forgot, however, among the *Carabidæ*, what will perhaps be considered my greatest prize, *Catadromus tenebrioides*; but it is very scarce. I have not found a single *Lucanus*; and the natives to whom I showed figures of them and other large insects, such as *Scarabæus Atlas*, denied their existence in the country; but no dependence is to be placed upon them, as they have not even a distinctive word for "beetle" in their language. In the other groups I have nothing particular, except a few pretty *Rhyncophora* and *Phytophaga*.

It is an ill wind, however, that blows nobody good; and the scarcity of *Coleoptera* will be highly satisfactory to some of my hymenopterist friends, since it led me to pay more attention to their favourite group than I should otherwise have been inclined to do. After the first showers fell, bees and wasps appeared in plenty, and I worked very hard at them. They are notoriously sunshine-loving animals; and for many an hour, when my health ought not to have permitted it, have I stood in the noonday sun, at some flowering shrub where they abounded, armed with net, pliers and bottle, intent upon their capture. On the whole I have made, I consider, a very fine collection for such a very short time (less than two months). I have obtained in all 142 species, but of these 120 (about) are *Aculeata*, and, only about 12 being bees, the great majority are wasps, &c., of which many are very fine, large things, and the greater part seem to me different from any I took in Malacca or Borneo. I have also not neglected the small species, and I doubt not there will be a host of novelties.

The *Diptera*, *Hemiptera*, ants, &c., I have scarcely collected at all, but they promise well for another season.

The Lepidoptera come last, and, though few in species, present a fair amount of novelty. On my very first visit to the forest I took three fine specimens of the magnificent Ornithoptera Remus, or a variety of it, for the female does not agree with Boisduval's very imperfect description of it. This made me think it common, but I have since never taken another, except an imperfect female. The common Ornithoptera here is a variety of Amphriscus, with the upper wings entirely black in both sexes. Of Papilios I have three new species, one near P. Sarpedon, but the band narrow, dark green-blue on a velvety black ground, divided into rounded spots on the upper wings and linear ones on the lower. Of this I have a fine series. Another is close to P. Eurypilus, but quite distinct from all I have seen or that are described, by the abdomen above being pure white, which, with the white anal margin of the lower wings, and the white down which extends broadly over them, give the insect a most beautiful appearance when on the wing, and enabled me to pronounce it a new species the first time I saw it hovering over a muddy hole. It flies very strong, is rare and difficult to capture, and I secured very few specimens. The third is a rather obscurely marked species, near P. Helenus. I have only one specimen. Of Papilio Ascalaphus, Bois., I have taken the male and female. P. Polyphontes is common, but I only obtained two or three good specimens. Of Pieris and Euplœa I have several pretty things, and one or two good Nymphalidæ; but the best part of my collection, and what will perhaps please most, are the Lycænidæ, to which I have paid much attention. I have about 35 species out of 115 butterflies, and of half of these I have got the two sexes. With health, a better season and a better locality, I have no doubt a very fine collection of insects might be made in this part of Celebes, and these I hope to have next dry season, which I have arranged, if all goes well, to spend at Bontyne, situated at the South end of the Peninsula, and close to one of the highest mountains in Celebes.

I must now tell you where I am off to in the mean time. I am going another thousand miles eastward to the Arru Islands, which are within a hundred miles of the coast of New Guinea, and are the most eastern islands of the Archipelago. Many reasons have induced me to go so far now. I must go somewhere to escape the terrific rainy season here. I have all along looked to visiting Arru, as one of the great objects of my journey to the East; and almost all the trade with Arru is from Macassar. I have an opportunity of going in a *prou*, owned and commanded by a Dutchman (Java born), who will take me

and bring me back, and assist me in getting a house, &c., there; and he goes at the very time I want to leave. I have also friends here with whom I can leave all the things I do not want to take with me. All these advantageous circumstances would probably never be combined again; and were I to refuse this opportunity I might never go to Arru at all, which, when you consider it is the nearest place to New Guinea where I can stay on shore and work in perfect safety, would be much to be regretted. What I shall get there it is impossible to say. Being a group of small islands, the immense diversity and richness of the productions of New Guinea will of course be wanting; yet I think I may expect some approach to the strange and beautiful natural productions of that unexplored country. Very few naturalists have visited Arru. One or two of the French discovery-ships have touched at it. M. Payen, of Brussels, was there, but stayed probably only a few days; and I suppose not twenty specimens of its birds and insects are positively known. Here, then, I shall have tolerably new ground, and if I have health I shall work it well. I take three lads with me, two of whom can shoot and skin birds.

A. R. WALLACE.

MR. H. W. BATES.*—Ega, Upper Amazons, May 30, 1856. I received your last of the 7th of January by this month's steamer, as well as the parcel sent at the same time: it was a happy day for me, as I had not received any periodicals or new books since May, 1855; for the last parcel, sent in September, is not yet to hand, and I have no doubt it is detained at Pará. You, in England, in the midst of books and intellectual treasures,—in fact, bored by their profusion,—cannot form any idea of the luxury of receiving, in these savage solitudes, such a parcel.

You say you like my descriptions of the country, &c., and would be glad of accounts of my daily excursions, captures, the natives, &c. There is not so much variety of ground and scenery in this country as you doubtless imagine, and the hunting districts are very much circumscribed. Ega is situated on a point of land formed by the junction of a small tributary with the river Teffé, and is about eight miles distant from the Amazons. The Teffé, at Ega, is six miles broad, without islands: the tributary (which has no name, being simply called the "Igarapé," or creek, from "Igára," canoe, and "pé," path) is a

* Communicated by Mr. F. Bates.

quarter of a mile broad at Ega, but five miles inland it contracts into a mere rivulet, running through a broad dell of lofty trees: when the waters are high they fill this dell to the depth of six or eight feet, and the small canoes paddle away for miles through regular water-paths cut through the lower trees. This is the general characteristic of the lower lands of the upper Amazons,—forest dells with narrow streams running through them in the dry months, and navigable waters, under a dense shade of forest, in the wet months. The higher lands are called “Terra firme;” they are never very high, but never flooded. The forest behind Ega is “terra firme;” soil clayey, no rock, not a pebble to be seen in a day’s journey: the land is undulated, furrowed with deep dells, but all covered with one uniform and impenetrable forest. Behind Ega there is a soft, grassy slope, at the top of which appears a pretty straight, high hedge: this hedge is the border of the forest, and there is nothing else but a dense forest inland for hundreds of miles. There are three or four very narrow paths from Ega inland, but the longest of these does not extend beyond three or four miles. This same forest clothes all the banks of the rivers, and limits the view everywhere; in fact, the only features in the landscape are forest and stream, forest and stream,—no hill, no cliff, no cultivated land. A village of 300 to 500 inhabitants every 100 miles, more or less, and a very few huts of settlers in the intervals. Ega has just 107 houses, three-fourths of which are mere huts, and the inhabitants generally “at home” are about 700, but another 500 may be added as the floating population, being always out fishing or on board canoes: there are four or five Portuguese, three French and one Italian, residents, and about a dozen or twenty Brazilians from Parà, &c.; these are all pure whites, the whole of the remainder have more or less Indian blood; 600 may be considered as pure Indians; in fact, many are brought from the savage tribes on the rivers Japurá, Journá, &c. To see Indians in their purely original state you must journey to those rivers; but all the coloured inhabitants of Ega differ but little in civilization, habits, arms, utensils, &c., from the pure savage: they are very taciturn, idle and phlegmatic; so apathetic that they never appear to feel any of the emotions or affections—love, gratitude, admiration, joy, enthusiasm; they even do not covet things, except rum or eatables, or sugar; in fact, they are so uninteresting and unamiable a set of animals that you must excuse my giving any further account of them.

The charm and glory of the country are its animal and vegetable productions. How inexhaustible is their study! Remember that, as

to Botany, in the forest scarcely two trees of the same species are seen growing together. It is not, as in temperate countries (Europe), a forest of oak, or birch, or pine—it is one dense jungle: the lofty forest trees, of vast variety of species, all lashed and connected by climbers, their trunks covered with a museum of ferns, Tillandrias, Arums, Orchids, &c. The underwood consists of younger trees,—great variety of small palms, mimosas, tree-ferns, &c., and the ground is laden with fallen branches,—vast trunks covered with parasites, &c. The animal denizens are in the same way of infinite variety, not numerous, as to give the appearance at once of tumultuous life, being too much scattered for that; it is in course of time only that one forms an idea of their numbers. Four or five species of monkey are constantly seen. The birds are in such variety that it is not easy to get two or three of the same species: you see a Trogon one day, —the next day and day after, another each day, and all will be different species. Quadrupeds or snakes are seldom seen, but lizards are everywhere met with, and sometimes you get tortoises, tree-frogs, &c. Insects, like birds, do not turn up in swarms of one species; for instance, you take a dozen Longicorns one day, and they are sure to be of eight or ten distinct species: one year of daily work is scarcely sufficient to get the majority of species in a district of two miles circuit.

Such is the scene of my present labours, and all the rest of the Amazons is similar, though less rich, the river Tapajos alone differing, being a mountainous country. Having thus my work at hand, I will tell you how I proceed. My house is in the centre of the town, but even thus only a few minutes' walk from the edge of the forest. I keep an old and young servant, on whom I rely for getting eatables and preparing my meals, so as to leave me unembarrassed to devote all my thoughts to my work. Between nine and ten, A.M., I prepare for the woods: a coloured shirt, pair of trousers, pair of common boots, and an old felt hat are all my clothing: over my left shoulder slings my double-barrelled gun, loaded, one with No. 10, one with No. 4 shot. In my right hand I take my net; on my left side is suspended a leathern bag with two pockets, one for my insect-box, the other for powder and two sorts of shot; on my right side hangs my "game-bag,"—an ornamental affair, with red leather trappings and thongs to hang lizards, snakes, frogs or large birds; one small pocket in this bag contains my caps, another papers for wrapping up the delicate birds, others for wads, cotton, box of powdered plaster, and a box with damped cork for the Micro-Lepidoptera; to my shirt is pinned my

pin-cushion, with six sizes of pins. A few minutes after entering the edge of the forest I arrive in the heart of the wilderness—before me nothing but forest for hundreds of miles. Many butterflies are found on the skirts of the forest: in the midst of numbers flitting about I soon distinguish the one I want—often a new one, *Erycinide*, *Hesperia*, *Thecla*, or what not. Coleoptera you see nothing fine of at first—a few minute *Halticæ* on the leaves, or small *Curculios*, or *Eumolpi*: when you come to the neighbourhood of a newly-fallen tree is soon enough to hunt closely for them; not only wood-eating species, but all kinds seem to congregate there—*Agras* and *Lebias* in the folded leaves—grand *Cassidas* and *Erotyli*, *Rutelas* or *Melolonthids*, *Gymnetis*, &c.; often a *Ctenostoma* running along some slender twig: it requires a certain kind of weather for Coleoptera, and some days all seem to be absent at once.

Whilst I am about these things I often hear the noise of birds above—pretty *Tanagers* or what not. You cannot see the colours of red, cobalt-blue or beryl-green when they are up on the trees, and it takes months of experience to know your bird. I have sometimes shot at small, obscure-looking birds up the trees, and when they have fallen have been dazzled by their exquisite beauty.

I walk about a mile straight a-head, lingering in rich spots, and diverging often. It is generally near two, P.M., when I reach home, thoroughly tired: I get dinner, lay in hammock awhile reading, then commence preparing my captures, &c.: this generally takes me till five, P.M.; in the evening I take tea, write and read, but generally in bed by nine.

July 18th.—I had written as above, when the steamer arrived unexpectedly, two days before its time. Our post is only once in two months, so I was compelled to wait the finishing and sending of this letter till the present month. I have worked very hard lately, spending my days just as I have described in the former part of this letter. Birds, however, I can scarcely find now. I have collected a good many *Micro-Lepidoptera* of late: they are extremely numerous here; in fact, there are many hundred species, I have no doubt, in South America, and all, I suppose, will want describers and names: there is nothing extraordinary in their appearance,—most of them have just the look of English species, and are such as would not particularly surprise one to turn up in a wood there.

Some of my best captures lately have been in *Lepidoptera*: a *Morpho*, new to me,—pale, satiny blue, rather small, beneath pale,

with fulvous rings: another new *Agrias*,—fore-wings rich crimson, except the extreme tips, with a cobalt bloom; hind-wings almost wholly blue; beneath much more variegated than in the other species. In Coleoptera, an *Allorhina* all bronze velvety, 14 lines long,—it is about the finest Coleoptera I have yet taken, to my thinking; also two beautiful new *Gymnetes*. In Hymenoptera, a new form of ant,—must be a new family, equal to *Myrmicidæ* and *Formicidæ*, because it has no nodular segment to abdomen; the neuration and prothorax of the female is very different from anything in *Scoliidæ* or *Mutillidæ*. In the same order I have also a male of Mr. Smith's *Euglossa pulchra*, which has greatly pleased me. I have worked hard for *Geodephaga*: one day whilst grubbing along the muddy margins of a brook I turned up a huge *Oödes*, 10 lines long, brassy. I got also a new *Brachinus*. The *Scaritidæ* only are numerous here: of true *Carabidæ* I do not find a single species.

Trenantins, Upper Amazons, November 23, 1856.—I left Ega on the 7th of November, by steamer, on a short excursion to this place: it is, I think, about 180 miles, in a direct line, above Ega; but there are considerable bends in the river, and very strong currents, so that it took the steamer four days and nights to make the passage. I chose this place for a visit because it lies on the north bank of the Amazons, on the "Terra firme," which is continuous with the banks of the Japurá up to the Andes, and is separated from Ega by the vast expanse of low-flooded lands forming the deltas of the Japurá, Jurná, &c. I reached here on the 11th, and began to work on the 12th, so that I have had twelve days' collecting. I am sorry to find that insects of all kinds are very scarce,—a fact which I cannot explain, as the grounds are most excellent, much varied,—swamp, dry forest, "ygapó," clay soil, sandy soil, magnificent forest-paths,—in fact, all that could be desired. A good number of the species which first turned up were new, and when I do find a beetle in the woods it is almost sure to be a new one: the conclusion is that it will require many months' stay to get a fair collection; but I cannot stay so long, for the immense number of insect-pests (clouds of "piums" by day and mosquitos by night), added to positive hunger (for next to nothing is to be had to eat), are beyond my powers of endurance.

In Diurnes I found at once two new *Cybdeles* very abundant, and I have seen several of a third, too nimble for me to capture as yet. I have got one new *Eubagis*, the largest of the genus; one very distinct new *Ithomia*; and I see a new *Timetes*, but cannot as yet capture

it. I have also two new *Theclæ*, two *Satyri* and two *Erycinides*. The best of my captures in the *Diurnes* is a *Catagramma*, very peculiar and rich in its colours, unlike anything figured by Hewitson, and as handsome as the finest of those figured in his work: it somewhat approaches *Lyca*. The next finest thing is a *Eurygona*, likewise the handsomest of its genus, being crimson! with black border. I have now three *Eurygonæ* here. *Coleoptera* are very scarce: in *Longicornis* two or three new species,—one grand thing being a new species of *Anisocerus*, nine lines long.

The birds and monkeys of this upper river are very interesting. I am living, too, in the midst of a nation of Indians not yet reclaimed from the purely savage state,—they are the *Caishánas*, a very quiet, harmless tribe. There are about 300 of them: some of their houses are about a mile from the village, but the greater part live two days' journey up the river *Trenantins*: they have no warlike weapons, and do not practice tattooing; they use, however, the *Zarabatana* and *Urari* poisons. The journey hither, although accomplished by steamer, is no very light matter, for they neither embark nor disembark passengers, and give but a very small allowance for luggage, as the vessel is very small, and almost entirely taken up by an elegant cabin and saloon for twenty passengers. The voyage was an agreeable change to me, after sixteen months' very close work ashore. As to the river I could see no difference in it; after passing the mouths of the vast tributaries, *Japurá*, *Jurná*, and *Jutahí*, no difference was perceptible in its breadth: a dead, level country,—perfectly uninterrupted wall of luxuriant light-green forest, with its inextricable maze of lianas, creepers,—one matted, interwoven web, binding together slender feathery palms and gigantic forest trees. The village here is a miserable little affair of some twenty rickety huts and three or four houses of a rather more decent appearance, one of which was immediately given up to me. I purpose staying and working here for a few weeks, by which time I shall be able to pronounce on the relations of the Fauna with that of other districts. I shall then return to *Ega*.

HENRY WALTER BATES.

Dr. Leach and the Elephant.—Mr. Spence Bate delivered a lecture at the Plymouth Institution and Devon and Cornwall Natural History Society, his subject being the life of Wm. Elford Leach, M.D. In the discussion of the lecture Mr. I. Prideaux, a very intimate friend of Dr. Leach's, gave the following reminiscence, as he stated, of his distinguished neighbour. Although of such a lively and sensitive temper,

his coolness, when required, was exemplified in the cure of an elephant at Exeter Change. Observing an excrescence on the trunk, not far from the eye, he pointed it out to Mr. Crosse, telling him that, if allowed to increase, it would probably prove fatal. Mr. Crosse replied that he so considered it; but how could it be prevented? Dr. Leach said that if bound tight round near the roots circulation would be stopped, and the excrescence would die and fall out. "Yes," said Mr. Crosse; but who is to tie it?—he might crush the man to pieces." "I will venture it," said Dr. Leach; "for, though it will give him pain, I think he may be made to understand that it is for his good to get rid of a sore and troublesome excrescence; so get me some strong silk thread, and let his keeper go in with me, and keep him soothed and occupy his attention." Accordingly, having obtained the thread, he mounted up, he and the keeper both speaking to the elephant, and induced him to submit to the operation. When it was bound round many times and securely tied, he descended to the floor of the menagerie, and observed the animal casting a knowing look upon him. On going to see him next day, he learned that after he was gone the elephant had turned up the finger of his trunk, and felt the binding all round till he found the knot, which he had either untied or broken, and then unwound the silk and threw it down. Dr. Leach therefore talked to him in a reasoning manner, and, with the keeper's aid, induced him to submit to the operation a second time; but Dr. Leach, observing the same knowing look, talked to him more upon the subject, and fastened the silk, as he thought, securely. However, he was no sooner gone than the animal began to try the fastening, and persevered until he had got it off again. On finding this, the next day Dr. Leach brought some annealed brass wire, with which he again bound the excrescence, drawing the ends in under the binding so that they could not be got at. The substantial texture of the wire and its polished surface now baffled the attempts of the elephant, who at last gave it up, and submitted to the temporary annoyance, manifesting no displeasure at Dr. Leach on his next visit. The result was, as Dr. Leach had foretold, that the excrescence worked out in course of time; and the sore was not difficult to heal. Thus the elephant was saved; and Mr. Crosse insisted on Dr. Leach receiving about twenty (I think) £5 notes for the venturesome cure.—*J. J. Reading; Plymouth, May 20, 1857.*

Beautiful Variety of the Mole.—A few weeks back I was fortunate enough to obtain the skin of a beautiful variety of the mole. It was caught near here; and the person by whom it was taken states that it is the only one of the kind he has ever met with. When alive it must have been a very beautiful object.—*J. Pristo; Alverstone, Whippingham, Isle of Wight, April 17, 1857.*

Singular Familiarity of a Squirrel.—Whilst walking, in the month of June last year, in the Royal Gardens of Charlottenburg, near Berlin, I remarked a squirrel (*Sciurus vulgaris*) descend from one of the noble avenue of trees which border the lake on to the public footpath, undeterred by the presence of a party of citizens who were at the moment promenading the place, and enjoying the declining rays of the sun in that lovely spot. On approaching, however, I found that the little animal was disposed to carry his confidence still further. He sportively ran about the path among the people; and when pursued by some children, instead of rapidly ascending his tree, he contented himself with dodging them round the base of its trunk, and then was off again, cutting capers on the pathway, and now and then stopping to nibble a fungus which grew upon the edge of the grass. The children could scarce contain themselves for delight at his familiarity; and after thus noticing him for several minutes

the party moved on. I remained an interested spectator; and, picking up a piece of the fungus he had been munching, I approached him quietly, holding out my hand. Nothing loth, the bold little animal came coyly up, and nibbled the food in my hand; but he would not allow me to touch him. When I finally quitted the spot the squirrel still remained gambolling alone upon the pathway, amusing himself with chasing round and round the tree-trunks, now half-ascending a tree, and anon descending to his favourite *terra firmâ*.—*Cuthbert Collingwood.*

Capture of Vespertilio Nattereri.—With reference to the list of bats found here, and which I sent you on the 24th February, I beg to inform you that I this morning found fourteen specimens of *Vespertilio Nattereri*, clustered together by themselves, in the same place where I found the one I have mentioned in my former communication. They could not have been there long, or they would have been noticed sooner.—*J. H. Jenkinson; Dripshill, Upton-on-Severn, April 28, 1857.*

Reddish gray Bat (Vespertilio Nattereri).—May 16th, 1857.—Shot a bat of this species (length 5 inches, extent of wings $13\frac{1}{2}$) near the old church in the village of Tudely, about two miles from Tunbridge, where there is a very ancient yew tree, measuring, at about four feet from the ground, 19 feet in circumference. The trunk is a mere shell, into which some three or four persons might easily creep.—*Henry W. Hadfield; Tunbridge.*

Harvest Mouse.—In the 'Zoologist' for the present month (Zool. 5592) I observe a communication from Mr. E. H. Rodd, stating the occurrence of *Mus messorius* at Penzance, and of its not having been noticed in Cornwall before. I find in Couch's 'Cornish Fauna,' Part I. p. 3, that it is common; and as far as my experience goes it is, for during my residence at Goran Haven this very beautiful little creature was well known to me, having seen it and its nest on the stems of corn in the fields, and at times by dozens in winter, in the corn stacks, with the common mouse, when the farmers were taking their corn into their barns; for at such times either myself or children were often requested to attend, with my old and favourite dog Hassan, who, though a large fellow, was exceedingly quick, and very fond of catching mice and rats, and few could escape him. The red mouse (harvest mouse) was a delicate and dainty morsel, which he immediately swallowed: the other mice and rats he merely killed. My children on one occasion took home some of the harvest mice, for which I made a small cage. They lived with us some time, drank milk freely, and fed on any sort of grain or bread; and it was interesting to watch their gambols, and see them suspend themselves by their prehensile tails from the wires of the cage. Unfortunately, these wires were so flexible that one by one they got out, and fell a prey, no doubt, to pussey.—*Charles William Peach; Wick, Caithness, N. B., May 4, 1857.*

Anecdote of a Dog.—As I have introduced my dog, I may as well mention a trait in his character proving that he was as "rigidly faithful and honest" as the dog mentioned by Mr. Atkinson (Zool. 5590); he differed, however, from this tail-less one in having a splendid black "tail, w' upward curl," tipped with white. A butcher visited the cove every Friday. The dog most certainly knew the day, was invariably on the look-out, and immediately took possession of the shop, and, when the butcher was absent, full charge of the meat, and was frequently shut up with it lying all around him, even on the low block on which it was chopped; and woe betide the cat that attempted to steal! He, however, claimed as his perquisites the small pieces that dropped when chopping; but should a large piece fall he did not interfere. Hassan had not been trained to keep shop, for I had him when only a month old: nor did I

tell him to attend the butcher: he carried his character in his look, and so gained the situation.

“ His honest, sonsie,* bawsn't face
Aye gat him friends in ilka place.”

And greatly respected he was by all my neighbours for his honesty and quiet good nature. With the children he was an especial favourite, and constant attendant in their walks. A more intelligent, “faithful tyke” there could not be. He lived with me fifteen years. Since his death I dare not keep another: I cannot bear these partings. I could tell very many things about him showing a something which throws mere instinct into the shade, but must not trouble you farther, beyond mentioning that, however good a character he had, his name (Hassau †) got one of my little sons for a time a bad name. On removing to Fowey a lady inquired of him the dog's name. He said, “Hassan, madam.” She mistook it for “Ask him, madam,” and thought him impertinent. A friend to whom she mentioned it explained. From that time both dog and boy became favourites with her. The dog soon learned to lift the latch of the door leading to her kitchen, and many a piece he got by it.—*Id.*

On the Connexion of Reason with Instinct.

By JONATHAN COUCH, Esq., F.L.S., &c.

IN the second part of the Rev. J. C. Atkinson's paper on ‘Reason and Instinct’ (Zool. 5565), that gentleman has done me the honour to refer to my work, entitled ‘Illustrations of Instinct,’ in which I have endeavoured to define the boundary and explain the nature of that faculty of a living animal, as distinguished from reason on the one side and unconscious irritability on the other; both of which I believe to exist in connexion with it, as well in the various orders of the higher animals as in man himself.

But, in the reference made to my work, a quotation is made, which, in the insulated condition in which it stands, appears to me to be capable of conveying an impression of my meaning very different from that which it was my intention to inculcate, and which therefore I will endeavour to explain.

The quotation to which I refer is contained in the words, that “Reason in brutes is the servant of instinct,” from which it is probable that readers who have not followed the chain of observations

* He had, like the dog of Burns, “a white stripe down the face.”

† “The camel driver.”

which led to that conclusion, might be induced to believe that I had advanced the opinion, that, in creatures inferior to man, the faculty termed reason is intrinsically lower in its nature than the quality bearing the same name in the human race; and consequently that, after all that had been said, the question only was, whether a certain faculty in animals should bear the name of reason, or might require the invention of a new descriptive designation.

Those who have read the 'Illustrations' with attention will be in no danger of falling into this mistake; but to those who have not done so it is proper for me to say, that, in the work in question, it has been my wish to show the fact,—that whilst, in animals generally, instinct is so strong as to be the governing principle of their actions, yet that still the faculty properly termed reason has a powerful influence within them,—although, in its habitual exercise, it is only employed in bringing the promptings of their instinct to a more successful conclusion. And what other than this is the case when man himself permits himself to be overcome by his bodily appetites? It is then that his station becomes degraded from the high standing in which the exercise of his reason as the governing influence would have maintained him, and in this fallen condition I am compelled to say of him, in the same sense as of the brute, that his reason has become the servant of his instinct; the important difference being that, in one case the condition is unnatural and artificial, while the other was intended by the Creator, and is in perfect conformity with His laws.

That I may not occupy the pages of the 'Zoologist' with this explanation only, and, at the same time, that I may afford an illustrative example of the exercise of this faculty of reason in carrying out the instinct of self-preservation, I will add an account of the proceedings of a hare, as they were attentively noted by a good observer, involving as they do, the consideration of several independent propositions, all of which must have been regarded in the mind of the animal in a very rapid manner, in the moment when her fears were leading her to escape for her life. The deep impression of the poet's words—

"You know my feet betray my flight"—

were never more fully illustrated, to which is to be added the persuasion that, in the hastiness of pursuit, the dogs, however keenly scented, would not be likely to distinguish the impressions made on the ground by tracks in one direction from those in another: the whole matter resolving itself into the conclusion, that it was more safe to trust for

safety to this than to the chance of escape by seeking it in the mere rapidity of flight.

A hare was seen running down the slope of a hill, by the side of a hedge in a turnip-field, pursued by a couple of dogs. As the dogs came into the field, the hare stopped and lifted her ears, in the attitude of listening; and when they had come near her, within a little more than the distance of a gun-shot, she ran backward for some distance along her own track, and then, by a sudden spring, threw herself on one side of her former course into the midst of the turnips, where she remained altogether quiet. The dogs passed onward at a swift rate, and, as soon as they had gone forward on her track, by another bound the hare sprung back to the place she had quitted on her backward course, and ran upward along her own descending line,—thus confounding the downward with the upward way. When the dogs had proceeded to the lower extent of the hare's course they stopped short, and seemed at a loss how to act; and this delay of theirs enabled the persecuted animal to accomplish an easy escape. This disposition of the hare to leave a powerful scent in its footsteps might appear to be one of the besetting misfortunes of its nature; but the evil is casual and transient, while the benefit and pleasure to itself is constant, being the principal means by which they follow and find each other in the fields where they meet for their amusement.

I will give another example, as related in the 'History of the Rev. Mr. Moffat's Missionary Labours in Southern Africa,' Chapter X.

The lion has been seen to make an error in the calculation of distance, in taking a leap, and then to show signs of reflection on the cause of the error, with the obvious view to correct it. A large lion had crept towards a short black stump which much resembled the human form, and, having approached within about a dozen yards, it bounded on its supposed prey, when, to his mortification, he fell short of it by a foot or two. According to the testimony of a native, who had been watching his motions, and who joined the missionary soon after, the lion lay for some time steadfastly eyeing his supposed meal. He then rose up, smelled at the object, and then returned to the spot from which he had begun his first leap. He then leaped four several times, till at last he placed his paw on the imagined prize.

JONATHAN COUCH.

On the Migration and Breeding of Pastor roseus in the Neighbourhood of Smyrna. By the Marquis ORATIO ANTINORI.
Translated by PHILIP LUTLEY SCLATER, Esq.

THE fifth part of last year's 'Naumannia' contains a very interesting account of the migration and nesting of the rosecoloured pastor in the neighbourhood of Smyrna, from the pen of the Marquis Oratio Antinori, of Perugia, in Italy, already well known to Continental naturalists for his writings on Natural History, and in particular for his recent researches in Ornithology in Asia Minor and Palestine. To him, I believe, we are indebted for the discovery of a very curious black-bird with a hooked nail on its wing (*Merula dactyloptera* of Prince Bonaparte, and the type of his genus *Pteronychia*), of which there is a specimen in the Paris Museum, of a new swift and honey-bird from the Holy Land (*Cypselus galilæensis* and *Nectarinia* —), and various other novelties from that country.

The article on *Pastor roseus* will, I think, be very interesting to English ornithologists, as it is one of the birds included in the British list, concerning which authentic information as to its nesting and eggs is most scanty. It is somewhat as follows:—

“The rosecoloured pastors began their passage on their northern migration through the neighbourhood of Smyrna this year about the 15th of May; for on this day I found myself in the field, and I observed large flights passing rather from south-west to north-east than from south to north-east, as on the following days. One of these flights passed so close over me that I managed to kill four out of them in one shot. They were all young birds of the first or second year, and as in the whole flight I did not perceive the beautiful red colouring of the old male (which can be easily distinguished in the air) I concluded that it consisted only of young birds of that age. This supposition was further confirmed by the fact that out of the various individuals procured by other sportsmen on the same day not one had the plumage of the third year. I am sure that the complete plumage of the adult is only attained at the end of the third year, perhaps not until the fourth; for some young birds which have been kept in cages in the vicinity of Smyrna since last year have hardly yet attained their full plumage, which is exactly such as is described by Professor Bonelli in Temminck.

“On the 14th of May, when again in the field with Herr von Gorzenbach, we saw an immense multitude of old birds passing at a small

elevation over the new English churchyard, and alongside and over the old castle which commands the city; and, when near a mineral spring, called Ligea, on the left of the Gulf of Smyrna, on the 26th of May, about sunrise, I saw, to my great delight, large flights of these birds sitting so closely packed together upon the trees as to make them look as if they were all covered with red flowers. On the 29th, 30th and 31st of May and following days up to the 5th of June the flights were most numerous; after this term they ceased, and the birds became stationary. The flights were no longer rapid, high in the air, large in numbers and directed towards the north, but slow, low-flying, small in numbers and going in every direction of the compass. The fields were full of them, and the gardens were full of them, and even in the villages they sat on the roofs of the houses. These facts convinced us that the birds were nesting in the hills surrounding the Gulf, but in spite of all our efforts—owing to the dense ignorance of the inhabitants and the unconquerable idleness of the peasantry—we could obtain but very few eggs, for which we had to pay dear, and that not until the 27th of June. As all of these eggs had the embryo more or less developed, and were besides rotten, it was clear that they had been taken whilst under incubation, and had been laid at least a fortnight. The man who brought them told us that he had collected them upon a hill seven miles off in the interior, and that the Turks had caught him in the act, and beaten him and driven him away.

“The possession of these eggs determined Herr von Gorzenbach and myself to undertake ourselves the search for them at once, and on the morning of the 30th of June we set out for the village of Bournatut, where we were assured that the gardens and surrounding hills were full of rose-starlings; and we were quite rewarded, for not only on the road which we passed along, but even in the streets of the village, upon the moss-grown walls, and on the trees of the courts and gardens, we had fine opportunities for making close observations on these peculiar birds. Whilst we were waiting for a guide at the door of one of the houses a young rose-starling flew through the window into the room, and was instantly captured by the owner and given to us. Many others were around us, following their mothers about with a very peculiar chirp, and we at once perceived that we had come too late to procure eggs.

“After we had promised our guide a good reward for assistance, we set off for the mountains. I must here mention that the rather high and rugged hills which hem in the sides of the Gulf of Smyrna and the Valley and Gulf of Bournatut, particularly towards the north,

and form the foot of the higher hills, consist of surface beds of limestone, covered with large erratic blocks of granite of different shapes and sizes. These massive stones, heaped one above another, leave no place for vegetation of any sort except the *Asphodelus ramosus*. Our way then lay northwards towards these pathless mountains, and after a wearisome ascent up the empty bed of a torrent, on whose banks the beautiful *Nerium oleander* and the charming *Agno casto* grew luxuriantly, we arrived, after a good hour, at the foot of the higher range above mentioned. All along our road, in the bed of the torrent, we had found rose-starlings in great plenty: they came down to drink, first alighting on the ground, and then on the oleander bushes, where they seemed to vanish like magic, as they mixed their gay colouring with the flowers of the oleander. We had hardly begun to mount the hill before we noticed another thing; there was not a stone or block which was not covered with the white excrement of these birds, they resorted there in such multitudes; but how great was our astonishment when we saw, at a distance of about 200 metres above us, the rocks covered with white, looking as if lime had been spread out for 200 yards square. On arriving there we found a real camp and a battle-field in one: the nests were in thousands, some quite open, and uncovered, others so concealed amongst the blocks of stone, that it was necessary to turn them over to find them; some were more than a foot below the surface, and others could not be reached with the arms. The nests were often so close together as to touch one another; they were made with but little care: the birds content themselves with a slight hollow in the ground, in which are placed some dead stalks of the "*Agro casto*," and, in a few instances, a lining of grass: I observed many in which the eggs lay on the bare earth. This sort of nesting exposed them to a great many enemies, which were roaming about them on all sides: for that reason I said that we had found a battle-field as well as an encampment, for to give you an idea of the quantity of nestlings destroyed by jackals, martens, wild cats, rats, &c., judge, when I tell you that in a space of about five square yards I counted fourteen pairs of wings and three remains of old ones: besides who can tell the number of eggs destroyed by the snakes? Indeed, it is wonderful how the rose-starlings can propagate at all, in spite of all these enemies: and if, on the one hand, this is due to its immense numbers, so also, on the other side, something must be allowed to the care with which it broods over and watches its eggs, and the quickness with which the young grow and attain their plumage.

"Although, from what I have before related concerning the migra-

tion, they could not have arrived here before the first days of June, and so not have begun their nests until from the 6th to the 8th of that month, yet it is quite certain that, on the 25th, or at most the 27th, of June, the young had left the nest. Indeed, our observations on the spot answer completely to the account given to us by the people in Bournatut on the 30th, namely, that the young with their parents had then already arrived in the gardens four or five days; and to what was told us by a chasseur, whom we met, who said that he had found a great number of young full fledged in the nest on the 22nd of June in a different locality from this. For this reason we found in the whole large number of nests only two with young unfledged, all the others were flown. Of eggs we found but very few, all addled, and not more than two in a nest.

“These eggs measure, on the average, 13” in large and $9\frac{1}{2}$ ” in small diameter. I say on the average, because we did not find two exactly alike, some being pear-shaped, others elliptical. Some are fleshy white, others pearl-white with a tinge of blue; some have a few small, dark specks at the thick end. The shell is very beautiful, strong, shining. Although the general number of eggs may be two or three, judging from the number of young which were in company with their parents on the first days of their flight, yet it may nevertheless often amount to four or five.

“The great difference in number between the male and female (which I spoke of in my last letter), having found eight males out of ten individuals procured, is reducible to a much smaller proportion; for although the difference exists it appears greater, because most of the birds were procured at the breeding time, when the females were passing most of the day on the nest. Another fact leads towards the same conclusion, namely, that the males, whilst the females are sitting, could go off by themselves in search of grasshoppers, and then, with grasshoppers in their beaks, fly away back to the mountains, no doubt in order to feed the sitting female, or, later in the season, the young. The perseverance with which the rose-starlings search for grasshoppers seems to have its origin not so much in regard for their own supply of food as in an instinctive desire of destruction or antipathy against them. The rose-starlings dart down upon them and kill them, uttering continual cries and squalls, and leave the greater part of them untouched on the earth.

“One morning, as I was observing, for half-an-hour together, five rose-starlings, which were eating the fruit of a white mulberry tree with great avidity, I saw two or three of them dart down suddenly

from the tree to the earth, in order to kill some grasshoppers which appeared between the swathes of a mown field of grass, and leave them without eating them. The birds are so far from shy that a person can easily remain within four or five paces of them without frightening them; and on the trees they will remain with still greater confidence.

“The old birds are very careful of their young; and directly one of them calls up comes the male or female to lead it out of harm’s way. The young seem able to feed without assistance directly they are flown, and the old ones only lead them about in order that they may find their food more easily. This quick development of the young enables them to leave the old after the expiration of from ten to twelve days; for I assure you that to-day, while I now write, the greater part of the old birds have disappeared, and the young are already assembled together in flocks.

“ORATIO ANTINORI.

Smyrna, July, 1856.”

Birds of the Crimea. By THOMAS BLAKISTON, Esq., Lieut. R.A.

(Concluded from p. 5600).

Grallatores.

I was at a loss for a long time as to what bird it could be, for I was sure it was a bird, which, during the summer nights, would utter a note something between a whistle and a cry when flying over, as I was lying between the blankets in my tent on the hills near Sebastopol, and it was not until some months after that I saw a specimen, which had been killed during the summer, and having turned over the leaves of Yarrell, that I accounted for the noise. It must have been the cry of the stone curlew (*Edicnemus crepitans*), which bird was at no time numerous, but might occasionally be met with on the bare hills, except during winter, when it must have been farther South. I shot a fine female from a pair which rose together, while out with my gun one morning towards the end of April.

On the afternoon of the 7th of September, the wind having been stormy from the north during the day, I observed large flights of what I took for plovers, one of which came very close to me as I was riding, and I observed that all the birds in the flock would turn at the same instant, which they did very quickly. The first specimens which

I had a chance of examining were shot by some men who were left in camp on the eventful day following, which I minutely examined, and, not knowing what they were, noted the following description at the time:—Length $11\frac{1}{4}$ inches; extent $22\frac{1}{2}$ inches; closed wing 8 inches; upper parts dark greenish brown, tinged with light brown, except part of the tail-feathers, but mostly on the head; under parts, throat light yellow-brown, remainder white; swallow-tailed; legs and feet black: they were excellent eating. I have no doubt that the above-mentioned birds were pratincoles, but which of the two very similar species I cannot say; however, I consider the following to be the blackwinged pratincole (*Glareola melanoptera*), although without more proof I must include it among the doubtful. A specimen was brought to me, which had been shot near the Alma on the 2nd of May out of a flock: on referring to Yarrell, I considered that it was the collared pratincole, not being aware of another closely allied species, but I noted at the time the points in which it did not agree with his description:—Length $10\frac{5}{8}$ inches; closed wing $7\frac{1}{2}$ inches; first quill-feather the longest; greenish tinge on the back; auxiliary plume and under-surface of the wing black; legs and feet also black. I was very sorry that the specimen was in so bad a state that I considered it not worth preserving, for if I had kept even the wing it would have settled the point.

The golden plover (*Charadrius pluvialis*) arrived in the Crimea on their northward journey some time after the middle of March, and I heard of none after the beginning of April; but the dotterel (*Charadrius morinellus*) were about in numbers at the time, and Dr. William Carte procured a specimen in March; they, however, I think, followed their golden relations in a few days, as I have none noted after the 5th of April. Dr. W. Carte also brought home a specimen of the former.

I found a specimen of the diminutive Kentish plover (*Charadrius cantianus*) on the 7th of April among a number of other birds which had been shot by an officer some days. I also considered that I saw one of these birds on the north side of Sebastopol Harbour after the middle of May. I preserved the specimen above mentioned.

I have seen a specimen of the little ringed plover (*Charadrius minor*), which was procured in the Crimea by Lieut. Irby, who has also included in his list *Charadius hiaticula*.

The peewit or lapwing (*Vanellus cristatus*) was observed by me in April and at the end of October, and Dr. William Carte brought a specimen from that country.

Up to beyond the middle of September I observed large flights of birds coming from the north, which I took for plover.

Towards the end of August, while sitting in my tent about mid-day, my attention was attracted by a most inharmonious clanking noise: stepping out of my tent I saw above my head a flight of about fifty-six cranes steering east, but as soon as they were fairly over the camp they commenced to wheel and get gradually higher and higher till nearly lost to sight, when they bore away in about the same direction they were previously going. I observed some more flights come over about the end of September, going south. In the spring, on the 2nd of April, I heard some flying over at night, and from that time till the 10th of May I continually observed flocks going over northwards. I observed a couple on the plains at the end of May. I often fired ball up at the cranes, but they were always so high that I never succeeded in bringing one down. Lieut. Irby, in his list, notes the flocks in the spring, but says that he could not identify the species. Now of what species were these large flocks? Dr. W. Carte is rather of opinion that they were the Numidian crane (*Grus Virgo*), of which he obtained a specimen in March, and which Lieut. Irby includes in his list. My opinion, however, is that they were the common crane (*Grus cinerea*), because, when in Bulgaria in March, I observed great numbers of slate-coloured cranes on the plains, which I took to be of that species.

I observed herons on a few occasions, but never to identify any: Lieut. Irby was, however, fortunate enough to bring home a specimen of the purple heron (*Ardea purpurea*) and also of the great white heron (*Ardea Egretta*), both of which I saw among his other specimens: he also brought home a bittern (*Ardea stellaris*), which he shot in December, 1854.

In September, in looking over the contents of a French soldier's haversack, among a number of birds, including an owl, cuckoo, buntings, quail, &c., I found a bird, which, from recollection, I should have said was the little bittern (*Ardea minuta*): this bird is, however, certain, as I have seen more than one specimen from the Crimea since I returned to England.

An officer who was for some time stationed at Kertch tells me that during the autumn he observed flamingoes, which he describes as breast white, back white, and wings crimson, darkest near the body: this is likely enough to be the red flamingo (*Phœnicopterus ruber*).

The curlew (*Numenius arquata*) was obtained by Dr. W. Carte in March, and I had an opportunity of minutely examining a specimen shot at the end of the same month, a week after which I observed some in the Valley of the Tchernaya

The redshank (*Totanus calidris*) I obtained in Bulgaria, and I saw a bird in the Crimea which I thought very like it. Lieut. Irby has included it in his list. The absence of anything approaching to full notes on the birds of this kind is to be accounted for by the very scanty opportunities we had of searching their haunts, owing to the peculiar situation of the army.

The dunlin (*Tringa variabilis*) I obtained, together with the ruff (*Machetes pugnax*), from a bundle of birds which I found tied up by the legs, hanging outside the hut of a friend, which were shot within the few first days of April.

Dr. W. Carte obtained the green sandpiper (*Totanus ochropus*) in March, and it must have been the species observed by me in the Inkermann Marsh late in April, when I shot a specimen of the common sandpiper (*Totanus hypoleucos*) on the river bank. I also observed what I took for another species on one or two occasions.

The avocet (*Recurvirostra avocetta*) was obtained near the Tchernaya river, and I measured the specimen, which was, closed wing $9\frac{1}{4}$ inches, bill $3\frac{3}{4}$ inches: this was the only specimen which I heard of, and I believe that it came to England.

The spring arrival of the woodcock (*Scolopax rusticola*) is difficult to determine. I heard of one coming into a camp near the sea during a snow storm one night in the middle of the first week of March. Several were shot before the expiration of the week, and by the 10th a good many were in. I heard of one being shot at the Monastery of St. George on the 22nd of September, and some were found by shooting parties before October. I have heard of tolerable sport with woodcock, but not as a usual thing.

I saw some of the common snipe (*Scolopax gallinago*) in September, but there was very little ground at that time where one would be likely to come across them. In the spring, on the 7th of March, I met a man who had just fired at a snipe, and I killed one only three days after: they were in the Inkermann Marsh near the end of April.

The land rail (*Gallinula crex*) I came across, while quail shooting the last two days of September, and heard this bird in the middle of May.

Dr. W. Carte was fortunate enough to procure a specimen of the little crake (*Gallinula pusilla*), and since I have been in England I have seen specimens of it, as well as of the spotted crake (*Gallinula porzana*), from the Crimea. Lieut. Irby has also included Baillon's crake (*Gallinula Baillonii*).

The coot (*Fulica atra*) was common enough in Bulgaria, and I should think is most likely to be found in the Crimea.

Natatores.

The notes on the waterfowl are but scanty. As to geese, I had it on the authority of others that some were killed in the Crimea during the winter of 1855-56, and Lieut. Irby, in his list, mentions the white-fronted goose (*Anser albifrons*) as very common; if this be certain it is curious that, west of the Black Sea, the graylag goose (*Anser ferus*) should take its place, as observed by me, in Bulgaria, during March.

A few days before the middle of March I observed a swan on the harbour of Sebastopol, which the officer above mentioned considers was the hooper (*Cygnus musicus*); however, I did not get a clear view of one, but was told that a couple of swans were shot in Balaclava Harbour shortly after Christmas day, which differed considerably in size, and were therefore considered to be male and female; they were described as having the bill and legs black, head light slate-colour, and whole body white.

I have seen a specimen of the common shieldrake (*Anas tadorna*), which was killed by an officer near the Tchernaya from a couple which rose; the other coming down, however, at some distance, not quite dead, was bagged by one of our allies.

I have little doubt that the ruddy shieldrake (*Anas rutila*) also inhabits the Crimea, as Lieut. Irby tells me that a specimen was brought home to England by an officer.

The wild duck (*Anas boschas*) has been killed, and I examined a fine specimen, shot in the winter near Balaclava.

I observed the teal (*Anas crecca*) on several occasions; and a friend of mine, on whose authority I can rely, told me that he shot both teal and wigeon (*Anas Penelope*) in the harbour of Sebastopol towards the end of winter; and I saw a specimen of the latter which he had preserved. Dr. William Carte also obtained both in March, as also the whiteheaded duck (*Anas leucocephala*), which is mentioned by Gould as common in the East of Europe: this specimen is in the Museum of the Royal Dublin Society.

A pochard (*Anas ferina*) came into my hands which had been picked up by a canteen-man, who had seen it fall while on his way to Balaclava one morning; he kept it for a few days until it died. Dr. W. Carte also brought home a specimen of this bird. My friend who

had the specimen of the wigeon observed what he considered to be the tufted duck (*Anas fuligula*).

In February, while riding towards Kamiesch, I put up a duck from a small run of water; it was of a bright bay colour on the back, with black and white wings and tail. I also, on the 3rd of September, observed a couple of ducks on the high dry land, such as I had never seen before; they had some red and white about them. Lieut. Irby includes several others, but it does not appear that specimens of any were procured.

Passing on we arrive at the divers, of which the eared grebe (*Podiceps auritus*) was very common along the coast of the Crimea, and I obtained several specimens at the Monastery of St. George, where I was forced to be my own retriever, by swimming after those shot; this was at the end of September, when I did not obtain a single specimen in full plumage. On one occasion, at this time, I lay for a long while on the beach, in the hope of a couple of large grebes or divers, which were some distance out, coming in close enough for a shot: while waiting thus I had a good opportunity of watching their movements. In diving the whole body would be out of water at the moment the head was going under: I observed that the eared grebe also did this sometimes. These two birds were of a light slate-colour and white, and may have been the great crested grebe: when one was diving the other would put its head under water, the better, I suppose, to distinguish his comrade: this was also done occasionally before taking a dive.

A friend of mine told me that he observed the little grebe (*Podiceps minor*) in the harbour of Sebastopol: he also said that a good many redthroated divers (*Colymbus septentrionalis*), in their winter plumage with speckled breasts, had been shot about Balaclava Harbour, and that they were called great northern divers, which latter bird he never saw.

One of the striking features of the Black Sea during winter is the immense number of cormorants which are to be seen, where I found that they were much more restless than I had ever considered them to be, and I am sure that their habits must be most interesting, and often did I wish that I could accompany a flight of them during their wanderings. What is that long, animated, dark line? Cormorants. And again more in the form of an incomplete V. This scene was continually passing before our eyes, as on a morning, during the cold weather just before Christmas, we lay off the bold coast outside Balaclava, awaiting orders to enter the harbour: the quantities of these

birds continually passing and re-passing was wonderful, and as we approached the high cliffs more were to be seen sitting on convenient ledges, which, when disturbed by a shot or otherwise, would apparently drop, or, as it were, dive through the air into the water below. These birds, I should suppose, frequent that coast during the year, but their numbers must be very greatly increased at the commencement of winter. There were at least two kinds, the common cormorant (*Carbo cormoranus*) and the green cormorant or shag (*Carbo cristatus*), but I should think that this latter species makes up but a very small proportion of the immense numbers of the whole. I had a good opportunity of observing one of these, which was knocked over by a graze in the throat from a bullet which had killed another; he died after three weeks' captivity. The common cormorant is by no means an inactive bird on the wing: I observed one mount in the air almost vertically to a considerable height in a very short space of time; but when flying at sea, they usually keep in a horizontal direction not much above the water. When seen high above land their flight is not very unlike that of geese, but they may be distinguished by the quick flappings and occasional sailing. Great numbers used to congregate in the small harbour of Balaclava, and when there was no shooting allowed they were very tame.

Pelicans, which were described as pure white, were seen at Kertch in large numbers during autumn, there being usually from five to ten in each flock.

Laridæ.

Any one who has shot specimens of gulls or terns, when he has had no opportunity of comparing them with others, will I think agree with me that they are a most difficult tribe of birds to identify from written descriptions or even drawings; their plumage varies so much with age and sex, besides their habits being often difficult of observation.

The terns should first in order be taken, but I cannot identify a single species; however, while riding along the harbour of Sebastopol with a friend who had a good knowledge of British birds, we observed some terns all white, except dark brown or black heads: this was near the end of April; and about the beginning of May he saw three different kinds seated on a log in the water, one of which he described as very small.

Of the true gulls I have only identified three species, one of which is the widely distributed species, the herring gull (*Larus argentatus*), of which I examined some specimens in winter and spring, one of

which was brought to England. Two gulls shot in mid-winter I did not preserve, but noted descriptions, which correspond with the common gull (*Larus canus*), of which I have since seen a specimen in England said to have come from the Crimea. There is one other, of which I have a specimen, that was shot by an officer on the first or second day of January, 1856, at the Monastery of St. George, where he said that there were a good many, and that he observed a number flying over the land: he looked for them on many occasions afterwards, but never saw another. This bird, the redbilled gull, is to be found described and figured by Prince Charles Lucien Bonaparte, in 'Iconographia della Fauna Italica,' as Xema Lambruschini, and I am indebted to Mr. Gould and Mr. George Gray for its identification; and I must here say that I have received great kindness from those gentlemen, in the way in which they have given me much valuable information.

A friend of mine, who was pretty well acquainted with the gulls of Britain, told me that during the winter he observed what he considered to be the little gull (*Larus minutus*), and also the masked gull (*Larus capistratus*), but he never had a chance of examining them except on the wing. In March I saw a small gull in Balaclava Harbour, not larger than a good sized pigeon, which had the front of the head, bill and end of wings black, and the feet either red or black; this bird I also observed in Baltjic Bay, on the west coast of the Black Sea, two days after.

The Manx shearwater (*Puffinus anglorum*) is the species which the Turks consider to carry the souls of the condemned dragomen in their crops, during their uninterrupted flight up and down the Bosphorus; however, I did not hear of any on the Crimean coast.

Addenda.—The two following species of the family Strigidæ were omitted in their proper places, namely, the little owl (*Strix passerina*), which was obtained by Lieut. Irby in the Crimea, and of which Mr. Gurney informs me there is a specimen in the Norwich Museum from that locality, which, however, he says is of the "light coloured variety." Tengmalm's owl (*Strix Tengmalmi*) has been mentioned, but only as "very doubtful;" I now find, from Dr. William Carte's valuable paper on the 'Natural History of the Crimea,' published by the Royal Dublin Society, that he obtained this bird.

Appended is a list of errata in the foregoing papers: any after mistakes readers must be good enough to overlook, for before these lines

are in print I expect to be far away across the Atlantic, *en route* for the North-West, where I hope to be able to devote my spare time to renewing my acquaintance with the animals of the New World, and I shall lose no opportunity of extending such acquaintance.

THOMAS BLAKISTON.

Kew Observatory, May 12, 1857.

Errata.—Zool. p. 5422, 13th line from bottom, for “but sufficiently,” read “but not sufficiently”; same page, 2nd line from bottom, for “two months,” read “ten months”; p. 5505, 7th line from bottom, for “ten,” read “one”; p. 5512, 15th line from top, for “immediately,” read “minutely”; p. 5600, 13th line from top, for “migration southward,” read “migration from the southward.”

Occurrence of Tengmalm's Owl (Strix Tengmalmi) in Norfolk.—A female of this rare British species was killed at Burlingham, in this county, about the 6th of April. This is probably the first time that this little owl has appeared in Norfolk; but a single specimen is recorded to have been taken some years since in the adjoining county of Suffolk.—*H. Stevenson; Norwich, May 23, 1857.*

Occurrence of the Lesser Spotted Woodpecker near Fermoy.—As Sir William Jardine mentions, in his ‘British Birds’ (‘Naturalist's Library’), that the lesser spotted woodpecker (*Picus minor*) is unknown in the Scottish and Irish Fauna, perhaps you may think the fact of a specimen having been seen in this neighbourhood on the 14th of last month may be worthy of notice. I observed him on a beech tree, in the upper Lismore Road, about two miles from Fermoy.—*G. E. Bulger; Fermoy, May 7, 1857.*

Raven Pairing with Crow.—It may interest some to know that this occurred in the spring of 1855. I believe the hooded and carrion crow have been known pretty frequently to pair; but the pairing of the raven and the carrion crow has never been noticed. A pair of ravens had been observed, during the winter of 1854–5, about a fir plantation; and one of the old birds was shot by a keeper at the end of February or the beginning of March, just when, had both old birds survived, they would have been about the business of nidification. The surviving raven was not seen there for some time, but he returned about the 20th of March, with another bird, which was at first supposed to be another raven; but it was soon discovered, from its peculiar cry, to be a carrion crow; and they were observed constantly together. The plantation which they haunted was of considerable size, and I failed to discover their nest till the end of April or beginning of May, when there were three newly fledged young ones, and one addled egg, which I succeeded in blowing, and which is between the ordinary size of a crow's and a raven's. While I was in the tree both old birds came very near, especially the raven, which perched in the next tree, and croaked for a long time together. As far as I could make out, the crow performed the part of sitting on the young, while the raven secured all round. The young birds had left the nest by May 13, and I saw no more of them. The only way one can account for the raven pairing in this manner is by supposing that, owing to the time of year when its mate was killed, it was unable to find a companion, as they would then all be occupied with the

business of incubation, and consequently it returned to its old place according to its usual custom, but with the crow as his companion. I know of a nest being occupied for ten years together, and one of the old ravens shot every year, each spring the surviving bird bringing a companion, which reared its young till one or other of the old ones was shot on the nest.—*Reginald Bosworth Smith; the College, Marlborough, May 23, 1857.*

Hawfinch breeding at Marlborough.—I think, among the constant haunts of this bird in England, the neighbourhood of Marlborough has never been mentioned: it frequents Savernake Forest, and nearly every spring three or four, or even five, nests are met with; they select the thickest hawthorn bushes, and build their nests close to the top, where they are quite concealed. The first nest this year was met with on the 19th of May; it contained five fresh-laid eggs, of which I have some in my possession.—*Id.*

Note on the Reed Bunting (*Emberiza schœniclus*).—I should not probably have considered it necessary to have offered any remarks on so common a bird as the reed bunting undoubtedly is, but having lately shot a handsome male of this species, I consulted Montagu, who says, “the back is black, deeply bordered with reddish brown.” Not feeling satisfied with this description, I referred to Macgillivray, who states (vol. i. p. 454) that “the general colour of the upper parts is bright chestnut, each feather with brownish black in the centre.” With all due deference to the opinion of Montagu I must agree with Macgillivray in calling the back chestnut-brown, for although it is true that the centre of each feather, including the shaft, is black, it is so broadly margined and tipped with light brown as to throw the former colour into the shade. With regard to its nest the above authors are also at variance: Montagu tells us that it is “never fastened or suspended, as authors have related:” Macgillivray, on the contrary, says, “It places its nest among aquatic plants, in a tuft of grass or reeds, often fastening it to the stems of the latter:” he also mentions having found a nest “by Duddington Loch, fastened at the height of more than half-a-foot among stems of *Arundo Phragmites*.” Is it possible that so experienced an ornithologist could have mistaken the nest of the sedge warbler for that of the reed bunting? as most authors agree in saying the former suspends its nest to reeds and other aquatic plants; for instance, Temminck (tome i. p. 189), “Bec-fin Fragmite. Construit, en forme de panier, un nid artistement entrelacé dans les roseaux;” but, in describing the nest of the reed bunting (p. 310), he says, “Niche dans les roseaux, près de terre, ou entre les racines des arbustes qui croissent près des eaux, souvent dans les hautes herbes.” Now let us turn to Cuvier, (*Règne Animal*, tome i. p. 382), “Le bruant de roseaux. Niche aux pieds des buissons, le long des eaux.” But not one word do these authors say in corroboration of Macgillivray’s assertion. Never having seen the nest of the reed bunting (although I hope soon to do so), I cannot pretend to decide who is in the right. I will now give the description of the bird, as noted down at the time:—“Reed bunting, shot February 14, 1857. Length $5\frac{3}{4}$ inches; extent of wings $9\frac{1}{2}$ inches; wing from flexure 3 inches and 2-tenths; bill along the ridge $3\frac{1}{2}$ -tenths; lower mandible $2\frac{1}{2}$ -tenths; tarsus 8-tenths; middle toe $\frac{1}{2}$ inch, claw 2-tenths; outer toe 4-tenths, claw $1\frac{1}{2}$ -tenth; inner toe 4-tenths, claw $1\frac{1}{2}$ -tenth; hind toe 3-tenths, claw $2\frac{1}{2}$ -tenths. Dorsal line arcuate: upper mandible black, but horn-coloured at the edges, overlapping the lower, which is angular and of a light horn-colour, but darker towards the point, which is acute; legs flesh-coloured, claws arched and dusky, but black at the points; head black, but many of the feathers are tipped with reddish

brown and dotted with white; nostrils lozenge-shaped, rather large, and placed so far back as to be almost concealed by the feathers and black bristles which surround them; chin reddish brown, with a slight admixture of gray; throat and breast black; the feathers bordering the eyes ferruginous. A white line commencing at the lower mandible, where it is only a tenth of an inch wide, but increasing to two-tenths beneath the eye; it then takes an upward direction, passing round the back of the head, narrowing again to one-tenth on the nape, where there are a few black hairs or bristles. The quills are black, the second longest, the third little shorter, the first and fourth being about the same length; outer webs fringed with reddish brown for half their length, the rest being of a light gray; inner webs margined with white; five first quills narrow and rounded, the rest much broader and serrated at the tips. The spurious wings are of a bright glossy reddish brown; the upper coverts black, margined with bright bay on the outer webs, white on the inner. The feathers of the back black in the centre, but broadly margined with chestnut-brown. The wings greatly resemble those of the house sparrow; the tail consists of twelve dark feathers, the two centre ones narrow and pointed, black near the shafts and at the tips; outer webs edged with cinereous, inner webs broadly margined with light reddish brown. The two outer feathers are half white, but black at the base and on the shafts, that colour gradually increasing till it terminates in an oblong patch. Upper tail-coverts gray at the base, ferruginous towards the tips, with black shafts. The transition from the black of the head to the white collar is sudden, but from the bright chestnut and black of the back it is gradual, the tints becoming fainter, with an admixture of gray bordering the white. Belly and vent of a pure white. Many of the feathers, both on the sides and beneath the wings, have longitudinal dark brown streaks down the middle, increasing in size towards the thighs.—*Henry W. Hadfield; Tunbridge, March, 1857.*

Notes on the Rook (Corvus frugilegus).—Tunbridge, March 22, 1857. There is a rookery in some lofty elm trees close to the town: observed this afternoon their manner of building, one rook remaining to guard the nest whilst its partner flew off in search of building materials; but I remarked that, instead of picking up dead twigs or sticks, it set to work to break off green ones; after having secured two, which it retained in its beak, it endeavoured to break off a third, but failing in doing so, as it was not only a green but a strong twig, the rook threw itself back so as to bring its whole weight to bear, not, however, relinquishing its hold of the branch on which it stood, extending its wings at the same time, so as to add force to the pull; by this means it eventually succeeded in dragging or slipping it off, although its utmost powers had previously failed in breaking it. There were two other nests on the same branch, one indeed almost touching the first, and I counted about thirty in a more or less forward state, but few, I think, were completed; consequently it would appear that rooks are rather backward with their building this season, as White tells us they begin as early as the 16th of February, Macgillivray mentions the same date, and Markwick the 28th of February: the second-named author informs us that the nest is completed in a week or ten days. ... March 27. Had another look at the rookery this afternoon; found the nests were beginning to make more show, but, from the great clamour and commotion that prevailed, I am inclined to think few out of the number can yet be ready to receive eggs. I witnessed several skirmishes, besides a general assault made on a half-finished nest, which was not only covered with the assailants but surrounded by them for some time. I observed one of the unfortunate rooks defending its aerial castle most stoutly,

indeed furiously, clinging to it with the greatest tenacity, never once quitting its hold, emitting, at the same time, an angry, hissing kind of noise, which might have been heard at a considerable distance. What the culprit had been about I could only conjecture, but probably it had been caught, or rather detected, in the act of robbing one of its neighbours, but as rooks are notoriously a thievish race I was not prepared for such a general and public display of virtuous indignation, proving, however, the old adage true that there is even honour among thieves. ... March 31. In passing the rookery I observed the rooks were as quarrelsome as ever, frequent fights taking place even upon the nests, so that had they contained eggs they must, I think, have been either broken or thrown out. I noticed several rooks, evidently paired, on the branches close to and immediately over the nests,—a proof that they could not have contained their full complement of eggs, or one of the birds would have been setting on them. Rooks are exceedingly clumsy birds, for they even roll about in walking, and their oscillation on first alighting on the branches is very remarkable, and in flying into the trees they often miss the branch on which they had endeavoured to perch, thereby dropping several feet lower into the tree than they had intended; and even when seated they are a few seconds balancing themselves to and fro, with wings extended and their heads depressed. This awkwardness may, I think, partly arise from the great size and weight of the head and bill, as well as from the shortness and rigidity of the claws, which certainly appear better adapted for walking than for grasping the branches of trees.—*Id.*

Early arrival of the Cuckoo, &c.—*Umbridge*, March 26, 1857. Observed a cuckoo this afternoon flying low, so that in threading its way through the hop-poles it passed so close to me that I could plainly distinguish the varied and chequered plumage of the back. ... April 5. Saw a chiffchaff in an oak tree; heard the notes of two more in the course of the day, which has been warm, with a westerly wind. ... April 6. Saw a swallow.—*Id.*

Another Egg prodigy.—I herewith give the dimensions of an ostrich's egg, selected by me some years since, when at the Cape, from amongst several others, on account of its superior size. I think it decidedly the largest that I ever saw, although possibly there may be found some to exceed it in private collections or in public museums in this country: its circumference lengthwise is $16\frac{1}{2}$ inches, and $14\frac{1}{2}$ inches in breadth, and is capable of containing three pints of liquid.—*Id.*; April 8, 1857.

Notes on the House Sparrow (Fringilla domestica).—March 31, 1857. Rather more than a week since a pair of house sparrows commenced building in one of the small elm trees in front of the house: the site selected for the nest is a forked branch near the top, and the work seemed to be progressing favourably till a sudden change in the weather not only put a stop to it, but the drenching rain that has during the last few days succeeded the snow has almost washed away the few straws that had escaped the violence of the equinoctial gales; however, I observed, both yesterday and to-day, the unfortunate couple endeavouring by renewed exertions to repair damages, but as the weather still looks threatening I think the new foundation not unlikely to follow the old. The position chosen for the construction of the nest is not only a most unsafe but an unlikely one, for the tree, as I have already observed, is by no means a large one, and might be climbed with ease, as the branch on which it is placed, although not large, is strong enough to bear the weight of a good-sized boy. It is wonderful to think how these birds can manage to make a nest stick on, for at present it seems to consist merely of a few loose straws balanced on the forked branch so insecurely that

one would imagine the merest puff of wind would send it flying before it. Why they should have selected a tree, and such a tree, I am at a loss to conjecture, as there are houses and outbuildings in all directions. They are not tree sparrows, however, although they might possibly be taken for such, as Montagu tells us that "every house sparrow that has built its nest in a tree (by no means an uncommon occurrence) has at once been pronounced to be the tree sparrow, and consequently that species has been supposed to be more plentiful, and more generally diffused throughout England, than we have any reason to believe is the fact."... April 14. The late tempestuous weather has completely swept away the new nest, not one straw remaining, but the patient and indefatigable birds are still there, seemingly unwilling to quit the scene of their past labours, nor should I be surprised to find them shortly renewing their endeavours; but how the female can, under the circumstances, manage to retain her eggs till the nest may be ready to receive them is to me a mystery, unless she is endowed with the faculty, generally ascribed to the cuckoo, of bearing them about until a fit opportunity offers for depositing them.—*Id.*; April 14, 1857.

Notes on the European Nuthatch (*Sitta europæa*).—April 8, 1857. Described a female nuthatch in a lofty oak tree; it was seemingly engaged in enlarging a hole or opening in one of the branches, possibly with a view to constructing a nest, for so intent was it upon the work that it allowed me not only to approach the tree, but to explode two or three percussion caps before I could discharge the gun, which had been loaded for some days, and when it did take wing I was not long in discovering it again, being attracted to the spot by the loud tapping sound it made with its bill, which might probably have been heard at the distance of fifty yards or more. ... April 9. I observed two nuthatches fly across the road and alight suddenly on some high trees: I followed them up, and having shot at and wounded one it flew to some distance, and, although badly hit, managed to retain its footing on an elevated branch till brought down by a second shot: it proved to be a handsome male bird. On subsequently shooting the female, I found that although a pellet (No. 8) had gone through its eye, passing out at the top of the skull, it was still alive, and I had some difficulty in killing it,—indeed its tenacity of life was something extraordinary. The male, although a stouter and heavier bird than the female, does not much exceed it in length, although the bill is stronger and about a tenth of an inch longer: the plumage, however, is far more brilliant, the sides and feathers beneath the wings, as well as under tail-coverts, being of a bright chestnut or reddish brown, whereas in the female these parts are much paler, indeed many shades lighter. The black band or line commencing at the nostrils, where it is but a tenth of an inch in width, after passing over the eye, gradually increases to about two-tenths of an inch. The outline figure of the nuthatch, as represented in the 'Naturalist's Library,' is, I think, pretty correct, but the colouring of Temminck is more natural, although the artist has not only given the bird a tail about as long again as it ought to be, but has drawn it in a right line, whereas it is considerably curved, as well as the whole body, bill excepted, which is quite straight. There is a large, well-defined black patch beneath and on the wing, which, although very striking, is not even alluded to by the authors I have referred to. Merely judging from its struggles to escape, although wounded in the manner described, I should have set it down as a wonderfully powerful bird, and, on removing the skin, I found the muscles, considering the small size of the bird, uncommonly strong, and the flesh unusually firm. The bill, although undoubtedly strong, I should not, at first sight, have considered sufficiently so either to have perforated or cracked a

nut, unless it had been so stated on the best authority; besides, if constantly used in drilling holes through nuts, it would necessarily have become, I should have thought, in some degree blunted thereby, whereas the bills of all these birds are very acute, and the upper mandible exceeding the lower in length, which seems unlikely to be the case if constantly brought in contact with so hard and polished a surface as that of the nut. The back is of a uniform bluish gray, the lower parts reddish yellow; the first quill has a slight white spot on the shaft as well as on the inner web at the base, the rest of the feather being of a dark brown; second quill much the same, but has a slight narrow white line about half way up the outer shaft; the third and fourth quills are marked the same; the fifth is white at the base and on the inner shaft; the rest of the quills slightly margined with white on the inner webs only; the fourth is very little longer than the third; the second and fifth are about the same length; the first three-tenths shorter than the second. Several authors, Temminck among the rest, say the throat is white, but in all three of the specimens that I have recently had under examination that part is gray, but in the male the lightest: there is, however, a silvery white patch on the cheek, as well as a white spot on the wing near the flexure. The tarsi and toes of the male are much the darkest. The tail, which is composed of twelve feathers, has the two centre ones narrow and of a bluish gray, like the back, the three outer ones are black at the base, and have diamond-shaped white patches on the inner webs towards the points, which end in triangular black spots, the exterior feathers only being white on the greater part of the outer webs, but black at the base and at the tips; the fourth feathers are merely tipped with white; the fifth are entirely black, with the exception of a slight shade of gray at the tips; the under tail-coverts are white in the centre, margined with reddish brown. Female: length $5\frac{1}{2}$ inches; extent of wings 10 inches; wing from flexure $3\frac{1}{4}$ inches; tail $1\frac{3}{4}$ inch; bill along ridge $6\frac{1}{2}$ -tenths of an inch, along edge of lower mandible $\frac{3}{4}$ inch; tarsus 8-tenths of an inch; hind toe $\frac{1}{2}$ inch, claw $\frac{1}{2}$ inch; middle toe 6-tenths of an inch, claw $3\frac{1}{2}$ -tenths of an inch; inner toe $3\frac{1}{2}$ -tenths of an inch, claw 3-tenths; outer toe $4\frac{1}{2}$ -tenths of an inch, claw 3-tenths of an inch.—*Id.*; May 1, 1857.

Note on the Woodchat Shrike (Lanius rufus).—May 14, 1857. Went out in quest of birds, and had not proceeded above a quarter of a mile from the town when I observed a strange one fly across the road; there was a peculiarity in its appearance, as well as flight, which attracted my attention, and I felt sure it was a species I had never before seen; consequently hastened to load my gun, and while doing so it passed so close that I could not only distinguish the reddish brown patch on the head and neck, but a fly that it had captured and still held between its beak. Having seen it alight on an oak tree, some fifty yards off, I followed it up and shot at it, when it fell among some nettles, but being merely winged it crept into a hedge, where it was subsequently seen by some boys who had joined me in the search, which was continued for an hour or two. As I distinctly saw the rufous of the hind neck there can be no doubt of its being the wood shrike. Its flight was most buoyant, and, in passing over head with expanded wings, it seemed to float upon the air. I remarked that the whole of the under parts appeared perfectly white, which agrees with Temminck's description, "d'un blanc pur," whereas he tells us that the redbacked shrike (*Lanius collurio*) has the "poitrine, flancs et ventre d'un roux rose."—*Id.*; May, 1857.

Note on the Grasshopper Warbler (Sylvia locustella).—May 6, 1857. In passing through a wood on my return from the village of Pembury I heard the peculiar but well-known notes of this singular little bird, which I was

not long in discovering, as it was perched on one of the topmost twigs of a bush, at the distance of thirty yards. The grasshopper warbler, we are told, is generally dispersed, and so it may be; nevertheless, it is my belief that not one person in fifty has ever set eyes on it, though possibly they may have heard the notes, which doubtless would be taken for those of the grasshopper or cricket. But even if occasionally seen (which, from its skulking habits, is not likely), it would probably, unless in the very act of singing, be taken for a whitethroat, to which it bears a striking resemblance, particularly when creeping among the bushes. Having shot the bird, and wishing to compare it, I turned over Temminck's beautiful coloured prints, and might have continued to do so from that time to this without recognizing it, had it not been for the name at the foot of the page, for the artist has made both throat and belly black, whereas those parts are white. The work referred to originally belonged to Yarrell (who has made notes in it, and added an English index), or I could have fancied the print had been tampered with. In the specimen about to be described (a male) the under tail-coverts are nearly as long as the tail, but in the print they do not reach half-way up, and the upper mandible is too much arched. Having examined it well before removing the skin, I found the measurements as follows:—Length 5 inches and 6-tenths; extent of wing 7 inches and 6-tenths; wing from flexure $2\frac{1}{2}$ inches; bill along the ridge 4-tenths of an inch; lower mandible $3\frac{1}{2}$ -tenths of an inch from plumes; tarsus 8-tenths of an inch; middle toe 6-tenths of an inch, claw $1\frac{1}{2}$ -tenths; inner toe 4-tenths of an inch, claw $1\frac{1}{4}$ -tenths; outer toe 4-tenths of an inch, claw $1\frac{1}{4}$ -tenths; hind toe 4-tenths of an inch, claw $2\frac{1}{4}$ -tenths. Dorsal line straight for more than half its length, but considerably curved towards the point, which is acute; lower mandible straight and overlapped by the upper, which has a notch to receive it, light horn-colour at the base, but with a purple tinge towards the point, the latter being of a dark reddish brown; legs flesh-coloured, toes and claws a shade or two darker, the latter moderately arched; head much depressed and tapering; nostrils linear, but partly concealed; there are a few black bristles at the base of the lower mandible, but becoming more numerous at the upper, extending towards the eye, which is small and black, with the iris hazel, over which there is a light yellowish streak, and beneath a dark brown one; chin and throat pure white; breast of a most delicate fawn-colour; lower parts white; under wing-coverts and sides light buff, but the feathers are yellowish brown towards the vent, and for the most part dark brown on and near the shafts; under tail-coverts pointed and very elongated, reaching to within four-tenths of the end of the tail, hair-brown at the base and on the shafts, the rest of the feathers gray, tinged with yellow. General colour of the back and head olive, tail and coverts clove-brown: most of the feathers of the upper parts are either black or dark brown in the centre, which, being partly concealed, leave triangular or spear-shaped spots, disposed in regular lines down the head and back; those on the former proportionally minute, and branching off from the bill till they terminate suddenly at the nape, with the exception of a few which become so faint as to be almost blended with the rest of the plumage. The tail, which is two inches and two-tenths in length, is composed of twelve broad feathers, but suddenly tapering at the points, the two centre ones being the longest, the rest rapidly decreasing; the outer webs clove, the inner hair-brown, transversely barred with black. The wing is short, and has nineteen quills, hair-brown on the inner webs, but broadly margined with gray and tipped with the same colour, the three first only edged with gray on the outer webs, the rest with greenish yellow; the first quill is

barely half an inch in length and very narrow, third longest, the second but little shorter, fourth nearly the same, from ninth to fifth inclusive regularly graduating, tenth a mere trifle longer than the former, eleventh $1\frac{1}{2}$ -tenth of an inch shorter than the tenth, which, together with the four following, vary so slightly as to appear almost of the same length, but the sixteenth is longer by 1-tenth, and the seventeenth is fully 1-tenth longer still, but the eighteenth suddenly decreases by $1\frac{1}{2}$ -tenth, and the nineteenth is so short and flexible as to be barely distinguishable from the primary coverts, which are dark brown in the centre, margined with light yellowish brown. Secondaries the same till they approach the flexure, where they become slightly margined with gray. Montagu considered it very local, for he says:—"We have not been able to trace this species far North, nor into all the South-eastern counties: the borders of Gloucestershire and Hampshire have hitherto been the utmost of their known range eastward." Pennant, who mentions its having been found in Shropshire, observes, "The hind claw shorter and more crooked than is usual in the lark kind." On reading this I had the curiosity to compare the two, for there is nothing like mensuration in these matters (although a Russian Prince has been criticized of late for carrying about with him a yard wand). I found that the hind claw of the lark measured three-fourths of an inch, that of the grasshopper warbler, as has been already stated, only $2\frac{1}{4}$ -tenths of an inch. No great resemblance here!—*Id.*

Note on the Nightingale (*Motacilla lusciniæ*, Linn.)—April 20th, 1857 (thermometer 65°).—At six o'clock P.M. I revisited the spot where a nightingale was first heard on the 11th instant. After vainly waiting for some half-hour or more, I was returning home disappointed, when the clear but distant notes of one could be plainly distinguished above that of every other songster. We (for I was accompanied by one of my sons) immediately hastened to the spot. To leave the high road, cross a ploughed field, and clear a hedge, seemed, in our state of excitement, but a momentary affair. As we drew near, not one only, but several of these sweet warblers were pouring forth their melodious notes at the same moment, apparently vying with each other in eager but peaceful rivalry. We now found ourselves in a lane, bordered on either side by hawthorn hedges, which, like most others in this neighbourhood, had been allowed to grow up in a natural and luxuriant manner, to our left; and adjoining the road there was a small plantation, chiefly of oak, but the ground at the foot of the trees was completely covered with tangled bushes and briars; an old, unused cart-road running through the midst of it, on the entrance-gate to which we sat ourselves quietly down to listen to and enjoy this unexpected serenade. I never before, that I am aware of, heard more than one or two at a time, but now there were three or four singing at once, and so powerfully that the thrilling sensation caused by it is more easily imagined than described. And what met our eyes was equally astonishing; for we had barely time to take up our post of inspection when my son directed my attention, although it was not needed, to two of these most elegant birds (for the nightingale, though so modestly attired, is inferior to none in lightness and beauty of form) in pursuit of each other; and so regardless were they of our presence that they frequently, in their windings, passed so close that I could clearly distinguish the colour of the plumage, particularly the reddish brown feathers of the tails, which were momentarily expanded before alighting on the bushes, which they occasionally did within four or five yards of us, when they would at once commence their song, which was generally taken up or immediately followed by others that were continually sporting about, occasionally alighting on the ground, and one I saw, but for an instant only, pitch on

the public road; they also frequently flew into the leafless oak trees, where they remained for a minute or so, singing as if they would crack their throats, which were greatly distended. During the continuance of the song I observed that the body was kept in a horizontal position, the head being brought down to a level with the tail, which was, however, frequently flirited up and down at its conclusion, when they would spring up or hop round, reversing their position on the branch. There was, I am inclined to believe, but one female among them, for I saw but one pair chasing about, the rest flying singly; and, as they frequently passed over the open space left for the road already referred to, I could not have failed to have noticed it had there been more than one pair; besides, when the two birds entered a bush together the notes of one only was heard to proceed from it. This charming spot, although so retired, is not more than a few hundred yards from the railroad; but I observed that the passing train only caused a momentary cessation to their song, and the shouting and screaming of some children on the road did not even appear to be noticed. Their flight is very buoyant, and they thread their way through the hedgerows and bushes with surprising facility, in a somewhat similar manner to that of the hedgesparrow, but then the wings are more expanded. There is a small lake close to the wood, but so completely shut in and fringed by the underwood, as well as overshadowed by the surrounding trees, that it would probably be unobserved by any less prying eyes than those of an ornithologist or botanist; in fact, it is a spot that seems to combine everything that can make it desirable as a breeding place; so, if undisturbed, they would doubtless remain in what is probably an old and favourite haunt.—*Id.*

Parus major. — Mr. C. R. Bree, in remarking on my note on the tom-tit (Zool. 5426), says, "They are not like the woodpecker when thus engaged bringing to the surface insect-food, but they are actually cracking nuts, which is a much more difficult proceeding. The stone of the haw-berry or some other small fruit is carried by Tommy into the tree, and being fixed in some convenient niche," &c.; and, as it appears that the correspondent referred to "observed the whole process," there can be no doubt that the tom-tit is a *nut-cracker*, *i. e.* a cracker of "the stone of a haw-berry or some other small fruit." But if Mr. Bree will only take the trouble of re-perusing my note, he will find that the bird was therein described as having been seen "*clinging* to one of the topmost branches," a very significant expression I should have thought, and one that Mr. Bree cannot fail to observe was intended to show the true position of the bird as suspended by the claws *beneath* an almost horizontal branch, where it would have been utterly impossible for a tit or any other bird to have fixed a nut; consequently I must adhere to my former opinion, which was not made public without due consideration. And in taking leave of the subject I have only to add,—I have hitherto made it a rule to allow all remarks that may have been made on my notes to pass unnoticed, and shall continue to do so, unless, as in the present instance, it should appear that my silence may possibly be misconstrued.—*Id.*

Remarks on the Etymology of Names of Animals.

By the REV. PHILIP H. NEWNHAM, M.A.

"POLONIUS. What do you read, my lord?

HAMLET. Words, words, words!"

Hamlet, Act. ii. Scene 2.

DURING the last few years Etymology has made great progress. We have outgrown the era of Johnson, Horne Tooke, Junius, and others of the same stamp, when a word was held to be sufficiently "derived" if it were referred to its counterpart in French or Latin, or if a strong resemblance could be traced between it and another word. So little, at this time, was the true theory of the science understood, that the most fanciful and arbitrary origins for words were elaborated. Etymology was thus brought into great disrepute: it was, for the most part, looked down upon by men of learning, as an amusement for dabblers and triflers, whose happiest conjectures merited little other praise than that which might be accorded to a successful pun.

This state of things, however, has given place to a sounder and more rational view of the science; and, in consequence, the not unmerited sneers which were then bestowed on etymologists are now heard less of. Nor has any one contributed more to the effecting this result than Mr. Trench, whose charming books have rendered the study of words so deservedly popular: no one has more successfully shown the fascinating interest that is excited by the disinterment of the "fossil history and poetry" that lurk beneath the apparently unattractive surface-soil of "mere words."

That the subject is one to which a strong interest naturally attaches few will venture to deny. When we speak of a dog, a horse, or a pig, surely we are not to be contented with simply knowing that these are the names of certain animals; should we not ask *why* they bear these names? Should we not ask whether there be any reason why a pig might not be called a whale, or the grampus change names with the eagle, without any principle being violated? And, if there be any such reason, should we not endeavour to investigate it? And, again, when we see how much of a nation's history—of its manners and customs, and antiquities—can be elucidated from a study of its language, we cannot help feeling how interesting, as well as how important, that study is. And there is abundant proof that this feeling is growing in the public mind: in all popular books on Zoology which

have lately been published,—and especially in Mr. Bell's 'History of British Mammalia,'—the derivations of many of our vernacular names are given or attempted. These are signs which show that a want is being felt, which there is at present nothing capable of supplying.

Great progress, as I have said, has been made in unravelling the true family history of words. We are no longer confined to Johnson, but have other dictionaries to fall back upon, and, in particular, that of Webster, which is immeasurably the best, both in the amount of information supplied, and in general soundness of principle. Still, these are cumbrous volumes; their price makes them generally inaccessible; their information needs to be put in a less scattered, as well as in a more inviting form. A sounder and more comprehensive system, too, is very desirable: and, if this last remark be true of the whole subject, still more is it applicable to the names of objects belonging to natural science. Whatever dictionary we may consult, we cannot help feeling that the thing needed is a mind which combines some knowledge of Natural History with skill as a scholar and a linguist. We constantly find an origin ascribed to some name, from some supposed habit or characteristic which has its only existence in the fertile imagination of the ingenious lexicographer.

This subject has for some years been one of great interest to myself. I have felt the difficulties and deficiencies to which I have alluded, and I have therefore thought it would not be unacceptable to naturalists if some information of this kind could be presented to them in a condensed and readable form. And here I must, at the outset, express my utter abjuration of that system of philological falsehood in which people are now being educated, when they are taught that a certain word in one language is "derived from" a similar word in another language. The languages of Europe, as is well known, have a common origin: what that original stock was we cannot say,—probably the Sanscrit is the nearest approach to it. As the various tribes of men migrated westward, climate and other local influences modified their speech into dialects of the old root language. Thus, as we should expect, we usually find the same word, though often strangely modified, expressing the same idea in the kindred dialects of Europe, and often traceable back to its Eastern birth-place also. But we must remember that these forms have an *independent* existence; nor must we say that one is "derived from" another, unless a clear case of *importation* can be established.

My wish will be, wherever it is possible, to trace out this family connexion; not simply to rest satisfied with giving the root or origin of any name, but to find out the *Etymology*, or *true meaning of the word*, as well. In the present paper I shall confine my observations to the names of our own indigenous Mammalia.

I have now only to crave the indulgence of my readers: I must ask them to act upon the golden rule of etymologists, "Never reject an Etymology because it seems strange, or accept one because there is a strong verbal similitude." Of course I do not expect all persons to agree with me, nor do I wish it: I have no doubt I have made many mistakes, and I wish nothing that I have said to be looked upon as a dogmatic statement: I wish my attempt to go for what it is worth. I put it forward in all diffidence, with the hope that it may, at all events, serve as a stepping-stone by which some other mind shall be able to grasp higher things than my own ability, leisure, and power of procuring books can enable me to hope after reaching for myself.

The etymology of the word *bat* is involved in most disheartening obscurity: Skinner derives it from the Anglo-Saxon *bat*, a boat; because, with its wings expanded, it resembles a boat impelled by oars. This hardly needs to be characterized as a fanciful conjecture: he, however, compares it with its Arabic name, *baphus*. It is to be noticed that G. Douglas calls it *bak*, and its Scotch name to this day is *backie-bird*.

Assuming the word to be aboriginal in its present shape, I shall venture to put forward a suggestion, first entering a caveat that I look upon it as a mere conjecture. How is it that the word *beetle* signifies both the insects known by that name and also a large hammer or mallet? In the latter sense it manifestly originates from the verb to *beat*; and the name of the insects may come from the same source, from the habits of one of the best known of them,—the common cockchaffer: every one knows what a pest this creature may become, when one is out on a summer evening: they *beat* around your head and mob you, just as swallows do to a cat. Now the little pipistrelle has a precisely similar habit; and hence the fancy has crossed my mind that the name of *bat* may be drawn from hence.

Fluttermouse, *flittermouse* and its corruption *flintymouse* are common provincial names for the bat: these need no explanation; but they are interesting, inasmuch as, together with many other vernacular terms, they show the just appreciation of natural affinities which our rustic forefathers possessed. *Reremouse* is a somewhat

similar term, by which the bat is known in heraldry; and in 'Midsummer Night's Dream' (Act ii. Scene 2), Titania bids her attendant sprites,

"Some war with remice for their leathern wings,
To make my small elves coats."

The first syllable of the name is our common word to *rear*; thus signifying the *mouse* that has the power of *rearing*, or raising itself from the ground.

Noctule, *pipistrelle* and *serotine* have much the same meaning. *Noctule* is the Latin *noctula*, from *nox*, night. *Pipistrelle* rejoices in the Italian modifications of *pipistrello*, *vipistrello* and *vespertillo*; thus enabling us to identify it as only a corruption of *vespertilio*, derived from *vesper*,—a name primarily applied to the evening star. *Serotine* is the Latin *serotinus*; from *serus*, late.

The *barbastelle* is named from its hairy lips: the Latin *barba* is *beard*, from a root signifying *roughness*, which appears also in the word *bristle*, and a thousand other modifications. The name of the *horse-shoe bat* requires no comment.

Mr. Talbot, in his 'English Etymologies,' suggests that the name of *hedgehog* is, in its origin, *edgehog*, from the Anglo-Saxon *ecge*, Danish, Swedish and Icelandic *eg*, a point; referring, of course, to piggy's sharp spines. And this etymology is rendered the more probable when we compare the German *stachel-schwein* and the Danish *pinswin*, both words signifying "thorn-hog."

The original name of the *mole* is *mouldwarp* or *mouldiwarp*, from the Anglo-Saxon *weorpan*, *warp* or throw up; and *mold*, now spelled *mould*. It still retains its original name in some parts of the country, although the English love for monosyllabizing has long since adopted the shorter form for general use. Gascoigne, who wrote in the sixteenth century, used *mowle* and *mouldiwarp* indifferently. It is interesting to trace in words like this the development of the nation's character. Business and hard matters of fact bring along with them all manner of abbreviations and curtailments.

The word *shrew* has been referred to the Anglo-Saxon *schreadan* (the origin of our *shred*), or to *scheorfan*, to bite, or *schrif*, to censure,—words akin to our *sharp*;—and the idea conveyed by the name is supposed to be derived from the old tales of its running over and biting cattle. No doubt the word *shrew* has been applied to female scolds; and the old exclamation, "Beshrew thee," has taken its origin from some source of this kind. But we find words in other languages which are obviously identical with *shrew*; and these words

are as obviously to be referred to a very distinct root. With the Anglo-Saxon *schreava* I should compare the French *souris*, Latin *sorex*, and Greek ὑραξ. The meaning of the name is shown us by our own word *shrill*, as also the Sanscrit *svri*, to whisper. Country people generally make two syllables of the word, pronouncing it “*sher-ew*.” This confirms the idea that the name is imitative of the animal’s voice.

Erdshrew is also found as a name for this creature. The first syllable is clearly the Anglo-Saxon *eorth*, earth.

Badger is derived by Skinner from the Teutonic *back*, a jaw, from the strength of that part in our animal. To my mind this is hardly satisfactory; but I have nothing better to offer. *Brock*, Anglo-Saxon *Broc*, is a name given from the sulky snarling of the creature when “badgered.” In Welsh *broc* also means a *noise*. Like the name of our *rook*, and the Latin *raucus*, harsh, it is intended to imitate harsh or unpleasant cries.

Weasel is the Anglo-Saxon *weste*, Dutch *wesel*, German *wisel*. Probably it is named, like the shrew, from its shrill *whistling* cry.

Ermine in Spanish is *Armenio*. Gwillin, in his ‘Display of Heraldrie,’ gives the origin of the name:—“This is a little beest, lesse than a squirrell, that hath his being in the woods of the land of Armenia, whereof hee taketh his name.” *Stoat* is undoubtedly the same word as *stout*, as the name is still pronounced in some parts of the country. In the ‘Gentleman’s Magazine’ for 1784, p. 732, we read:—“Perhaps the fumart is the animal we know here (Berkshire) by the name of the *stout*, though very improperly called so, being, I believe, the smallest beast we have, except the mouse. It partakes of the nature of the weasel.” But this difficulty is removed when we remember that *stout* originally meant *bold*; and, improper as the word seems in its usual acceptation, we at once recognize its truthfulness in the sense of *stout-hearted*.

Foumart, *fumart*, *fulimart*, and other varieties of spelling, are all of them contractions of *foul marten*. The name is of course derived from the disgusting smell of the well-known secretion of the animal. The same prefix appears in the name of the *fulmar*. *Polecat* is a word which has given rise to many conjectures. Mr. Bell suggests that it is simply *Polish cat*; but historical evidence is wanting whereby to connect it with Poland. Mr. Talbot thinks that it may mean *furcat*; and he compares the Anglo-Saxon *pylca*, a fur garment; *poell*, a cloak;—which are identical with the Latin *pallium*, cloak; *pellis*, skin: German, *pelz*, fur; *fell*, skin: and our own word *peel*. But in

the root from whence we take our word *foul* (and which runs back finally to the Sanscrit *puj*, to rot) *p* and *f* seem to be used interchangeably: hence I feel inclined to regard *pole* as merely a modification of *foul*.

Ferret is, German, *fret*, *frettel*; French, *furet*; Spanish, *huron*, *furam*;—all taken from the Latin *fur*, a thief. It seems doubtful whether the Latin *viverra* be really belonging to this root.

Otter presents us with an etymological nut by no means easy to crack. In German it is *otter*, in French *loutre*, in Latin *lutra*. By fathering this upon some such word in Greek as *λούτρα*, which would signify *bather*, we can at once get rid of the difficulty. But the insuperable objection remains that the Greeks had no such name for the otter. Now, just as *ounce* has passed through the French *l'once* into the Italian *lonza*, and as *lierre* (ivy) was originally *l'ierre* (from *hedera*), so *loutre* and *lutra* have originally come from *l'outre*; so that the *l* is no essential part of the word. Again, in German *otter* not only means our animal, but *adder* also; and the two words are, in fact, etymologically identical. *Adder* was originally written *nedre*, the *nether* or creeping animal. It was a generic term, just like *serpent* or *reptile*, both of which words mean *creeper*. This prefixed *n* appears again in the Latin *natrix*, snake, and our own *natterjack*; and the parallel is further kept up by the Spanish for otter being *nutria*. Thus I am inclined to believe that the resemblance of the long, lithe otter to a swimming reptile will furnish us with the true key to the origin of the name.

Marten is in Anglo-Saxon *mearthe*, French *martre*, German *mararder*, Latin *martes*. It is named from its rapacious and *murderous* disposition; as Vossius and Gesner say, because it destroys poultry, &c., “*vi martiâ*.” It need hardly be said that the name of the house-martin, however similar at first sight, has a wholly different origin.

Dog is the Teutonic *docke*, French *dogue*, Phrygian *daus*. On listening carefully, any tolerable ear will at once be struck with the fact that very few of our dogs enunciate the “*bow-wow*” of our nursery ideas. All, without exception, end off with a *g*, or strong guttural *gh*. “*Bog*,” “*wog*” are the cries of many dogs; but a very large proportion prefix a *d* to the sound, and utter their own name very distinctly; and from this fact I believe the name to be derived, as so many other names are. I may mention that I had observed this peculiarity years before I had turned my attention to etymology. On the origin of the feminine term *bitch* I can only hazard a conjecture. In German it is *betze* or *petze*. Now, in French *biche* is a doe, and in Ger-

man *bache* is a wild sow; and these words bear a strong family likeness to each other. I am inclined to believe that they are artificial feminine modifications of the word *buck*, possibly first applied to the female deer, and afterwards transferred to other animals, exactly as is the case with our own *buck* and *doe*.

Hound, the Gothic *hund*, is the Greek *κύων*, which, like many other words beginning with the same letter, was pronounced, not with a *k*, but with a strong guttural *h*. In French *chien*, and in Latin *canis* are identical forms, and in Sanscrit we also find *çvan* and *çun*, besides a host of other and apparently most dissimilar modifications of the same root in kindred dialects. *Hound* means the *hunter*. It is identical in origin with the words *hunt* and *hand*, and may be traced to the Gothic *hinthan*, Latin *pre-hendere*, to seize.

Puppy is the Latin *pupus*, *pupa*, our own "*poppet*,"—terms of endearment, in the first place applied to young children, and afterwards transferred to the young of animals, and, as was natural, retained in particular by the most domestic among them. Our word *baby* is of the same family; and all these names, as well as *papa* and other similar ones, are imitations of the earliest cries of children. *Puppy*, as applied to a fop, is no doubt a corruption of *puppet*, in the sense of a dressed-up doll, just in the same way as we find *muneco*, *manikin*, used in Spanish.

Whelp is the Danish *hvelp*, Swedish *valp*, and in all probability the Latin *vulpes*. Primarily applied to fox-cubs, and then made of more general application, it affords us a curious instance of a process exactly the reverse of what we have seen to be the case in *puppy*. *Vulpes* is the same word as our *wolf*, and may be traced back to a Sanscrit origin, signifying the *tearer* or *gripper*.

Of the numerous varieties of dog, I have been able to trace the origin of the following. *Bandog* seems to be compounded of *band* and *dog*, and to have been originally a sort of general term, applied to those dogs whose fierceness obliged them to be always kept *bound* or chained up. *Beagle* is the French *bigle*. Skinner derives it from *bugler*, to *bellow* (or to *bell*, as we say of deer), from their deep, sonorous bark. Following the same idea, Richardson thinks that it may be formed from some diminutive of the verb *to bay*. Skinner also suggests as an origin the Italian *piccolo*, small; but this seems more like a *guess* than the others. In French *bigler* is to *squint*; whence it is probable that *bigle*, as the dog's name, is only a French way of spelling our own word. *Brach* is a word we meet with in Shakspeare and elsewhere. It is French *braque*, Dutch *brak*, Italian

bracco, Spanish *braco*. The Spanish *braco*, *brazzo*, Italian *braccio*, are the Latin *brachium*, arm; and hence it is probable that our name has its origin from the idea of *pointing*.

Cur has a curious derivation. It is corrupted from *curtailed*, the Latin *curtus*, short. By the old forest laws all dogs found straying were to be deprived of their tails, as a mark of disgrace; and such dogs were thereby disqualified for hunting or coursing. Hence the word became gradually more extended, and, as forest laws became obsolete, the name acquired a general application to "curs of low degree."

It is not easy to choose between the various derivations proposed for *greyhound*. Its Latin name is *canis graius*; and some have supposed this to mean *Grecian* dog, as though this variety were first used by the Greeks; but this lacks historical confirmation. Another suggestion is the Dutch *grüphund*, from *grypen*, to gripe. This is not a bad idea; but I am inclined to agree with Mr. Bell when he says:—"Perhaps, after all, the most simple and obvious derivation,—from the prevailing colour of the original breed of these dogs,—is the true one."

The *harrier*, Anglo-Saxon *harier*, is no doubt simply the dog used for hunting the hare. In this sense it must not be confounded with harrier, the name of the hawk, which is named from its *harrying* propensities, just as our word *havoc* refers to the devastations committed by the *hafoc* or hawk. Still, it may be too much to say that the verb *to harry* has had *no* share in causing the name of our dog to be spelled with a double *r*, instead of the single one which appears in the Anglo-Saxon.

Lurcher is a dog that *lurks* or watches slyly for his game. *To lurch* is an old word, meaning to defeat or disappoint, also to cheat or defraud. It is probably derived, as Johnson suggests, from *lourche*, an old game, something like our draughts. We can easily suppose that the game gave employment to numbers of blacklegs, "et hoc genus omne," which accounts for the idea of cheating or secret dealing which runs in our words *lurk* and *lurch*.

Mastiff is the French *mâtin* (for *mastin*), Italian *mastino*. Skinner derives it from the French *maison tenant*, "house-keeper." I have no feeling of confidence in this etymology, but can find none other.

Poodle is the German *pudel*, "a rough or curled dog." The same word also means "a cropped or curled head of hair." The connexion between the two meanings is obvious. No doubt the word is derived

from *puder*, powder; and thus the name of our dog will serve to keep in mind, for the benefit of future generations, the memory of the "good old time" when wigs and hair-powder were indispensable.

Pug.—This word seems to be the Anglo-Saxon and Swedish *piga*, Danish *pige* (a *girl*, whence our name *Peggy*), Spanish *poco*, Latin *paucus* (few), and perhaps the Greek *πυγμαῖος*, pigmy. The name was first applied to the monkey, as resembling a pigmy man, and was thus transferred to a variety of dog whose flat nose somewhat reminded one of a monkey. Now, there are many words which exhibit what may be called a pregnant etymology. They may be referred, in the first place, to one root; but they are also influenced by other roots, of similar sound but of totally dissimilar meaning. It is probable that our present word is a case of this nature. *Pug*, as applied to a monkey, may have a secondary reference to the name of *Puck*, the mischievous elf of fairy tales, whose name is akin to *bogle*, *bug*, *bugbear*, and other words which are taken from a root denoting terror.

Spaniel is corrupted from the French *espagneul*, Latin *hispaniolus*, the breed being originally Spanish. *Terrier* is from the Latin *terrarius*, "earth-dog," "from its subterranean employ," says Pennant.

Lastly, a *mongrel* is a dog of *mixed* breed, from the Anglo-Saxon *mengan*, to mix; German, *mengen*; our own *mingle*.

(To be continued.)

P. H. NEWNHAM.

Guildford.

On the Aquarium; being the Substance of a Discourse delivered by Robert Warington, Esq., at the Royal Institution of Great Britain, on Friday, March 27, 1857.

THE speaker opened the evening's demonstration by stating that he had immediately responded to the invitation of the Managers of the Royal Institution to deliver this discourse, on what they had been pleased to call his "own subject," from the feeling that, as the originator of the aquarium, he was in duty bound to afford to all those who had taken up this "new pleasure" every assistance, from the results of his own experience, that lay in his power, in order to render the undertaking more easy and pleasurable; and for this purpose he proposed to lay before his audience, as far as was practicable, a demonstration of the principles on which it was founded, particularly

as very erroneous ideas had been promulgated on the subject, and instructions given in several most engaging publications which might tend materially to mislead and disappoint those inclined to recreate themselves with this interesting subject.

HISTORY.

After a short sketch of the several discoveries in the various branches of Science embraced in this subject (as the experiments of Lower, Thurston, Hooke and Mayo, on respiration and animal heat; the presence of air in water, and its necessity for supporting the life of fish, by the Hon. Robert Boyle; the discovery of fixed air, carbonic acid, by Dr. Black, and its production in respiration; the experiments of Priestley, Ingenhousz and Sennebiel, on the action of submersed aquatic vegetation, exposed to light, in removing carbonic acid, and restoring oxygen to the air dissolved in water; all of which had been since substantiated by numerous experimenters), a cursory review was given of the common employment of the ordinary fish globe, the cisterns, tanks, pans and tubs, with their fish and water plants, to be seen every day in our conservatories and greenhouses, and the glass cylinders used by almost every microscopist for preserving Chara, Nitella, Vallisneria, and other like plants, in which the circulation of the sap was visible, as also for propagating Rotifers, Stentors, and other microscopic animalcules; the consideration of which points brought the subject up to modern times. Mr. Warrington then proceeded to give an account of his own experiments, and the reasons which had led to their commencement, namely, the statements made for a series of years in our works on chemistry,* that growing vegetation would counterbalance the vital functions of fish. To test the truth of this and its permanence, † a large twelve-gallon receiver was filled to about two-thirds its capacity with river water, and some clean washed sand and gravel, with several large fragments of rock-work placed in it, the latter so arranged as to afford shelter to the fish from the sun's rays. A good healthy plant of *Vallisneria spiralis* was then transplanted, and as soon as it had recovered from this operation a pair of gold fish were introduced. The materials being thus arranged, all appeared to progress healthily for a short time, until circumstances occurred which indicated that another and very material agent was required to perfect the adjustment and ren-

* Brande's 'Elements of Chemistry,' 1821, and repeated up to the present time.

† 'Quarterly Journal of the Chemical Society,' 1850, Vol. iii. p. 52.

der it at all permanent, and which at the commencement of the experiment had not been foreseen. The circumstances alluded to arose from the natural decay of the leaves of the *Vallisneria*, the increase of which rendered the water turbid, and caused a rapid growth of green confervoid mucus on the surface of the water, and upon the sides of the receiver; the fish also assumed a sickly appearance, and had this been allowed to progress they must have speedily perished. The removal of this decaying vegetation from the water as fast as it was formed became, therefore, a point of paramount importance; and to effect this recourse was had to a very useful little scavenger (whose highly important and beneficial functions throughout all nature have been too much overlooked, and its indispensable uses in the economy of animal life not well understood), the water snail, whose natural food consists of decaying and confervoid vegetation. Five or six of these little creatures, the *Limnea stagnalis*, were consequently introduced, and by their extraordinary voracity and continued and rapid locomotion soon removed the cause of interference, and restored the whole to a healthy state.

Thus, then, was established that wondrous and admirable balance between the animal and vegetable kingdoms, and by a link so mean and insignificant as almost to have escaped observation in its most important functions. The principles which are here called into action are, that the water, holding atmospheric air in solution, is a healthy medium for the respiration of the fish, which thus converts the oxygen constituent into carbonic acid. The plant, by its vital functions, absorbs the carbonic acid, and, appropriating and solidifying the carbon of the gaseous compound for the construction of its proper tissues, eliminates the oxygen ready again to sustain the health of the fish; while the slimy snail, finding its proper nutriment in the decomposing vegetation and confervoid mucus, by its voracity prevents their accumulation, and by its vital powers converts that which would otherwise act as a poisonous agent into a rich and fruitful pabulum for the vegetable growth. Reasoning from analogy, it was evident that the same balance should be capable of being permanently maintained in sea water, and thus a vast and unexplored field for investigation opened to the research of the naturalist; and this proved on trial to be the case.

PRINCIPLES OF THE AQUARIUM: THE AIR CONTAINED DISSOLVED IN WATER.

The ordinary atmospheric air is found to be composed of 79 volumes of nitrogen gas and 21 volumes of oxygen; and water has the

power of absorbing gaseous bodies in varying proportions, thus:—
100 volumes of water, at a temperature of 60° Fahr., and under ordinary barometric pressure, will absorb

1.56	volumes of nitrogen gas,
3.70	„ oxygen gas,
100.00	„ carbonic acid gas ;

and hence we find that the air absorbed by water, and existent in rivers to the extent of from 2 to 3 per cent., consists of about 29 of oxygen and 71 of nitrogen. In fresh-fallen rain and melted snow it ranges from 30 to 35 per cent of oxygen, and in some spring waters it has reached as high as 38 per cent. This oxygen, by the process of respiration, is converted into carbonic acid gas, or mephitic air, the choke-damp of the coal-pit, a gas highly poisonous to animal life; but here comes into play that beautiful and wonderful provision which, by the action of growing vegetation under the influence of the sun's light, converts this baneful agent into vital oxygen, the "breath of life."

WATER, FRESH AND MARINE.

The water used for the aquarium should be clean, and taken direct from a river, or from a soft spring, and should not have been purified by means of lime.

As regards sea water, it should, if possible, be taken at a distance from shore, and at the period of high water. If artificial sea water is employed, it should be made either from the saline matter obtained by the evaporation of sea water,* or by the following formula:—

Sulphate of magnesia	7½ oz.
„ lime	2¼ „
Chloride of sodium	43¼ „
„ magnesium	6 „
„ potassium	1¼ „
Bromide of magnesium	21 grains
Carbonate of lime	21 „

These quantities will make ten gallons. The specific gravity of sea water averages about 1.025; and when from evaporation it reaches above this, a little rain or distilled should be added, to restore it to the original density.

* This is prepared by Messrs. Brew and Schweitzer, of 71, East Street, Brighton.

VEGETATION.

The plants best fitted for fresh water are the *Vallisneria spiralis*, the *Myriophyllum*, *Ceratophyllum*, and the *Anacharis*, all of them submersed plants, and fulfilling the purposes required most admirably. From the great supply of food in the aquarium, the growth of the *Vallisneria* is very rapid, and it requires, therefore, to be thinned by weeding; this should never be done until late in the spring, and on no account in the autumn, as it leaves the tank with a weakened vegetation at the very time that its healthy functions are most required.

The vegetation of the ocean is of a totally different character and composition, being very rich in nitrogenous constituents. There are three distinct coloured growths,—the brown or olive, the green and the red. For the purposes of the aquarium, where shallow-water subjects are to be kept, the best variety is the green, as the *Ulvæ*, the *Enteromorpha*, *Vaucheriæ*, *Cladophora*, &c. These should be in a healthy state, and attached to rock or shingle, when introduced. We shall have occasion to notice the *Rhodospiræ* under the head of 'Light.'

SCAVENGERS.

A most important element in establishing and maintaining the permanent balance between the animal and vegetable life, without which no healthy functions can be secured, and the aquarium must become a continued source of trouble, annoyance and expense. The mollusk which was first employed, the *Limnea stagnalis*, was found to be so voracious as it increased in size that it had to be replaced by smaller varieties of *Limnæ*, by *Planorbis*, and other species of fresh-water snail. The number of these should be adjusted to the quantity of work they are required to perform. In the marine aquarium the common periwinkle fulfils the required duties most efficiently, and is generally pretty active in his movements. The varieties of *Trochus* are also most admirable scavengers; but it must be borne in mind that they are accustomed to mild temperatures, and will not live long in a tank liable to much exposure to cold. The *Nassa reticulata* not only feeds on the decaying matters exposed on the surface of the rock-work and shingle, but burrows below the sand and pebbles, with the long proboscis erected in a vertical position, like the trunk of the elephant when crossing a river. But in the ocean there are innumerable scavengers of a totally different class, as the *Annelids*, *Chitons*, starfish, nudibranch mollusks, &c.; thus affording a most beautiful

provision for the removal of decaying animal matter, and converting it into food for both fish and man.

LIGHT.

It is most probable that the greater amount of failures with the aquarium have arisen from the want of a proper adjustment of this most important agent, the tendency being generally to afford as much sun's light as possible; but on consideration it will be found that this is an erroneous impression. When the rays of light strike the glassy surface of the water, the greater part of them are reflected, and those which permeate are refracted and twisted in various directions by the currents of the water; and where the depth is considerable it would be few rays which would penetrate to the bottom; but let the surface become ruffled by the passing wind, and it is little light that can be transmitted; and when this same disturbing cause lashes into waves and foam, not a ray can pass, and all below must be dark as night. Too much light should therefore be avoided, and the direct action of the sun prevented, by means of blinds, stipling, or the like. It is a great desideratum to preserve the growth of the lovely red Algæ in all their natural beauty, and prevent their becoming covered with a parasitic growth of green or brown-coloured plants; this can be effected by modifying the light which illuminates the aquarium, by the intervention of a blue medium, either of stained glass, of tinted varnish, coloured blinds, &c. The tint should be that of the deep sea, a blue free from pink, and having a tendency rather to a green hue. This modified light affects also the health of those creatures which are confined to shallow waters, so that a selection of the inhabitants must be made.

HEAT.

The proper control of this agent is also most material to the well-being of these tanks; for experience has proved that an increase or diminution of temperature beyond certain limits acts most fatally on many of the creatures usually kept. These limits appear to be from 45° to 75° Fahrenheit. The mean temperature of the ocean is estimated to be about 56°; and this does not vary more than 12° throughout the varying seasons of the year, showing the extreme limits to be from 44° to 68°. Great care should therefore be taken to afford as much protection as possible, by the arrangement of the rock-work, both from the sun's rays by day, and the effects of radiation at night, as, from the

small volume of water contained in the aquarium, these effects are rapidly produced.

FOOD.

As many persons, to whom those interested in these matters have naturally looked for instruction, have decried the idea of feeding, it will be necessary to offer a few remarks on that point. How creatures so voracious as most of the denizens of the water are, both fresh and marine, are to thrive without food, is a question it would be difficult to solve: common sense would say they must gradually decrease in size, and ultimately die from starvation. The food employed should be in accordance with the habits of the fish, &c.; for the vegetable and mud feeders, vermicelli crushed small, with now and then a little animal food, as worms, small shreds of meat, rasped boiled liver, and the like; for the marine creatures, raw meat dried in the sun, and moistened when used, answers very well. Oyster, mussel, cockle, raw fish, shrimps, and the like matters may be employed; these should be cut or pulled into very small pieces, and never more given than they can at once appropriate; and if rejected by one it should be transferred to another, or removed from the tank. In the case of Actinia, they require, from their fixed position, that the food should be guided to their tentacles; and if the animal food, of whatever kind, is soaked in a little water, and the water thus impregnated with animal fluids be dropped in moderate quantity into the tank, it will afford food for the small Entomostraca, and smaller creatures with which the water abounds, and which constitute the food for many of them.

A few observations were also made on the construction of a microscope for the purpose of employment in connexion with the aquarium, and the method in which such an instrument could be used.

The Mollusca of the Firth of Clyde.

By the Rev. ALFRED MERLE NORMAN, B.A.

THE notes which have hitherto appeared in the pages of the 'Zoologist' on our Marine Invertebrata have been but few and far between. There have been admirable papers by Mr. Gordon on the Zoology of the Moray Firth, and a few others on a less extensive

scale, though equally valuable as regards the particular branch of the Invertebrata to which they have relation. Although much remains to be done, and no one district has, as yet, been thoroughly investigated in all the branches of Marine Zoology; yet it is probable that our seas have been more thoroughly searched than those which wash the shores of any other portion of the world. This being the case, it is much to be regretted that those who have been most active in their investigations and who have devoted much time, trouble and money, to dredging and other means of capturing and studying the denizens of our salt waters, should keep all their knowledge to themselves, and that the results of their investigations should have been so very partially made known.

It is my intention to give somewhat similar lists to those of Mr. Gordon on the Marine Invertebrata of the Firth of Clyde. Will not other naturalists who have carefully examined any particular district of our coasts give the readers of the 'Zoologist' an insight into the result of their labours, by publishing some account of them in its pages? I know many of its readers who would warmly welcome such lists, if full and carefully prepared, but the greatest care should be taken that no mistakes be made in the discrimination of species; I mention this from having not unfrequently found the most egregious blunders in local lists relating to objects of Natural History: above all, if an error be made and afterwards discovered, it should be at once rectified; all are liable occasionally to fall into error, but it is unpardonable, when others have been misled by us, not to correct them if in our power.

The district which these notes are intended to include is that portion of the "Clyde Province" which constitutes the "Firth of Clyde" proper. It thus embraces that part of the Clyde Province which lies between the Isles of Bute and Arran and the Ayrshire coast, extending southwards as far as the town of Maybole and the southernmost point of the Isle of Arran. It excludes that part which lies to the west of Bute and Arran, namely Kilbrannan Sound and Loch Fyne, as well as those waters which extend from the southern extremity of Arran to the Irish Coast. In these parts I have never dredged: Loch Fyne is glorious ground; would that my dredge had formed its acquaintance! It will be seen that the arm of the sea to which this paper refers is a comparatively limited one, but it will be found to be extremely productive in all branches of Marine Zoology.

The investigations, on which these papers are based, were made by me during the year 1854, which I spent upon the Isle of Cumbræ, in the very centre of the district named, and during which I thoroughly examined the sea all round its shores. In the early spring of 1855 I was, for a week or two, on the Isle of Arran, for the purpose of dredging in Lamlash Bay and hunting up the shore.

This paper will, however, be much indebted to the labours of others. The Clyde has had accurate and active observers, who have examined almost all parts of it most carefully, and who, living on its shores, and having ample opportunities and appliances for its investigation, have devoted much of their time, and that too, most successfully, to the study of its inhabitants. In the eighth volume of the 'Memoirs of the Wernerian Society,' published in the year 1838, there appeared a paper, "On the last changes in the relative levels of Land and Sea in the British Islands, by James Smith, Esq., of Jordanhill, F.R.S.L. & E., F.G.S. & M.W.S.:" this paper contains a "Catalogue of Recent Shells in the Basin of the Clyde and the North Coast of Ireland," to which I shall make frequent reference. Mr. Smith added from the Clyde many most interesting shells to the British Fauna; among these may be mentioned *Pectus danicus* and *striatus*, *Pilidium fulvum*, *Propilidium Alcyloide*, *Puncturella Noachina*, *Trichotropis borealis*(?) and *Mangelia Leufroyi*. No year passes without his yacht skimming the surface of the Clyde, while his dredge brings him into communication with the ground beneath. Mr. Smith is, however, even better known as a geologist than as a conchologist, and his researches into the recent beds of the Clyde are of great interest. In the following catalogue I have affixed an asterisk to those shells which Mr. Smith has found fossil in the "Newer Pliocene Deposits" of the Clyde: under this name of "Newer Pliocene," Mr. Smith has included two deposits,—the first, a few feet only above the present sea level, does not contain any fossils, except of such shells as are still to be found recent in the Clyde; the second, at a somewhat higher level and underlying the last-mentioned, abounds in fossils embedded in a stiff clay, the majority of which are still to be found living in the neighbouring sea; but a few, though still extant in more northern places, are no longer to be met with as denizens of the waters of the Firth of Clyde. These deposits are frequently spoken of by Forbes and Hanley as the "Pleistocene," or "Glacial Beds" of the Clyde.

At Saltcoats there lately lived an eager, acute, and energetic natu-

ralist, whose name will be familiar to all, the Rev. David Landsborough, D.D.: he was the author of 'The Excursions to Arran, Ailsa Crag and the two Cumbraes, with reference to the Natural History of these Islands.' This work, which was published by Johnstone and Hunter, of Edinburgh, gives us an insight into Dr. Landsborough's Natural-History trips over just that district which I have already described, and from his researches these papers will derive much of their value. I had looked forward to forming the acquaintance of a naturalist, who had taste so congenial to my own, and who was so conversant with almost all branches of Natural History, but this was not to be! Soon after I went to Scotland, the ravages of cholera carried off one who was even more regretted as a man than he was as a naturalist.

Major Martin, who resides at Ardrossan, has for many years devoted much time to the study of the Marine Zoology of that neighbourhood, but I believe that he has attended more to some other branches of Natural History than he has to the Mollusca. There are many other familiar names which will here and there occur in these notes as contributors to the zoology of the Clyde, but I have now mentioned the only naturalists who have done more than paid a passing visit to its waters.

The arrangement and nomenclature used is that of Forbes and Hanley's 'British Mollusca.' Where the first name is succeeded by others between brackets, such names are the synonyms by which the mollusk is designated in Mr. Smith's catalogue and Dr. Landsborough's work. If a name between brackets has an asterisk attached, it is one that occurs in Mr. Smith's 'Catalogue of the Shells from the Newer Pliocene Deposits of the British Islands,' and is not used in reference to a recent shell by either of the writers referred to. Any deviations from the nomenclature of Forbes and Hanley will be noticed when they occur.

Class I. ACEPHALA.

Div. I. TUNICATA.

This branch of the Mollusca has hitherto been greatly neglected. It presents an obstacle which unfortunately stands in the way also of many other branches of Natural History, namely, the impossibility of preserving its members without their suffering a total loss of beauty; added to this, the want of a good book upon the subject is greatly felt by those who would be willing otherwise to embrace it in

their studies. Most beautiful the Tunicata certainly are; for although the most common species of the Ascidiæ, *A. mentula*, is not very attractive in its appearance, many of the rarer Ascidiæ are lovely, and all the Botryllidæ are most exquisite objects when alive. I wish the following list to be looked upon rather as a skeleton of what may be done in the Firth of Clyde than as a perfect catalogue: a diligent collector might very greatly add to the number of species. I was so much taken up with other branches that I was unable to attend to the Tunicata as I should have wished. I saw many more species than those mentioned, but was obliged for want of time to leave them unexamined: this remark applies especially to the genera *Leptoclinum*, *Botryllus* and *Botrylloides*.

Fam. I. *Botryllidæ*.

Leptoclinum gelatinosum is to be found on Fuci and Laminariæ, at low water-mark, round the shores of the Isle of Cumbrae.

Diastoma variolosum. The Allans and other parts of Cumbrae, on Fuci in rock-pools, but not common.

Botryllus Schlosseri. This beautiful species is frequent "on stones and sea-weeds," at low water-mark, in those parts of the Clyde I have examined.

Botrylloides Leachii. Parasitic on *Laminaria digitata*, spring tide, the Allans.

Fam. II. *Clavelinidæ*.

Clavelina lepadiformis. Forbes and Hanley give Lamlash and Rothesay Bays as localities for this species, on the authority of Mr. Alder.

Fam. III. *Ascidiadæ*.

Ascidia intestinalis. This pellucid green species is common on dead *Pectens*, *Cyprinæ*, and other shells in the Coralline Zone: it is generally found on the inside of the valves.

„ *venosa*. I procured one specimen of this lovely *Ascidia* between Cumbrae and Bute, in fifteen fathoms water.

„ *mentula*. Frequent off Cumbrae, and in Lamlash Bays. From one specimen I extracted no less than eleven *Crenella marmorata*, some of them of large size, such as are not to be found elsewhere than on the west coast of Scotland.

„ *arachnoidea*. Lamlash, Alder, Forbes & Hanley.

Ascidia virginea. I met with several examples of this, as it were, blood-stained species, off Cumbrae, Lamdash, *Lands*. p. 34.

„ *parallelogramma*. A beautiful species; remarkable for the numerous star-like bright gamboge-yellow spots with which it is adorned; only one specimen occurred to me.

„ *prunum*. Common on various seaweeds growing in rock-pools, at extreme low water-mark, Allans, Cumbrae.

„ *echinata*. Very rare, deep water, off Cumbrae.

Cynthia rustica (*Ascidia rustica*). Dr. Landsborough mentions this species, under the name of *Ascidia rustica*, as having been dredged near the Corrigils, Isle of Arran, by Major Martin, *Lands*. p. 49.

Fam. IV. *Peloniaidæ*.

Peloniaia corrugata. The Firth of Clyde can boast of having both the British representatives of this singular genus occurring in its waters; I took a single specimen of the present species off Shell Bay, Cumbrae, in about twelve fathoms.

„ *glabra*. “Dredged in seven fathoms water, in mud, Rothesay Bay,” *F. & H.*

Div. II. LAMELLIBRANCHIATA.

Fam. I. *Pholadidæ*.

Teredo norvegica (*Teredo navalis*). The first notice of this species occurring in the Clyde district was that of Mr. Smith, who, in his Catalogue, published in 1838, recorded it as found in wood in the Clyde. It has since that time done great injury to the docks at Ardrossan, in which situation it was first found by Major Martin. I was enabled to procure some very fine, though dead, examples from a portion of the old dock-gates, which had been removed in consequence of the attacks of the *Teredo*. Dr. Landsborough writes of this species, “their strong calcareous tubes are not often seen more than a foot in length, but Mr. W. Thompson mentions that at Portpatrick they have, in some cases, attained the extraordinary length of nearly two feet and a half: the greatest diameter at the larger end is seven-eighths of an inch; at the smaller from one and a half to two lines. In these cases the valves of the shells were large in proportion, being three-quarters of an inch in diameter. The largest tubes I ever met with were found by me in a quarry at Content, near Ayr; they were in beams of timber like masts of vessels, which though still

pretty firm, must have been buried there above twenty feet underneath the present surface, during some great convulsion, which must have taken place before a house of the town of Ayr was built, and at a period to which the history of Ayrshire does not extend."—*Lands.* p. 84.

Teredo megotara. This rare ship-worm is included in Dr. Landsborough's list of Arran Mollusca.

Xylophaga dorsalis. Abundant in and around Ardrossan docks, in company with *Teredo norvagica*. Major Martin sent specimens from this locality to Mr. W. Thompson, who, in 1847, published an interesting account of the species in the 'Annals of Natural History,' (*vide* also 'F. & H.' vol. i. p. 93). There is a good specimen of the *Xylophagæ*, *in situ*, from Ardrossan, in the British Museum. Mr. Hennedy states that "*Xylophaga dorsalis* was found last year (1851) when Gourock Quay was repairing: it inhabited the piles, and, along with *Limnoria terebrans*, had completely destroyed the portion under water. Timber, thoroughly perforated with these pests, is often cast ashore in the vicinity of Gourock."—*The Naturalist*, vol. ii. p. 88. While the *Teredo norvagica* bores *with* the grain, penetrating into the very heart of the wood, the *Xylophaga* bores *across* the grain, and rarely excavates deeper than an inch from the surface.

**Pholas dactylus.* Clyde (*Smith*), *F. & H.*

* ,, *crispata.* Bute, Clyde, *Smith.* It is far from rare in Lamlash Bay, where it may be found near low water-mark by turning over the pieces of shale and examining them for its excavations. It usually bores from beneath upwards, and when it has perforated the stone through to the upper side, which it does, as the stones are not very thick, it dies. It does not grow to a large size in this locality; my finest specimen does not exceed an inch and three-quarters in length. "*Pholas crispata* occurs plentifully in clay at the Castle and in several places further down the Clyde."—*Hennedy*, '*The Naturalist*,' vol. ii. p. 88. On one occasion I observed two or three *Pholades* burrowing in the Red Sandstone, just west of Kames Bay, Isle of Cumbræ: having no instrument with me I could not then procure them, and left them hoping to return another day and extract them; unfortunately, however, I neglected to mark the exact spot, and although I many times searched I never again fell in with them. From the view I had of the siphons, I believe these individuals to have been *crispata*, but of this I cannot speak with certainty.

Fam. II. *Gastrochenidae*.

Saxicava arctica (*Hiatella arctica*, *minuta* and *præcisa*, *Anatina arctica*). This species is frequent in all parts of the Clyde district, and may be taken either by the dredge, or in rock-pools among the roots of *Corallina*.

* „ *rugosa* (*Saxicava Pholadis*). In similar situations to the last, but more common.

Fam. III. *Myadæ*.

**Mya truncata* (*Mya ovalis*, *Sphenia Swainsoni*). Is common in most of the sandy bays throughout the district. Specimens, in fine condition and of very large size, may be found cast up in abundance at Fintry Bay, Cumbrae, after storms. Specimens from this locality sometimes measure three inches long and two and a half inches wide. Dr. Landsborough mentions the variety named *uddevalensis* as found in Lamlash Bay.

* „ *arenaria*. This is a far more local species in the Clyde district than is the last. It occurs in Lamlash Bay, and Mr. Alder has met with it “at Rothesay Bay, where both this and *truncata* are used by the fishermen for bait,” *F. & H.*

**Panopæa norvegica* (*Panopæa Bivonæ*). This is an abundant fossil in the glacial beds. Dr. Landsborough says, “the first specimen ever got in Scotland of *Panopæa norvegica* was found on the shore at Fintry Bay, Isle of Cumbrae, and probably from the post-tertiary deposits.”—*Lands.* p. 420. The shells found in this deposit are in such beautiful preservation that they might easily be mistaken for recent examples. The specimen in my cabinet, for which I am indebted to Mr. Smith, is from the Kyles of Bute, and has the epidermis still on: I have seen such specimens placed in cabinets as recent; but the *Panopæa* has never, I believe, been taken alive on the west coast.

Fam. IV. *Corbulidæ*.

**Corbula Nucleus* (*Corbula striata*). As far as my observations go, this is a somewhat scarce shell; I have taken it between the Cumbraes, and it likewise occurs in Lamlash Bay, but in neither of these places does it appear to be gregariously abundant, as it is often met with elsewhere.

Sphenia Binghami. Included in Dr. Landsborough's list of Arran

Shells, and Mr. MacAndrew has likewise taken it in the Firth of Clyde.

Næra cuspidata (*Corbula cuspidata*). Has been taken off the Isle of Bute by Mr. Smith, of Jordan Hill.

Fam. VI. *Apatinidæ*.

Thracia phaseolina (*Thracia declivis*, *Anatina declivis*). Very sparingly distributed: it occasionally occurs on the shores of Arran and Cumbrae, in the Laminarian Zone. A series is in the British Museum, from Saltcoats.

„ *villosiuscula* (*Anatina villosiuscula*). Much more frequent than the last. It is mentioned by Mr. Smith as taken at Bute, but altogether omitted by Dr. Landsborough, who may have confounded it with the last, or taken it for the young of the following. I have dredged it off Largs, to the west of Cumbrae, and fine and frequent in Lamlash Bay.

„ *pubescens* (*Amphidesma pubescens*, *Anatina pubescens*). I have never met with this shell in the district: it is mentioned by Mr. Smith and Dr. Landsborough, but this is not a part of Great Britain in which we should have expected to meet with the species. May not *villosiuscula* have been mistaken for the young of this species, and hence its insertion in the catalogues referred to?

„ *convexa* (*Amphidesma convexa*). Ayr, *Smith*. “Single valves have been found at Arran (Al der),” *F. & H.*

„ *distorta*. I took two full-grown and many young specimens of this *Thracia* from the roots of *Corallina officinalis*, growing in rock-pools at Clachland Point, Arran.

Cochlodesma prætenue (*Anatina prætenuis*, *Mya prætenuis*). A somewhat local species, though found in many spots: I have taken it in Lamlash Bay and to the south-west of Cumbrae, though very sparingly: it is more frequent, however, off Largs. Ayr, Bute, *Smith*.

Fam. VII. *Solenidæ*.

Solen marginatus (*Solen vagina*). “It is enumerated by Mr. Smith among the shells of the Clyde; but, if a Scottish shell, is certainly a very rare and local species,” *F. & H.* I wrote to ask Mr. Smith whether he could give me any further particulars respecting this and some other species, and whether he could tell me the exact locality where it occurred, and if it appeared to be firmly established in its habitat; but, unfortunately, Mr. Smith’s dredging-book having been

lost, he is unable to give any further information respecting its locality.

**Solen siliqua* is found at Lamlash, and is cast up frequently after storms in Kames Bay, Cumbrae. The specimens from this last locality are remarkably fine; an example in my cabinet measures eight and a half inches long and one and a half wide, dimensions considerably exceeding those given by Forbes and Hanley, and to which it is said by them rarely to attain.

* „ *ensis*. Common in suitable localities, and attains a very large size: those in my cabinet from Fintry Bay, Isle of Cumbrae, where it is found cast up in abundance after storms, measure six and a half to seven inches in length, and an inch in width, nearly double the size of ordinary specimens. “Spout-fish” is the name by which the Solens are known in this part of Scotland.

„ *pellucidens (Solen pygmaeus)*. Ayr, Bute, *Smith*. I have taken it in deep water just outside Lamlash Bay, off Clachland Point, and to the west of Cumbrae, between Fintry and Shell Bay, but it is scarce.

Fam. VIII. *Solecurtidae*.

Solecurtus coarctatus (Solen antiquatus). I have not met with this species; but it is undoubtedly a native of the Clyde, as it occurs in the lists of both Mr. Smith and Dr. Landsborough.

Fam. IX. *Tellinidae*.

Psammobia vespertina. The Setting Sun is very abundant in Loch Ryan to the south of the district to which this catalogue refers. In the district itself I have not found it, nor is it mentioned among the Clyde shells by Mr. Smith, or those of Lamlash Bay by Dr. Landsborough. It appears, however, to occur at Loch Ranza, which is at the northern extremity of Arran, as there are two specimens in the British Museum labelled as from that locality, and presented by the Rev. D. Landsborough.

„ *Ferroensis*. Ayr, Bute, *Smith*. I have taken it in Kames Bay, Cumbrae, and at Lamlash, but only procured a specimen or two from each locality.

„ *tellinella (Psammobia florida)*. Occurs occasionally in the Coralline Zone on the west of Cumbrae and in Lamlash Bay. Its colours in this part of Great Britain have not the brilliancy which makes this such a lovely shell when taken further south: at Herm I have met with snow-white specimens, and one of an uniform dark purple.

Psammobia costulata. Ayr, *Smith*.

**Tellina crassa*. Ayr, *Smith*; Lamlash Bay, *Lands*. I have dredged it in the laminarian zone, Shell Bay, Cumbrae.

„ *donacina*. This beautiful shell, which seems to have its head quarters in the west of Scotland, is found frequently in such parts of the Clyde as are suitable for it, in twelve to fifteen fathoms water, among nullipore and comminuted shells.

„ *incarnata* (*Tellina depressa*, *Tellina squalida*). Although I have taken many single as well as two or three double valves of this shell between the Cumbraes and in Lamlash Bay, they have all been evidently so long dead as to lead me to regard them rather as post-tertiary fossils than as recent shells, although they may have been the latter. Mr. Smith, however, mentions it as found at Ayr and Bute; and Dr. Landsborough has met with it in Lamlash Bay, in which last locality it has also been taken by Mr. Alder.

* „ *tenuis*. Is very common in the sandy bays, mostly white, occasionally pale pink or yellowish, but I have never met with crimson specimens in the Clyde.

„ *fabula*. Local in its distribution: Kames Bay, Cumbrae, is a prolific source; it is found there in some numbers among the fine sand, with which the dredge comes up filled.

„ *solidula*. Lamlash Bay, *Lands*.

Syndosmya alba (*Amphidesma Boysii*, *Amphidesma album*). Arran, Bute, &c., *Smith*; Lamlash, *Lands*. I have likewise taken it off Cumbrae.

* „ *prismatica* (*Amphidesma prismatica*). Dr. Landsborough records this among the Lamlash Bay Mollusca.

„ *tenuis* (*Amphidesma tenue*). Introduced into Mr. Smith's catalogue without any locality affixed: as his list embraces the arm of the sea right away to the coast of Ireland, it may find its place in the list from having been found on the latter coast; I have, however, taken it in Lamlash Bay: it appears scarce.

Scrobicularia piperata (*Lutraria compressa*, *Amphidesma compressa*). Bute; Ayr, *Smith*. It is recorded by Dr. Landsborough as found at Arran.

ALFRED MERLE NORMAN.

Kibworth, Leicestershire,
May 28th, 1857.

(To be continued).

List of the Podophthalmous Crustacea occurring in Dublin Bay and the adjacent Waters. By JOHN R. KINAHAN, M.B., M.R.I.A., &c., &c.

THE value of local lists is now generally acknowledged. The following, therefore, needs no apology. All the species, with a very few exceptions noted, have occurred, living, to myself; and most of them, including that rare crab, *Perimela denticulata*, have been under my observation in the vivarium for a considerable time. The district in which they occurred includes the seaboard between Bray Head on the South and Skerries on the North; but the majority of the species have occurred in the bay between Dalkey Island and Howth. This district comprehends the following localities:—Merrion, a clear, open sand, with a few sand pools; Salt Hill and Sandycove, rocks with rock pools, and a limited *Zostera*-clad sand bank; Dalkey Sound, a rocky channel, in some parts muddy bottom, in others shingle, and in others a clear sand and nullipore, a strong tide running through it. This affords almost all the species noted, many of the deep-sea species being taken here, especially in the spawning season, in six to eight fathoms water. None of the other localities call for note, except the Scallop Bed, which is a sandy bank, lying about nine miles from shore off Bray, with from nine to fifteen fathoms water on it.

Long-legged Spider Crab (*Stenorhynchus Phalangium*, Penn. sp.) Common in laminarian and coralline zones. Sometimes thrown ashore after high gales, entangled in masses of zoophytes. Many specimens agree in part with the details of *S. tenuirostris*: these are chiefly from the deeper waters. Local name "Spiders." In ova in January.

"Scorpion Spider Crab" (*Inachus dorsettensis*, Leach). Not common. Found entangled in the fishermen's lines off Howth; also dredged in Dalkey Sound, and off Bray Head.

Inachus Dorynchus, Leach. Not uncommon. In shallower water than last, and occasionally drifted in after gales.

Great Spider Crab (*Hyas araneus*, Linn. sp.) Very common among rocks beneath overhanging sea-weed near extreme low water. Large specimens from the fishermen's lines when set in the shallow waters. Dredged in tidal streams abundantly. Local name "Tinker." In ova in February; exuviate in March.

Hyas coarctatus, Leach. Very common, being abundant in the

whelk pots and on the long lines, but an inhabitant of much deeper water than *H. araneus*. This species grows to a very large size here, but, being an inhabitant of deep water, large specimens are not frequently met with. I find this species dies sooner in a tank than the last. The larger specimens appear not to change their carapace annually, zoophytes, barnacles, *Anomias*, *Serpulæ*, and even oysters of large size, being found attached not merely to the exterior of the carapace, legs, &c., but even internally on the surface of the prælabial space. The bifid extremity of the rostrum frequently has its cornua crossed. This was first pointed out to me by W. S. Macnally, Esq. I have found it since of frequent occurrence, and generally accompanied, and probably caused by, the growth of a sponge. Local name "Tinkers." In ova in February; exuviate in January.

Strawberry Crab (*Eurynome aspera*, Leach). Rare. Two specimens were obtained from twenty-five fathoms water off Bray Head. Many years ago abundantly obtained on the shore near Malahide. Specimens in the Museum of the Dublin Natural History Society, thence obtained, were presented by Dr. Lloyd to the collection of that Society.

Great Crab (*Cancer pagurus*, Linn.) Excessively common in suitable localities. Essentially littoral in its habits, and seldom taken in the dredge. One dredged between the valves of a dead oyster-shell, in about twelve fathoms water, in Dalkey Sound. Local name "The Crab." This is the only species eaten here. In ova in April.

Hairy Crab (*Pilumnus hirtellus*, Linn. sp.) Rare. Some years ago this crab was washed ashore in numbers near Portmarnock. I obtained a small specimen under a stone in a rock-pool at Sandycove, near Kingstown, 1857, and have met with remains of the animal near the Pigeon House Wall. It does not occur here in anything like the abundance in which it is met with at Galway.

Pirimela denticulata, Mont. sp. The only Dublin specimen of this crab I know of was dredged by me in Dalkey Sound in twelve fathoms water, May 2, 1857; it was a small female, and in ova; the zoeas resemble very closely those of *Cancer pagurus*. In ova in May. This species lives well in confinement, and is extremely active in all its movements.

Common Shore Crab (*Carcinus Menas*, Penn. sp.) Excessively common. Essentially a littoral species. The young, especially from brackish water, vary much in colour, from a dead brickdust-white to almost purple; the ordinary colour of the species is, however, green: one adult specimen, three inches in diameter, had the fingers and

upper part of hand nearly pure white, the tips of the claws excepted, contrasting most curiously with the rest of the animal. I find that the adults do not change their carapace annually. They may be found covered with barnacles of considerable size, and you also find their claws worn in a way you never see in the junior specimens. I have seen the teeth of the fingers worn quite smooth, especially those of the grasping claw. In the young specimens there is no distinction between them. Local name "Green Crab," "Soft Crab" when just exuviated, in which state they are largely used as bait.

Variegated Swimming Crab (*Portumnus variegatus*, Leach). In certain districts after easterly gales this species occurs rather plentifully. I have never dredged nor met with it in any quantity under other circumstances.

Velvet Swimming Crab (*Portunus puber*, Linn. sp.) Common among rocks in laminarian zone. Seldom captured in the dredge, though tolerably frequent in the lobster and crab pots. The young are curiously variegated. Many of the adults are nearly quite flat. In ova in March. Local name for all the Portuni, "Tailors."

Wrinkled Swimming Crab (*Portunus corrugatus*, Penn. sp.) Very rare. I have never met but one, and that a very young specimen, in strand pools near Merrion, after a heavy gale from the East, November, 1854.

Arched-fronted Swimming Crab (*Portunus arcuatus*, Leach). A single specimen at same time as last. The same remarks apply.

Cleanser Swimming Crab (*Portunus depurator*, Leach). Local. Probably only an inhabitant of the deeper zones. Occurs on the long lines, and also in the dredge, on the scallop beds. In ova in March.

Livid Swimming Crab (*Portunus holsatus*, Fabric.) Not rare. Occurs on Merrion Strand in some numbers after easterly gales; also dredged in extreme laminarian zone, on sandy bottoms. A curious wrinkled variety of it occurs in Dalkey Sound, which may be confounded with the young of *P. depurator*. This may prove to be a separate species, but I think not. In ova in March.

Dwarf Swimming Crab (*Portunus pusillus*, Leach). Very common in suitable localities in laminarian and coralline zones. In ova in February.

Common Pea Crab (*Pinotherea pisum*, Penn. sp.) Excessively common. Nearly every *Mytilus* and *Modiolus* from the laminarian and coralline zones contain this crab. The females much more numerous than the males. Both sexes rarely present together.

Common Nut Crab (*Ebalia Pennantii*, Leach). Rare; probably, rather, not found. Bray, Dalkey Sound. In ova in April.

Circular Crab (*Ateleyclus heterodon*, Leach). Rare. Three small specimens of this species occurred to me in 1854, along with *P. arcuatus* and *P. corrugatus*. It is apparently an inhabitant of comparatively deep water.

Mask Crab (*Corystes Cassivelaunus*, Penn. sp.) Sandy beaches after gales, also deep-sea lines. Not uncommon. In ova in March.

The following species are recorded as having occurred in Dublin Bay, but have not come under my notice living.

Florid Crab (*Xantho florida*, Leach). Very doubtful. Most probably an error.

Angled Crab (*Gonoplax angulatus*, Fabr. sp.) Though I have never met this crab recent, yet there are many well-authenticated specimens of it from Knockagin, Co. Dublin, in the University collections, Trinity College, as well as in private collections. Local name "Coffin Crab."

Cranch's Nut-crab (*Ebalia Cranchii*, Leach.) The late lamented Doctor Robert Ball showed me a specimen of this crab taken by himself, many years ago, on the Dublin coast, I think in Dalkey Sound.

JOHN R. KINAHAN.

Donnybrook, Dublin,
May, 1857.

Note on Carcinus Mænas.—A few days since I observed a small shore crab (*Carcinus Mænas*), in my aquarium, devouring one of his own species of less dimensions; so far there was little to remark, but I was struck by the circumstance that both the claws of the victim were gone, and, as none of his eight legs were injured, it seemed highly probable that the conqueror had deprived the vanquished of his weapons, that he might finish his meal in peace. Perhaps others can tell whether this scientific proceeding is usual among crabs.—*George Guyon*; June 15, 1857.

Hybernating Larvæ feeding on Moss.—A friend of mine, residing at Crewe, who paid me a visit the other day, mentioned in conversation the following circumstance, which may be of use to other entomologists who may have a brood of hybernating larvæ:—He said, while beating for larvæ late last autumn, on passing a bed of *Epilobium hirsutum*, he beat some of the plants over his umbrella, and, upon examination, found a number of young *Noctua* larvæ: he took a few home, and placed

them in a breeding-cage, where he had some pupæ covered over with damp moss; when the weather became cold he placed the cage against a wall, behind which was a fire, belonging to a neighbour, that was seldom allowed to go out night or day, consequently the wall was always warm. The moss was always kept damp, and one night, on looking in, he found the larvæ crawling about, and greatly increased in size; he continued to look at them when going to bed, and found them feeding upon the moss; they ultimately changed, and came out in the beginning of last month (if I recollect right) *C. nigrum*. As there is often much difficulty in keeping larvæ alive through the winter, it might be worth while to try other species with moss, by keeping them in a green-house.—*James Cooper; Museum, Warrington, May 24, 1857.*

Capture of Deilephila Euphorbiæ near Box Hill.—In close proximity to a favourite nook for *Toxocampa Pastinum*, I espied the above rarity at rest on a fence, on the 5th of July, and I was not long in boxing him: it is, I believe, the first specimen ever taken in that neighbourhood. Within half-an-hour I succeeded in capturing six specimens of *T. Pastinum*, when a continuation of smart showers stopped collecting. *Polyommatus Alsus* was abundant, as was also *Arge Galathea*. I visited the same ground on the 6th, but without success. I tried the sugar-pot up to a late hour for *P. leucophæa*, but he would not come out; so that, after boxing about half a gross of small fry, I returned to the "land of smoke."—*James Gardner; 52, High Holborn, London.*

Locality of Gastropacha Ilicifolia.—In answer to your question (*Zool.* 5629), I beg to say that all the specimens of *Gastropacha Ilicifolia* that I bred were from larvæ that I found on Cannoch Chase: I also found one pupa in the same locality. In one of the pupæ was a pupa of some large Ichneumon, but it has not yet showed itself out.—*Richard Weaver; Post Office, Rugeley.*

Locality of Gastropacha Ilicifolia.—I bred my *Gastropacha Ilicifolia* from some larvæ that I took on Cannoch Chase.—*F. Bonney; Marlborough College, Wilts.*

Locality of Gastropacha Ilicifolia.—I took the pupæ of those specimens of *Gastropacha Ilicifolia* that I bred on Cannoch Chase.—*Edward S. Bonney; Churchdale House, Rugeley.*

Silkworms feeding on the Oak.—The Impérial Société d'Acclimatation, at Paris, has received from one of its members, the Bishop of Manchouria, 300 cocoons of the silkworm living on the oak tree in the North of China. These silkworms vary greatly, especially as regards climate, from those on the Indian oak tree, of which the Society has established already a little colony at the villa of one of its members, M. Chavannes, at Lausanne. Just at this moment, when the mulberry-tree silkworm is so much visited by disease, this new oak silkworm from Manchouria, which, it is expected, will thrive in the northern parts of France,—and probably in England,—is of the highest importance.—*The Morning Star, May 25, 1857.*

Cucullia Chamomilla.—This species I have again bred, from larvæ obtained last summer: the first specimens appeared on the 28th of February; these were brought forward by heat, the pupæ having been placed in a parlour-cupboard, where there is a chimney: by this method I reared the whole, whereas the average is two-thirds from pupæ.—*J. J. Reading; Wyndham, Plymouth, May 20, 1857.*

Captures at Street-Lamps.—Two specimens of *Drymonia Chaonia* have come to my share, one on the 11th and the other on the 19th of May. On the 17th of May, when looking after *D. Chaonia*, *Peridea trepida* made its appearance, and I took a fine male specimen, measuring $2\frac{3}{8}$ inches.—*Id.*

Ennomos illustraria, var. *sublunaria*.—A few entomologists still believe the summer brood of this insect to be a distinct species from the spring brood, because the size and colour are so different. On the 9th of May, 1856, I took at a gas lamp a female *illustraria* that deposited nearly one hundred eggs; they produced larvæ, from which I reared the perfect insect in July and August following; they were of the var. known as *sublunaria*: a female of this brood also presented me with eggs that produced larvæ, that, late in autumn, turned to pupæ, from which, on the 18th of March, 1857, the first two emerged perfect insects, and they are true *fac-similes* of their grandpa and grandma of the spring, 1856. Another remarkable feature in the history of this species is the very uncertain periods at which their changes take place; for instance, some of the pupæ that were the produce of last year's vernal females did not produce the perfect insect at the same time as the remainder of the brood, but continued in the pupa state until the 21st of March, this year; therefore this one species is an example of both single and double-broodedness.—*Id.*

Eupithecia cognata and *E. subfulvata* bred from the same batch of Eggs.—Within the last week I have bred both *Eupithecia cognata* and *E. subfulvata* from eggs deposited last year by a specimen of *E. subfulvata*; thus proving beyond a doubt, were proof still wanting, the entire identity of these two supposed species. It is worthy of remark, however, that there is not a specimen of *succenturiata* among them, nor has the insect, to my knowledge, been found in this district.—*R. F. Logan; Duddingston, Edinburgh, July 3, 1857.*

Capture of Abraxas Ulmaria at West Wickham.—A specimen of this insect was taken by Mr. J. Fancourt, at West Wickham, on the 27th of June. I had the pleasure of seeing the specimen alive.—*C. B. Newman; 7, York Grove, Peckham, July 18, 1857.*

Varieties of Abraxas Ulmaria, &c.—For many years past I have given great attention to the varieties that occur in different species of Lepidoptera, with what success entomologists who have seen my specimens are best able to judge. The above species, although extremely abundant for years, appeared to be a species not given to great variation: during the last two or three years, a few appeared of a pure white colour, void of the lead-coloured markings almost invariably present: this season two specimens have occurred of a beautiful slate colour, giving the specimens a most striking appearance. *Grossularia* has also been bred void of all black markings, and the yellow scarcely visible; in fact, almost an albino. *Leucophæaria* I took in spring, all gradations from gray to entirely black; the female varies precisely the same. *Pilosaria* is also extremely variable.—*R. S. Edleston; Bowdon, June 8, 1857.*

Notes on Tineina.—*Batodes Angustiorana* and *Pædisca occultana*. I have bred these species lately; the former on yew trees, the latter on larch.

Plutella sequella. During the last few days I have bred this charming species from white cocoons found on the boles of oaks in Dunham Park.

Crambus falsellus is not uncommon this season, but very local: the only time to take them is just before dark.

Tinea corticella. For some weeks past specimens have been constantly appearing on a dead branch of an oak near to my house.

Nepticula myrtillella, *Edl.* From the cocoons mentioned in the 'Zoologist' (Zool. 5406) I have bred a few of the moths during the last few days. Head and face orange, palpi white, antennæ fuscous, basal joint white; anterior wings fuscous, with a faint violet tinge, beyond the middle is an oblique slender whitish fascia,

slightly interrupted with fuscous scales; cilia yellowish white; posterior wings pale gray.

From the *Nepticula* cocoons collected last autumn I have bred some hundreds of these little gems: *Septembrella* and *subbimaculella* emerged in swarms; apple, oak, hornbeam and hawthorn cocoons produced their tenants in a satisfactory manner; with precisely the same treatment few have emerged from rose, hazel, sloe, birch, elm and mountain ash. *Regiella* made its appearance this morning from hawthorn. At the close of the season I will send to the 'Zoologist' a list of the species bred.

Vaccinium Vitis-Idæa. From larvæ feeding in this plant I have bred *Coleophora vitisella* (the males are very like *orbitella*), *Euchromia flammeana*, *Anchylopera myrtillana* and *Lithocolletis vacciniella*. In the course of a few days I expect to see *Nepticula Weaveri*, *Coccyx ustomaculana* and two species of *Coleophora*; the latter appear to be very scarce,—I met with but two cases of each.

Lithocolletis Klemannella. I bred two from alder; and *Ornix Scoticella* from mountain ash. During the last few days I have taken a few specimens of *Lampronia luzella* and *rubiella* flying in the afternoon amongst raspberry bushes.—*Id.*

The Tsetze of Africa identified with Cestrus Bovis.—A considerable degree of uncertainty and even misapprehension appears to prevail about the fly that Dr. Livingstone so interestingly describes as annoying the cattle in Africa, and which he designates the *tzetzes*, its African appellation. Although introduced as a new species, I beg to observe that it is a very old one under a new name,—the fly so feelingly described by Moses of old as infesting the cattle of Egypt, and by Isaiah, the prophet, as being very troublesome in his day; and after these the heathen writers and poets, especially of Rome, do not fail to notice it,—“*Est lucos Silari circa,*” &c. The fly itself, the cause of this trouble, has been exceedingly scarce; so much so that Valisneri, an Italian writer on the subject, had never seen but a mutilated specimen of it, nor had Réaumur, a French writer, and Linneus himself had never seen one, and, throughout all the editions of the 'Systema Naturæ,' he has, by a strange oversight, given a horse-bot for it. It has been my good fortune to get no less than five specimens of this fly; two I obtained when living at Moulsey, near Hampton Court, by fixing a pitch-plaster on the loins of two cows, on Moulsey Common,—the plaster having a hole in the centre, in which was fixed a gauze-pouch, into which the larva fell on making its exit from the cow's back: in this way I obtained two full-grown grubs, which, put into a garden-pot of earth, brought me two perfect and lively flies; one flew out of a window while I was looking at it, the other was drawn by Sydenham Edwards for representation in the third volume of the Linnean Society's 'Transactions:’ a third I caught in a journey in Savoy, on Mont Blanc, with the ingenious Peter Huber, whose labours among the bees and ants have lately so eminently distinguished him; it was flying about some cow-dung, and on seeing it my agitation to secure it was so great that Huber said, “Let me try,” and with a sweep of his hand he caught it; I gave this specimen, on my return from Switzerland through Germany, to the celebrated Professor Daniel Schreber, of Erlang, the pupil and friend of Linneus, till then had never seen a specimen of it: a fourth I saw, among a number of other insects, in a shop-window in Paris, and, purchasing it for a franc, gave it to young Wm. MacLeay, a devoted naturalist. Now this African *tsetze*, I am led to believe, is the real patronymic of the French *Estre*, made more pronounceable by introducing more vowels and fewer consonants, and then from it we get the Latin *Cestrus* and the

Greek *Oistron*, and so forth, all meaning the same cattle-frighting object noticed by all: and so terrific is the fright that the cattle will run away with their plough even through the opposing hedge rather than submit to their infliction; and yet, what is most singular, they possess no weapon of infliction, but simply a telescopic sort of tube for thrusting the egg down upon the skin, which hatching there, the tiny grub gnaws its way through the skin and forms its nidus there in a comfortable abcess, leaving its abode when fully grown, and tumbling to the earth becomes a chrysalis and next a fly, which goes forth to perform this strange round of events, the object of which appears to be to save the poor cow and ox from the effects of idleness and repletion, which, in those sunny regions, they would be so exposed to, if not roused into activity and leached and blistered in this way. Such are the ways of Providence, meant in kindness no doubt. It is the *susurrus*, or whistle they make that frightens the cattle, and not the infliction. And what is too remarkable to be omitted, we learn from that very ancient poet Avienus, that these Isles, abounding in forests, wild cattle and these flies, were known by the name of *Æstrimerides* before they obtained from the Romans the name of Britannia.—*Bracy Clark*; 18, *Giltspur Street, London*.

Description of the Male of Megastigmus Pinus.—Having been furnished with some more of the *Pinus* seeds, such as produced the female described some time ago (*Zool.* 5548), I have been fortunate enough to breed a male specimen; I therefore give a description of it, so as to complete the species:—Yellow; the eyes and tips of the mandibles ferruginous; antennæ black; the scape honey-yellow; the flagellum with a pale yellow line along the back. Prothorax subquadrate, the collar with three minute ferruginous dots above: base of the prothorax with a green transverse stripe and a triangular blackish macula; an angular spot above the tegulæ, also a triangular spot on the scutellum, black. Wings beautifully iridescent, the stigma and nervures black. Abdomen honey-yellow, the upper surface with an interrupted broadish black line. Legs pale yellow, the claws of all the tarsi ferruginous. Length $1\frac{3}{4}$ lines; expanse of wings 3 lines.—*Edward Parfitt*; 4, *Weirfield Place, St. Leonard's, Exeter*; July 10, 1857.

Capture of Dyschirius impunctipennis.—I have again met with *Dyschirius impunctipennis*, *Daw.*, and have taken about seventy specimens. Let those who want it write to me,—not to exchange a “black dog” for a “monkey,” as I prefer giving insects and having them given to the huxtering system which seems so much in vogue now. Of course I shall supply old friends first, and any one who does not hear from me may conclude my stock is exhausted.—*C. S. Gregson*; *Stanley, June 9, 1857*.

Occurrence of Carabus intricatus near Plymouth.—When digging for insects, a few days since, in the neighbourhood of Plymouth, I had the good fortune to find three fine and perfect specimens of *Carabus intricatus* and the mutilated remains of a fourth. These insects vary much in colour, some being tinged with resplendent blue and violet, whilst others are dull and nearly black.—*John Gatcombe*; *Wyndham, Plymouth, May 18, 1857*.

Description of an uncharacterized British Anthicus.

ANTHICUS SCHAUMII.

A. ater nitidus confertim punctulatus et cinereo-pubescentis, capite magno postice valde quadrato, antennarum basi tibiis tarsisque plus minus rufescentioribus.
(*Long. corp. lin.* $1\frac{1}{4}$.)

Anthicus ater, *Steph.* [nec *Panz.*], *Ill. Brit. Ent.* v. 74 (1832).

„ „ *Steph.*, *Man. Brit. Col.* 341 (1839).

Deep black, shining, more or less densely clothed with a fine, decumbent, cinereous pubescence, and rather coarsely punctulated all over,—the punctures on the prothorax, however, being smaller, and those on the head somewhat less numerous, than elsewhere. Head large and square posteriorly,—its hinder margin being almost straight,—and with a tolerably distinct central line. Elytra sub-parallel and immaculate. Antennæ at base, tarsi and generally the tibiæ more or less ferruginous; antennæ at apex obscurer.

The present little *Anthicus*, which is abundant at the Chesil Bank, near Weymouth, has been the subject of a good deal of confusion, as regards its synonymy. By both Stephens and Curtis it was referred to the *ater* of Panzer, from which, however, it is totally dissimilar,—the latter species being immensely larger, of a different form and sculpture, much less pubescent, with its feet alone ferruginous, and peculiar to Northern Europe. By Dr. Schaum, when he was in England, in 1847, it was inadvertently identified with the *fenestratus* of Schmidt; but, as he had not a specimen of Schmidt's insect with him at the time to compare it with, it is not surprising that he should have since altered his opinion concerning it. Having been lately examining the *Anthici*, with particular reference to the determination of an allied representative which abounds on the mountains of Madeira, and which I had supposed to be identical with the British one, and not feeling satisfied that either of them was precisely coincident with the *fenestratus* of Mediterranean latitudes, I communicated afresh with Dr. Schaum on the subject, and have received from him typical examples of the *fenestratus*, collected in the South of France. The result is, not merely that the English and Madeiran species have been proved to be distinct from the *fenestratus*, but also distinct *inter se*, and moreover (as it seems to both of us) new, being apparently undescribed in Laferté's monograph; and the former of them I have therefore great pleasure in now dedicating to him. It recedes from the *fenestratus* in being more shining, of a much deeper black, and quite immaculate, there being no indication of a paler humeral patch (though the silvery pubescence with which it is clothed does occasionally cause the shoulders, from their prominence, to seem just perceptibly lighter than the rest of the surface); in its elytra being a little more parallel at the sides (or less oval), and with scarcely any appearance of the postmedial impressed line, on either side of the suture, which is there so broad and conspicuous; by the punctuation of its head and prothorax being less dense, and much better defined (there being no admixture of the elevated points or granules, which so thickly beset those parts in that insect); and by its limbs being of an obscurer hue. It used to occur in profusion beneath stones on the Chesil Bank; but I have not myself observed it in any other locality.—*T. Vernon Wollaston.*

Chrysomela cerealis.—On the 5th inst., during a long hunt on the Llanberis ascent to Snowdon, accompanied by one of my boys, he had the good fortune to find two specimens of this beautiful beetle (male and female) under separate stones. We also found elytra and fragments of at least three other individuals, all confined to a small space below the road over the west side of Glyder, a little above the latter. The various species or reputed species of *Geodephaga* proper to the locality were in great plenty, with the exception of *Carabus glabratus*, of which we did not see any trace,

probably being too early in the season for it.—*J. Hardy; Radnor Street, Hulme, Manchester.*

The Aquarium.—The aquarium described in the 'Zoologist' (Zool. 4957) was cleared out the other day, to clean the glass, the contents not having been changed for two years and three-quarters, fish being in it at the latter part of the period. During an absence of seven months the newt, beetles and mollusks lived on, without any feeding or attention beyond the addition of a little water, to make up for the loss by evaporation.—*George Guyon; June 15, 1857.*

PROCEEDINGS OF SOCIETIES.

ZOOLOGICAL SOCIETY.

Tuesday, May 26, 1857.—DR. GRAY, F.R.S., V.P., in the chair.

Mr. Bartlett read a paper on the Chinese sheep, describing and referring to specimens presented to the Society by H.R.H. Prince Albert, to whom they were sent from China by Rutherford Alcock, Esq., H.M. Vice-Consul at Shanghai. The most important feature with regard to these sheep is their great fecundity. The three ewes in the Society's gardens having produced thirteen lambs in the spring of the current year. Mr. Bartlett having submitted specimens of the wool of these sheep to the Council of the Chamber of Commerce for the worsted district of Bradford, read the Report of Dr. Price to that board upon it, which was favourable as to its quality for certain branches of manufacture.

The Secretary read a paper communicated by Mr. Cuming, containing descriptions of thirty-one new species of land shells by Dr. L. Pfeiffer.

Dr. Gray read a paper on the animal and bark of the genus *Antipathes*. In the Proceedings of the Society for 1832, he described for the first time the bark and animal of *Antipathes dichotoma*, from Madeira. He observed that this species had been separated from the others of that genus because the surface of the axis is smooth and not covered with a number of minute uniform cylindrical spines, like the true *Antipathes*, and has been called for that reason *Leiopathes*, and it has been further stated that, although *Leiopathes* has a distinct bark and animal like the *Gorgoniadæ*, this may not be the case with the normal species of the genus. Dr. Gray had failed to discover any traces of a bark or any kind of animal matter in the various specimens examined by him until a few days since, when Mr. Samuel Stevens laid before him a very fine specimen of *Antipathes* from the Sechelles, which was entirely covered with a very distinct bark or animal covering.

Tuesday, June 23, 1857.—DR. GRAY, F.R.S., V.P., in the chair.

Mr. Sclater read a paper containing descriptions of twelve new or little known species of the South American family Formicariidæ.

Mr. R. F. Tomes communicated a paper on two species of bats inhabiting New Zealand. The first notice of the occurrence of Cheiroptera in New Zealand was given by Forster in 1772—74, who recorded the occurrence of a bat flying over the sea-shore near the margin of a wood in the estuary of Queen Charlotte. It was shot, but being struck only in the wing, lived for two days. To this species Forster gave the name of *Vespertilio tuberculatus*. Having some time since had occasion to examine some species of bats in the Museum of the College of Surgeons, Professor Quekett showed Mr. Tomes one which had been recently received from New Zealand. It was not until he had been assured that it came directly from that country that he could be persuaded that no mistake as to the locality had been made, the example being so entirely unlike the only New Zealand species he had seen. Mr. Tomes shortly afterwards inspected three of this supposed new species in the Leyden Museum; and finally he detected five other examples in the British Museum. Being thus satisfied of the existence of two species of bats in New Zealand, he was anxious, if possible, to determine to which of these Forster had given the name of *V. tuberculatus*. The kindness of Dr. Gray speedily placed in his hands all the necessary materials. There could be no hesitation, the supposed new species was undoubtedly that from which Forster's drawings had been made, whilst the description indicating the number of incisors, and other peculiarities, pointed unequivocally to the same conclusion.

The Hon. E. Chitty read a paper on the Jamaican species of *Cyclotus*, and the descriptions of twenty-one proposed new species and eight new varieties of that sub-genus from Jamaica. The new species and varieties were exhibited to the meeting.

The Secretary read a paper by Dr. Gray containing the description of a new species of antelope from Bombay, lately living in the menagerie of the Society; it was characterized under the name of *Oryx Beatricis*.

The Secretary also read a paper by the same author, containing descriptions of two new genera of *Gorgoniadæ*; they were named *Sarcogorgia* and *Subergorgia*.

The Secretary then read a paper by Mr. A. D. Bartlett on a rabbit said to be originally brought from the Himalayan Mountains. This animal is smaller than the domestic rabbit, being shorter and more compact, its body is pure white, the nose, ears, feet and tail are of a dark brownish black, the eyes dark red. The fur is much shorter and more nearly equal in length than in the common rabbit. Mr. Bartlett has not yet examined the skull of this animal, but stated that, upon so doing, should he find sufficient difference, upon comparison with the skulls of the other known species, he should then propose for this animal the name of *Lepus nigripes*.

Tuesday, July 14, 1857.—DR. GRAY, F.R.S., V.P., in the chair.

Mr. Gould having returned from a visit to N. America, whither he had proceeded for the purpose of studying the habits and manners of the species of *Trochilus* frequenting that portion of America, detailed some of the results of his observations. Having remarked that he arrived just prior to the period of the migration of this bird from Mexico to the North, and having had ample opportunities of observing it in a state of nature, he noticed that its actions were very peculiar, and quite different from those of all other birds; the flight is performed by a motion of the wings so rapid as to be almost imperceptible; indeed, the muscular power of this little creature appears to be

very great in every respect, as, independently of its rapid and sustained flight, it grasps the small twigs, flowers, &c., upon which it alights, with the utmost tenacity. It appears to be most active in the morning and evening, and to pass the middle of the day in a state of sleepy torpor. Occasionally it occurs in such numbers that fifty or sixty may be seen in a single tree. When captured, it so speedily becomes tame that it will feed from the hand or mouth within half an hour. Mr. Gould having been successful in keeping one alive in a gauze bag attached to his breast button for three days, during which it readily fed from a small bottle filled with a syrup of brown sugar and water, he determined to make an attempt to bring some living examples to England, in which he succeeded; but unfortunately they did not long survive their arrival. Had they lived, it was his intention to have sent them to the Society's Gardens, where they would doubtless have been objects of great attraction.

Mr. Gould exhibited a highly interesting species of *Ceriornis*, which he had found in the collection of Dr. Cabot, of Boston, who, with the greatest liberality, permitted him to bring it to England for the purpose of comparison and description. For this new bird, forming the fourth species of the genus, Mr. Gould proposed the name of *Ceriornis Caboti*.

Mr. Sclater read a list of upwards of sixty additional species of birds obtained by M. Auguste Sallé from the environs of Jalapa and St. Andres Tuxtla, which were not included in his former Catalogue.

Mr. Chitty read a paper on *Stoastomidæ* as a family, and on seven proposed new genera and sixty-one proposed new species, and two new varieties from Jamaica. Mr. Chitty took an opportunity of recording his thanks to Dr. Livesay for the great assistance his microscope and ingenious contrivances had afforded him in the examination and measurement of shells, enabling him to measure to the thousandth part of an inch with the nicest accuracy.— *D. W. M.*

*Notes on an Excursion from Ega to Tunantins and Fonte Boa,
on the Upper Amazons.* By HENRY WALTER BATES, Esq.

ON the 7th of November last I left Ega by the small Upper Amazon bi-monthly steamer "Tabatinga," on an excursion to Tunantins, a small village, about 240 miles above Ega: there and at Fonte Boa, on the voyage down, as well as at the mouth of the Jutahi, where also I spent four days, I saw much that was interesting, and propose therefore to give you a rough account of my trip.

Ega, as those at home interested in Amazonian matters are now perhaps aware, is the only place on the upper river at all endurable as a residence for any time; it is really a charming, quiet, cleanly little spot, and being far within the mouth of a black-water river, is nearly free from insect pests: all the villages above, up to Nanta, are nearly uninhabitable,—night and day there is not an hour's peace, and possibly this is the chief cause of the demoralization, laziness and

drunkenness of their few inhabitants. The place I was going to was no exception to the rule, so I provided myself with a large mosquito tent, and hoped that for two or three months, amidst the pleasures of acquiring daily new species of insects, birds and shells, I should get along agreeably.

We were four days reaching Tunantins; the passage was a pleasant one, all the passengers but one being foreigners; four or five were Frenchmen on a trading expedition to Moyobamba, one was a Peruvian, of Chachapoyas on the Andes, one a German, and one a Moorish Jew going to Nanta. As to the river scenery, little can be said; the whole distance, and indeed all the way to the river Huallaga, there are the same monotonous low lines of forest as I have before described in the notes on my first voyage from Barra to Ega. The commander of the steamer and the passengers generally gave it as their impression that no difference in width and grandeur was perceptible from Santarem to this part; but, after passing the mouths of the mighty Japurá and the Journá—that is, from Fonte Boa upwards—I think a difference is perceptible; there were no longer such magnificent reaches and limitless horizons, with fading lines of forest, as occur lower down. In passing along with even speed in a steamer within ten yards of the shore, I observed that there were three distinct kinds of coast and corresponding forest constantly recurring, and the same may be said of the whole upper river. First, there are the low sandy and muddy shores, the most recent alluvial deposits, covered with a dense, tall, broad-leaved grass, often with the arrow-grass; whose feathery-topped flower stem rises to a height of twelve or fifteen feet, sometimes with a uniform forest of Cecropiæ, but without any large trees; besides the banks of the river, many of the islands were of this character. Secondly, there are the moderately high banks, only partially overflowed in the flood season; they are wooded with a magnificent, varied forest, in which palms of certain species are intermingled in a very large proportion; the general foliage is vivid and riant in colour; the water frontage is sometimes covered with a mass of greenery, but where the current sets strong along the friable, earthy banks they are cut away and offer a section of forest, where the trunks of trees appear laden with parasites; in these places the river, for some eight or ten yards out is encumbered with vast fallen trees and *debris* of the forest. The third class of coast is the “terra firme” of the Brazilians, or “terra geral” (the “general country”),—a very apt expression: it consists of a comparatively high, undulating land, the soil generally stiff or clayey. The forest here is of a different character from that of

the other parts; it is rounder in outline, more uniform in character, palms are very much less numerous and of different species, and animal life, too, which gives some little animation to the other parts of the river, here is seldom apparent.

At Tunantins I found I was expected, and one room of a dilapidated house was ready for me: its appearance was not very cheering, as the only window was covered over with calico, on account of the piums (a small *Muscidæ*, a terrible pest), and the walls were disfigured with large mud patches,—work of the Termites. I got all my baggage stowed, hammocks and mosquito tents hung, in a short time, presented my letters of introduction to the only white person in the village, all on the day of arrival, so as to be able to begin work on the following day.

On the 12th of November I had a general survey of my ground, and will give a short description of it. The village, consisting of about twenty houses (four of which only really deserve that name) in a line fronting the river, is situated about a mile within, and on the left bank of, the river Tunantins. This is a small river here, but is probably little inferior to the Thames in size; its waters are of the same black colour as those of the Rio Negro. The population, and that of the neighbourhood, is nearly wholly Indian, chiefly of the two nations *Shumána* and *Passé*, which do not now exist in the purely savage state; there are also a few of the nation *Caixána*, which still exists in the aboriginal state on the river, two days' journey above the village. Like all the settlements on the Amazons, there is but a small tract of cleared space beyond the houses; in this place, overrun with weeds and impurities, and not offering the charming slopes of soft green-sward as *Ega* does. The virgin forest rises as a tall hedge, about a hundred paces behind the village, and thence inland no further sign of the presence of man or the neighbourhood of human dwellings is noticeable, except two narrow paths, leading two or three miles towards the centre. The neighbourhood I found much cut up by narrow valleys and creeks, which, at this season (the waters being as yet low), have only a narrow breadth of water. Immediately below the village enters a broad creek, which half encircles the place behind and above, there is another narrower rivulet. These hollows, being thinly wooded at this season, form deep dells, with tracts of moistened soil towards the water, forming a fine locality for the many beautiful species of *Nymphalidæ* of the vicinity. These dells and the borders of the forest, and the more humid of the two forest pathways, proved, as I foresaw, the best working grounds to me during my stay.

Circumstances obliged me to leave Tunantins sooner than I had intended, as I had agreed to descend in a sailing vessel belonging to an Ega merchant, which I was told would leave Tunantins after Christmas, but it was afterwards arranged to sail on the 1st of December. However, I worked diligently during my twenty days' stay: the weather was very favourable, and I had nothing to hinder me from making the best of my time. On the slopes of the dell, the first day, I met with two species of *Cybdelis* new to me, one closely allied to *C. Clytia*, *Hewits.*, the other to *C. Castalia*, *Hewits.* A few days afterwards they were in great abundance, in company with *Clytia* and *Castalia*, a few *Cinara*, *Celma*, *Bechina*, *Eurotas*, three other species (also found at Ega), and a third new one, which I did not succeed in capturing. It seemed to be the head-quarters of the genus *Cybdelis*, as *Clytia* and another species were in countless multitudes. They are extremely wary and rapid butterflies, settling on the moist ground and darting off to the foliage of high trees on the least alarm. In the same places there were five species of *Timetes*, all old friends, and a sixth species new to me, but I think known to Science; it resembles *T. norica*, *Hewits.*, but has the basal half of all the wings silky fulvous: I only captured one specimen. Next to these two genera the *Eubages* were most abundant, *racidula*, *Hewits.*, and *Erchia*, *Hewits.*, two other species old friends, and two species quite new to me. I think every station hence to the Andes will offer, when properly searched, new species of the genera *Cybdelis* and *Eubagis*. The two species of *Megistanis*, the white-belted and rufous-belted, the females of which still remain to be discovered, were also rather common; but they are more frequently seen dashing madly about the houses, settling on the mud or other impurities in their vicinity. Four species of orange-banded *Epicaliæ* occurred, and *E. Ancea* I found in the forest: it does not occur at Ega, but turned up again at Fonte Boa. The fifth or sixth day I captured a *Catagramma*, a species resembling *C. cynosura*, *Doublet.*, also found at Ega; and a day or two afterwards, after two hours' chase, being led by it round and round the dell from tree to tree, on the trunks of which it settled, I captured a glorious species of the same genus, new to me, and before I left, by daily search, succeeding in getting two more specimens. I saw a fourth, and believe that the species will be found some day further up the river, as well as many other new ones of this most beautiful group of insects. On the last day of my stay I captured two of a third species from the trunk of a tree, at which they were imbibing the oozing sap. This species also occurs

at Moyobamba, on the eastern slopes of the Andes. For many days I revelled amongst these splendid productions. There was little else to be found in the dell; no Coleoptera; a short distance off, however, towards the denser forest, I found a grand new Anisocerus on a felled tree; it is a very large species, coloured and tubercled like the Curculiones of the genus Cratosomus, and is doubtless new to Science. I also captured, on the wing, a charming little gaily-coloured Saperda, and a new Agra between the folds of a leaf. There was also a species of dragon fly, of the genus *Hetærina*, which I think is not described in De Selys' 'Monograph'; it is allied to *H. ænea* of De Selys. Near the same felled tree where I found the Anisocerus I captured a very curious Elater, yellow and black, with flabellate antennæ, neatly retractile within a deep chink on each side of the prosternum: I have two other species of the same character from Ega, and am very curious to know what genus they belong to. At the same place, too, I found a new species of blue Agrodes, the handsomest genus of the Staphylinidæ; and, again, on a bright, sunny day, I caught a brilliant brassy species of the curious genus *Tænodema*, which came flying rapidly near the ground, and settled on a woody stem, just as the *Megalopi* (family *Cyclica*) do. All these Coleoptera, however, were only single specimens; and I was much disappointed, after many days' search in the same places, not to find more of them.

In the pathways in the forest I met (as is always the case in this country) with a different set of insects. I had made up my mind, before I undertook this excursion, to discover further new species of *Papilio* of the group Bolivar, Orellana, &c., and also one or two *Leptalis*; in this, however, I was disappointed: I saw nothing new in the genus *Papilio* on the whole voyage, and not a single *Leptalis*, although six species occur at Ega at this season. *Heliconiidae* at Tunantins were also very rare. I got one new *Heliconia*, and one charming new *Ithomia*, very distinct in colouring from any, I think, yet known. Other *Ithomiæ* were, one or two *I. Sao*, *Hubn.*, *I. Vestilla*, *Hewits*, *I. Fluonia*, *Hewits.*, and a species very near to *I. Cyrianassa*, but I am inclined to think distinct; *I. Cyrianassa* occurred rather commonly at Fonte Boa, as it does at Parà; and this Tunantins species was pretty common up the Tapajos, where the true *Cyrianassa* did not occur. The *Ithomiæ*, to me, are a most interesting group of insects; the species differ from each other by very slight marks; they should be studied with very minute reference to their geographical site. In one district all the hundreds of individuals that occur of a

species will, in nearly all the specimens, be exactly similar; and in another district a species, so nearly allied that if found mingled with the other would be considered a variety, will be found equally constant through all the individuals examined. In Nymphalidæ I found nothing new in the forest; in Satyridæ, two Euptychiæ, new,—and a small pale blue Satyrus, a charming thing, also new. In Erycinidæ I met with three new species, of genera I am not acquainted with, and four new species of Eurygona, two of which were of a colour quite different from any of the sixty species I had previously taken of the genus, being crimson, with velvety black borders. At Fonte Boa, a few weeks afterwards, I found a third species of the same colours; so that we have here the commencement of a district where these charming insects offer a new style of colour, in the same way as the mid-Tapajos region yielded four species of the delicate blue-edged group, of which Euoras and Arbas, figured by Mr. Hewitson, are examples. The red species are certainly not found at Ega. In Theclæ I acquired two new species; in Hesperidæ I met with none new; in moths, one new Glaucoptis, several new Lithosiadæ, and two magnificent Bombyces, several Noctuæ and Geometridæ new to me. Coleoptera here were remarkably scarce; but the few I met with were nearly all new to me. Such were a grand Erotylus, nearest, perhaps, to *E. aulicus*, *Lac.*; four new large Staphylini; a *Scytalinus* which was flying straight forward near the ground, exactly as the *Agrodes*, of which I got here a new brassy black species. The *Agrodes* are not stercorarius; I have never detected them feeding, but I think they search for particles of putrid matter, or perhaps living insects amongst fallen leaves. I got here two new *Doryphoræ*, one *Chrysomela*, one or two *Hispæ*, one *Chlamys*, several *Eumolpi*, and five species of *Haltica*, but not a single *Cassida* or *Clythridæ*, and only one or two *Ega* species of *Megalopides*. In *Lamellicornes* my only capture was a large species of *Anomala*, new,—and one or two *Canthidium*, *Er.*; in *Clerii*, one very fine new *Ichnea*; in *Cicindelæ*, nothing at all; and very few *Curculionidæ*. Neither was there anything in *Longicornes*, *Buprestidæ* or *Elateridæ*. Finding so very few *Coleoptera* in the forest in comparison with *Ega*, I inquired my way to the new clearings which the inhabitants of the villages annually make in some direction or other; and one lovely, warm morning I visited one of them, a very large one, over an acre at least of ground. Here, in the midst of a chaos of felled trees, partially burnt and of many different kinds, I expected to find a great number of *Longicornes*, in the same way as I had done at *Ega*, *Santarem* and *Caripé*. I crossed the

place, examining all the trees and their branches, ripping up the bark, and so forth; then I skirted the edge of it, for one half its circuit, to where the ground sloped down to a brook, but was unsuccessful: the only Coleoptera I found was a *Clytus Wallacei*, *A. White*, a small *Leiopus*, and a new species of *Helopidæ*. One day I determined to fish for water-beetles, and tried some insignificant pools of muddy water in the forest; I acquired in this way two or three species of a pretty genus, having the facies of the European *Hydaticus*, but smaller than the English species; I got also two or three curious species resembling *Hydroporus*, and a *Tropisternus*, in abundance. Of all aquatic Coleoptera in this country, species of *Tropisternus* and *Berosus* only are abundant: at certain seasons they fly to the lamp at night in great numbers. On the bordering edge of the forest several species of *Nymphalidæ* were always to be seen, some of which do not frequent the edge of the water; such were the *Epicaliæ*, *Paphiæ*, *Siderones*, *Eresia*, *Protogonius*, *Eucides*, *Hypna*, *Victorinæ*, *Stheneles*, *Thyridia Psidii*, with several *Callidryades*, *Terias*, *Colænis* and *Agraulis*, all common species. On the banks of the river I captured two very rare species of *Pieris*, one of which is the *P. Lorena* of Hewitson.

Such is a sketch of what I observed at this place. The summary of my captures in insects during the twenty days was 607 specimens, about 300 species, of which 20 were new diurnal *Lepidoptera* and 66 new *Coleoptera*. I acquired also a few new things in other orders, the most interesting of which was a quite new species of *Thore*, *Hagen*, a genus of *Calopterygidæ*, in the *Neuroptera*. I carried my gun with me only two days, shooting only two birds new to me, one a small parrot, and one a chatterer, I think common, the *Coracina rubricollis*. One day an Indian hunter brought me a pair of a very handsome little monkey, a *Midas*, new to me: I had previously known five species of the genus.

I left *Tunantins* with less regret, finding *Coleoptera* so scarce; but, as I intended to spend six or seven weeks at *Fonte Boa*, I hoped to succeed better. We left in an excellent little schooner of about eighty tons burthen, dropping down gently with the current, sometimes stopping for a short time to receive small portions of cargo. At a sandy beach, which was now rapidly becoming submerged as the river was rising, I searched for *Megacephalæ*, but found nothing except *M. curta*, and the other rather smaller species closely resembling it. At 10 A.M. on the 3rd of December we entered the mouth of the river *Jutahí*, which is nearly concealed from view, from the main river, by two or three small islands. We had to stay here several days, so

procured a sheltered place within the mouth of an affluent on the right bank, called the Sapó, and then moored the vessel alongside the forest. The Jutahí is not a black-water river, but still not clay-coloured like the Amazons; in breadth it is very inferior to the Rio Negro, Tapajos and Madeira, and shows itself to be only a second-rate tributary; it seemed to me to be about equal to the Purús. We had to send hence an *igarité* to fetch a quantity of salt fish from a settler up a second affluent of the river on the right bank, called the Cupatánà. The master of the schooner, a pleasant young Paranes and friend of mine, preferred staying to take a trip with me to the mountain up the Sapó. The first and third days of our stay I examined the forest in the vicinity for insects; on the second, Senor Francisco Raio and myself, with one Indian, started on our trip. We paddled up, for a distance of about twelve miles, to the last house, and on our return visited three other houses. The inhabitants were Indians very little removed from their original state. We found two persons who could speak Portuguese pretty well; the rest were Indians of the Maraúa and Jurí nations; the latter were old, the lingering relicts of this once fine, manly and industrious race, which once peopled the Upper Amazons and the lower parts of the tributaries from the Tefé to the Içá. They were (as all I have seen) marked with a large, blue-black, tattooed patch on the face; in some it is merely the circuit of the mouth so marked, but in most of them it is a large and quadrate patch, occupying the greater part of the face. We came upon some of these fine old men fishing under the shade of the lofty, sombre wall of forest; they were polite and cheerful, and not sulky as most of the civilized Tapuios are. At the last house I tried the forest for insects, but could not succeed in finding a path, so was unsuccessful.

On our return, at one of the places we stopped at, I found an excellent locality. There was a broad path from the river bank, leading through the forest to the house, and the neighbourhood of the latter had a wonderful variety of trees and plants. It was now evening, however, and I had only time to make a short, hurried search, getting two very handsome new *Cassidæ* and other things.

I obtained some information here about the river Jutahí. The description given me of the physical features and the names of the "gentios," or races of savage Indians inhabiting the banks, agreed with what I had before learned of the river Juruá. The sources of both are equally unknown, canoes having ascended two months and upwards without reaching anything like a termination of the naviga-

tion. The banks are earthy and low, similar to the Amazons, and uniformly covered with forest. The tribes of Indians succeed each other in the following order:—Maraúas, Arauás, Catoquíños, Catauixís and Coníbos, the last-mentioned having communication either by land or a connecting stream with the Ucayáli.

On the evening of the 7th December we arrived at Fonte Boa, a wretched, muddy and dilapidated village, situated a mile or two within a creek appearing like a back-water of the main river. The character of vegetation and soil here was different from that of any locality I had searched on the Upper Amazons; I had planned, therefore, to devote six weeks to the place. Having written beforehand to one of the principal inhabitants, in the course of an hour I had a house, and got all my baggage comfortably stowed before dark. The village is built on two rounded, clayey mounds, and has rather a large tract behind cleared from the forest; but the whole place, including the streets and backyards of the houses, is covered with a very dense, tough carpet of shrubs and grasses, beneath which the mud is almost always moist and soft; so that, although living in a mud swamp is not very agreeable, the coolness of the place was very pleasant, and certainly healthy. The village was formerly a considerable place, with an industrious population of whites and Indians, who mingled together, so that now there are few of the pure Indian blood left. The tribes were originally Shumánas and Passés, which now no longer exist, and will soon be forgotten like the Solimoés (who gave the name to the Upper Amazons), the Cambevas (part of the original population of Ega), and others.

I found the forest at Fonte Boa, as far as I penetrated it, to have the same cold, clay soil as the water frontage at the village; the vegetation was the most luxuriant and the forest trees the most gigantic I had ever seen. Through the shades flowed two sparkling brooks, with perennial and crystal waters, a feature rare to meet with on the Upper Amazons, where the small water-courses generally dry up in the dry season. Their banks were perfect paradises of verdure, the most striking feature of which was the variety of ferns with immense fronds, some terrestrial, others climbing the trunks of trees, and two (at least) fine species arboreal. Birds and monkeys, in this glorious forest, were very abundant,—the *Pithecia irrorata* the most remarkable of the monkeys, and *Cephalopterus ornatus*, *Pteroglossus Beauharnaisii*, amongst the most beautiful of the birds. On the North bank of the Amazons, opposite Fonte Boa, the red-haired, vermilion-faced monkey (*Brachyurus rubicundus?*) is known to be common;

and yet in the six weeks I spent in the neighbourhood I could not obtain a specimen of it. The distribution of these curious monkeys is very remarkable. There appear to be three species, two of which I have seen plenty of alive at Ega, where they are very expensive. They are all three confined to the low lands constituting the delta of the Japurá, none of them reaching so far east as Ega or so far west as St. Paulo. The white one (*B. calvus*?) is confined to the eastern part of the delta, and the red one to the western part. Some few leagues within the main mouth of the Japurá is found the third species, ashy coloured, the face not red. This last I have not yet seen.

Entomology at Fonte Boa promised very well in the beginning; but after the 4th of January a period of heavy rains set in which interfered very much with my success. On the first day a magnificent new Nymphalide, which settled on a leaf of a tree before me in one of the broad forest pathways, gave me great hopes of future success. It proved to be an aberrant species of *Catagramma*, coloured above similar to *C. cynosura*, but quite plain beneath like the *Epicaliæ*, so that it seems intermediate between the two genera. I did not succeed in finding a second specimen. A few days afterwards I got a specimen of another new *Eubagis*, and after I had beaten the woods three weeks I alighted on a charming dry hollow, quite alive with *Ithomiæ*, comprising *I. Illinissa*, *I. Ælia*, *I. Cyrianassa*, *I. Fluonia*, another common species, and four new species, three of which are very interesting, being intermediate between *I. Illinissa* and *I. Ælia*. I captured a series of each, and found, notwithstanding their singularly close resemblance, that each species kept itself perfectly distinct. Sometimes, when a number of very nearly allied species of butterflies, such as *Mechanitis* and *Ithomia*, are found flying together in the same locality, the idea of hybridity suggests itself almost irresistibly; but I have closely watched for proof of this, and have found none. On the contrary, at Ega, where four species of *Mechanitis* are about equally abundant in the same confined space, I have frequently captured pairs *in copulá*; the male and the female invariably agree precisely, spot for spot and line for line. I have not yet seen *Ithomia in copulá*, except once, and then the two individuals were precisely the same in markings. That a number of allied species should be found together is to be explained by the fact that both genera are very gregarious: one limited spot, of a few yards in extent, will be the only place, at one station, where you find any *Ithomiæ*, and there all the species of the district will be found assembled. At Fonte Boa I found two *Ithomia* haunts, the one above mentioned, and another where four

other different species congregated, namely, *I. Sao*, *I. Vestilla*, *I. Onega*, and *I. Virginia*, *Hewits.* (*Exot. Butt.*, *Ithom.*, fig. 18). At Ega *I. Vestilla* and *I. Sao* assemble in one place, in the months October to December, in countless numbers; the forest dell is alive with them, fluttering and gambolling together about the foliage near the ground; in company with them are the two handsome species resembling *Thyridia*, but much rarer.

In Coleoptera I made some charming acquisitions. First of all an *Iresia*, the first I have captured since I have been in the country, although I had seen two at Santarem, but was unable to capture them, from their habit of running over the cylindrical trunks of trees, where the net is difficult to apply. I found also a new brilliant-coloured *Odontocheila*, four new *Lebiæ* and one *Coptodera*, two new *Ozænæ* (*Goniotropis*); the *Lebiæ* run very nimbly over foliage; the *Coptodera* are found only on decaying, fallen trees. I got four new *Cassididæ*, one (I think) an undescribed *Omaspides*, one (also undescribed) *Dolichotoma*, and one *Calliapsis*; the fourth is a very fine thing, even the genus unknown to me. Another capture, which pleased me extremely, was a *Megalopus*, of the section having densely hirsute hind tibiæ. *Lacordaire* describes two species, mine will make a third; I captured it from the terminal bud of some low-climbing plant, and thought I had got a new *Necydalis* in my net. A curious *Chlamys* was common here, and I added a fine new species to my *Alurni*. A large number of the *Eumolpi* which occurred were new to me, and many of them were very pretty. A new species of *Doryphora* was common, and I found a solitary specimen of another, very peculiar in its colours. In *Lamellicornes* I met with nothing very conspicuous. One day I got a large brilliant *Chlorota* from a leaf rather high up a tree, and found soon afterwards that the trees over head swarmed with them; doubtless they were gnawing the fruit, as is the habit of many of the *Rutelidæ*; but, although they fell when I shook the trees, booming past my ears, I could not capture a single specimen: they made off through the entangled thicket, whither it was impossible to pursue them. I found a pretty species of *Bolax*, rather frequently, gnawing leaves; it was quite new to me. The *Copridæ* were less interesting; there were several new small species, as is the case in each new station one visits. In *Longicornes* I found three new species, in *Elateridæ* only one conspicuously new, and in *Buprestidæ* not one species new to me. In *Erotylidæ* there was a large *Erotylus* (true), rather common, and new to me; it is yellow-belted, whilst the corresponding species at Ega are red-belted, the latter not

occurring at Fonte Boa. The Erotylidæ of this country, like the Heliconiidæ, I think are an interesting study, rich in suggestive material for theory.

On the 25th January I embarked on the steamer for Ega, arriving there on the following day. The latter part of my stay at Fonte Boa was anything but agreeable or profitable. The excessive rains had succeeded in converting the whole place into a glutinous mud-swamp. The house in which I lived, the only one procurable, was very damp; the moisture oozed through the mud floor, and I became afraid of my collections suffering from the damp; for besides the choice collection of insects, increased by 895 specimens at Fonte Boa (about 100 new species), I had acquired a large collection of monkeys and birds. My last excursions to the forest were made through mud half-way to the knees. The mosquitos were incessant day and night; the plague of insect pests I had not felt so much whilst I was constantly amused and occupied, but in bad weather, when little or nothing can be done, they become intolerable: no one can imagine the state of feverish irritation to which the unceasing attacks of mosquitos reduce a nervous person. There is no place free from them; the rooms are always filled with a humming swarm, especially towards the ground, where they penetrate any thickness of trowsers. In the forest it was infinitely worse; I noticed the species were different also, the forest species being much larger and having transparent wings: it is a little cloud one carries about one's person every step on a ramble in the forest, and their hum is so loud as to prevent one hearing well the notes of birds, &c. In the village the species has opaque speckled wings. The inhabitants ought to be thankful the great fellows never come out of the forest. At Tunantins there were very few mosquitos; the pest was Pium, which attacks only the bared parts of the body, and in the day time. It is a small muscide, fixing itself on the skin, and sucking the blood through its rather broad proboscis, so as to leave, after it is satiated, a little red pustule. They come silently, and cause a very disagreeable irritation; at Tunantins they filled the house like a thin cloud of smoke, and there were no means of protecting oneself from their attacks. The mosquito-net is of course an effectual protection at night, but in the day time it is too confining to use.

Upon the whole I am pretty well satisfied with my excursion. The inhabitants of the villages, although almost as savage as the wild Indians of the retired districts, and much more demoralised, are not offensive to strangers. With a little tact, I find it always easy to get

along with them; and it is scarcely anything I want of them except fowls, turtle and fish, and other articles of provisions; for hunger is the great difficulty with the traveller in the Upper Amazons.

HENRY WALTER BATES.

Ega, March 10, 1857.

Remarks on the Necessity of precise Definitions in Attempts to Distinguish Reason and Instinct. By the Rev. EDWARD TAGART, F.L.S., F.G.S., &c.

I HAVE read with great interest and pleasure the Rev. J. C. Atkinson's paper in the 'Zoologist' on the subject of Reason and Instinct. Although it seems to be in some respects too metaphysical for a work devoted to Natural History, yet, as all sciences are connected, and all are advanced by the use of distinct terms significant of distinct ideas, perhaps you will allow one who has hitherto been more of a metaphysician than a naturalist to offer one or two suggestions, in reference to Mr. Atkinson's paper, which may help still further to clear away difficulties and harmonize discordant modes of expression on points confessedly obscure. Possibly a few brief remarks on the same subject by a different hand may open to Mr. Atkinson himself some vistas of reflection to which his glances have not hitherto been directed,—some paths of investigation which he has not been tempted to tread.

The question, as Mr. Atkinson has discussed it, seems to be very much this,—How far are animals, or creatures whom we are accustomed to speak of as guided by instinct, participants of reason, which is the characteristic of man? It may be a further question,—How far is man, as a reasoning being, assisted by the instincts, as we call them, of the lower orders of being?

But there is a prior question essential to the discussion; that is,—What do we mean by instinct and by reason? Do we know what we are talking about when we use these terms? I submit that both are *terms of ignorance*. With regard to the first term, instinct, that it is so may be most easily shown. We say the bee constructs its cell, the bird its nest, the spider its web, the beaver its house, by *instinct*, because we know nothing of any process of calculation, observation or anticipation, which these creatures go through. Horne Tooke would say Instinct is a Latin participle, derived probably from

“tingo,” *to dye*, and is significant of the colour or quality with which any object may be imbued. But what the power or quality is with which the creatures are endowed whom we speak of as endowed with instinct; what process of observation, reflection, abstraction or calculation they go through; what conscious recollections or anticipations; what power of will they possess or exercise, we know not; and nothing is added to our knowledge of the actions, or causes of the actions, of insects and other animals by saying they act from instinct. By constantly using the term we imagine that we mean something distinct by it; but when we begin to reason with it or upon it we find it associated with a variety of indistinct and confused impressions, without any one impression sufficiently clear and permanent to make an item in reasoning or calculation.

But how is it with *reason*? Is this also a term of ignorance? It will seem strange to very many to say we know not what we mean by reason, so often proudly called the high prerogative, the distinguishing faculty of man. But, give it what other names you please, bestow upon it the grandest epithets, I ask, Is it susceptible of such a definition as shall make it a safe term in a syllogism, sufficiently clear for a valid inference or a well-conducted argument? Before you can decide whether animals have reason, you ought to know at least what it is in man, whom you acknowledge or consider to possess it. But do we know what it is in man? Is it a single power or a combination of powers? If the latter, as on a little reflection many will concede, what and how many are the powers which it includes? Here we may soon lose ourselves in a very embarrassing inquiry, in which I fear the metaphysicians, and the great Locke among them, furnish but little help. Let us proceed with caution.

When we say that man is endowed with reason, I do not question but we know what we mean with sufficient exactness for ordinary converse, and the business of life to which that converse applies, because we experience in ourselves and we observe in others the powers which are esteemed and called rational; and we exercise these powers, and observe their exercise, freely and constantly. But when we try to separate them from one another, and to distinguish them, when so separated, by specific names or marks,—in short, to analyze the complex idea associated with the term reason;—when we try to ascertain and describe, with precision and exactness, any one of the many differing and complex processes of thought and action which come under the term rational, which are equally entitled to the term, and equally characteristic of the being to whom it is peculiarly applied;

then I conceive we put ourselves upon a course of inquiry into which very few have entered, and in which the many would find themselves at once utterly lost.

But it is something to know and to acknowledge that the term reason is significant of a vast variety of complex processes of thought and action,—that it is significant, not of any one definite and uniform development of power or powers, but of a combination of attributes and powers, varying indefinitely and unascertainably, in the nations, the families and the individuals of the human race.

If this be fully and clearly seen and acknowledged, we are on the road for determining how far the brutes possess reason; for the inquiry resolves itself into this,—What powers have they analogous in kind or degree to those possessed by man?—and if there be any peculiar combination of powers in man to which the term reason is or ought to be applied and rigidly confined, what living beings, other than man, have this peculiar combination?

We speak sometimes of the higher and lower functions of reason; and Mr. Atkinson speaks (Zool. 5456) of estimating the “degree or kind of exercise of reason, from its simplest manifestation to its somewhat more complicated operation.” But such language does not quite satisfy the exact scientific inquirer. He may wish to feel quite sure that he understands what is the “simplest manifestation” and what the “more complicated operation” of reason.

Has reason its root in sensation, as Locke seems in the main to teach, and to teach, too, though obscurely, even in the passages quoted by Mr. Atkinson? Then all sentient beings have that element in common with man, when they feel, and perceive they live. But is reason something beyond and above sensation? Is it rational to remember and to anticipate, to take measures for the renewal of sensation, whether to ward off evil or secure pleasure? Who will deny to the different races of animated being, in different degrees, these elements of reason?—who will say they have not memory, anticipation, and a power of provision? Is it an element of reason to communicate sensations and ideas by signs? Who will deny to animals, in degrees, the limits of which cannot be accurately fixed, the power of communicating emotions and intentions? But is reason something higher still, something beyond the power of communicating ideas, emotions and intentions by articulate sounds, or marks and signs previously agreed upon, and therefore understood? Is it the power of tracing effects to their causes, of classifying and arranging the results of observation, of recognizing and obeying *law*? Here

we approach to some of the highest attributes, we touch the nobler functions and higher attainments of the human intellect in its more perfect forms; and then we may ask, with triumph, who brings evidence for, or supposes the existence of, these functions and these attainments in other tribes of animated beings, curious and wonderful as their peculiar or characteristic qualities and powers, occasionally may be.

On the whole, may we not conclude that it is rather by the degree and the variety and the perfection of his powers, exercised in combination with one another, that man is distinguished from other denizens of the globe on which he walks, than by any one kind of quality or specific attribute absolutely peculiar. And, as Horne Tooke was wont to say, as I have heard, that no definition could be given of man which would suffice to distinguish him from other animals, on account of the immense variety of qualities or parts, both as regards bodily frame, vital function and mental powers, which he had in common with the creatures around him, the term *man* standing sometimes for the whole and sometimes for portions, more or less important, of these qualities and powers, or parts and degrees thereof; so, with regard to the term *reason*, I conceive no adequate idea can be formed or account given of it, because it includes such a great variety of processes of thought, and has itself so many attributes, some of which may be found in and may be characteristic of the higher orders of animals, though other processes and attributes may not, at least in any marked degree, or in anything like the perfection of their development in man.

In conclusion, permit me to suggest that Mr. Atkinson seems to have embarrassed his subject, or hindered arrival at a satisfactory conclusion, by his references to Locke. Mr. Atkinson's quotations are taken from the 9th, 10th and 11th chapters of the second book of Locke's 'Essay,' one of its least valuable portions. In these Locke laid himself open to the successful attack of Bishop Berkeley, who exposed Locke's weakness on the subject of abstract and universal and general ideas. What, for example, can be more unsatisfactory or less precise than Locke's intimation that "beasts compare not their ideas further than some *sensible circumstances annexed to the objects themselves*"?

The truth is that Locke wrote his great and invaluable work at distant intervals. It was often laid by and often resumed. When he wrote this part of his 'Essay' the vast importance of words in reasoning, and the necessity of definition, the matter upon which he

touched in the third and fourth books, had scarcely dawned upon his mind; and he was not careful to correct what he says of perception, comparison, retention, abstraction, composition, &c., in one place speaking of them as distinct faculties of the mind, by his clearer thoughts and better expressions in another place. My habitual veneration for the name of Locke leads me often to wish that it were less difficult than it is to separate the ore from the dross, the wheat from the chaff, in his great work; the more so as the ore is the gold of Ophir, and the wheat the element of the bread of life.

EDWARD TAGART.

Wildwood, Hampstead,
April 2, 1857.

Addendum.

Should you think the observations on Reason and Instinct which were forwarded to you after the appearance of Mr. Atkinson's first paper worthy of any attention, perhaps you will permit a few additions to them, now that I have had the pleasure of reading Mr. Atkinson's concluding paper. I do not wish to controvert any of the opinions which your correspondent has expressed, or the conclusions at which he arrives, but rather to submit to his consideration, and to that of other readers of the 'Zoologist' who may be disposed to enter into such inquiries, the possibility, and the desirableness, if possible, of giving to the discussion a more exact and scientific form than it usually assumes. Our language on the phenomena of the mind,—on all which is included under the term "mental action," whether we have reference to the human mind or to the humbler races,—is for the most part too vague and indefinite to permit of any logical argument or scientific conclusion, owing to the extreme complexity and subtlety of the matter under discussion. We are perpetually in danger of losing sight of the simple, unquestionable facts of Nature, which alone are of value in coming at any safe general principle, because we are carried away by words which we imagine to be clear and expressive, and with which we are satisfied because they are familiar. But the words which are good enough for the purpose of common intercourse are not adequate to the needs and uses of the exact scientific inquirer.

It is rather as a logician and metaphysician than as a naturalist that I venture to address these few lines to you, and far more with a view

to modify some of Mr. Atkinson's modes of expression, and thus to aid in the arrival at a sound general conclusion, than to dispute the facts to which he has called attention, or the sentiments which he has enforced. I conceive that the subject, confessedly obscure, may be cleared by placing it in a somewhat different light.

1. Is reason, as the attribute of man, a compound of many elements? We do not come at any clearer or more useful notion of it by speaking of it as "the intellectual essence." For the purpose of the argument, I should mean by reason and the intellectual essence the same thing. I include under these terms the same processes of thought. Is it, then, a compound of several or many elements? Mr. Atkinson implies it is. He speaks of it as comprehending memory, comparison, abstraction, contrivance, calculation; and he intimates that there are "other operations of understanding" (Zool. 5580), which, however, he does not name. Taking those he does name, may we now ask, Do not brutes remember?—do they not compare, distinguish, contrive? If they do, and who will dispute or deny it, it is admitted that they possess some of the elements of reason, and those not the least important to man. The question of the approach of the brutes in reasoning power to man is therefore a question of degree, for testing which we want exact measures. Wanting these measures, we can arrive at no very exact or important general conclusions, no safe rules beyond those of a limited experience and imperfect observation. I understand all that Mr. Atkinson says, and wishes to maintain, to be in harmony with this remark; and he will further agree with the observation that the races of animals, both as individuals and as species, differ from one another in the powers which they possess, and the degree in which powers are acquired or developed, as they differ also from men, and men from one another, by boundaries indistinctly marked, and very difficult to trace and describe.

2. The language in Mr. Atkinson's last paper which seems to me most open to criticism is that which relates to instinct. At one time he speaks of instinct as if it were a known and determinate faculty, or as an ascertained condition of many combined faculties which reason subserves or is in harmony with; at another time he implies that there are many different kinds of instinct. He speaks of the instincts peculiar to man, as if man had some instincts distinct from, yet more or less analogous to, the instincts characteristic of the other animated beings, like ourselves denizens of earth and time. No authority, no custom reconciles me to such language. It may be used by Sir B. Brodie in his recent 'Physiological Researches,' by Mr. Couch, by Dr.

Prichard, by Dr. Butler, and, because so used, may be respectfully heard. But it does not satisfy. We may still ask what is meant by it. Say, if you please, with Sir B. Brodie, that "the desire to live in society is as much an instinct in man as it is in the bee, the ant, the beaver, or the prairie dog;" but it is no more so. It is no more an instinct than any other desire, than all desire, the desire to sit, lie or sleep when weary, to eat when hungry, to drink when thirsty, to have more clothes or get nearer fire when cold; it is no more than saying that man is the creature of desire, or subject to desire, like all other animated beings. Desire it is which puts him into action, and, in common with the humblest creatures around him, he continues through life subject to its influence. Is there anything special in the desire to live in society to make it more than other desires worthy the name of an instinct?

I object to the application of the term instinct in any sense to man, whether to the parts, functions and attributes of his bodily frame, or to the emotions of his moral nature (dependent as I believe these to be on the state of society in which he is found and the education to which he has been subjected, at least in all the most important and considerable respects deserving philosophical attention), or to the powers and attributes of his mind in humble or lofty development. I know of no instincts, properly speaking, *peculiar* to man, peculiar in the correct sense of the word, that is, not common with him to any other animated beings. You may call all the functions of his animal frame, all the emotions and powers natural to him in a given position or in a certain stage of development, instinctive, if you please so to call them. But it is not instructive; may I not say it is injudicious and confusing? Surely it is the peculiarity of man not only to be conscious of the ends which he pursues, and of the methods by which he attains them, but to be able to give an account of these ends and methods, so as to instruct his fellows. He not only knows and remembers how the various objects and materials of nature affect him, he is not only aware and conscious of the processes of thought and contrivances of action which are involved in whatever he does or attains, but he can describe what he feels and knows, and, so far as his acts and plans are voluntary, at will or pleasure he can repeat them. Above all, he communicates with his fellows by fixed and agreed signs. In constructing a house, a ship, a railroad, a Nasmyth hammer, in all that is most important and peculiar to him, he proceeds, therefore, not by instinct, which is, according to my view, an impulse or endowment of nature, often called blind, and of which we can give

no further account; but by reason, by which I understand, in this present usage, all the lessons and mastery of experience, all the processes of thought of which he has distinct apprehension and can give distinct account. In all that is most important and peculiar to him he proceeds, for instance in making and reading a book, in a manner which would be impossible without an experience, without an instruction, such as that with which we are familiar, and of which account can be given more or less exact and philosophical. With regard to animals it is not so: we say they proceed by instinct because we know not what or how far they observe, or anticipate, remember and infer. If the bee, the ant, the bird or beaver, in the processes peculiar to the individuals and to the races, learn anything or much by experience, we are ignorant of it. To what extent they instruct one another or communicate with one another, we are for the most part utterly ignorant, notwithstanding some very curious and rare phenomena, which excite attention and interest only or very much by their exceptional and unexpected character.

I shall only observe, further, that it is a very great and increasing fault in the loose popular writings of the day that emotions and ideas, powers and tendencies characteristic of man, as we are familiar with him in a state of society now called civilized, and certainly much advanced when compared with the condition of savages such as the Bushmen, are constantly spoken of as *instinctive*, merely because they are *common*. It is forgotten that such emotions and ideas, powers and tendencies are only characteristic of and peculiar to the civilized, educated and formed man, restrained by law and assisted by the arts and habits of a particular condition of social life.

Again, the functions of the bodily frame which are not subject to the will, and the many wants and feelings growing out of that frame, and even the endowments of the mind, such as memory and anticipation, are frequently, but loosely, called instinctive, because they are natural, and they are, like all that belongs to man, the general gift of that Providence by whom we and all animated creatures are wonderfully made. We breathe, we digest, we see, we hear, we sleep, feed, move and cry, it may be said *instinctively*, meaning naturally, without knowing and considering how. The beasts do the same. But when we would speak of what is peculiar to man, as distinguishing him from other animals, it is a kind of careless and injudicious speech, well enough for those who are not anxious to learn and know, to weigh and consider; not enough for the cautious inquirer. When the anatomist and physiologist examines more closely the lungs and

the stomach, by that examination he discovers much of which he was before ignorant, and of which the superficial and uninstructed remain ignorant; so the logician and mental philosopher, by the investigation and analysis of language and the complex laws of thought, discovers niceties of meaning and shades of apprehension quite unknown to the less thoughtful and less observant.

If I were in amicable conference with Mr. Atkinson on this interesting but somewhat difficult subject, I should venture one or two other minor criticisms on his modes of expression; but they would not affect the truth or value of any sentiment which he wishes to establish, and therefore it is not worth while to trouble the readers of the 'Zoologist' with them.

I hope these remarks, crude and imperfect as they must appear, will be received, not as designed to controvert any of your respected correspondent's main positions, but as an humble contribution to clear thought and useful knowledge, on a subject less physical than metaphysical, as the Aristotelians have taught us to express ourselves.

EDWARD TAGART.

Wildwood, Hampstead,
July, 1857.

Notes and Remarks on a few of the Birds of Southern India.

By CAPTAIN HENRY W. HADFIELD.

“Que de charmes, que d'idées douces, agréables, nous présente l'Histoire Naturelle! Que d'objets variés, intéressans! Quelle source inépuisable d'observation, de recherches, et d'instruction pour celui qui se sent un gout décidé pour cette vaste Science.”—
DAUDIN.

ALTHOUGH I do not anticipate that the observations and remarks I may now, or hereafter, be able to make on some few of the birds of the Carnatic can prove very interesting to the professed or more scientific ornithologist, still I am induced to offer them for publication in the 'Zoologist,' trusting that sufficient may be gleaned from them to make them acceptable to the general reader.

Vulture (*Vultur fulvus*, Gmel.). When out deer-stalking,—which I generally followed by dismounting from my pony, and leading it by the bridle, concealing myself behind it, and keeping pace, as much as possible, with its front legs,—having observed a herd of antelopes on

a distant plain, I sent my horse-keeper with the pony to make a circuit, with a view to driving them, if possible, within shot, as they appeared much too wild and wary to be approached in the usual manner, and as there was not the least cover of any kind or inequality in the surface of the ground, there was nothing for it but to throw myself flat down, and wait patiently the result of my stratagem. As I lay perfectly motionless the vultures that had hitherto been eyeing me from a vast height began gradually to descend, contracting their circular sweeps, having apparently satisfied themselves, after passing me in review much in the same manner as I had just done with the deer, that I was fair game, and as we were both intent on catering for our suppers, this was all well enough; but still there was something rather disagreeable about it, and when first one and then another had alighted within a few yards of me, and still seemed inclined for a closer inspection of the apparently inanimate body, whether fish, flesh or fowl, they appeared all this time to have been puzzling their brains to make out: however, I should soon have undeceived them, and I felt greatly tempted to punish one at least for its audacity, but knowing full well that the loss of all chance of a shot at the deer would undoubtedly have been the consequence, they were allowed, although reluctantly, to soar aloft in quest of other and less dangerous prey! What the fate of a poor, sick or wounded creature might have been under similar circumstances it is easy to conjecture.

Pondichery Vulture (*Vultur auricularis*, Daud.). Not uncommon in the neighbourhood of Trichinopoly, where I have seen them perched on trees, appearing in the distance like turkeys; indeed, their resemblance to that bird is so great that they might easily be mistaken for it by the novice. I found them shy and difficult of approach.

Kite (*Falco milvus*). The kite is a very common bird in India, so much so, indeed, that I have frequently seen the vessels at anchor in the Madras roads surrounded by them; they are neither so troublesome nor so familiar as the crow, but their audacity is even greater, which the following incident will serve to exemplify; although I did not witness it I was one of the sufferers by the occurrence, the truth of which I have no reason to doubt, though it may appear somewhat marvellous to those who are only acquainted with the European kite:—When seated at the dinner-table, in readiness for the second course, the excited servants rushed in to inform the company that a thievish and hungry kite had, while one of them was bearing a joint of meat from the cook-house (which is generally a detached building

in the East), made a pounce at the savoury morsel, and succeeded in carrying it off without let or hindrance.

Carriion Crow (*Corvus corone*). Those who may only have seen the European crow, which is a wary bird, can have no conception of what a bold, impudent, noisy and intrusive creature the common Indian crow is; in fact, it is a complete nuisance in the large towns and garrisons. They find their way into the houses, where they perch on the chairs and tables, and are no sooner driven out of one window than they find their way in at another. On one occasion, when I was on the main guard at Trichonopoly, a crow flew on to the breakfast-table, and before it could be dislodged coolly proceeded to regale itself on the butter, having, in the first place, knocked off the top of the butter-cup: they also peck at the loaves, and endeavour to carry them off.

King Crow (*Gracula religiosa?*). Common in India, of the colour and size of the blackbird, although it may appear somewhat larger on account of its long forked tail, which is in some degree lyre-shaped. It is one of the few song-birds met with in the East, and as its notes are heard before any other, and is a sure and never-failing precursor of the dawn, as such, though neither powerful nor melodious, has a peculiar charm about it when heard in the deep solitude of the forest, ere the crowing of the jungle-cock or the shrill cry of the pea-fowl has resounded through the woods. It is also remarkable on account of its restless and pugnacious nature and instinctive animosity to the common crow, which it invariably attacks, although some three or four times its size. Shrike-like it takes up a position on a conspicuous twig or branch, ever ready for attack,—ever on the offensive,—never even allowing a crow to approach, much less intrude upon, its domain without its being immediately assaulted and persecuted; in fact, the little king crow is the greatest of tyrants, and it is amusing to witness the vain attempts of the poor crow to effect its escape, which it seldom, however, succeeds in till duly punished for its temerity, for resistance is rarely attempted, its whole powers of wing being exerted in vain endeavours to avoid or escape its dreaded and relentless foe.

Pea Fowl (*Pavo cristatus*, Lin.). Common enough in moist jungles in India, particularly in the mountainous districts, where their shrill piercing cry may be heard far and wide, and the sound is somewhat startling to the nerves of the novice or young sportsman, in the midst of the vast, dense and solitary jungle, where all else is buried in silence. Its vigilance, shyness and timidity are extreme, so that it can

only be approached with the greatest caution: when feeding at early dawn I have found the best time for shooting them, and I know nothing much more exciting than seeing several of these elegant birds feeding together in a glade or on an open patch on the skirts of the jungle, for they seldom move far from cover, to which they retreat at the least noise or appearance of danger. The male birds, in their wild state, are still more magnificent than the tame ones, and are much prized by the sportsman, although their flesh is somewhat dry and insipid, and much inferior to that of most other kinds of game.

Sand Ptarmigan or Rock Pigeon of Southern India (*Lagopus arenaria*; *Ganga unibande* of Temminck; Sand Grouse of Latham). From the description given in Temminck's 'Manuel d'Ornithologie,' I believe it to be the species commonly known in Southern India as the rock pigeon, but which I have, for want of a better, named *Lagopus arenaria*, considering that, both in its form and habits, it bears a far greater resemblance to the ptarmigan than to the grouse. Those shot by me have not only varied much in plumage, but I have rarely found two exactly alike. It is a handsome bird, its elongated form giving it a remarkably elegant appearance when seen on the wing: the legs are short and feathered, as well as the toes; reddish brown, black and light yellow, are I think the prevailing or dominant colours, blended with cinereous, ferruginous, or pale chestnut, 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. Many of the rocks are of gigantic size, giving to the scenery a peculiarly grand and impressive aspect, and the deep solitude that ever reigns is so complete that the sudden apparition of a human form would be startling. No wonder, then, if the whirring, whistling sound of the rising pack should unnerve the hand of the novice, seeing that the sport is necessarily followed without the aid of dogs, so that one never knows when or where to expect them, not unfrequently rising behind the gunner, who has then to wheel round and take a snap or chance shot, a second being seldom obtainable. 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. Temminck, in describing the Ganga remarks:—"Ils parcourent d'un vol soutenu les vastes solitudes." Unlike the grouse! Again, "Vit et niche à terre parmi les pierres"—"pond quatre on cinq œufs." Unlike the grouse!

Redlegged Partridge (*Tetrao rufus*, Lin.). The only species found in the southern parts of the peninsula of India, where it perches on trees, from which elevated post its shrill note or call at early dawn may be heard far and wide, and if cautiously approached may be seen among the branches. They are seldom to be met with in coveys, but are generally found singly or in pairs scattered about in the patches of stunted jungle, from which they are sprung with difficulty, for they seldom take wing, trusting instinctively to their legs for safety, and their course is rapid. To show their preference for this mode of progression, I will relate an incident that I witnessed when detached at Ramnad, near Cape Comorin: between that place and the coast there are extensive sandy plains dotted here and there with patches of prickly pear (*Aloes*) as well as with stunted date and other jungle. Two shikarries, or native hunters, brought me some partridges which they had just captured; having nothing else to do, or rather no better sport, I made them let out the birds one by one to be shot at, for my missing some was fortunate, as it not only enabled me to get more shots, but to witness the great dexterity exhibited by these native sportsmen in recapturing the game, which they did in the following surprising manner:—So soon as I had discharged my gun, and they perceived that the partridge had escaped they commenced running at full speed, following in the direction it had taken, keeping the bird in view until it had either alighted or got into cover; on reaching the point where it was lost sight of, they examined the ground with great care, and were not long in discovering in the fine sand the foot-marks of the unfortunate fugitive, soon to be recaptured and exposed to new dangers. Their manner of proceeding was thus:—When they had succeeded in tracing the bird to a bush one man extended his net before it, and the other, running quickly round to the opposite side, commenced beating it,—the poor, scared partridge of course flying into the net, thus falling an easy prey to these skilled and most indefatigable fowlers.

Coromandel Quail (*Tetrao coturnix*, Lin.). An author who has written a good deal, and edited still more, about birds, informs us that the Indian quail is found to frequent the cultivated districts and corn-

fields; but having passed some years in the South of India all I can say is that my own experience has proved the reverse of this to be the case. Being unable to indulge much in snipe-shooting I used to follow the quails, a very common bird indeed in that part of the country, consequently had good opportunities of learning something of its habits. I will not, however, undertake to say that quails are not occasionally to be found in the cultivated fields, but their habitat is the stunted jungle. What their usual food may be, not having dissected any, I am of course not prepared to say, but think I should not be far wrong in conjecturing that it is grass and other seeds, berries, ants' eggs, Crustacea, and such like, all found in abundance in these localities. So common are these birds in the situations described that I have seen some twenty or thirty driven out of bushes only a few yards in circumference, reminding one of a flock of sparrows. Although they greatly resemble the common European quail individually they vary much in plumage, and in size they are much inferior, I should say fully a third. Their flesh is dry and insipid, but could it be kept even for a day or two it might prove more savoury. The quails found in the northern districts are not only much larger, but their plumage is darker and far more beautiful.

Madras or Painted Snipe (*Rhynchæa capensis*, Tem.). Is common in the South of India in some districts; I fell in with a great number in the paddy-fields, only a few marches from Madras, on the Trichinopoly road. I found them less wild than the common snipe, so that when missed there was no great difficulty in getting a second shot. The plumage is not only darker but far more beautiful and glossy than that of the latter, but their flesh is considered much inferior. Cuvier, in describing and comparing it, says, "Ils joignent des couleurs plus vives et se font surtout remarquer par des taches œillées sur leurs penes des ailes, et de la queue." Another author describes it as having a pale reddish bill; upper parts mixed with tawny and blackish; a brown stripe down the middle of the crown and behind each eye; two black-brown bands on the back; throat and fore part of the neck tawny, spotted with black; rest of the under parts white, except a band of black across the breast; quills and tail variegated with black, tawny and gray.

HENRY W. HADFIELD.

Tunbridge, July, 1857.

(To be continued).

Occurrence of the Kite (Falco milvus) near Banff.—A most splendid male specimen of this rare bird was shot, a short time ago, at a place called Eden, the seat of G. E. Grant Duff, Esq., about four miles from here. The bird is truly a noble one, being in first-rate plumage, in fact as fine a one as the longing, not to say covetous, eye of any ornithologist ever rested on, although I myself, to tell the truth, envied the animal as soon as I saw it. I may add that, through the kindness of Mr. Duff, who has ever proved my friend in that way, it now adorns my collection, having been most generously presented to me by that gentleman.—*Thomas Edward; Old Market Place, Banff, June 2, 1857.*

Hawfinches breeding in Suffolk.—Having communicated (Zool. 4946) what I believe to have been the first recorded instance of the hawfinch breeding in Norfolk, it may not be uninteresting to add the following notices of its doing so, not once, but often, in the adjoining county of Suffolk. In the 'Bury Post' of last week a paragraph sent by an ornithological friend, appeared as follows:—"A nest of the hawfinch has been taken in Ickworth Park containing five young ones." This statement, as "a curious fact," elicited, the next week, some further information from another correspondent, who says:—"Some twenty-four or twenty-five years since, I saw, in the garden of Great Finborough Hall, a nest of young ones; and they had reared some in the same garden at least one year preceding. In the following June, Mr. Nicholls (the then gardener, and a most enthusiastic naturalist) wrote to invite me to pay him a visit; and in his note he says, 'We have two nests of the hawfinch in the kitchen-garden at this time, and one is on the same tree you saw them on last year.' It is but a few days since that I saw a nest full of young ones in a garden in the neighbourhood of Bury. It is perhaps rather singular that in all cases the birds selected apple trees as their place of abode. In addition to these, we may add that last year a nest of young were reared in the pleasure-grounds of either Ampton or Livermere, at the moment I forget which, but I believe the former place." From these and other instances that have of late years been recorded of hawfinches nesting in this country, there can be no doubt that they do so regularly and in some numbers, although, until their habits and resorts were better known, their excessive shyness and rapid movements left ample room for doubt.—*H. Stevenson; Norwich, June 18, 1857.*

Inquiry respecting the Plumage of the Common Dipper.—Can any of your north-country correspondents, acquainted with the haunts of the water ouzel, inform me if the chestnut-colour on the breast of some specimens is merely the summer plumage of the species, or the plumage assumed permanently by the adult birds? Two years since, I received a pair of these birds, shot during the summer in Scotland, which had the lower part of the breast bright chestnut, shading off into gray towards the vent; but out of four specimens killed in this county in autumn, even as late as November, when the few stragglers that visit Norfolk are chiefly met with, I have found none exhibiting the slightest trace of chestnut, but, instead, the same parts are invariably grayish black. Mr. Yarrell, I find, speaks of no difference in the summer and winter plumage, and states that males and females are alike in plumage; I therefore want to ascertain if the birds that visit us are not in immature plumage, which might assume the chestnut tints in the following spring. The young bird in its first plumage differs from either of the specimens alluded to.—*Id.*

Note on the Migration of the Swallow Tribe.—It is, I think, quite impossible that the vast flights of swallows that in their migration pass annually to the eastward can either have been bred in or belonged to this or the neighbouring counties; it is far

more probable that we have the accumulated thousands not only from the western counties, but also from Wales and the South of Ireland; nor do I see anything surprising in this, or that it should be considered a wild theory; for, it having pleased Providence to endow them with such wonderful instinct, what more natural that in taking their departure they should be guided by it, so that, instead of directing their flight at once to the southward, which would expose them to a tenfold risk of perishing by the way, they should shape their course to the eastward till the narrowest part of the Channel had been reached, where their crossing would be unattended with risk either from adverse winds or tempests. Stray birds are generally to be met with in greater or lesser numbers late in the season; but those shot for inspection I have invariably found to be young birds, their plumage being speckled with white, giving them a gray appearance on the back and head; and the bills were tinged with yellow at the base. Although I will not take upon me to say decidedly how it happens that so many swallows are annually left, in a helpless and immature state, to shift for themselves, I am inclined to believe it is somewhat after this manner. When swallows construct their nests in exposed spots, which we know to be sometimes the case, they are liable to be injured by the rain, or possibly blown down; and when this happens late in the season, even if they should succeed by renewed or redoubled exertions in getting their nests repaired or rebuilt, there would still remain the business of incubation to be gone through again, which would necessarily throw them back a fortnight or more. There is also the chance of one of the old birds being killed, in which case the survivor would have to look out for another helpmate; so that much time might be lost, as there would probably at that season be a scarcity of swallows of a suitable age unpaired; moreover, there would be the house to replaster and refurnish, eggs to be laid and incubated, and brood to be reared. — *Henry W. Hadfield; Ventnor, Isle of Wight, 1856.*

Nidification of the House Sparrow (Fringilla domestica). — June 11, 1857. — In walking round the garden at about six o'clock in the evening, I perceived on the lawn what appeared to be a ball of hay or straw, but which on a nearer approach proved to be the nest of a house sparrow. Lying near it, but quite dead, was a young bird some seven or eight days old. On taking up the nest and inserting my finger, I felt some young ones within, apparently dead, but on a closer inspection found that one out of the two it contained still showed symptoms of vitality, although well nigh as cold as its fellow-nestling. But before proceeding with my description it may be necessary to account for its strange and rather mysterious appearance on the grass-plot. Although the weather had been stormy and unsettled for some days, on my retiring to rest about midnight it was calm; but I am informed that towards morning there was a sudden and violent squall. I am particular in noticing this circumstance to show the great length of time that this young bird must necessarily have passed without food; and when we consider that probably it had not been fed since eight o'clock on the previous evening, which I have ascertained from observation to be about the hour the sparrow ceases to feed its young, it most probably had gone without food for some twenty-two hours; at the same time not only exposed to the cold night air, but still further chilled by its close proximity to its dead companion. The bird found dead on the ground had probably been killed by the fall of some forty or fifty feet, as it could scarcely have crept so far from the nest. On taking the poor half-starved bird from the nest, the warmth of my hand seemed to revive it, so much so that I was induced to try it with a worm, which, after two or three unsuccessful attempts, it

managed to gulp down, and before night had sufficiently recovered to admit of its being regularly fed, and replaced in the nest in a warm room, where it passed the night. In the morning it was found to be not only still alive, but strong and well, crying out most lustily for its breakfast. It is, I think, worthy of remark that so young a bird should, under the adverse circumstances detailed, have survived; probably the young of few other species could have done so. It would appear from this nest not having been blown down, also from what has been elsewhere stated on the subject, that there is much risk and uncertainty attending their building in trees, particularly in exposed situations, so much so that one would at first be inclined to set the sparrow down as wanting both in "reason and instinct." But when one reflects what a persecuted bird the poor house sparrow is, and how frequently its nest is taken and the young destroyed, both by man and beast, when placed either in holes about houses and other buildings, or in the ivy on the walls, one cannot be greatly surprised at their occasionally, at least, preferring to trust their progeny to the vicissitudes of the elements rather than to the mercy of man, or their still more deadly enemy, Grimalkin; but strange, though true, it is that cats do not climb trees in quest of nestlings, at least I never observed them doing so; and although there are at the present moment several sparrows' nests in the garden I have never remarked cats, although they are frequently to be seen prowling about, even attempting to get at them, though the chirping of the young birds cannot, I should think, fail to be heard by them. I will now endeavour to describe the nest, which is both bulky and inelegant. It is of an oval form, convex above, concave beneath, in circumference lengthwise $24\frac{3}{4}$ inches, breadthwise 20, depth 6. Internally it is oval, and $3\frac{1}{2}$ inches in width in the centre. The bottom of the nest is indented by the impression of the branch on which it rested: upper part slightly projecting over the opening, which is of a circular form, placed at the large end, and in size little more than sufficient to admit of the free ingress and egress of the old birds. The concavity is made to slope downwards at once from the entrance, from which the young bird seems to shrink with instinctive dread, for I find it a difficult matter to draw it up, as it clings with the greatest tenacity to the lower part and sides of the nest, and when released turning itself immediately round and retreating to the bottom. The outside of the nest is composed principally of hay, grass, and a little straw, intermixed with roots of different kinds, as well as twigs, rose-leaves matted together, a long piece of black worsted, bits of red worsted, matting, shavings, tape, bark of tree, two pieces of playing cards, stalks of flowers and plants, buttercup, moss, &c. [But the inside is chiefly lined with feathers, wool and paper: of the latter there is a great variety; among the rest a piece of a printed notice of a sermon to be preached in the parish church, scraps of a Latin exercise, bits of newspaper, blue paper, also some of my own handwriting, bits of blue and brown braid, plaid and blue cloth, worsted twist, tissue paper, cotton, thread, rope, swan's-down, flock, horse-hair, dog's or cat's-hair, rags, weeds, strings, rabbit's fur, &c., and a piece of the plan of Sebastopol.]

June 18.—The gale still continues, although somewhat abated. Another sparrow's-nest was blown down to-day: it contained only one egg entire, but there were several pieces strewn about. This nest is somewhat more elongated than the former one, and is remarkable for the quantity of strings and threads intermixed with the other materials, measuring in the whole about 90 feet; there are also considerably more feathers but less paper than in the old nest. It measures in circumference lengthwise about 29 inches, breadthwise 19, and is 6 inches in depth. A needle having two feet of thread attached to it was found in the nest, which, like the other, is chiefly composed

externally of hay, grass, and a little straw, intermixed with roots, sticks, &c. Internally it is lined with a profusion of feathers, paper, cotton, wool, &c. The following are some of the things noticed:—Pieces of green and drab alpaca, white and coloured rags, worsted-twist (one bit 24 inches in length), threads of various length, red tape, strings, boot-lace, flannel, cotton, paper top to reel, silk, horse-hair, twine, moss, weeds, flower-leaves, &c., &c.—*Id.* ; June 18, 1857.

Nidification of the Bohemian Waxwing (*Bombycilla garrula*).—At the March Meeting of the Zoological Society, Dr. Gray, F.R.S., in the chair, a pair of adult waxwings, killed from their nest, a young bird, and two nests and eggs, were sent for exhibition by Mr. John Wolley, jun. The exhibition was accompanied by the following paper, from Mr. Wolley, ‘On the Nest and Eggs of the Waxwing:’—“The waxwing, as observed in Lapland, makes a good-sized and substantial nest, but without much indication of advanced art. It is of some depth, and regularly shaped, though built of rather intractable materials. As in those of many other birds in the Arctic forests, the main substance is of the kind of lichen commonly called tree-hair, which hangs so abundantly from the branches of almost every tree. This lichen somewhat resembles a mass of delicate rootlets, or perhaps may be compared to coarse brown wool; but some of it is whitish, and in one nest there is a little of this mixed with the ordinary brown or black. This main substance of the nest is strengthened below by a platform of dead twigs, and higher up towards the interior by a greater or less amount of flowering stalks of grass, and occasionally pieces of *Equisetum*. It is also interspersed with a little reindeer lichen, perhaps a sprig or two of green moss, and even some pieces of willow cotton. There may also be observed a little of the very fine silvery-looking fibre of grass-leaves, which probably have been reduced to that condition by long soaking in water. In one of the nests examined there were several pen-feathers of small birds as an apology for a lining. Of other nests which are to be found in the same forest it most resembles that of the Siberian jay, but is considerably less than it, which, however, is less securely put together, but has many more feathers and soft materials for a lining. The nest of the waxwing is built on the branch of a tree, not near the bole, and rather, as one of the observers has said, standing up from the branch like a fieldfare’s or other thrush’s nest, than supported by twigs touching it at the sides, as the nests of many birds are supported. Of six nests four were in small spruces, one in a good-sized Scotch fir, and one in a birch, all placed at a height of from six to twelve feet above the ground. The tree in several instances was unhealthy, thin and scraggy in its branches, to which there hung a good deal of hair lichen; and the nest seems generally much exposed, though, from its resemblance to the lichen hanging near, it might escape the eye. The nests found were in parts of the forest considerably open, once or twice on the side of low hills near a river, or with an undergrowth of dwarf swamp-loving shrubs. But at present we have scarcely enough examples to show that there is a preference for any particular kind of ground. Five seems to be the ordinary number of eggs; in one nest only there were as many as six. They have a pale salmon-coloured ground, upon which are distributed, pretty equally, good-sized purple spots, some with more and some with less deep colour, but nearly all of them having a shade or penumbra, such as is common especially in the eggs of the chaffinch. The only very marked variety I have yet seen has short streaks, and much smaller and more numerous spots than usual, of which markings a considerable proportion are of a pale yellowish brown. The eggs may be about an inch in length, but hardly enough have been obtained to determine

the average dimensions. Marked differences in size in the eggs of the same nest have not yet been observed; but, as with other birds, we find that one nest may have all its eggs considerably larger than those of another nest. In the backward and cold spring of 1856 waxwings had their full complement of eggs about the 12th of June. The writer abstains for the present from offering any remarks on the distribution of this bird in the breeding season, hoping that upon this subject, as upon the habits of the waxwing in the summer, he may hereafter have some more complete observations to communicate. A young bird caught on the 5th of August, as it fluttered from the nest, had a general resemblance to the adult, though all the colours were more dull. The wax-like ends to the wing-feathers, the yellow tip to the tail, the black patch between the eye and the beak, are all there, whilst the rich mahogany of the under tail-coverts is of a quieter brown; the blooming vinous colour of the head and back has not yet emerged from a homely neutral, and the crest is but just indicated by the longish feathers of the crown. The most marked difference between the adult and young is in the throat and under surface generally. There is at present scarcely a trace of the deep black patch of the chin, and the delicate tint of the general under surface of the adult is replaced by mottled neutral and white. This, upon examination, is found to owe its appearance to those longer webs which, arriving towards the root of each feather, extend as far outwards as the webs which arise nearer its tip, being very pale or white, and thus relieving, on both sides, the last-mentioned darker webs. — *Muoniovara, February 2, 1857.*"

Swallows. — These pretty and generally welcomed harbingers of spring and summer frequently cause great nuisances by building their nests in the corners of windows; and the dirt thrown out of the nest when occupied by young ones, as well as the constant twittering and noise they and their parents make during the breeding season, often becomes very annoying to the inmates of the house. The result usually is that the too zealous and officious housemaid, in remorseless haste, with the end of her broom knocks down the whole fabric, regardless whether it contains eggs or young ones, and the doomed nest is at once demolished. Thus all the labour and care bestowed upon its construction, and the devoted attachment of the parent birds to bring up their young, end but in sorrow and disappointment; and this perhaps takes place again and again during the summer. The poor swallows, persevering to the last, either lose all their time in vainly endeavouring to repair the injury, or are driven at length to seek some other more secure spot in which to carry out their purpose; but this they seldom do until the season has become so far advanced that the young ones cannot be brought up, and obtain sufficient strength to be able to undertake their long migratory journey to a warmer climate, before the period has arrived for the other swallows to do so; and consequently these late-hatched birds are left behind, to die of hunger and cold; for it is seldom the parent birds, notwithstanding all their strong affection for their young ones, will remain if the failure of food and the coldness of autumn has once begun to be felt, so as to induce the rest of the swallows to congregate and quit their summer houses. Any plan, therefore, which can be suggested as likely to prevent this sad destruction of the poor swallow's domiciles, and thereby prevent their building in places where, to use a sporting phrase, they are sure "to come to grief," will, I trust, be received with favour, and adopted by all those who wish well to this most harmless and interesting visitor, whose confidence in man's protection but too often leads to its own destruction, and defeats all its fond hopes and zealous care in stirring to rear its helpless progeny. The method I have found

to answer most fully is very simple in itself, and, as prevention of an evil is better than its cure, it will also save much trouble in the end, instead of leaving the poor birds to begin their nests anew, and then having to knock them down as soon as such is perceived to be the case. Last year, having had all the outside wood-work and window-sills of the house from whence this is written fresh painted, and which, being of considerable size, contains more than thirty windows, in front, on the sides and in the corners of which the swallows were before always accustomed to build, causing so much dirt and annoyance that the nests were obliged to be removed; and this had to be done from time to time, every succeeding summer, for several months together, as the poor birds still persevered in rebuilding as often as a former nest was destroyed, and no other remedy having been applied to prevent their doing so; but in the summer of the year when the house was so painted not a single swallow out of all the numbers which were seen about attempted to build as formerly in the corners of the windows, or elsewhere where the repainting had taken place. As the smell of the paint had so effectually prevented this occurring, I thought that in the present year the same result might ensue if I took the precaution of putting in the upper corners of each window-sill a small portion of paint, or some similar substance which would tend to prevent the swallows building there as before. As soon, therefore, as I perceived the swallows had commenced building in those places, I had the incipient nests removed, and a small spot of tar, of about the size of half-a-crown, put with a brush in the corners of the window-sills. Although this has now been done for more than two months, and numbers of swallows are constantly to be seen flying round the house and about in various directions, not one has since ventured to rebuild its nest in any of the places above mentioned. And, to show the efficacy of the plan, I may mention that a short distance off, at the stables and outbuildings belonging to the house, where no tar has been used, there are now numerous nests built, many containing young ones in them, besides those which have already flown this season. Thus I feel satisfied that this simple process will effectually prevent swallows and martins* from attaching their "procreant cradles" to any house so as to cause the nuisance so often complained of, and almost every place to which swallows resort to build their "pendant beds" may be reached by means of a common paint-brush fastened to the end of a stick of a few feet in length, and the tar or paint be thus easily applied. When we consider the long distance these pretty birds travel to visit us, their perfect harmlessness in all other respects, their utility in destroying superabundant insects, and the pleasure their cheerful flight and rapid evolutions afford to every beholder, as well as the confiding nature of this social bird,—when all these claims on our compassion are thought of, I cannot but hope the above plan, which so easily prevents the evil complained of, will be adopted, and thus spare the wanton destruction of so many innocent lives, given by Him who is the giver of all life.—*W. H. Slaney; Hatton Hall, July 20, 1857.*

"*Hurstpierpoint: a great Curiosity.*—Some persons were one evening taking tea in the Chinese Gardens, when their attention was drawn to a couple of tomtits, which boldly entered the little room where they were sitting, and disappeared underneath the table. Their curiosity was aroused, and after a long search they found the birds' nest, containing several young ones, in the table drawer. This drawer was about 18 inches square, yet the poor birds had filled it with moss, and in the middle of it had

* Does not the writer refer *exclusively* to martins?—*E. N.*

reared their young family. Mr. Adams, the proprietor of these pleasure grounds, says that forty or fifty people had taken tea on that table during the three weeks that the nest must have been there, and had not discovered it; and that the table had been moved to the lawn and back several times, yet the parent birds did not desert it. The birds found an entrance to the drawer through a hole in the bottom, and through this hole they had carried all the moss found in the drawer."—*From the Sussex Express, June 6, 1857.*—*Communicated by the Rev. Arthur Hussey.*

The Shoveller (Anas clypeata) breeding in Dorsetshire.—I have great pleasure in recording this bird as having bred in the county of Dorset. Some few weeks since, when trout-fishing with Mr. Williams on his manor at Ilsington, we disturbed, some way from us, a bird, which the keeper informed me was a wigeon. Mr. Williams also informed me that his keeper had found the nest, and had brought him two of the eggs (leaving the rest to be hatched), and that he had placed them in the Dorset County Museum. The disturbed bird circled round us, at a great altitude, for at least a quarter of an hour, and whistled occasionally the same notes as the wigeon, which, added to the smallness of the bird and the quantity of white in the plumage, led me to believe that it was a wigeon, and so I marked it in my note-book, but with a query appended to it. I always use great circumspection in making use of gamekeepers' information respecting species; but my own observations in this case induced me to believe that he was right, and that it was in fact a wigeon. This bird was flushed several times during the day, and each time its flight was similar. Some way further down, and in a bend of the river, we noticed the female bird with a brood of young; but we were so far off that I could not identify the species. On the 25th of June my friend Mr. Williams, who had been "flapper shooting," kindly sent me, amongst other wild fowl, a wigeon. On examination this proved to be a female shoveller, and I have no doubt whatever but that, instead of being wigeons, they were shovellers that he and I saw on a previous occasion. Any keeper in this part of Dorset who has a river and water-meadows in his manor will tell you that both wigeon and teal breed with him. This only shows how very careful we should be in satisfying ourselves before we admit a species into the Fauna of a county, or, in fact, of a country. In obtaining materials for my 'Fauna of the County of Dorset' I have met with instances where a very different bird was introduced from the one intended. In one list I found the hooded merganser named as having been obtained in Dorset. As this was the only occurrence I had heard of, I wrote to the compiler (one of our first entomologists) respecting it. When he next came to Weymouth I saw him; he kindly gave me all the information in his power, and the result was the proof, beyond all question, that the hooded merganser of his list was only the tufted duck (*Anas fuligula*). Another case occurred to me only this week. In a new Guide-Book of Weymouth and Portland, now publishing, the proprietor had applied to a gentleman in this town to give him a list of marine birds. The list was supplied. Happening to call on the publisher, he asked me to revise the list; and this I promised to do, and took it home for that purpose. What was my astonishment to find the first bird found on the cliffs of Dorset was *Falco gentilis*! The mischief that may accrue to Science from mistakes like these is such that some remedy should be attempted. I think it might be managed if the Linnean and Zoological Societies would take it in hand, and certify of any work that there were no gross inaccuracies. It would in time add to the value of the work, and would obtain favour with the public, and therefore with the author.—*William Thompson; Weymouth, July 5, 1857.*

Note on the Little Auk (Uria alle) appearing on the Norfolk Coast in Summer.—I have now in my possession a specimen of this bird, with the perfect black throat of the summer plumage, which was shot at Wells, on this coast, about the 26th of May. This bird, which was shown me in the flesh, was shot from the beach whilst skimming rapidly over the waves close in shore, and was covered with sand when brought to me. Mr. Yarrell says of this species, "It is only a winter visitor to the British Islands, and is more frequently met with among those of Orkney and Shetland than further South." It is also known to frequent and breed in such high northern regions that the occurrence of this single specimen on our coast at such a time is not perhaps unworthy of record. Scarcely an autumn or winter passes without a few being taken in various parts of Norfolk; but these may be reckoned rather as accidental than regular visitants, driven from their proper course by storms; and thus not only drifted on to our coasts, but carried sometimes for miles inland, till they fall exhausted in the streets of our towns and villages. During the last winter, after the high winds which prevailed at different times, many of these birds were picked up, and one was taken alive in a yard in the centre of this city. All these have of course the white or grayish white throat peculiar to the winter season; but I am not aware of any previous instance of the little auk visiting us in summer.—*H. Stevenson; Norwich, July 6, 1857.*

The Eye of the Carp turns on its Axis.—In watching a small carp seeking food alternately at the surface and the bottom of my fresh-water aquarium, I remarked the eye turns upon its axis, and does not partake of the inclination of the body. The same movement may be seen in the human eye by inclining the head towards either shoulder before a looking-glass. Thus the images of earth and sky fall upon the same portions of the retina in all ordinary positions of the head. May not the reversal of these conditions account in some measure for the effects noticed in viewing a landscape with the head inverted and looking between the legs, effects which are usually imputed to the additional flow of blood to the head?—*George Guyon; June 15, 1857.*

Giant Specimens of Unio tumidus and U. pictorum.—I have met with these Uniones in two ponds in this neighbourhood, situated in the parishes of Fleckney and Wistow, of a size which I believe to be wholly unexampled. Forbes and Hanley write of *Unio tumidus*, "A fine specimen measured three inches in length, and more than half that in breadth at the widest part;" and of *U. pictorum* they remark that "a large individual measured full three inches in length, and nearly an inch and a half in breadth." In the following table I give the dimensions and weights of Wistow and Fleckney specimens, and have added those of my finest examples from other localities for the sake of comparison. Number 5 is a dwarf variety of *U. tumidus*, from the Cherwell, Oxford, where it rarely, if ever, attains a size larger than that of this specimen. The difference between the Uniones of this neighbourhood and others will be seen more remarkably by a comparison of their weights than by that of their measurements. The sum total of the weights of 3, 4, 8 and 9, it will be observed, only

exceeds the weight of the specimen of *U. pictorum* from Fleckney by half a drachm, and falls short of the weight of the Fleckney *U. tumidus* by twelve and a half drachms! Although those measured are the largest I have as yet found, all the specimens of *Unio tumidus* and *U. pictorum* from this neighbourhood are of extraordinary size, and none of my correspondents have ever seen any that can be compared with them.

		Length.	Breadth.	Girth lengthwise.	Girth breadthwise.	Weight.	
		Inches.	Inches.	Inches.	Inches.	Oz.	Dr.
1.	<i>Unio tumidus</i> , Fleckney	$4\frac{3}{10}$	$2\frac{1}{5}$	$9\frac{2}{5}$	6	3	2
2.	" " Wistow.....	$4\frac{1}{5}$	2	$9\frac{1}{5}$	$5\frac{3}{5}$	2	10
3.	" " Surrey Docks ...	$2\frac{9}{10}$	$1\frac{1}{2}$	$6\frac{2}{5}$	$4\frac{1}{10}$		10
4.	" " New River	$2\frac{9}{10}$	$1\frac{2}{5}$	$6\frac{2}{5}$	$3\frac{9}{10}$		$11\frac{1}{2}$
5.	" " Oxford	$2\frac{1}{5}$	$1\frac{1}{5}$	$5\frac{1}{10}$	$3\frac{2}{5}$		6
6.	<i>Unio pictorum</i> , Wistow	$4\frac{7}{10}$	$2\frac{1}{5}$	$10\frac{3}{10}$	$5\frac{1}{5}$	2	6
7.	" " Fleckney	$4\frac{1}{2}$	$1\frac{9}{10}$	$9\frac{9}{10}$	$5\frac{1}{2}$	2	7
8.	" "	$3\frac{3}{10}$	$1\frac{1}{2}$	$8\frac{1}{5}$	$4\frac{1}{10}$		13
9.	" " var. <i>rostrata</i>	$3\frac{1}{5}$	$1\frac{2}{5}$	$6\frac{4}{5}$	$3\frac{7}{10}$		5

—*Alfred Merle Norman; Kibworth, August 12, 1857.*

Description of a Galathea new to Science.—In December, 1856, at Bray, in the same boats where the channel-tailed shrimp (*C. Allmani*) first occurred to me, I met with several specimens of a small Galathea which I was at the time unable to identify with certainty, further than establishing its distinctness from both *G. squamifera* and *G. strigosa*. I was unable to procure a typical specimen of *G. nexa*; and the description in Bell's 'British Crustacea' did not afford sufficient details to enable me to pronounce a positive opinion as to the specific value of the characters exhibited by my specimens. Unwilling to suppose it a new species, I marked it provisionally as a variety of *G. nexa*, and as such exhibited and described it briefly at the Dublin Natural History Society, at a meeting held on the 13th of March, and more particularly at a meeting of the same Society held on the 17th of April. Last July, through the kindness of Mr. Adam White, of the British Museum, I had an opportunity of comparing it carefully with the authenticated suite of specimens of *G. nexa* in that collection, and found it specifically distinct from them, and also from what I think must be considered another nondescript species obtained by the Rev. A. M. Norman at Falmouth. The following is a description of the new species.

GALATHEA ANDREWSII, *Kinahan.*

Rostrum short. Armed on each side with from four to five flattened teeth, each tooth channelled in the middle, the hindermost pair situated on the orbit. Anterior pair of legs narrowed, elongate, covered with a few tubercles, these generally terminating in spines, a few squamulose. Tubercles arranged in somewhat parallel longitudinal lines. Hands slender, narrow, elongated; fingers very slender, nearly parallel,

finely denticulate, very sparingly hairy, terminating in a fine nail, their exterior borders slightly spinous. Second joint of external foot-jaws not shorter than a third the length of animal. Locality, coralline zones, Dalkey and Bray. The character of the first pair of legs at once separates this from all our native Galatheæ; in fact, they are hardly distinguishable from the same limbs in *Munida Rondeletii*. The flattened teeth (almost lobes) of the rostrum also afford a good distinctive character. The whole animal is much flatter and smoother than any of the others.

In naming this remarkable species, I have selected a name well known to British naturalists for careful researches into the Botany and Zoology of the west coasts of Ireland, that of William Andrews, M.R.I.A., the discoverer of *Geomalacus maculosus*, and for many years past the active Honorary Secretary of the Dublin Natural History Society. Specimens of the new species are deposited in the British Museum, the Museum of the Royal Dublin Society and the Dublin Natural History Society.—*John Robert Kinahan; Leonard Terrace, Donnybrook, August 8, 1857.*

Capture of Trochilium Allantiforme at Hungerford.—I have just added to my private collection a very fine specimen of this exceedingly rare insect, captured near Hungerford, in Berkshire. Possibly some of your readers could inform me the exact number of specimens known of this insect.—*James Gardner; 52, High Holborn, London.*

Abraxas Ulmaria at Coombe Wood.—Mr. Canham having told me that near Coombe Wood is a new locality for *Abraxas Ulmaria*, I forward you the particulars. My specimen was taken on the 6th of June this year, at half-past 5 p.m., at rest, on some palings on the road from Kingston to the wood, just before you come to the lodge at the end of the road through the wood leading from the Maldon station.—*Charles E. Challis; 2, Old Cambridge Terrace, South Lambeth, July 30, 1857.*

Corrections to Mr. Waterhouse's List of the Aleocharide (Zool. 5632).—

Genus *ISCHNOGLOSSA*, “*prolixa*, (*Grav.*), *Er.*,” and “*elegantula*, *Sahl.*, *Er.*,” and insert—*rufopicea*, *Kraatz*.

EURYUSA, add an asterisk before the name “*acuminata*.”

ALEOCHARA, “*bipunctata*.” This determination remains a little doubtful.

TACHYUSA, remove the note of doubt after “*scitula*, *Er.*”

OXYPODA, erase “*præcox*,” and insert “*exoleta*” in its place.

HOMALOTA, add note of doubt to “*debilicornis*,” sp. 2.

„ species 13 erase.

„ „ 36 erase.

„ „ 52, instead of “*nigricornis*, *Thomss.*,” insert—*divisa*,

Markel.

„ „ 64, instead of “*putrida*, *Kz.*,” insert—*subrugosa*,

Kiesew.

„ „ 73, after “*vernacula*, *Gr.*” read *Er.*

For “*Eucephalus*” read “*Encephalus*.”

—*G. R. Waterhouse.*

PROCEEDINGS OF SOCIETIES.

ZOOLOGICAL SOCIETY.

Tuesday, July 28, 1857.—Professor BUSK, F.R.S., in the chair.

Dr. Gray communicated, through the Secretary, a paper containing a synopsis of the families and genera of Bark corals.

Dr. Gray also communicated a notice of a marine animal taken on the coast of Montrose, and presented to the British Museum by Mr. Beattie, Secretary of the Montrose Natural History Society. Dr. Gray provisionally named it *Lineus Beattiei*, after its discoverer.

The Secretary read a paper containing the description of a web-producing lepidopterous insect, from Wollombi, by A. W. Scott, Esq., member of the Legislative Assembly in N. S. Wales. The paper was accompanied by a beautiful drawing, executed by Miss Scott.

The Secretary also read a paper by Mr. Lovell Reeve, containing descriptions of six new shells from the collection of Sir David Barclay, of Port Luis, Mauritius.

Mr. Selater read a paper 'On a Collection of Birds made by Signor Matteo Botteri in the vicinity of Orizaba, in Southern Mexico.' Of the species contained in this collection upwards of 120 were the same as had been previously obtained by M. Sallé in the same country, and had been already mentioned in Mr. Selater's papers upon M. Sallé's birds. Other (41) species were not included in M. Sallé's collections, and were now enumerated, with remarks upon their nomenclature, geographical distribution, &c. The Society's attention was particularly called to three specimens,—a very curious American type, the *Vireolanus metitophrys*, Bp.; a new *Zonotrichia*, proposed to be named, after the discoverer, *Z. Botterii*; and an apparently new form of *Vireoninæ*, which was characterized under the title *Neochloe brevipennis*.

Dr. Crisp exhibited a nest which he found, in May last, on the eastern coast of Suffolk. It was covered with twigs and small branches like that of a magpie. Dr. Crisp believed that it was the deserted nest of the great gray shrike (*Lanius excubitor*).

Dr. Crisp read a second communication, on the presence or absence of air in the bones of birds. The object of the author was to correct the prevailing error that the bones of birds contain air, his conclusion being that the majority of British birds have no air in their bones, and that, with the exception of the Falconidæ, but very few British birds had hollow femora.—D. W. M.

ENTOMOLOGICAL SOCIETY.

May 4, 1857.—W. W. SAUNDERS, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Proceedings of the Royal Society,' Vol. viii. No. 25; presented by the Society. 'Journal of the Proceedings of the Linnean Society,' Vol. i. No. 4; by the Society. 'Revue et Magasin de Zoologie,' 1857, No. 3; by the Editor, M. F. Guérin-

Méneville. 'The Zoologist' for May; by the Editor. 'Stettinor Entomologische Zeitung,' Vol. xviii. Nos. 1-3; by the Entomological Society of Stettin. 'A Manual of British Butterflies and Moths,' Vol. i. and No. 14; 'The Substitute' for 1856-7; 'Elements of Entomology,' No. 7; 'The Entomologist's Weekly Intelligencer,' No. 27; by H. T. Stainton, Esq. 'On the Distribution of certain Species of Fresh-water Fish, and on the Modes of Fecundating the Ova of the Salmonidæ; by John Hogg, Esq., M.A., F.R.S., F.L.S., &c.;' by the Author. 'The Literary Gazette' for April; by the Editor. 'The Athenæum' for April; by the Editor. 'Proceedings of the Berwickshire Naturalist's Club,' Vol. iii. No. 7; by the Club. 'List of the Specimens of Lepidopterous Insects in the Collection of the British Museum,' Part XI., Noctuidæ; by the Author, F. Walker, Esq., F.L.S., &c.

Exhibitions.

Mr. Stevens exhibited two pairs of *Endromis versicolor* recently taken in Tilgate Forest; also a pair of *Euchirus longimanus* from Ceram; and some fine species of *Pieris* sent by Mr. Wallace from the islands of Baley and Lomback, which were interesting from the variation of the species in these closely-adjoining islands.

Mr. Stevens also exhibited a specimen of *Hetærius sesquicornis* taken on the 2nd instant, in a nest of *Formica fusca*, at Hampstead; and a specimen of *Lophopteryx Carmelita* bred from the egg.

Mr. Foxcroft sent for exhibition specimens of *Anchomenus Ericeti*, *Panz.*, and other Coleoptera and Lepidoptera taken at Rannoch.

Dr. Power exhibited a box of British Coleoptera containing a fine series of *Drypta emarginata*, *Sunius filiformis*, *Meloe brevicollis*, and other rare species; also three specimens of *Hetærius sesquicornis*, taken from nests of *Formica fusca* at Hampstead.

Mr. Croker exhibited a box of Indian *Locustidæ* and *Gryllidæ*; also a fan used in Egypt to drive away the mosquitos.

The President observed that similar fans were used in the East Indies for this purpose.

Mr. Westwood exhibited a mutilated specimen of *Acherontia Atropos* which he had lately found in a bee hive. He observed that he had never heard of any instance having been recorded, in this country, of this moth proving destructive to bees; but his attention had been lately drawn to one of his hives, the stock of which did not commence working, and gradually got weaker and weaker, till at last scarcely 100 bees remained. On turning up the hive he discovered the remains of the specimen of *A. Atropos*, which he exhibited, attached to the comb. Whether the loss of the stock was to be attributed in any way to the moth was a matter of conjecture.

Mr. Westwood also exhibited a gigantic species of flea, for which he proposed the specific name of *imperator*. The specimen, which is about twenty times the size of the common *Pulex irritans*, was found dead in a bed at Gateshead.

Mr. Westwood also exhibited some cloth-like texture from South America, said to have been found inside a tree, and to be the production of some insect.

Major Vardon exhibited some insects brought from the interior of Africa by Dr. Livingstone, respecting which Mr. Westwood furnished the following details.

"The insects which Dr. Livingstone has placed in my hands are—

"1. The larva of a coleopterous insect, of which I am unable to determine the family, but think it may possibly be Cembrionideous. The head is flat, nearly circular,

and furnished with strong triangular jaws; the six legs short and jointed; the body rather thickly clothed with short black hairs, and terminated by two large and very strong, horny, conical appendages, which shut together on their inner edge. The insect has the habit of burying its head in the sand, leaving exposed its strong forceps-like caudal appendage, which it moves about so as to attract the attention of passing insects, which, on approaching, are seized by it, and then conveyed to the mouth and devoured. It thus has a certain amount of analogy with the ant-lion, but is quite unlike that insect, both structurally and in the details of its habits.

"2. Two larvæ of another species of beetle, short, thick and fleshy, black in colour, with a yellow head; which seem to me to be referrible to the family Chrysomelidæ. When crushed, they are employed by the natives for the purposes of poisoning the tips of their arrows, which are dipped into the fluids of the body.

"3. A species of tick, about a quarter of an inch long, with a granulated and much-wrinkled body; which burrows into the feet of the natives between the toes, causing inflammation, which gradually ascends the legs, and other diseases. It is closely allied to the so-called poisonous bug of Persia, *Argas reflexus*. With the specimen were about forty young, with the cast skins of the eggs from which they had been hatched, and which were probably deposited by the female after being placed in the box.

"4. A species of the curious heteropterous genus *Phyllomorpha*, or dead-leaf bug, closely allied to the *Cimex paradoxus* of Sparrmann, brought from the interior of South Africa. It may be thus characterized:—

" *PHYLLOMORPHA LIVINGSTONII*, *Westw.*

"Fusco albidoque varia, longe spinosa, capite et parte antica prothoracis linea tenui media et hujus margine postico recto albis, lobis prothoracis maximis aliformibus, apice oblique truncatis, angulo antico truncaturæ acutissimo, lobis segmentorum 4 et 5 abdominalium maximis subæqualibus apice bipartitis, divisione singula acuminata. *Ph. Capicola et paradoxa* duplo major.

"5. The minute flat pupæ of a species of *Psylla* found on the leaves of a species of *Bauhinia* which cover themselves with a secretion similar to that of the Australian *Wo-me-la*, which is also the produce of a species of *Psylla*, and which is scraped off the leaves by the natives, and eaten as a saccharine dainty, as is also the case with the secretion brought home by Dr. Livingstone by the natives of Central Africa.

"6. Dr. Livingstone has fully confirmed the statements of Major Vardon relative to the destructive powers of the tsetze (*Glossina morsitans*, Westw. in Proc. Zool. Soc.) in its attacks upon horses, which it very often kills; it appears, however, not to attack asses."

Mr. Wollaston exhibited various Coleoptera lately captured near Farnborough, in Kent, in a high chalky valley belonging to Sir John Lubbock, including a series of *Homœusa acuminata*, *Mærk.*, an insect which was hitherto unique as British, a single example having been obtained by himself a year ago, from out of an ant's nest, in the same locality.¹ He also exhibited specimens of *Claviger testaceus* and *Lomechusa emarginata*, likewise from the nests of *Formica fusca*; and an example of a species of *Scopæus*, apparently the first detected in this country. The other species to which he called attention were *Callistus lunatus*, *Tritoma bipustulatum*, *Byrrhus dorsalis*, and some scarce *Pselaphidæ*.

Mr. Smith exhibited the at present unique specimen of *Tropideres sepicola*, *Herbst*, taken in August last, by Mr. F. Plant, in Budden Wood, Leicestershire, and now presented by him to the British Museum.

Mr. Janson exhibited a specimen of *Myrmedonia cognata*, *Müerk.*, being the third indigenous example hitherto recorded, taken by Mr. E. Shepherd in a nest of *Formica fuliginosa*; a pair of *Atemeles emarginatus* which he had taken *in copulâ*, and observed that he had not been able to detect any external sexual distinction; and a pair of *Ampedus subcarinatus* captured a few days since.

Mr. Bond exhibited specimens of *Mixodia Hawkerana* bred from sea spurge, and the pupa-cases from which they emerged.

Mr. Hawker also exhibited specimens of the *Mixodia*, and the shoots of the sea spurge in which the insects had assumed the pupa state.

Mr. Robinson exhibited a drawing of the larva of *Polyommatus Artaxerxes* feeding on *Helianthemum vulgare*.

Mr. Janson made some observations on Mr. Smith's remarks on *Bledius hispidus*, *Parfitt*, with reference to which subject Mr. Westwood denied that he had, as stated, informed Mr. Parfitt that this species was new to Science.

Mr. Newman communicated the following:—

A Word on the Pseudogynous Lepidoptera.

“The attention of entomologists has lately been directed to a phenomenon, which, under a severe scrutiny, seems to have arisen from the questionable position of an exception into the importance of a normal law. I allude to Agamogenesis. I have now to invite attention to what might be termed a compensating or balancing phenomenon,—a phenomenon which, instead of providing an unlooked-for multiplication of life, seems to dry up the source of life. This phenomenon is Pseudogynism, or the occurrence of false or unproductive females. It is very familiar to the breeders of domestic cattle, by whom such false females are called free martins. All attempts to overcome their sterility having of course been unsuccessful, they have been abandoned, and the beasts have been at once fattened for the butcher. I think entomologists have not hitherto recorded the existence of the same free martinism, or pseudogynism, among moths; it is nevertheless a fact that it exists to a very great extent, more than half the individuals of certain species proving sterile females. The first observation I made on this subject was in 1846, on an autumnal-disclosed specimen of *Orthosia instabilis*, the abdomen of which was opened, with a view of ascertaining the state of the eggs on the occasion of this unwonted first appearance on the stage of life. Eggs there were none; the abdomen was a hollow cylinder, without any trace whatever of an ovary, or indeed of any portion of the ordinary contents. The next observation was made on an example of *Sphinx Convolvuli* taken the same year. The captor slit open the abdomen longitudinally, from the anus to the insertion of the legs, intending to remove the contents prior to drying the insect for the cabinet. In this case also the abdomen was perfectly empty. My notes on this subject were laid by, but not forgotten, until 1851, when I received a notice from the South of France respecting *Deilephila Celerio*, which that year appeared in profusion in the months of September and October, the report stating that all the females were barren. This of course

afforded more food for reflection, and in 1852 I sacrificed a number of *Sphinx Ligustri* and our of three species of *Smerinthus*, thinking to find and investigate a similar phenomenon. In this I was disappointed: all the specimens were summer-disclosed, and all had the ovaries distended with mature eggs. I was now inclined to assume that the previously observed facts were accidental or exceptional, and not to be recorded as the results of any universally operating law; but, last autumn, that is the autumn of 1856, the subject was again brought before me by the examination of recently disclosed females of *Acherontia Atropos*, which proved perfectly sterile. Now, as I knew there was a summer disclosure of this insect, giving rise, among the raw recruits of our science, as in the case of hibernating *Rhamni*, to a double-brooded hypothesis, I could not but be struck with a phenomenon that began to assume the weight and importance of a fixed law. It appeared, on comparing and arranging a series of observed facts, 1st, that certain *Lepidoptera* had two periods of disclosure, the æstival and the autumnal; that the summer batch, produced while the leaves were in full vigour and afforded abundant food for the larvæ, was fruitful; the autumnal brood, disclosed when the leaves were about to fall, was barren. The autumnal brood seems only to occur in cases where the number of the specimens has been much larger than usual, and when the species, if multiplied by uniform and ordinary fecundity, would either more than exhaust the usual food-plant, and would therefore starve, or would seek other food, and thus defoliate our vegetation. The phenomenon, therefore, if reduceable to a law, is yet another proof of that 'wisdom of God in creation' which was the favourite theme of our greatest English naturalist, and the illustration of which is the cherished object of every right-minded teacher at the present day. Before offering these remarks to the Entomological Society I thought I would submit the facts to the scrutiny of a second entomologist; and for this purpose I selected the '*Lepidopterologiæ Princeps*' at once, thus passing by, not only the *habitués* of what might be called our 'Circumlocution Office,' but also those really hard-working investigators of truth, our *Wollastons*, our *Douglasses* and our *Powers*. Mr. Doubleday's experience, I am happy to say, exactly coincides with my own. The following extract from his letter contains irresistible evidence of the prevalence of my facts:— 'The first pupa,' Mr. Doubleday writes, 'that I ever possessed of *Acherontia Atropos* produced a female moth, in July, and was full of eggs. In 1846 I had a number of larvæ of the same species; these became pupæ at the usual time, and eight or ten moths were produced at the end of September or beginning of October; ALL the females were barren, their abdomens being quite hollow. Most of the female *Convolvuli* that I took the same year [it was the great *Convolvuli* year] were barren, but I took one or two which laid eggs; not one of the eggs, however, hatched. I believe the females of some species are mostly barren when disclosed in the autumn; but where there are two distinct broods of a species, a vernal and autumnal brood, both are fertile. I believe that all species occasionally produce barren females.'

Mr. F. Smith read the following extract from a letter addressed to him by Mr. R. T. Grant, from Canada West (Orillia):—

Letter from Mr. R. T. Grant, West Canada.

"The first insects make their appearance about the middle of April, on the blossoms of the willows, which are very plentiful here, and swarm with insects of all orders, even before the snow has disappeared. Fancy the ground covered with snow

to a great depth, and the beautiful butterflies sporting in the hot sunshine. The first to appear is *Vanessa Antiopa*, which is extremely abundant here; *Andrenidæ* are also very plentiful; *Andrena Clarkella* is here, and *A. chrysoseles* and a very dark species, like *Clarkella* but handsomer. I have also found *Colletes*, *Sphecodes* and *Halictus*. You say in your Bee-Book that you know of no other genus among the solitary bees but *Sphecodes* and *Halictus* that remain torpid in the winter; but there is one here, a genus I am quite unacquainted with, very like *Halictus*; I have found two species, both of a beautiful golden green; the commonest of them is found upon every log or stump." (The bees here mentioned belong to my own genus *Angochlora*, of which I have enumerated thirteen species from North America, and seventeen from different parts of South America; they are closely allied to the genus *Halictus*, and are remarkable for having the eyes more or less reniform, some species distinctly so, like a wasp.) "I have also taken several *Nomadæ*, one *Cœlixys*, and two species of *Stelis*, *Melecta* and *Anthophora*; a very large *Chelostoma*, and four species of *Bombi*; also one *Apathus*. Here are also great quantities of ants, of which I hope to send you a great number. I have met with one species of the genus *Tapinoma*. The greatest annoyance here is from flies, which in fact are the only things I dislike in the country. When you go out in summer, you are immediately pounced upon by a swarm of mosquitoes, black flies, cattle and deer flies, all eager to suck your blood. The mosquitoes are truly awful. One day, putting off in a canoe to cross a lake, I was completely covered with them; and so dreadful were their stings that I was driven almost mad. Their bite is extremely sore, and itches to a degree no one can imagine; the swelling was so great upon myself that I could neither close my hands nor move my fingers for several days. The only way to obtain rest at night is to light heaps of rotten wood and *Fungi* round your house. The contrast of temperature here is very great, 96° in the shade in July, and 32° below zero in January. To-day the cold is intense. I am writing this before a red-hot stove, to prevent the ink from freezing."

Mr. Douglas read the following note on

Trachys pygmæa.

"In the 'Revue et Magasin de Zoologie' of M. Guerin-Méneville, No. 2, 1857, is a report of a memoir by M. Leprieur, read by M. Dumeril at a Meeting of the Academie des Sciences de Paris held on the 2nd of February, 1857, intitled 'Essai sur les Métamorphoses du *Trachys pygmæa*, insecte de la famille des Buprestides,' from which I beg to present the following extract, which will be the more interesting as it relates to an insect which is a native of Britain, but hitherto exceedingly rare in our collections.

"M. Leprieur, after recapitulating in his memoir several observations already made, by authors whom he quotes, upon the larvæ of some coleopterous insects which live in the interior of stems of plants, under the bark or in the woody tissue, mentions those in particular which are developed in plants of the order *Malvaceæ*. The author relates that having remarked upon tufts of the mallow several leaves bearing vesicular spots, coarsely rounded in their circumference, of a yellow tint, contrasting with the green colour of the leaves, he sought to know the cause of them; and he supposed that they had been the abode of some insect. The following year he was fortunate enough to prove the presence in these little cavities of a *Buprestis*, which, in the space of two or three weeks, went through all the phases of its development. This was to him an ex-

traordinary and unknown fact, and he studied it in all its details. They are very singular, but are too circumstantial to be reproduced here.

“The author of the memoir describes and figures the larva of this *Trachys*, which has a very peculiar form, as well as the pupa, which is transformed without being enveloped in a cocoon. He compared this larva with those of other *Buprestidæ* already known, in order to indicate by figures the peculiarities which distinguish them. He examined the interior of the vesicle of the epidermis, where he found the remains of the former skin, those of the digested matter which had served for the growth of the larva, and proof that, among other parasitic larvæ, that of a *Cynips* for example [?], had made their food of it, and took its place.

“We think that the memoir of M. Leprieur confirms and develops much better the first observation of Réaumur upon the larvæ of the *Trachydes*, all of which have very probably the same manner of living; that his researches establish a positive fact upon a point too little known in the history of these insects, that the exactness of his researches merits the approbation of the Academy, which has received them with interest, and that the publication of them is very desirable.”

Part IV. of Vol. iv., N. S., of the Society's 'Transactions,' published in April, was on the table.

June 1, 1857.—W. W. SAUNDERS, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—‘The Natural History Review,’ 1857, No. 2; presented by the Dublin University Zoological Association. ‘The Zoologist’ for June; by the Editor. ‘Revue et Magasin de Zoologie,’ 1857, No. 4, by the Editor, M. F. E. Guerin-Méneville. ‘The Literary Gazette’ for May; by the Editor. ‘The Journal of the Society of Arts’ for May; by the Society. Certain Insects taken in the interior of Africa by Dr. Livingstone; by that gentleman. ‘Elements of Entomology,’ Nos. 8 and 9; ‘The Entomologist’s Weekly Intelligencer,’ Nos. 28 to 35 inclusive; by H. T. Stainton, Esq.

Election of a Subscriber.

Henry Gorham, Esq., of 9, Hornton Terrace, Kensington, was elected a Subscriber to the Society.

Exhibitions.

Mr. Bond exhibited a beautiful series of *Retinia Turionana* bred from larvæ found in the shoots of Scotch firs in Buckinghamshire; also living larvæ of *Coleophora palliella* and *C. currucipennella* from Richmond Park.

Mr. Stevens exhibited *Stenolophus elegans* and other *Coleoptera* lately taken at Sheerness.

The Rev. H. C. Stowell sent for exhibition a fine dark variety of *Melitæa Euphrosyne*.

Mr. Stainton exhibited the living larva of *Hypercallia Christiannana* received from Switzerland.

Mr. Janson exhibited various species of Coleoptera captured by himself in the neighbourhood of London during the last month, and made the following observations in reference to them :—

“ 1. *Rhyncolus truncorum*, *Germer, Gyll.* A novelty to our list, notwithstanding that its name for many years there held a place; but, as Mr. Walton has shown, the insect thus designated by the late Mr. Stephens pertains to the genus *Phloeophagus*, being the *P. æneopiceus* of Schönherr.

“ Of the two species of *Rhyncolus* extant in British collections and enumerated by Mr. Walton, the present insect is most nearly allied to *R. cylindrirostris*, *Oliv.* (*lignarius*, *Marsh., Steph.*), from which it may be at once distinguished by its more robust habit, its singularly depressed eyes, whose position may be styled infero-lateral, no trace of them being discernible on regarding the insect from above, and by its slender tarsi.

“ 2. *Phloeophagus spadix*, *Herbst, Schönh., Walton.*

“ 3. *Ieptinus testaceus*, *Müller, Hardy.*

“ 4. *Xantholinus glaber*, *Nordman, Erichson*, of which the only indigenous example previously known is in the cabinet of the late Mr. Kirby, in whose manuscript catalogue it is denominated *Gyrohypnus rotundicollis*; the insect, however, representing *Xantholinus rotundicollis* of Stephens in his collection is a small variety of *X. punctulatus*, *Fab., Eric.*

“ 5. *Stenus contractus*, *Eric.* (*fornicatus* of Kirby's but not of Stephens' collection; *basalis*, *Curtis.*)

“ 6. *Homœusa acuminata*, *Müerke, Kraatz, Wollaston.*

“ 7. *Tomicus (Bostrichus) bispinus*, *Ratzeburg, Bold, nec Guyon.*

“ 8. *Homalota confusa*, *Müerke, Kraatz, Waterhouse.* One of three specimens taken, a few days since, in a nest of *Formica fuliginosa*, by my kind and assiduous friend and colleague Mr. Edwin Shepherd.”

Mr. Janson likewise exhibited a box of Coleoptera just received from Rannoch, where they had been recently taken by Mr. Foxcroft. The species most noteworthy were *Ampedus tristis*, *Rhyncolus ater*, both sexes of *Dictyopterus Aurora*, *Elaphrus uliginosus*, *Anchomenus Ericeti*, and *Calathus micropterus*.

Mr. Smith brought for distribution amongst the members some series of named specimens of British ants, and exhibited some cocoons said to have been found in the *débris* of a hornet's nest, and from one of which his correspondent assured him a male hornet had emerged; on examination, however, it was discovered that the remaining cocoons contained *Bombi*.

Mr. Wilkinson observed that he had tested a portion of the cloth-like substance exhibited at the last Meeting, which was said to be the production of some insect; the result of his experiments, however, proved it to be of undoubted vegetable origin.

Mr. Westwood called attention to the continuation of Sepp's 'Nederlandsche Insecten,' the publication of which had been resumed in Holland: he was happy to say that entomologists appeared to be going energetically to work in that country, the recently published parts of the 'Transactions of the Netherlands Entomological Society' containing several excellent memoirs.

Mr. Westwood read the following note :—

“ With reference to a note by Mr. Newman, published in the ‘ Zoologist,’ p. 5629, on the subject of the introduction of *Acentria nivea* into the order Lepidoptera, I beg leave to refer those who may be interested in the question to the first volume of the ‘ Transactions’ of this Society, p. 118, where, twenty-three years ago, I proved the truth of this relationship; also to my ‘ Introduction to the Modern Classification of Insects,’ pp. 324 and 413; to my ‘ British Moths and their Transformations,’ vol. ii., and to Kolenati’s ‘ Monograph of the Trichoptera,’ p. 6. Why the propriety of the removal of *Narycia elegans* of Stephens, with its pectinated antennæ, well-spurred legs and want of thoracic tippets, to the order Lepidoptera, as affirmed by Dr. Hagen, should as a matter of course involve *Acentria* in the like fate, does not appear to me quite evident. As Mr. Newman, moreover, considers my arguments insufficient for removing *Acentria* to the Lepidoptera, I call upon him to state upon what other grounds he has arrived at his conclusion. It is generally supposed that Mr. Newman has paid especial attention to the study of the Linnean Neuroptera, and entomologists will doubtless be very anxious to know what structural peculiarities he may have discovered sufficient to outweigh those which I have adduced in my various notices upon the *Acentria*.”

Mr. F. Smith read the following notes :—

On the Habits of Trypoxylon.

“ A few years ago the habits of the species of the genus *Trypoxylon* was a subject of some controversy; St. Fargeau, indeed, described it as being parasitic; the Linnean account, however, is the correct one, and was confirmed, as far back as 1840, by Mr. Kennedy and Mr. Westwood. Any one, however, who is in the habit of watching these insects, running as they do upon posts, rails or sand-banks, and constantly entering the burrows of other insects, might be induced to adopt the opinion of St. Fargeau; and if, in addition to the above habit of the species, he examined the structure of the females, and found them destitute of cilia and spines on the legs, his opinion would no doubt be considerably strengthened as to their parasitism. The observations of numerous hymenopterists have long settled the question, and they are well known to store up spiders as a nutriment for their young. One point in the economy of this genus remains to be established; and I may ask the question, Has any one ever observed a species of *Trypoxylon* constructing its own burrow? without any chance of its being answered in the affirmative. I am of opinion that there are some species of fossorial Hymenoptera, and also of Apidæ, which never construct a burrow for themselves, always availing themselves of some ready-formed receptacle suitable to their purposes: *Trypoxylon* is one of these, and, amongst the bees, probably *Anthidium* is another.

“ I have an opportunity of exhibiting this evening a most remarkable illustration corroborative of my opinion as regards *Trypoxylon*. The Rev. Hamlet Clark obligingly undertook to capture a few Hymenoptera on his late visit to Brazil. In addition to several new species of Formicidæ, he also brought a number of nests of a species of *Polistes*, also new to me.

“ On carefully examining the nests, I observed, in one of them, that several of the cells were closed with red earth or clay. On opening some of these cells, I found them

stored with spiders, and in one of them a specimen of *Trypoxylon fugax* of Fabricius. The cells had been tenanted by a young brood of the *Polistes* before the *Trypoxylon* took possession of them. This is certainly a very striking illustration of what I believe to be the habit of this genus of insects.

"The nests and the *Polistes* were obtained by Mr. Clark at Petropolis, where, he informs me, it is common."

On the Habit of Chelostoma florissomnis.

"I have received a letter from Mr. George Kearley, Blomfield Street, Finsbury, in which he describes a singular habit of the males of *Chelostoma florissomnis*. Mr. Kearley says:—

"I send you half-a-dozen bees which I took last evening. They were resting in a most singular manner on a dead branch of hawthorn that had been thrust into a hedge to stop a gap; the bees were attached to the points of the thorns by their mandibles, with their bodies stuck out straight and stiff in a line with the thorns, but quite clear of them. Almost every thorn on one part of the bush was grasped by a bee. They were attached so firmly, and were so loth to move, that it required a good shake to dislodge them; and when disturbed they immediately set about attaching themselves afresh. I broke off a twig and carried it to my residence, a quarter of a mile distant, swinging it about, but not one of them relaxed its grasp. On going early to the spot next morning I found the bush still thickly peopled with them, still attached attached by the mandibles alone, the legs being folded under the body, the body itself standing out stiff from the points of the thorns."

"This habit in the males of *Chelostoma* being new to me, I have thought it worth recording in our 'Proceedings.' The bees were no doubt, as Mr. Kearley suggests, settling themselves for the night. I have frequently found them huddled together by half-dozens in the closed petals of flowers, but never in the manner above described.

Mr. Westwood read a paper on species of *Callirhipus*, &c., chiefly taken in Ceylon, by Herr Neitner.

Mr. Moore read descriptions of undescribed species of *Euplæa* in the collection of the East India Company.

The President expressed his intention to invite the members to a day's excursion at Reigate during the present month.—*E. S.*

NORTHERN ENTOMOLOGICAL SOCIETY.

July 11, 1857.—B. COOKE, Esq., in the chair.

Election of Members.

E. Brown, Esq., of Burton-on-Trent, was elected a Member of the Society. Alexander H. Haliday, Esq., of Dublin, and E. Newman, Esq., F.L.S., of London, were elected Honorary Members.

Exhibitions.

Mr. Greening exhibited *Agrotis cinerea*, taken on flowers at 12 o'clock at night, near Llanferris, North Wales, the first week in June.

Mr. N. Cooke exhibited a box of insects which he and Mr. E. Birchall had captured in Galway, Ireland, at the end of June. In the box were *Zygæna Minos* and its pupa-cases; also three varieties of that species, one of them suffused with red all over, except the margins of the wings; also a fine series of *Miana expolita*, varying from a dull drab, as seen in the generality of Yorkshire specimens, to an intense red and ochreous-brown; and specimens of *Satyrus Davus*, *Rhodaria sanguinalis*, *Pyrausta octomaculalis*, *Strenia clathraria*, *Setina irrorella*, *Melanippe tristaria*, &c., &c. From the great number of specimens and species captured by Mr. Birchall and Mr. Cooke in five days, it would appear there is no truth in the oft-repeated remark that insects are scarce in Ireland, and that when species do occur there are few specimens.

The Secretary exhibited a box in which was *Lithocolletis hortella*, from the Rev. H. P. Newnham; *L. Bremiella*, from J. W. Douglas, Esq.; and a series of *L. ulicetella* recently captured at Wallasey; also *Crambus dumetellus*, from the sand-hills in the same parish, and *Coleophora Vibicella* and its cases. The specimens were bred from cases sent by Mr. Crump. He also exhibited *Coleophora palliatella* and its cases, bred from larvæ sent by Mr. Bond, and *Acidalia eburnata*.

The Rev. H. A. Stowell kindly sent a box of Coleoptera, amongst which were *Leptura ruficornis*, *Pæderus riparius*, *Chrysomela sanguinolenta*, &c., &c.; and J. A. Brewer, Esq., sent specimens of *Callidium violaceum* much finer than any yet seen in the North.

Mr. Cooper exhibited *Depressaria assimilella* bred from larvæ found near Warrington.

Mr. Marrat exhibited *Chrysomela Graminis* taken at Aber, North Wales.

The Secretary exhibited an *Elachista* larva feeding on *Carex flava*, which Mr. Marrat and he had discovered at Formby; and the pupa-cases of *Gelechia desertella* projecting from *Sedum acre*, observing that this cannot be its only food, as the insect abounds where the plant is scarce. He then produced a true *Tinea* which Mr. Greening saw captured, remarking that it was identical with the species below it, and that was the original specimen from which Mr. Stainton first described *Tinea pallescentella* several years ago.

A member asked, "What are we to understand by Mr. Stainton's recent re-description of *Tinea pallescentella*, from another species, in this year's 'Annual,' when that species had already been named and described in the 'Zoologist,' especially now this insect has again turned up?"

A discussion ensued on names in general, the Secretary pointing out a great number of names by Stephens, Haworth, Fabricius, Treitschke, &c., which ignorant people like him thought were Latin because they terminated with "ana" or "ella;" and observed that the genus *Mixodia*, *Guen.*, would serve as a good illustration how foreign and British authors Latinized foreign and English proper names by adding "ana;" thus, *Bentleyana*, *Haw.*, *Schulziana*, *Fab.*, *Zinckenana*, *Tr.*, all for one species, and all supposed to be pure Latin.

Mr. Linton informed the meeting he captured *Agrotis cinerea* at Lewes early in June, flying over flowers in the heat of a noon sun.

The President observed that it was singular one member should take this species at 12 at noon in the South, whilst another member took it at 12 at night in the North, both on the same day.

The President exhibited a box of Diptera for the Rev. H. H. Higgins, in which were several varieties, including *Syrphus Scalaris*, *Syrphus clypeatus*, &c.

Mr. Gregson exhibited a box of Coleoptera, amongst which were *Dyschirius impunctipennis* and *D. politus*, and a species of the same genus taken below high-water mark on the Lancashire coast, *Hesperophilus arenarius* and *H. fracticornis*, *Gripidium Equaseti*, *Adrostis marginatus* (with eggs), *Bembidium laterale*, &c., which were brought for distribution amongst the members.

Mr. N. Cooke read a paper 'On the Species of Lepidoptera observed or captured in Ireland during five days' collecting there,' after which he distributed his duplicate captures amongst the members present.—*C. S. G.*

Notes on Ascidia as a source for Diatomaceæ.—Being engaged, some time ago, in examining some dredged oyster-shells for Diatomaceæ, I discovered, on the surface of one of the shells, a cluster of semi-transparent gelatinous bodies, of a yellowish green colour, the shape being, however, not uniform, owing perhaps to their being dead and flaccid. In shape they approached small hazel-nuts. These I took to be Ascidia of some species, as they were apparently enveloped in an outer mantle or skin of somewhat tough consistency. In cutting through this mantle, and towards the centre of the body, a large stomach was exposed, quite distended with what appeared to be brown mud. On examining this under the microscope I was delighted to find it almost entirely composed of Diatomaceæ, still quite fresh and full of endochrome. The Diatoms were mostly uncommon forms; the most conspicuous of these, which occurred in the first specimen I opened, were *Coscinodiscus concinnus* (in great number and of unusual size), *Pleurosigma lanceolatum*, *nov. sp.*, *Eupodiscus crassus*, *E. Ralfsii*, *Eucampia zodiacus*, and a curious tubular *Rhizosolenia* which Mr. Brightwell has named *Rhizosolenia styliformis*. I have since then examined many Ascidia from the same source, and have never failed in any instance in obtaining Diatomaceæ in abundance; and these have been mostly species occurring in deep water, and consequently somewhat uncommon and difficult to obtain, unless the collector is furnished with an expensive dredging apparatus. Some of the forms are of great rarity, and some are even quite new. I would therefore call the attention of all Diatomists to this source as an easy and inexpensive method of obtaining good and rare forms, in a comparatively clean state, without much trouble, as the trawling boats are constantly bringing to market the large dredged oysters, which are frequently covered with Ascidia. The locality where my oysters were obtained is some twenty or thirty miles from the Yorkshire coast, a little to the North of the river Humber, and is known as the "Silver Pits." I give annexed a list of the species detected in merely four gatherings, which will serve to show what may be expected when Ascidia are examined from other and possibly more favourable localities. The letter A preceding the name denotes that the species occurs abundantly; F, that it occurs occasionally, though less frequently than the first; R, that it only occurs rarely,—perhaps, for instance, one or two specimens in a slide.

F *Eucampia zodiacus*

F *Pinnularia distans*

A *Pleurosigma lanceolatum*, *nov. sp.*, in the way of *P. angulatum*, but with

much coarser striae. The valve nearly straight, the central line much curved, and with a faint depression running across the centre of the

- valve. This form is constant, and occurs in most gatherings from deep water that I have examined
- F Pleurosigma prolongatum
- R Pleurosigma, small species, with very acute extremities
- R Pleurosigma transversalis
- R Pleurosigma fasciola
- A Coscinodiscus concinnus. Fine and large.
- F Coscinodiscus perforatus
- A Coscinodiscus excentricus. Fine
- F Coscinodiscus radiatus
- A Eupodiscus crassus. Fine
- F Eupodiscus Ralfsii
- R Eupodiscus sculptus
- R Eupodiscus Argus. In fragments
- R Eupodiscus? nov. sp., with cellular markings like a Coscinodiscus, and a single process near the margin
- R Amphiprora didyma?
- R Surirella fastuosa
- F Biddulphia turgida. Not entire
- A Biddulphia Baileyi. Fine
- F Biddulphia rhombus
- A Biddulphia aurita. In filaments
- A Himantidium? sp.
- A Rhizosolenia styliformis, nov. sp.
- F Rhizosolenia, small species, with ends produced into a long, slender filament
- F Rhizosolenia, a curious and beautiful species, apparently new, with feather- or scale-like markings
- F Doryphora amphiceros
- F Doryphora? sp. with parallel monilliform striæ
- F Chætoceros Wighamii
- F Chætoceros, apparently two more species
- A Actinocyclus undulatus. Fine
- F Actinocyclus? sp. without rays
- R Nitzschia closterium?
- R Nitzschia lanceolatum?
- F Orthosira marina
- R Orthosira? sp.
- A Asterionella? two sp.
- R Podosira maculata
- A Melosira? sp.
- F Stephanopyxis sp. Beautiful species, with cellular structure, and furnished with clubbed or forked horns at the ends of the frustules. Occurs in filaments of four to five frustules
- F Stauroneis pulchella
- R Triceratium favus. Fragments
- R Triceratium striolatum
- R Triceratium? curious form, with a star-like marking in the centre of the valve
- F Melosira? small form, with longitudinal markings
- R Navicula Lyra
- R Navicula Hennedyii

—George Norman; Hull, July 28, 1857.

List of Podophthalmous Crustacea found in Dublin Bay.

By JOHN R. KINAHAN, M.B., M.R.I.A., &c.

(Continued from p. 5717).

Common Hermit Crab (*Bernhardus streblonyx*, Leach sp.) Common in extreme littoral laminarian and coralline zones. It occurs in immense numbers, and of very large size, in the whelk pots, especially when set on a sandy bottom, as outside the Mugglins; also on the

lines drifted ashore, as Merrion lines. Spawns in March, April, May. Ova pale purple. There is a well-marked variety of this crab with the claws less spiny and smaller than the typical *B. streblonyx*; the sides of the chelæ also are strictly parallel, and the specimens are much rarer. This is the form recorded, in doubt, by me as *B. Prideauxii*, in a paper read before the Dublin Natural History Society, March 13, 1857. Comparison with the typical specimens of *B. Prideauxii* in the British Museum collection have convinced me my specimens are not that crab. Whether they are more than a variety, therefore, remains to be proved. Though I have taken them frequently, I have never found them in spawn. They differ from *B. Prideauxii* in the shape of the wrist of the smaller fore-leg. Local name "Soldier."

Dublin Hermit Crab (*Bernhardus Eblaniensis*, mihi). I am not quite convinced of the non-identity of this species with *B. Ulidianus*, *W. Thompson*; however, until I can obtain typical specimens of that form I must leave it in doubt. The species was recorded by me in the 'Proceedings of the Dublin Natural History Society,' March 13, 1857 (*vide* Nat. Hist. vol. iv. p. 85), as follows:—

"BERNHARDUS EBLANIENSIS.

"Resembling young of *B. streblonyx*. Hands more regularly globular, very granular, a raised denticulate line marking exterior edge; terminal extremities of posterior pair of legs scarcely twisted. Colour reddish white; legs prettily banded with reddish pink."

It occurs exclusively in deeper water, as at Dalkey (15—30 fathoms) and Bray (25 fathoms); it also occurs, though rarely, in the lobster and whelk pots; and one striking peculiarity about it is that it almost always inhabits clean and recent *Natica* shells. It is found in spawn in December, January and February, much earlier than *B. streblonyx*. Ova very dark chocolate-colour. I have never found the intermediate-sized specimens of that species in spawn at all; and, though this species in form is almost indistinguishable from the littoral form of *B. streblonyx*, I must consider them separate species.

Hairy Hermit Crab (*Bernhardus cuanensis*, *W. Thomps. sp.*) Coralline and laminarian zones, in dredge exclusively. Dalkey Sound, not uncommon; Bray scallop bank, extremely common and beautiful. In the latter station it inhabits shells coated over with Ha-

lichondria suberea? I have not met with it in spawn, though I collected it from December to June inclusive.

Thompson's Hermit Crab (*Bernhardus Thompsoni*, Bell sp.) The rarest of the lesser hermit crabs about Dublin. Same localities as last-mentioned, but much rarer, and specimens all small. Spawns in February, March and April. Ova chocolate-colour.

Broad-clawed Hermit Crab (*Bernhardus Hyndmanni*, W. Thomps. sp.) Same localities as last, and extremely common in the dredge; rare in lobster pots and on long lines. Merrion Strand, drift weed, very rare, *W. V. MacNally, Esq.* This species occurs in clean shells of *Natica* and *Trochus*, rarely *Turritella*. It is essentially an inhabitant of the coralline zones. Spawns in February, March and April. Ova pale chocolate. The adult male specimens have the wrist much elongated, twisted and serrated along the inner edge, and in this state may be mistaken for badly-marked specimens of *B. lævis*.

Long-horned Porcelain Crab (*Porcellana longicornis*, Linn. sp.) Common under stones in extreme littoral zone, and among *Corallina officinalis* in rock-pools; also in coralline and deep-sea zones. The arm and wrist, in young specimens, especially from the deeper water, are dentated along their inner margin. I do not find this the case in specimens of the same size from the littoral zone. Drifted in after gales abundantly at Merrion.

Broad-claw Porcelain Crab (*Porcellana platycheles*, Penn. sp.) A local species. Occurs under stones, in extreme littoral zone, at Sandy Cove, Salthill, Portmarnock, &c. It is essentially a scavenger, as in the localities in which it occurs the stones are more or less embedded in a thin layer of fœtid mud, the *débris* of decaying animal and vegetable matters, on which it apparently feeds. Even here it is very choice in its localities, occurring only in detached spots. It is by no means so common in Dublin as in the West. Spawns in April, May and June. Taken also in the dredge by trawlers.

Scaly Galathea (*Galathea squamifera*, Mont. sp.) Extremely rare. Taken in lobster pots in Dálkey and elsewhere. Bray, 1857. Local name for all Galatheæ, "Spanish Lobsters."

Spiny Galathea (*Galathea strigosa*, Linn. sp.) Commoner than the last, but yet rare. I have seen several living specimens from the lobster and whelk pots, and it is also occasionally taken in the long lines.

Embleton's Galathea (*Galathea nexa*, Embleton). I cannot record this species with certainty. A single specimen occurred to me, driven in on Merrion Strand, in 1854. The comparative characters

of foot-jaws and hands agreed with the descriptions in Bell. It has since been lost, and I have never met with another specimen.

Slender-clawed Galathea (*Galathea Andrewsii*, mihi). Occurs abundantly in deep water, as on the scallop bed at Bray, and in Dalkey Sound. It never exceeds half an inch in length. I first met it along with the channel-tailed shrimp, December, 1856, at Bray. Spawns in February, March and April. A most variable species in colour when alive. For description *vide* Zool. 5759. There is an unnamed specimen of this species in the collection of Trinity College Dublin Museum, put up by the late Dr. Ball, probably from Dalkey Sound.

Fresh-water Cray-fish (*Astacus fluviatilis*, Fabr.) One, at least, in Bray River, Co. Wicklow, formerly also in the Liffey. Perhaps introduced. This species is brought to market.

Common Lobster (*Homarus vulgaris*, M.-Edw.) Among rocks, very common. In spawn all the summer. Captured for market in wicker pots and drum nets. The most esteemed of all the Crustacea for the table here. The largest specimen I have seen was captured in Kingstown Harbour, by Joseph Todhunter, Esq.; it is now in the Museum of the University of Dublin; its length is $2\frac{1}{2}$ feet, breadth of carapace 5 inches, great claw $1\frac{1}{2}$ foot long.

Norway Lobster (*Nephrops norvegicus*, Linn. sp.) Dredged outside Poolbeg, and brought in great quantities to market, where they do duty in the Dublin "shell-fish" shops as "prawns." Occasionally drifted in at Merrion.

Common Shrimp (*Crangon vulgaris*, Fabr.) Abundant in all our sandy beaches, in pools and among rocks, in sandy patches, generally keeping near high-water mark; also in mouths of tidal rivers, as the Dodder, at Ringsend; ascending even into nearly fresh water. Specimens here are small, and not collected for the table. There is a tradition that all the shrimps were destroyed in Dublin Bar in a hard frost in 1740, and that they have never since grown to their former size! This species, more than any other, suffers from the heat of the summer's sun. On the 8th of August last thousands could have been collected dead in the dried-up strand-pools, this being almost the only species of Crustacea to be met with. Spawns in March and through the summer. Ova purplish. The specimens in autumn and winter have a conspicuous black tail.

Banded Shrimp (*Crangon fasciatus*, Risso.) This rare shrimp I have met with in but one locality, a small pool in a bank near Sandycove, at extreme low water. Spawns in May. Ova bright salmon-

colour. The broad black band on the further segment is most distinctive, and very different from the black *patches* occasionally found in a similar situation in the common shrimp.

Sculptured Shrimp (*Crangon sculptus*, Bell). A single specimen dredged on the scallop bank, Bray, December, 1856.

Channel-tailed Shrimp (*Crangon Allmani*, mihi). Met with in some abundance on scallop bank, Bray, in about 25-fathoms water. Spawns in March. Ova dirty grayish colour. (For description of this new species see Zool. 5759, and Nat. Hist. Rev. vol. iv. p. 80).

Varying Sand Shrimp (*Hippolyte varians*, Leach). Extreme littoral zone, in sand-pools, from April to June, abundant; in *Zostera* banks, Sandycove; at Howth, rare; Merrion Strand, washed in, very rare; also dredged in Dalkey Sound, but rare. Generally of a pink-colour. Spawns April to June. Ova dark chocolate-brown. Its variety of colours well deserve its specific name. The beak varies considerably in form and dentition. I never met with a specimen, however, in which the posterior superior tooth was absent. It is a difficult species to keep in a vivarium. It occurs in lobster pots.

Short-beaked Sand Shrimp (*Hippolyte Cranchii*, Leach). In the same pools as the last, but much rarer; also Merrion Strand, where it has occurred several times. I have neither dredged it nor seen it in the lobster pots. Spawns in May. Ova dark chocolate-brown: its beak often quadridentate above.

Kröyer's Sand Shrimp (*Hippolyte pusiola*, Kröyer). Common in coralline and extreme laminarian zones; hence frequently dredged in Dalkey Sound, and on the scallop bed, Bray; common in lobster pots; I never saw it in sand-pools. I first met with the species in 1854. The spine over the orbit and the simple apex of the beak, irrespective of other characters, distinguish it at once from *H. Cranchii*. Spawns in April, May and June. Ova bright emerald-green.

Thompson's Sand Shrimp (*Hippolyte Thompsoni*, Bell). Extreme laminarian and coralline zones, but rare. Dalkey Sound; Bray.

Common Æsop Prawn (*Pandalus annulicornis*, Leach). Rock-pools, rare; laminarian and coralline zones, not uncommon; scallop bank, in hundreds; also in the lobster and crab pots. Spawns in March. Ova pale purple. Occasionally brought to market as shrimps.

Blue-banded Prawn (*Palæmon Squilla*, Leach). Rock-pools, extremely abundant. In the summer months this species is found abundantly in the pools at Sandycove. Many of these pools are small in size, and have little communication with the sea; perhaps

not more than two tides out of thirty enter them. The water is frequently quite warm to the touch; yet in it a well-marked variety of this shrimp abounds. This variety is smaller in size (about one-fifth less), the beak always ending in a single point, and much deeper and shorter; the hands are more slender; but in other respects the animals appear identical. This variety has been figured in Desmarest's 'Consideration des Crustacés' as *P. varians*, but is distinct from that species here, the blue and orange bands of the legs separating it easily. Spawns all through the summer. Ova brown. Local name "Shrimps." Although found in such abundance, it is never brought to market. This is the species alluded to by Ruddy as destroyed by the frost of 1740, and not *P. serratus* as W. Thompson states.

Varying Prawn (*Palæmon varians*, Leach). In sand-pools at Merrion, rare. Easily distinguished from the last by the total absence of all coloured bands on the hands, &c. It is more restless in a vivarium than *P. Squilla*, but easily reared. I have had it for the last five months.

Varying Opossum Shrimp (*Mysis Chamæleon*, J. V. Thompson). Extremely abundant in sand-pools from March to September, when it spawns. Rare near the shore, at other times also in *Zostera* pools. The ova, which are pale yellow, are easily hatched.

Common Opossum Shrimp (*Mysis vulgaris*, J. V. Thompson). Common in strand-pools all the year round at Merrion. Abundant in the tide-way of the Dodder. Spawns the same time as the last. Not so common in the deeper pools.

Mysis ——? A small species, distinct from the *M. Chamæleon*, abundant in *Zostera* pools, which I think may be *Mysis Lamornæ*; but further investigation is required.

The following species are recorded as having occurred about Dublin; but living specimens have not come under my notice:—

Three-spined Shrimp (*Crangon 3-spinosus*). Looking over a collection of small Crustacea collected by the late Dr. Robert Ball and Prof. Forbes off Skerries, in 1845, I found three specimens of this shrimp previously unrecorded as Irish.

Spiny Lobster or Sea Cray-fish (*Palinurus vulgaris*, Leach). Rare, but has been captured at Dalkey, in lobster pots and on long lines; also at Bray. Though I have never seen a specimen thence myself, there can be no doubt of the fact. Occasionally brought to market here, chiefly from the West, but not much esteemed. Local name "Crawfish."

Common Prawn (*Palæmon serratus*). Has been accurately described to me by the Bray fishermen as occurring in their lobster pots in the summer. However, *Pandalus annulicornis* may have been mistaken for it.

Pasiphea Sivado, *Risso*. A single specimen in the British Museum was stated by its donor, the Rev. James Bulwer, to have been taken near Dublin (Thompson's Nat. Hist. Ireland, vol. ix. p. 392).

JOHN R. KINAHAN.

Donnybrook, Dublin,
August 12, 1857.

Determination of the Species of Phryganidæ described by Mr. Stephens, in his 'Illustrations of British Entomology.' By H. HAGEN, M.D. (Communicated by Dr. J. E. GRAY).

British Museum,
July 6, 1856.

MY DEAR SIR,

Dr. Hagen, of Königsberg, having paid a visit to the Museum for the purpose of determining the specimens of Trichoptera and Neuroptera in that collection, he examined with care the specimens, described by Mr. Stephens, now contained in the British collection, for the purpose of determining the names which these species bear in the continental works. I herewith send results of his labours as far as the Phryganides are concerned; and if you consider that they will be useful to your readers I will send you, for a future number of the 'Zoologist,' his observations on the Perlides, Psocides and Panorpides.—Believe me, my dear Sir,

Yours very truly,
J. E. GRAY.

Edward Newman, Esq.

Acentropus niveus, *Ill. Brit. Ent. Mand.* vi. 150, is a lepidopterous insect of the family Crambidæ.

Hydroptila tineoides and *H. brunneicornis*, *Id.* p. 152 = *H. pulchricornis* of Pictet.

Hydroptila sparsa = *H. tineoides* of Dalman.

Hydroptila Vectis and *H. costalis*. Of these two species there is no example in the Stephensian cabinet.

Agraylea sexmaculata and *A. multipunctata*, *Id.* p. 153. Of these species there is no example. They appear to constitute but a single species, and the former name is probably correct.

Narycia elegans, *Id.* p. 154, is a lepidopterous insect, and is twice described by Mr. Stephens as *Xysmatodoma* (*Tinea*) *melanella* and *X. atrella*. [This insect is also the *Tinea atrella* of Haworth, *Lep. Brit.* p. 566, and probably the *T. sequella* of the same author, according to Stainton, who gives the *T. stelliferella* of Fischer-von-Röslerstamm, Pl. 59, as another synonym. See Stainton, *Ins. Brit. Tin.* p. 21]

Agapetus funereus and *A. fuscipes*, *Id.* p. 156, are females of *A. ciliatus* of Pictet.

Agapetus laniger = *A. comatus* of Pictet.

Agapetus comatus, *Id.* p. 157, is the male of *A. ciliatus* of Pictet.

Agapetus setigerus and *A. azureus*. Of these two species no examples exist for comparison; the latter is described after Turton.

Beræa albipes, *Id.* p. 158. No example.

Beræa pygmæa and *B. Marshamella* appear to be new species.

Anticyra phæopa, *Id.* p. 159 = *Psycomia unicolor* of Pictet, male.

Anticyra gracilipes = *Psycomia fragilis* of Pictet, female (*Hydropsyche*, *Pictet*).

Anticyra subochracea, *Id.* p. 160 = *Psycomia* of Pictet, female.

Glossosoma Boltoni, *Id.* p. 161 = *Glossosoma vernalis* of Pictet (*Rhyacophila*, *Pictet*).

Glossosoma fimbriata is apparently a new species.

Tinodes pallescens, *Id.* p. 162, is a new species, and *T. flaviceps*, *T. xanthoceras* and *T. pallipes*, *Id.* p. 163, must be referred to it.

Tinodes luridus = *Philopotamus longipennis* of Rambur.

Tinodes annulicornis is a new species.

Tinodes albipunctatus, *Id.* p. 164, is a new species of *Hydropsyche*.

Tinodes obscurus is the female of *Glossosoma fimbriata* of Stephens, mentioned above.

Tinodes pusillus is a new species of *Psycomia*.

Rhyacophila vulgaris, *Id.* p. 165, *R. Stigma*, *Id.* p. 166, and *R. opaca*, constitute but one species, and correspond with the *R. vulgaris* of Pictet.

Rhyacophila nebulosa is a new species of *Hydropsyche*.

Plectrocnemia Senex, *Id.* p. 168 = *P. Senex* of Pictet.

Philopotamus Scopulorum, *Id.* p. 169, *P. variegatus* and *P. montanus*, p. 170 = *P. variegatus* of Pictet.

Hydropsyche atomaria, *Id.* p. 171 = *H. atomaria* of Pictet.

Hydropsyche tenuicornis, *Id.* p. 171, and *H. pellucida*, p. 172 = *H. tenuicornis* of Pictet.

Hydropsyche guttata and *H. lanceolata*, *Id.* p. 173 = *H. cinerea* of Pictet.

Hydropsyche hibernica, *Id.* p. 173 = *H. læta* of Pictet.

Hydropsyche angustipennis = *H. variabilis* of Pictet.

Hydropsyche fulvipes = *Id.* p. 174, is a new species.

Hydropsyche angustata = *Rhyacophila vulgaris*, mentioned above.

Cyrnus unipunctatus, *Id.* p. 175, and *C. pulchellus* together constitute a new species.

Cyrnus urbanus is also a new species.

Cyrnus unicolor, *Id.* p. 176. Of this there is no example.

Polycentropus subpunctatus, *Id.* p. 177, *P. picicornis*, *P. pyrroceras*, *P. fuliginosus*, *P. irroratus*, p. 178, and *P. multiguttatus*, are all new species. *P. concinnus* is identical with *P. fuliginosus*, and *P. trimaculatus* with *P. subpunctatus*.

Aphelocheira flavomaculata, *Id.* p. 179, is a new species; but no example exists of *A. subaurata*, *Id.* p. 180.

Brachycentrus subnubilus, *Id.* p. 182, is a new species, the female = *Pogonostoma vernum* of Rambur, the *Hydronautia maculata* of Kolenati.

Brachycentrus concolor and *B. costalis* are males of *B. subnubilus*.

Potamaria analis, *Id.* p. 183, *P. assimilis* and *P. hyalina* are females of *Sericostoma collare* of Schr. and *Sericostoma Spencii*, *Id.* p. 184, is the male of the same insect. *Analis* is the variety *multiguttatum* of Pictet and *hyalina* has the wings much rubbed.

Notidobia atrata, *Id.* p. 186 = *ciliaris*, *L.*

Silo pallipes = *S.* (*Trichostoma*) *picicornis* of Pictet.

Goera pilosa, *Id.* p. 187 = the female of *G.* (*Trichostoma*) *capitata* of Pictet, and *G. flavipes* is the male of the same insect.

G. vulgata, *Id.* p. 188 = *Silo* (*Trichostoma*) *fusciörne* of Pictet.

G. irrorata is described after Mr. Curtis.

Mormonia nigromaculata, *Id.* p. 189, is a new species, = the female of *Lepidostoma squamulosum* of Rambur, and is perhaps the *P. hirta*, *F.* *M. hirta* and *M. immaculata* are males of the same species.

Mormonia minor is a new species.

Chimarra marginata, *Id.* p. 191 = *C. marginata*, *L.*

Odontocerus albicornis, *Id.* p. 193 = *O. albicornis* of Scopoli and Pictet.

Odontocerus maculipennis, *Id.* p. 193, is described after Mr. Curtis.

Ceraclea nervosa, *Id.* p. 194 = *C. nervosa*, *F.*

Leptocerus ochraceus, *Id.* p. 195 = *L. pilosus*, *Mull.*

Leptocerus testaceus = *Setodes lacustris* of Pictet.

Leptocerus obtusus, *L. nigricans*, *L. ater*, *Id.* p. 196, and *L. niger* = *L. ater* of Pictet.

Leptocerus perfuscus is a new species, male = *L. rufinus* of Rambur.

Leptocerus aureus, *Id.* p. 197, and *L. annulatus* are new species, males.

Leptocerus dissimilis is a new species, male = *L. vetula* of Rambur, and *L. assimilis*, *Id.* p. 198, is the female of the same.

Leptocerus bimaculatus is a new species, male.

Leptocerus interruptus, *Id.* p. 198, is a new species, male = *L. albifrons* of Rambur.

Leptocerus affinis = *L. albifrons* of Pictet, male. There is also a specimen of *L. bifasciatus* of Pictet, male.

Leptocerus annulicornis, *Id.* p. 199 = *L. fulvus* of Rambur, female. There is also a specimen of *L. vetula* of Rambur, female.

Leptocerus seminiger is the female of *L. aureus* of Stephens, mentioned above.

Leptocerus cinereus is a new species, female.

Leptocerus filosus = *L. pilosus* of Pictet, female.

Leptocerus caliginosus, *Id.* p. 200. There is no specimen of this insect.

Leptocerus aterrimus = *L. ater* of Pictet, female.

Leptocerus bilineatus = *L. albifrons* of Pictet, female.

Leptocerus quadrifasciatus = *L. quadrifasciatus*, *F.*

Leptocerus longicornis, *Id.* p. 201, a new species = *Setodes conspersa* of Rambur.

Leptocerus rufo-griseus = *L. tineoides* of Scopoli.

Leptocerus bicolor is a new species.

Leptocerus elongatus is a new species.

Leptocerus tineiformis, *Id.* p. 202, is the same as *L. elongatus*. There is also under this name a specimen of *Setodes ochraceellus* of Rambur.

Leptocerus attenuatus = *L. filicornis* of Pictet.

Molanna nigripalpis, *Id.* p. 203, and *M. angustata* = *M. angustata* of Curtis and *Nais plicata* of Rambur.

Phryganea grandis, *Id.* p. 205 = *P. grandis*, *L.* There are also specimens of *P. fulvipes* of Burmeister.

Phryganea Beckwithii, *Id.* p. 206. There is no specimen of this insect.

Phryganea atomaria = *P. grandis*, *L.*, male.

Phryganea varia = *P. varia*, *F.*

Phryganea minor, *Id.* p. 207 = *P. minor* of Curtis.

Halesus digitatus, *Id.* p. 208 = *H. digitatus*, *Schr.*

Halesus cingulatus, *Id.* p. 209, is a new species of the genus *Stenophylax*.

Halesus Vibex = *Stenophylax striatus* of Kolenati.

Halesus latipennis = *Stenophylax pilosus* of Pictet.

Halesus hieroglyphicus, *Id.* p. 210 = *Stenophylax striatus* of Kolenati.

Halesus lateralis = *Stenophylax pilosus* of Pictet.

Halesus stellatus is described after Mr. Curtis.

Limnephilus pellucidula, *Id.* p. 211 = *Glyphotælius pellucidus* of Olivier.

Limnephilus Lineola, *Id.* p. 213 = *Grammotælius atomarius*. There is also a specimen of *G. nitidus* under the same name.

Limnephilus flavicornis and *L. dorsalis* = *L. flavicornis*, *F.*

Limnephilus discoidalis, *Id.* p. 214. There is no specimen of this insect.

Limnephilus rhombicus = *L. rhombicus*, *L.*

Limnephilus marmoratus. There is no specimen of this insect.

Limnephilus binotatus, *Id.* p. 215, a new species = *L. vitreus* of Rambur.

Limnephilus elegans and *L. nebulosus* are new species.

Limnephilus lunatus, *Id.* p. 216 = *L. vitratus* of DeGeer.

Limnephilus Stigma is a new species = *L. fulvus* of Rambur.

Limnephilus griseus, *Id.* p. 217 = *Goniotælius obscurus* of Rambur.

Limnephilus costalis, a new species = *Goniotælius anastomosis* of Kolenati.

Limnephilus affinis is the same as the last.

Limnephilus marginalis, *Id.* p. 218, *L. fenestralis*, *L. bipunctatus*, *L. signatus*, *L. obliquus*, *Id.* p. 219, *L. luniger* = *P. griseus*, *L.* *L. signatus* also = *G. fenestratus* of Kolenati.

Limnephilus Auricula, *Id.* p. 220 = *G. geminus* of Stephens and *G. fenestratus* of Kolenati.

Limnephilus geminus is a new species.

Limnephilus obscurus = *G. geminus* of Stephens.

Limnephilus fuscus, *Id.* p. 221, a new species = *Desmotaulius Megerlii* of Kolenati.

Limnephilus cænosus. There is no specimen of this insect.

Limnephilus punctatissimus, *L. Vinculum*, *Id.* p. 222, *L. tenebricus*, *L. fuscatus* and *L. sparsus*, *Id.* p. 223 = *L. fuscus* of Stephens, mentioned above.

Limnephilus irroratus = *Desmotaulius hirsutus* of Pictet.

Limnephilus flavescens is a new species.

Limnephilus ochraceus. There is no specimen of this insect.

Limnephilus consobrinus, *Id.* p. 224 = *Goniotaulius vittatus*, *F.*

Limnephilus notatus = *Goniotaulius flavus*, *L.*

Limnephilus substrigosus. There is no specimen of this insect.

Limnephilus bipartitus, *Id.* p. 225, *L. vittatus* and *L. nigrovittatus* = *G. vittatus*, *F.*

Limnephilus præustus, *Id.* p. 226, and *L. flavus* = *G. flavus*, *L.*

Limnephilus centralis, *Id.* p. 227 = *G. punctatus* of Stephens, female.

Limnephilus punctatus is a new species, male = *G. nebulosus* of Rambur.

Limnephilus elongatus = *G. punctatus* of Stephens, female.

Limnephilus fuliginosus = *G. punctatus* of Stephens, male.

Limnephilus ustulatus, *Id.* p. 228 = *G. punctatus*, a variety.

Limnephilus incisus is a new species = *Colpotaulius excisus* of Kolenati.

Agrypnia Pagetana, *Id.* p. 229, is a new species.

Anabolia nervosa, *Id.* p. 230, and *A. lurida* = *Stathmophorus fuscus* of Kolenati.

Anabolia testacea, *Id.* p. 231, *A. annulata* and *A. flavipennis* = *Halesus flavipennis* of Pictet.

Anabolia nigricornis, *Id.* p. 232 = *Stathmophorus destitutus* of Kolenati.

Anabolia dubia is a new species of *Stathmophorus*.

Chætopteryx villosa, *Id.* p. 233 = *C. villosa*, female, and *tuberculosa*, male.

Chætopteryx brevipennis. There is no example of this insect.

Neuronion fusca, *Id.* p. 234 = *N. ruficrus* of Scopoli.

Capture of Vanessa Antiopa at Ipswich.—I had the good fortune to obtain a good specimen of *Vanessa Antiopa* in our own garden, on the 25th of August.—*Samuel Alexander; Northgate House, Ipswich, August 29, 1857.*

[A number of notices of the capture of *Antiopa* have been published in the 'Intelligencer' and elsewhere.—*E. N.*]

Deilephila Galii at Kingston.—A female specimen of this rare species was found in a spider's web in the nursery grounds belonging to the Messrs. Jackson, of this town. It is in very good condition, considering its entanglement in the meshes of the web when found.—*A. F. Sheppard; Rutland House, Kingston-on-Thames, September 10, 1857.*

Capture of Stenia punctalis, &c., in the Isle of Wight.—*Stenia punctalis* was very abundant at Ventnor last July: I set out about a hundred specimens for my friends. I met with nearly all the insects usually taken in the island at that season of the year, including *Ænectra Pilleriana* and the rare *Gelechia inornatella*.—*Id.*

Larvæ of British Eupitheciæ.—I have now feeding one-third of the British species of *Eupitheciæ*, and intend exhibiting them at the next meeting of the Northern Entomological Society, with a view of inducing some of our members to investigate this hitherto neglected genus. They are all beautiful larvæ, some of them remarkably so; and, although some of the perfect insects can only be distinguished by the most practised eye, the larvæ are the most opposite things imaginable: thus *assimilata* of Doubleday's list (*Zool.* 5140) feeds on the under side of currant-leaves, and is a long, slender, light green looper, until the last skin, when it becomes brown; and *absynthiata* of the same list feeds upon the flowers and seed of *Senecio Jacobæa*, and is a short and very stout larva, red, yellow, all sorts of greens and light browns; indeed, no two larvæ are alike.—*C. S. Gregson; Edge Lane, Stanley, September 13, 1857.*

[Here is another instance of heterocampous and isomyious *Lepidoptera*. See *Zool.* 5523.—*E. N.*]

Capture of Mallota vittata on the Banks of the Thames.—I have been so fortunate as to find, in countless profusion, a dipterous insect the very name of which has only crept into Britain, as it were, by stealth, and British examples of which appear almost unknown. I may as well make a clean breast of it at once, and say that I had gone so far as to regard this beautiful insect as new to Science, and, notwithstanding the repeated warnings of the cautious, had ventured to give it a name. Mr. Haliday, however, who is as remarkable for the extent of his knowledge as for the readiness and obliging manner with which he communicates it, set me right on this point; and, having compared my specimens with authentic ones received from Professor Loew, he assures me he found them identical as species. The British history of this insect may be given in a few words. It is figured at Plate 429 of Curtis's 'British Entomology' as *Helophilus Ruddii*, from a specimen taken near Yarmouth, in Norfolk. Mr. Walker, in the 'Insecta Britannica,' *Diptera*, i. 251, gives the name as a synonym of *Helophilus transfugus*, to which species it certainly has but small resemblance. It is due to Mr. Walker to say that he must have judged entirely from Mr. Curtis's figure, because, when I had the pleasure of showing him the insect, it proved entirely new to him. The following description may perhaps be useful:—

Crown of the head black, becoming paler towards the antennæ, which are black and seated in a glabrous prominence; face silvery white, with a raised glabrous black line descending to the mouth; metothorax dusky luteous, approaching to testaceous-brown, with four conspicuous black vittæ, of which the lateral ones are separated

from the others by a very decided interspace; the median pair are approximate, and frequently fused together posteriorly: the scutellum is black at the base and ferruginous at the apex: the first dorsal segment of the abdomen is gray, and partially covered by the scutellum; the second, third and fourth segments are velvety black, each with two very distinct, somewhat arcuated, abbreviated vittæ, of a pale luteous hue, the concave margin of each presented towards the lateral margin of the segment; the second segment is broadly, the third and fourth narrowly, margined laterally with testaceous: the legs are black; the apex of the femora, the base of the tibiæ, and a median ring on the tibiæ, obscure on the fore and middle pairs, but distinct on the hind pair, testaceous. The length of the body is five-tenths of an inch; the expanse of the wings eight-tenths.

Habitat. Banks of the Thames about Greenwich, Isle of Dogs, Woolwich marshes, &c., on the *Scirpus maritimus*. Profusely abundant throughout the autumn. Never taken on the wing.—*Edward Newman.*

Stenophilus elegans: a History.—On the 28th of June, a baking hot day, I went on an exploring expedition to Sheerness, and on my way fell in with Dr. Power, and, like verbs substantive, active and passive, we signified that, on this occasion, we would be, do and suffer together. Soon we came to the ditch where, when it was dry, the Rev. Hamlet Clark found *Stenolophus elegans*, a species that has since remained one of the rarest Geodephaga,—one of the few British species not known on the Continent. Now the ditch was full of water, but at the end was some *débris*, and under the first piece I moved lay a *S. elegans*, glittering in the sunshine, but, in an instant, it was into a hole between two fixed stones, and of course I saw it no more. I carefully examined the rest of the refuse, covering a yard or two of ground, but no other beauty again showed itself; so I gloomily gathered up my sweeping-net, and went on after Power, who was hastening forward, evidently in the potential mood. All the way I turned up stones in vain: everything was burnt out. When I overtook Power he was busy in a swamp full of tall grasses, where the surface of the mud had become dried, and at first no living thing was visible. But I followed his example, brought my eyes down to the ground, picked it over with a knife, and soon was gladdened with the sight of *S. elegans*. How it ran, or rather glided, in an instant under the loosened bit of dried mud! Then another and another showed themselves for a second, and disappeared. Soon I found the only way to secure them was to clutch with my fingers on the spot where I saw one, and deposit the mud I took up on the white sweeping-net which lay at my side; over this surface the little fellows could not run quite so nimbly as on their native land. When I had managed to get twenty-one specimens, I thought I had enough, and Power and I beat a retreat, or rather we were beaten by the heat before we beat the retreat. On counting the heads of captives, Power found he had forty-five, at which no one who knows the Doctor will be surprised; but it is only fair to myself to say that he had half-an-hour's start of me at the work. Former expeditions have usually resulted in a tale of one: to most readers this will be a tale of wonder.—*J. W. Douglas; Lea, July 5.*—*From the 'Intelligencer.'*

Cleonus sulcirostris.—A young entomological acquaintance wrote to me the other day to ask if I could give him a specimen of *Cleonus sulcirostris*. I was at the time entomologizing at Deal. I had observed an odd specimen or two on some thistles; so next day I gave a look out after *Cleonus*. On the ground, at the roots of thistles, I soon found a fine specimen or two. Many of the thistles were quite dead and

withered,—black, as may be commonly observed; these are intermixed with green, healthy plants: the dead ones have been killed by *Cleonus*. As the readiest way of obtaining fine examples, and of saving time, let the collector dig up the dead plants during this month: the roots are long and require digging deep for. On digging up some at Deal I found, usually about six or eight inches under ground, a part of the root swollen: this, in every instance, contained either larva, pupa or perfect insect. There is no difficulty in breeding them: stick the dead, swollen portion of the root into moist sand, and keep it so; place them where they will have a little sun daily, and they will soon arrive at maturity. I had a fine one out this morning. This may be useful to young collectors.—*Frederick Smith; 27, Richmond Crescent, Islington, N., August 25.—Id.*

The Locust at Westminster.—About the second week in August a fine specimen of the locust (*Gryllus migratorius*) flew into the bar of the ‘King’s Arms,’ Millbank St., Westminster, and was captured, and exhibited for some time under a glass shade on the counter, where it attracted considerable attention. It was about three inches in length. I have heard of several other captures of it in various parts of town, but this is the only one that has come under my notice.—*William Gosling; 14, Chester Place, Kennington Cross, September 4, 1857.*

The Locust in Suffolk.—A living male of the migratory locust was brought me yesterday, the 20th of August.—*J. S. Henslow; Hitcham, Suffolk.*

The Locust at Highgate.—A specimen of the European locust rose at my feet in a field in Kentish Town, close to the bottom of Highgate Hill. It kept taking short flights, and, although I pursued it the whole length of the field, I could not succeed in capturing it. The last time I saw it, it settled about fifty yards in front of me, among some nettles (as far as I could see). Although I pulled the nettles up by the roots, it did not appear again, and all my subsequent visits to the field were fruitless.—*F. A. Walker; St. Michael’s House, South Grove, Highgate, August 24, 1857.*

The Locust in Ireland.—A live locust, a strange visitant to this part of the world, may now be seen at this office. It was found in a field at Gortrush, in the neighbourhood of this town, by a son of Mr. John Houston, ironmonger, on Tuesday morning last, the day after the thunderstorm. The young lad, seeing it hopping about, and fancying it was a bird, with some difficulty caught it, and brought it to his father, who kindly presented it to us. It is clearly a locust, that destructive insect whose ravages are proverbial,—one of those whose approach, from the innumerable myriads that compose their squadrons, is announced in prophetic language as a day of darkness and of gloominess, and whose desolating march is thus described:—“The land is as the Garden of Eden before them, and behind them a desolate wilderness; yea, and nothing shall escape them.” This locust is about $2\frac{1}{2}$ inches long, strong in body and very active. Has a locust been found in this country before?—*Tyrene Constitution.*

The Locust in Scotland.—On the 19th ultimo one of these insects was found alive in a field on the farm of Achvochkie, in Strathspey, by Mr. James Grant, of Advie, and is now in the Elgin Museum. In an unusually hot summer, some ten years ago, many locusts were found along the eastern counties of the island; so, in the present season, we expect to hear of them in like numbers. The Rev. L. Shaw, in his ‘History of the Province of Moray,’ gives a lengthened description of this insect, and records its occurrence in this district in 1748, the only notice, save a newspaper one from Sutherland in 1846, that we have of these singular creatures having been detected so far north in Scotland.—*George Gordon; Birnie, by Elgin, September, 1857.*

The Locust at Kingston-on-Thames.—I took a very fine specimen of this insect in our own garden at Kingston, on Friday, the 11th inst. Another was seen, but made his escape.—*A. F. Sheppard ; Kingston, September 19, 1857.*

The Locust at Huddersfield.—I had scarcely read Mr. C. R. Bree's communication in last week's 'Intelligencer,' when I was summoned to see an extraordinary insect which had been captured on the grass plot before our Infirmary. On examination it proved to be a locust, still very lively, although having been repeatedly dosed with chloroform. Only a week before, some boys had shown me another: they said theirs had come from Africa in a bale of wool; it ate grass voraciously.—*D. E. Brown ; Queen Street, Huddersfield, September 2.—From the 'Intelligencer.'*

The Locust in Sussex.—Three locusts were brought to me to-day.—*J. J. Reeve ; Newhaven, Sussex, September 7.—Id.*

The Locust near Walton Heath.—A fine specimen of this hitherto rare British insect was found, on the 2nd of September, by a woman, near Walton Heath, and is now in my possession.—*D. Watney ; Box Hill, Dorking, September 9.—Id.*

The Locust at Ripon.—A specimen of this insect (the European locust) was taken by my sister in her garden, on Sunday, the 23rd of August last: it is still alive, and measures about two inches and a half in length and nearly five inches in expanse of wing. I believe several other locusts have been taken in Yorkshire during the present summer.—*Edward Morton ; Ripon, September 10.—Id.*

The Locust in Yorkshire.—I have just seen a fine specimen of *Gryllus migratorius*, taken in a garden near this city. The lady who found it keeps it in a glass case, feeding on the leaves of red beech, on which it appears to thrive.—*J. Hasledine Tutin ; Ripon, September 10.—Id.*

[A number of other notices of the capture of the locust have been printed during the present month in provincial papers; others are communicated to me by friends at Brighton, Lewes, Godstone, Epping, Brixton, &c., &c.—*E. N.*]

Otter in Norfolk.—While fishing in Norfolk, on Barton Broad, in July last, I was fortunate enough to see a fine otter, who swam very leisurely across a gap in the reeds, close to the boat. I am informed that there are several in the same neighbourhood, which swarms with fish, and that several young ones have been seen at different times. Close to the same spot I saw, two or three years ago, a fine osprey; and a friend of mine has a specimen of the little auk shot there last winter.—*William Gostling ; 14, Chester Place, Kennington Cross, September 4, 1857.*

Young Water-rat suckled by a Cat.—On the 16th of last June I found, in a willow stump, the nest of a water-rat (*Mus amphibius*), containing four young water-rats, quite blind. One of them I flung into the water, and although quite blind it swam to land. I kept one and killed the rest. I took the one which was alive to a cat which had kittened the day before, and put it on the ground. The cat immediately jumped out of the basket, and returned to it with the rat in her mouth. The next day, on going to see which of the kittens should be killed, I found, to my surprise, the cat suckling the rat and four kittens. I had three of the kittens killed, and kept the other with the rat. On the 23rd of the same month the rat's eyes opened, and from that time I had great difficulty in catching it, as it got quite wild, but was still suckled by the cat. When I took the rat away the cat followed me, and directly I

put it down she would take it in her mouth and carry it back. In the beginning of July I found the rat dead in the nest. What the cause of its death was I cannot say, but there were no marks upon it to show that the cat killed it. The most extraordinary circumstance is that the cat suckled it before it had its kittens taken away.—*H. G. M. Williams; Crick House, near Chepstow, August 27, 1857.*

Note on the Occurrence of three Honey Buzzards (Falco apivorus) at Northrepps, Norfolk.—About 9 o'clock this morning I was riding along a broad green drive which runs through a wood in this place, when a honey buzzard rose from the grass, and alighted on a tree on the edge of the wood. I shortly after sent my gamekeeper in pursuit of it, and he succeeded in shooting it near the spot where I saw it. Hearing afterwards that before he shot this bird it had been seen flying in company with a second specimen, he returned to the drive, and succeeded in shooting that also, very nearly at the same spot where he had procured the first specimen, being guided in his search by loud whistling cries which the bird was making, probably as a call-note to the one which had been previously shot. About two hours later my son, who was passing through the drive, saw a third specimen rise from the ground and alight on a tree, in a similar manner and nearly in the same place as the first. The gamekeeper was again sent in pursuit; but when he succeeded in getting a view of this bird it had risen so high in the air that it was out of shot, and continued flying at a great height in an inland direction till it disappeared. Both specimens that were procured were in full adult dress, and possessed the beautiful gray tinge on the head which always distinguishes the adult examples of this bird. On dissection both of these specimens proved to be male birds. The stomachs of both contained the remains of wasps and wasp-grubs.—*J. H. Gurney; Northrepps, near Cromer, Norfolk, August 25, 1857.*

Occurrence of the Rosecoloured Pastor (Pastor roseus) near Penzance.—A female specimen of this bird was captured, a few days since, in our neighbourhood.—*Edward Hearle Rodd; Penzance, September 16, 1857.*

Autumnal Migratory Movement: Scilly Isles.—It has been noticed, on a former occasion, that the Scilly Isles form a sort of resting-place for our migratory birds in the great autumnal movement from the North to the South. This movement at first begins with the *Limosa*, *Tringa*, and other genera, in August, and continues to October, with the woodcock. At Scilly I find, from a correspondent, that snipes, godwits, and several of our small soft-billed birds are now to be seen. Many of the latter, birds of the year principally, are to be found flitting about in a restless state, and amongst them the young of the pied flycatcher, which is almost entirely confined to a few of the midland counties, and is unknown in the West of England. It will be a more interesting fact still to find that young nightingales form a portion of the party, as no recorded example exists of the nightingale having been seen or heard in Cornwall.—*Id.*

Wagtail's Nest in a Scarlet Geranium.—While staying in Northamptonshire, in July of this year, Lord Exeter's gamekeeper informed me of a curious incident which had just come under his notice. There had been a flower-show at Stamford on the preceding day, and, amongst other floral gaieties, there were some large scarlet geraniums, in pots, from a terrace outside Burleigh House. Shortly after they had been

replaced on the terrace a pair of pied wagtails (*Motacilla Yurrellii*) were observed very busily engaged about one of the pots, and on further examination it was found that they had chosen this spot for their nursery. In their nest was a very fine and nearly full-grown young cuckoo, (*Cuculus canorus*) in good condition and very lively, notwithstanding that he must have been without food for one whole day and two nights. Curiously enough, he had escaped detection from the thousands of eyes that must have beheld his domicile, and was restored in safety to his foster-parents, whose care he had already requited, after the fashion of Cuculidæ, by ejecting their own offspring from the parent nest.—*William Gostling*; 14, *Chester Place, Kennington Cross, September 4, 1857.*

Swallows building against a House.—I have no doubt that you are right in supposing that Mr. Slaney (Zool. 5756), in talking of the best way of preventing swallows and martins attaching their nests to our houses in inconvenient places, refers *only* to martins, as of course they are generally the only birds which do build under our eaves; but yet I think it should be recorded that in one instance, to my certain knowledge, a swallow did construct its nest in such a position. This occurred at Wickham Court, in 1854. I observed a nest under the eaves of a cottage which appeared to be not nearly so compact or neat as is usual with the nest of the martin. On watching I soon saw the old bird enter it. I at once thought it was a swallow, though, as the sight was so short, I could not be sure of it. On procuring a ladder, however, the fact was placed beyond a doubt by the five speckled eggs contained in it. The nest seemed very rickety, and loosely attached to the sill, and, unlike the martin's nest, the top was not attached to any part of the projecting eaves, there being a space of about three inches between the two, by which the old bird made its entrance. Indeed, I think when the young birds were hatched it must have been impossible for this crazy habitation to sustain its own weight and that of five young birds; but, as I left Wickham Court immediately afterwards, I had no means of observing the result.—*R. B. Smith*; *Marlbro' College, Wilts, September 4, 1857.*

The Cornish Chough (*Fregilus graculus*) *near Tenby.*—A few miles from this watering place are the ruins of Manorbeer Castle, which I visited this afternoon. I was interested in observing that they are frequented by the Cornish chough, which are bred there in great abundance. I by chance met the village schoolmaster, who told me that in the breeding-season and in the winter they are very tame, and will collect in numbers round the school-room door at the time the school breaks up, in order to pick up the pieces of bread, &c., thrown to them by the children. He mentioned an anecdote of one of them which had been brought up by some children who lived about two miles from the village. Whenever they left home to go to school the bird would precede them, and arrive there a few minutes after they had started, and about twenty minutes before the children. This it did so regularly that the master knew when the children might be expected. He also told me that the chough is taught to speak more easily than the magpie, and that it is of a very thievish disposition.—*Samuel Gurney*; *Tenby, August 22, 1857.*

Nest of the Willow Warbler.—I think it may be worth while to mention, what does not seem known to most of our ornithologists, that the willow warbler often builds its nest some height above the ground. Yarrell mentions the chiffchaff's having its nest in this position as a great rarity. Out of seven willow wren's nests which I have met with during the last three or four years, four of them were above the ground, the remaining three only being in the positions generally ascribed to

birds of this species. Of these four nests one was in some raspberry bushes trained against a wall; two others were in the ivy climbing round a tree, at about three feet from the ground; while the fourth was in some very lofty laurel bushes, upwards of nine feet from the ground. There can be no doubt about these nests not belonging to the chiffeball, as in two instances I actually caught the old birds, and in the others I had a good opportunity of watching them, and seeing their light-coloured legs, a sure mark of distinction between the two species.—*R. B. Smith; Marlboro' College, Wills, September 4, 1857.*

Nesting of the Wren.—The common wren is, next to the wood pigeon, the latest of our land birds in breeding. On the 10th of last July I found a nest with young birds; on the 12th, another, with five new-laid eggs; and on the 14th, a third, with six fresh eggs.—*Id.*

Late singing of the Thrush.—A few evenings ago I paid a visit to some fine sallow bushes not very far from our residence, for the purpose of catching specimens of the early Noctuæ. It was quite dusk, but still a thrush, perched “on some high spray” close to me, sang as clearly and as joyfully as though he were welcoming in the warm rays of the early sun. When I left the shallows the bird was still singing as perseveringly as ever, though it was nearly 9 o'clock, and the moon and stars were shining brightly in the heavens. Before I left Oxford for the Easter vacation, often, in the evenings, sometimes later than 9 o'clock, I heard a thrush singing from one of the fine old trees in Merton meadow. Is it usual for the thrush to sing as late as this?—*Murray A. Mathews; Merton College, Oxford.*

Velocity of Flight of the Water Ouzel.—A short time ago I had a fair opportunity of judging the velocity of flight of the water ouzel. The North Devon Railway runs for some distance almost parallel to the river Taw. One day when I was travelling on this line the noise of the train flushed an ouzel from his station, under an overhanging bush by the water-side. Birds of this species, like kingfishers, when frightened up, almost always fly over the course of the river, following it in all its windings, and rarely, except on occasions of extraordinary alarm, attempt to make swifter progress, and increase the distance between themselves and the enemy by cutting corners. On this occasion the ouzel in question did not depart from the general rule, being evidently tolerably accustomed to the passing trains. For nearly a mile he kept up with the train, which was then going at its full speed of a little over twenty miles the hour. I had some little excitement in speculating as to which in the end would win the race, the bird or the train. However, the train was obliged to slacken speed as it was nearing a station, and at the same time the river made a sudden turn; so that the ouzel shot a-head, and was lost to view.—*Id.*

The Buffbreasted Sandpiper (Tringa rufescens) and Brown Snipe (Scolopax grisea) in Devonshire.—I have received from a friend of mine a female specimen of the buffbreasted sandpiper, which he has just shot. The bird agrees with Yarrell's and Eytton's descriptions, except in its being about half an inch longer. Its being a female might perhaps account for its greater length. I have also a specimen of the brown snipe of Montagu, taken in this district a short time since. Being taken in the winter, it has not the rufous breast.—*H. Nicholls; Kingsbridge, South Devon, September 15, 1857.*

Rare Birds in Orkney.—A very fine specimen of the hoopoe (*Upupa epops*), in full adult plumage, was shot near Kirkwall, in the latter part of May last. On the 26th of last month two knots (*Tringa cinerea*) were shot near Kirkwall. One of them is a

male in perfect summer plumage; the other is a female in winter dress, with a few feathers on the back excepted. These are the first I have heard of being shot in Orkney. An immature specimen of the glossy ibis (*Ibis falcinellus*) was shot on the 4th inst.: this is the first specimen I am aware of being shot in Orkney. This season the sedge warbler (*Sylvia Phragmitis*), reed warbler (*Sylvia arundinacea*), chaffinch (*Fringilla caelebs*), and yellow bunting (*Emberiza citrinella*), have been found breeding here, which they have not done before to my knowledge. Perhaps this is owing to the very fine summer we have had.—*R. Dunn; Stromness, Orkney, September 14, 1857.*

Breeding of Teal in Dorset.—Empool, near Niton, Dorchester, is a favourite resort of the teal in the summer time. There is no river of any size there, but a number of rivulets wind in and out among large sedge-beds. A year seldom passes without one or more nests being discovered. This summer six young teal have been seen flying about with their parents. Teal are always very poor and unhealthy-looking when met with in the summer.—*R. B. Smith; Marlboro' College, Wilts.*

Wild Duck.—The wild duck is one of the earliest and also one of the latest breeders. Its eggs are frequently met with in March; and on the 18th of August I met with five or six young ducks, unable to flap, much less fly. Can any of your readers inform me whether two wild ducks are ever known to lay their eggs in the same nest; or, if not, what is the greatest number they ever lay? I met with a nest on the 23rd of April, 1855, containing nineteen eggs, all of which had been equally sat upon. When I first found it two ducks flew off, which, however, appeared to me to be the male and female, not two females; the second time only *one* drake flew off; so it would seem that *one* bird only had laid the prodigious number of nineteen eggs.]
—*Id.*

Notes and Remarks on a few of the Birds of Southern India.

By Captain HENRY W. HADFIELD.

(Concluded from p. 5750).

HAVING already stated that my remarks were to be confined to a "few of the birds of Southern India," I need only add that the expression must be taken in its most literal sense, the present paper containing all I have to offer on the subject, not liking to trust too much to memory in these matters, but, unless I had recourse to it, my observations would probably soon dwindle into a mere enumeration of species, and a very imperfect one too.

Indian Falcon. Although I never observed this hawk in a wild state I saw several in captivity, during my stay at Combaconune; they were powerful and voracious birds: their plumage is much darker than that of the European falcons. I was once present at a great display of falconry, given by a Rajah of the neighbourhood, and, not having

witnessed anything of the kind I gladly availed myself of this opportunity, but must confess to having been disappointed, although my anticipations of deriving amusement from the scene were by no means great. We were up with the lark, having a long distance to go before we could expect to find swampy or suitable ground, the paddy-fields at that season being in a dry and uncultivated state. Besides there was much time lost in useless parade, as is invariably the case in the East when there is anything to be done, either good, bad or indifferent! Several herons were, however, eventually discovered, reposing in their usual listless and sluggish attitude, with their heads buried between their shoulders, for the moment quite unconscious of the presence of their deadly foe, but who was no sooner observed than the scene was changed in an instant. Even the gray paddy-bird seemed suddenly, as if by magic, transformed into a beautiful white egret (although not blanched through fear, in the twinkling of an eye, as the locks of the doomed French queen were said to be). This may appear somewhat wonderful, but the fact is that when seen in a state of repose, as above described, they appear, even at a short distance, of a dark gray colour, the outer wing-coverts, as well as quills, being dusky, with more or less of that colour on the back; but, when their large wings are expanded, the whole of the sides and body, which are of a pure white, are exposed, which accounts for the metamorphosis alluded to. The herons were not only wide awake, but to be seen scudding in all directions, exerting their utmost powers of wing in vain endeavours to effect their escape, for the hawks generally proved too quick for them; however, their chief aim seemed to be the gaining of a considerable elevation,—that of the falcon to prevent it, which it generally succeeded in, and, having got the ascendant, it was all up with the poor paddy-bird, and down it would come like a stone, often without waiting the attack or having a feather injured, and there it lay cowering and crouching till the hawk thought proper to give it the *coup de grâce*. So ended the day's sport, which resulted in the slaughter of some half-dozen wretched herons, to say nothing of those we may have left more dead than alive through their fright. The loss on our side was one hawk missing, notwithstanding the strenuous endeavours of the falconer to win back the fugitive by a free use of the lure.

Mino. Very common all over the country, and, like the starling, frequents the pasture-lands where cattle are feeding: although not an elegant bird, its glossy black plumage is very beautiful, and the slight yellow line or patch on the cheek is at all times remarkable.

When stationed at Cochin, there was one about the house, belonging to a servant, which had been taught not only to repeat the name and rank of an officer of the regiment, but to go through the platoon exercise.

Black Robin of the Carnatic (*Tanagra nigricollis*, Linn.). Many years since, when stationed for a time at Combaconune, a place situated to the south-eastward of Trichinopoly, and not far distant from Tanjore, I first noticed this bird, which, from the striking resemblance it bears, both in form and habits, to the redbreast, I used in after years to speak of and designate as the "black robin of Combaconune," never having, that I can remember, met with it elsewhere. I was doomed to pass several long and dreary months there, with no other companions but my two black friends, who became so familiar that they were seldom out of the house, hopping about the floor, and perching on the backs of the chairs, perfectly regardless of my presence. The male was an exceedingly handsome bird, with glossy jet-black plumage, excepting a spot or bar of white on the wings; but the female was clad in more sober colours, being of a sooty black, looking like a robin that has just come down a chimney. They bear a greater resemblance to the pied flycatcher than to any other bird that I know of; but the latter is shy and solitary, the former just the reverse: besides I never observed them catching flies, but think it possible they may have been attracted to the house by the innumerable little red ants with which it swarmed, and were to be seen daily issuing forth from the numerous holes with which the floor was perforated in long continuous lines or columns, not unlike an army on the march, but occasionally diverging or taking ground to the right or left, to see—or rather try—of what one's legs were made of; and their bite is not only painful, but causes an irritable sensation for a long time after. The black robins were frequently to be seen during the day, perched on the ledge or coping of the wall beneath the roof or ceiling of the bungalow, and had, I fancy, constructed their nest in some hole or corner of the building, as they were seldom absent from it. The description I have seen of the little black *Tanagra* seems to answer pretty well, although I think it must be somewhat larger than my black robin, as it is said to be about six inches and a half in length. The male wholly black, except a spot of white on the wing; the female rufous and ash-coloured. It is also described as being so familiar as to visit the dwellings. Probably some reader of the 'Zoologist,' more conversant with the birds of Southern India than I profess to be, can identify it, as possibly it may be common enough in other parts of India.

Gray Coromandel Kingfisher (*Alcedo coromanda* of Sonnerat). Very common [indeed on most rivers and streams near the sea-coast, where they may be seen in great numbers for hours at a time fishing, which they pursue by balancing themselves above the water, tern-like, keeping in a stationary position before they make the plunge, by a constant and rapid vibration of the wings. After capturing a fish, they return at once to their aerial post of inspection; this is a peculiarity in their manner of fishing,—at least I never observed it in the common European kingfisher, which is described by Montagu as invariably perching on trees for that purpose:—“But it is a mistaken notion that these birds suspend themselves on wing, and dart on their prey like the osprey; the fact is, they sit patiently on a bough over the water, and when a small fish comes near the surface they dart on it, and seize it with their bill.” Cuvier states that “Ils vivent de petits poissons qu'ils prennent en se precipitant dans l'eau du haut de quelques branches ou ils se tenant perchés pour guetter leur proie.” It is by no means so shy and wary a bird as the European.

Indian Swallow (*Hirundo indica*, Lath.). The common swallow of the Carnatic: is found to frequent (almost invariably, I believe) the banks of rivers and nullahs near the coast, where it is constantly to be seen in pursuit of the flies and gnats that swarm there. In appearance, as well as in habits, it bears a striking resemblance to our sand^m martin, although the plumage is of a lighter and duller brown, and, in point of size, it is considerably less, but, never having measured one, I am not prepared to say how much, but I believe the following description to be tolerably correct:—Length about four inches; bill dusky; upper parts, including wings and tail, light brown; under parts dusky white; wings long; tail forked.

Indian Lark. Common enough, but nevertheless greatly prized by the natives, particularly by the Mahometans, on account of its song; they not only cage them, but carry them about on most occasions, particularly when they attend the morning worship at the mosque, suspending^r the cages at the door, that the song of the larks may accompany them in their prayers. The cages are very small, low and of an oblong shape, often highly ornamental, but, on the occasions referred to, are so completely enveloped, that nothing is to be seen of the birds. With the exception of being smaller than our skylark, I have observed nothing remarkable about them; but in a part of the world of which it may be said, almost literally, that there are no song-birds, they are of course much valued, for, with respect to the song of the bull-bull, I am inclined to think that, if not altogether a poetical

fiction, much at least that has been said or sung of its wonderful powers must be ascribed to the over-excited imagination of the poet.

Pensile Weaver or Warbler (*Ploceus pensilis* of Tem., *Saxia*, Linn.). Is one of the most beautiful as well as elegantly shaped birds of the East: I had a good opportunity of observing its habits, having on one occasion been encamped for some days on the banks of a river close to an old fort, where a colony of weavers (*P. pensilis*, I believe) had taken up a strong, in fact a fortified, position, their nests being suspended at the very extremity of the drooping branches of some trees, which had sprung up at the foot of the crumbling walls of this ancient fortress, their instinctive sagacity having led them to select what might truly be considered an impregnable post. On the opposite or south side of the fosse was an embankment or glacis, on ascending which the pendulous nests appeared so near that one had a difficulty in believing or in realizing the utter impracticability of a nearer approach, for the moat, although narrow, was unfordable, so, in reality, they were just as secure as if it had been some hundred yards wide. Not only were they safe from the intrusive hand of man, but it would have puzzled a monkey to have got at them, for although it might possibly have descended the wall into the ditch, it would have been quite impossible for one to have reached the nests, which were placed on the slender twigs of the branches overshadowing the water, and were far too slight to have borne even the weight of a much smaller animal; so it is easily foreseen what the inevitable result would have been had the attempt been made. Probably a snake might have had a better chance of success, but it is doubtful whether it would have risked the ascent, or rather descent. The flight of the weaver somewhat resembles that of the swallow. When seen soaring and sporting in the sun, the glossy green plumage of the back is very resplendent, and it was a most interesting sight to watch these light and active little creatures in pursuit (as I thought) of the gnats and flies, which swarm in such localities, although I am aware that the weaver is said to be granivorous. A minute description of the nest, which appears as if suspended in mid-air, and is rocked and waved to and fro with every breeze, will not be necessary, it having been so frequently brought to Europe: suffice it to say that it is pear-shaped, the stem of which fruit might serve to represent the slight fibrous cord which unites and secures it to the branch, the opening being placed at the large end, near the bottom of the nest, in which there is a passage or division forming two compartments, the whole being so closely and

firmly woven together that it would require some force to break through this grassy and fibrous matting.

Mango,—Humming Bird (*Trochilus Mango*). Although the humming bird is not common in the South of India, I have occasionally seen what I believe to have been the above-mentioned species, in my garden at Trichinopoly, its favorite place of resort being a round plot or border in front of the door, filled with a great variety of flowering shrubs; and many a time have I gazed with delight at this winged gem, with its bright and glossy emerald plumage, but rendered tenfold more brilliant by the rays of a noontide tropical sun, which, falling on the out-spread quivering wings, thereby not only enhance the splendour of the original tints, but call new shades into existence. [I thought the genus *Trochilus*, or true humming bird, was exclusively American.—*E. N.*]

Green Paroquet. There is in the South of India a diminutive paroquet, about the size of the common bunting, its plumage being of a beautiful green colour, without a spot of red on it; it is by no means common or even generally known: I met with it quite by chance at Courtallum, at the foot of the Ghauts, in the range of mountains which separate the Coromandel plains from those of Malabar, and succeeded in capturing a dozen or more, which soon became tame and were much and generally admired. Their manner of roosting is very peculiar, suspending themselves, bat-like, by the claws, from the top bars of the cage, with their heads hanging down.

Green Indian Pigeon. This bird is not easily descried among the branches or foliage of the lofty trees which it frequents, and it would frequently be passed unnoticed by sportsman or ornithologist, if not detected and pointed out by their lynx-eyed native followers. This is a large and exceedingly beautiful pigeon, and inferior to none in the delicacy of its flesh.

Malabar Turtle Dove (*Columba turtur*, Linn.). These doves are so numerous in India that the jungle at times seems almost alive with them, so much so that their almost incessant cooing becomes tiresome, if not fatiguing, and their tameness is so great that they might be shot by hundreds, but they are not much molested, in consequence of their not being held in much esteem as an article of food.

HENRY W. HADFIELD.

Tunbridge, August, 1857.

Notes and Remarks on the Storm Petrel, American Bittern, Night Hawk, &c. By Captain HENRY W. HADFIELD.

JULY 12, 1857.—When only a few miles from the north-west coast of Ireland (the day after leaving Liverpool), I observed a few storm petrels. I had on the previous evening seen several puffins and guillemots off the Calf of Mann. 19th.—When about half-way across the Atlantic, saw several storm petrels about the ship, and following in the wake, occasionally settling down on the water for a few seconds, but more frequently merely dipping the legs or feet, but whether they were made use of in picking up food from the surface, I could not distinguish, though I should imagine that their webbed feet would prevent their obtaining it in that manner, and that when so seen they were engaged in taking a closer inspection of the water. 20th.—The steamer was to-day followed by a great number of gulls and a few storm petrels, the latter approaching so near that I could observe the white patch on the rump. The former were to be seen in vast numbers; but there were only two kinds; indeed, I had at first supposed that they all belonged to one species, and that the few dark or dusky ones might be young and immature birds; but on a closer inspection I perceived that the latter were both longer in the wing and neck, and that, moreover, in their flight they kept apart from the short-winged white gulls, which are speckled on the wings, making gray appear the predominant colour of that part; the quills are tipped with black. There are patches of white on the wings, both above and beneath, which are peculiarly conspicuous, giving to the edge of the wing an appearance of having been cut. The body is short and stout, head large, neck short. They frequently, on observing food, settled on the water, on these occasions invariably fighting for every mouthful. 21st.—Saw a few gulls and petrels. 22nd.—At 8 o'clock A. M. observed a small brown bird not unlike the willow wren in shape. After flying round the ship it settled on the rigging, where it was caught, but subsequently released before I had an opportunity of examining it.

American Bittern (*Ardea minor*, Wilson). July 23, 1857.—When snipe-shooting near St. John's, Newfoundland, a bittern rose out of a marsh, which proved to be the American bittern, which, I was subsequently informed, is a very rare bird in the island; and I am inclined to believe it to be so, for on my way back to the town scarcely a person passed who did not either inquire what bird it was, or stop to examine it, declaring that they had never seen one like it. One

woman, somewhat more imaginative than the rest, ventured to suggest that it might probably be an eagle ! It will not be necessary for me to do more than make a few passing remarks, this bird having been so fully described by Wilson and others ; however, my specimen must be a peculiarly small one, for the entire length of the bill, measured from the gape, is only $3\frac{1}{2}$ inches, whereas Wilson tells us that the bill of the American bittern is 4 inches in length. Unfortunately, I did not, as usual before skinning it, take the dimensions. The entire length, as given by Wilson, is 27 inches ; but the skin measures 23 inches only ; it may have, and probably has, shrunk ; still, the bill being $\frac{1}{2}$ an inch shorter proves, almost beyond a doubt, that the bird must have been smaller ; besides, the tarsus is only $3\frac{1}{2}$ inches in length, whereas another author says it is $3\frac{3}{4}$ inches. The upper mandible along the ridge measures, from plumes, but $2\frac{1}{2}$ inches. The centre claw, which is serrated internally, measures 6-tenths of an inch.

Storm Petrel. Wilson states that the reason of its following ships is to procure the seeds of the gulf-weed and barnacles. "Thus it appears that these seeds, floating perhaps a little below the surface, and the barnacles with which ships' bottoms usually abound, being both occasionally thrown up to the surface by the action of the vessel through the water in blowing weather, entice these birds to follow in the ship's wake at such times, and not, as some have imagined, merely to seek shelter from the storm." Having passed at least two years of my life at sea, I may perhaps be excused if I venture to make a few remarks, which cannot, I think, fail to convince those interested in the subject that Wilson's idea of the storm petrel's generally following vessels for the sake of the sea-weed and barnacles was an erroneous one. I have doubled the Cape of Good Hope six times, in six different ships, one having been a short time previously entirely newly coppered at Lisbon, in consequence of damage sustained in a storm in the Bay of Biscay ; and at least two more of the vessels referred to must have been clean-bottomed. Although I write at a considerable distance of time, I may safely say that I never rounded the Cape, or made a long voyage, without seeing numerous storm petrels following the vessels, more particularly in stormy weather. So much for their feeding on barnacles. As to the gulf-weed, there could of course be none of that in those latitudes. However, I am of Wilson's opinion with respect to the absurd notion of the petrel's seeking shelter under the sides or sterns of ships : there can, I think, be no doubt of their being attracted by the refuse particles of food thrown over-board, on which I have myself observed them to feed. If the storm petrel now requires to shelter itself from the storm under the lee of ships, they

must have fared badly indeed ere Diaz and the early Portuguese navigators doubled the cape, or Columbus discovered the Continent of America. As to their being the precursors of the storm, though I am by no means superstitious, and am one of those who think a safe and prosperous voyage may be made across the Atlantic or Pacific without either setting sail of a Sunday, or having a horse-shoe nailed over the galley-door; still, I must confess to having a dislike to the appearance of the storm petrel; for, although it cannot perhaps be fairly charged with raising the wind, there can be no doubt of their gathering around ships in stormy weather, probably for this reason,—that they find a difficulty in procuring their ordinary food, which doubtless consists of the oily substances which in calm weather are so constantly to be seen floating on the surface of the water. [May I ask what is the seed of the gulf-weed to which Wilson alludes? Has the gulf-weed any other seed than the minute spores invisible alike to birds and men?—*E. N.*]

Humming Bird (*Trochilus Colubris*, Wilson). August 28, 1857.—Observed one hovering over the flowers of the scarlet runner in a neighbouring garden. Had previously caught a momentary glance of one near the same spot. They appear, however, common enough in this neighbourhood; at least, I was informed by an intelligent bird-stuffer in this town that he had killed six in one day. They frequent those gardens only where flowers abound, and as yet I have had no opportunity of examining them closely, or observing their manners. Their flight is so rapid that, unless on the look-out for them, they might pass unobserved. To say they shoot by like an arrow would be but to convey a faint idea indeed of the rapidity of it: a flash of lightning, passing ray of light or sunbeam would be more appropriate, although it may appear somewhat extravagant.

Yellow Bird or Goldfinch (*Fringilla tristis*, Wilson). Length 5 inches; extent of wings 9 inches; wing from flexure 3 inches, from shoulder 3 inches and 6-tenths, bill along the ridge 4-tenths, lower mandible 4-tenths; forehead black; nape and back greenish yellow; neck, breast and belly bright yellow; under tail-coverts white; length of tail 2 inches, with twelve feathers, two centre ones shorter, pointed and black, lateral ones broadly margined on the inner webs and tipped with white, each feather being more or less cut out; bill reddish yellow, tipped with black; under wing-coverts gray, tinged with yellow. The wing has eighteen quills, second longest, first and third about the same length; six first quills black, the rest tipped and margined with white on the inner webs; second, third and fourth indented and cut out. Spurious wing olive-green; feathers edged with black;

wing-coverts black, tipped with white. Length of thigh 1 inch; tarsus 3-fourths of an inch; middle toe $\frac{1}{2}$ an inch, claw 2-tenths; inner toe 4-tenths of an inch, claw $1\frac{1}{2}$ -tenth; outer toe $3\frac{1}{2}$ -tenths, claw $1\frac{1}{4}$ -tenth; hind toe 3-tenths, claw 2-tenths. Although differing much both in size and colour, it bears a striking resemblance to the European bird in form and note, as well as in manner of feeding. The one I have so imperfectly described (for it was much injured in the shooting) was perched on a thistle.

Yellow Wood Wren (probably the Yellow-throat of Wilson, *Sylvia marylandica*). August 24. — Shot a yellow wood wren. Length 5 inches and 1-tenth; extent of wings $7\frac{1}{2}$ inches; bill along ridge $3\frac{1}{2}$ -tenths, lower mandible 4-tenths (from plumes 3-tenths), bluish black, but light beneath and on the sides; forehead yellowish green, nape and back olive-green; cheeks, neck, and whole under parts of a most delicate light yellow, but it is of a darker hue between the upper mandible and eye, and beneath the wing becomes of a bright yellow; there are also spots or streaks of the same on the breast and sides; eye small and black; body rather broad and full; wing, third quill longest, second nearly as long, from fourth to ninth regularly graduating, tenth considerably shorter, and up to the fifteenth inclusive of about equal length, but the sixteenth is $1\frac{1}{2}$ -tenth longer, the seventeenth decreases by 2-tenths of an inch and the eighteenth by 3-tenths; wing rather short, from flexure $2\frac{1}{2}$ inches; quills hair-brown, margined with bright yellow on the outer webs, and with yellowish white on the inner, each quill being slightly tipped with gray; feathers of spurious wing dark brown, but very broadly margined with greenish yellow; primary coverts hair-brown, margined and tipped with light grayish yellow; secondary coverts hair-brown, broadly margined on the outer webs with pale yellow, and slightly edged with gray on the inner; the under wing-coverts are of a bright and glossy yellow; sides and thighs olive-green, intermixed with yellow; tail 1 inch and 9-tenths,—lateral feathers longest, hair-brown, margined with dark yellow on the outer and with light yellow on the inner webs,—the centre ones dark brown on the shafts and at the tips, the rest of the feathers being of a light yellow; tarsus, toes and claws of a light reddish brown; sides of the neck gray, with a greenish tinge; thigh 1 inch, tarsus 8-tenths; hind toe $2\frac{1}{2}$ -tenths, claw 2-tenths; middle toe $\frac{1}{2}$ an inch, claw $1\frac{1}{2}$ -tenth of an inch; inner toe 3-tenths, claw $1\frac{1}{4}$ -tenth; outer toe 3-tenths, claw $1\frac{1}{4}$ -tenth.

Night Hawk (*Caprimulgus americanus*, Wilson). August 26. — Shot a male bird of this species. Length $9\frac{1}{2}$ inches; extent of wings

1 foot $11\frac{1}{2}$ inches, from cubitus or shoulder 10 inches and 2-tenths, from flexure $8\frac{1}{2}$ inches; tarsus 7-tenths; middle toe $6\frac{1}{2}$ -tenths, claw 2-tenths; inner toe 4-tenths, claw 1-tenth; outer toe 4-tenths, claw $1\frac{1}{2}$ -tenth; hind toe 2-tenths, claw 1-tenth; bill along ridge 3-tenths; lower mandible from plumes $1\frac{1}{2}$ -tenth; mouth 1 inch wide; head 1 inch and 1-fourth broad; eye black and very large, diameter about 4-tenths of an inch. The bill is black; the nostrils, which project, are rounded and large, placed about 1-third of the way up the bill; there are numerous black bristles on the sides as well as above and beneath the bill, where they extend to within one-tenth of an inch of the point, having a beard-like appearance; there are also a few hairs on the upper mandible, extending beyond the nostrils. The head is black, but the feathers are spotted and margined with white and rufous; many of the feathers on the sides of the head are indented, giving them an oak-leaf appearance. There are numerous white spots over the eye. The back is black, but each feather has several white spots, besides being margined with white. The chin and throat are pure white. The feathers beneath the eye, and on the sides of the neck and scapulars, are of a dull yellowish brown, margined with black. The feathers of the lower neck and sides are elongated, intensely black, most delicately and beautifully spotted, barred and margined with pale buff, gray and white, the latter colours predominating towards the rump, so as to become in a great measure blended with the elongated secondary wing-coverts. The tail, which is 4 inches and 9-tenths in length, is composed of ten feathers, and is greatly forked, the lateral feathers being 3-fourths of an inch longer than the central ones. There are irregular oblong patches of white, about 4-tenths of an inch in depth, on all but the two centre feathers, forming an incomplete bar across the tail, at about half an inch from the extremity; there are also, on the first or outer feather, nine irregular narrow bars of white, tinged with yellow; eight on the second and third feathers, seven on the fourth; and the two centre ones have eight bars of reddish gray, but have no white spots. The upper tail-coverts are black, barred with white; the under tail-coverts are elongated, reaching to within an inch of the ends of the two centre feathers; they are white, tinged with yellow, the two centre ones having seven black transverse lines, the first being spear-shaped; the rest of the coverts are marked in a similar and regular manner, but with a proportionately less number of stripes. The breast is black, the feathers slightly barred and tipped with white, gray and reddish yellow. The whole of the under parts from breast to vent are regu-

larly marked with alternate transverse bars of black and white, tinged with yellow. Under wing primary coverts black; secondary coverts black, very elongated, regularly barred with white on the inner webs throughout their entire length, but with merely one white spot on the outer, each feather being tipped with white; all the smaller coverts, both primary and secondary, are disposed transversely, in close and regular order, like scales, with alternate circular black and white markings, but with a rufous tinge. The leg is feathered to within 2-tenths of an inch of the foot. The centre claw is serrated on the inner side, having, with its nine teeth, a regular comb-like appearance. The wing has nineteen quills, the first being longest; up to the tenth inclusive regularly decreasing; from this point or angle of the wing the feathers as gradually increase up to the nineteenth and last. The three last of the secondary coverts are longer than the quills. There is an irregular square white spot on the first quill, at about four inches from the tip, covering the whole breadth of the inner web, and about 3-fourths of an inch in length, but the shaft is black; the white extends to the fifth quill inclusive, but the spots are irregular and larger, including the shafts as well as outer webs of all but the second quill, which has an oblong spot of white near the shaft, the rest of the outer web being black; the sixth quill has two faint spots of white on the inner web towards the point; the seventh has three indistinct and irregular bars of white; the eighth has the same, with a few scattered spots lower down; the bars of white then become more regular and distinct on the rest of the quills, some of the last having an additional or fourth line of white. The primary coverts are black, tipped with gray; the secondary coverts are the same, but spotted with white on the outer webs, which are indented and cut out, giving to the feather a most elegant oak-leaf shape; the rest of the upper coverts, as well as the feathers of the spurious wings, are black, barred, spotted and margined with gray, intermixed with light yellow, the whole of the colours being most beautifully blended, but there is a spot of white at the flexure. The legs and claws are of a dark purplish brown. The white spot on the neck is spear-shaped, passing round towards the ears.

It was about half-past 4 o'clock P. M. when my attention was first directed to a flight of these most elegant birds; and a more beautiful sight, at least for an ornithologist, could not be desired; for some forty or fifty were to be seen within a very narrow circle hawking flies; and their manner of doing so, and rapidity of flight, was in the distance so similar to that of the swallow, that I was at first inclined

to believe that it was a flock of swifts that was approaching, but I was soon undeceived. They were now to be seen passing over-head at the distance of thirty or forty yards. Their flight was circular, but they were constantly deviating from this order of progression by momentary and sudden darts after the flies, often, when descending, raising the wings so as to bring the points nearly together, after the manner of the pigeon tribe. Their flight was most buoyant, and occasionally bat-like, and somewhat similar to that of the hawk or tern. On my shooting the one I have endeavoured to describe, the rest dispersed. Although shot through the head as well as in the body, I had some difficulty in killing it, its tenacity of life was so great. Wilson says that "there are no bristles about the bill;" but this is a mistake. The quantity of flies that these birds destroy daily must be immense, for, although the one in question was shot at the early hour above named, and consequently could not have been long feeding, it had managed to collect some hundred flies, for, although I did not and could not count them, I found, on opening the stomach, which was more distended than that of any other bird's I ever saw, and measured 4 inches in circumference lengthwise and $3\frac{1}{4}$ in breadth, that it was crammed full of flies, and I took three from its mouth and gullet. Although not opened till the day after it was shot, one fly, of a yellowish brown colour, with transparent wings, crawled out and escaped.

HENRY W. HADFIELD.

Kingston, Canada West,
Sept. 2, 1857.

Snake diving for Water Newts.—I detected the common snake the other day emerging from a pond with a newt (*Triton palustris*) in its mouth, which it had caught by diving. The snake seems to take to the water very much for food or coolness during the summer months. One is hardly ever met with at a distance from a stream or pond.—*B. B. Smith; Marlboro' College, Wilts, September 4, 1857.*

Occurrence of Opilio hystrix at Kibworth.—Having been on the look-out this year, I have found that *Opilio hystrix* is by no means an uncommon spider here. The majority of my specimens have been taken among violets; two more, however, have occurred in the house; they doubtless wandered in from a bed of violets close to the window. (*Vide Zool. 5627*).—*Alfred Merle Norman; September 8, 1857.*

*Zoological Notes of a Residence in Vienna in 1856.**

By CUTHBERT COLLINGWOOD, M.D.

A WINTER residence in a large capital, it must be confessed, is not exactly the condition most favourable to the study and observation of Natural History facts; much, however, may be done in the early spring; and this idea was not absent from my mind when I determined to prolong my sojourn at Vienna until the month of May, in time to note the arrival of visitors from the South. The following paper, therefore, by no means aims at presenting a complete Fauna Vindebonensis, nor even a list of such animals as are found in its vicinity, which might perhaps be written as easily in London, but will consist simply of remarks extracted from my note-book, and arranged in such a form as is most likely to give them interest.

Vienna, however, though a large city, is by no means deficient in spots in its vicinity which, when once reached, are favourable to such observations. It consists of two distinct cities, the inner closely packed and strongly fortified, beyond the deep moats of which extends, in all directions (except one point), a glacis, that is, a wide, open, grassy space, planted with avenues of chestnuts, limes and acacias, which do not, however, afford much protection from the piercing winds of winter, nor, if I can take the word of the universally grumbling residents, from the scorching suns and blinding dust of summer. Beyond this are the suburbs, or outer city, which stretches indefinitely in all directions, and is very extensive. The Danube does not come fairly up to Vienna, but the main stream divides several miles distant from the city, and only a small arm, designated the canal, touches the outside of the fortifications; and it is here that the glacis narrows, and is replaced by a bridge leading to the most populous and fashionable suburb.

There are, however, numerous spots in the vicinity of the city where the naturalist may find himself amply employed; for Vienna is rich in gardens, usually, it is true, cut in the formal Italian style, but abounding in birds. Such are the Augarten, Prince Schwarzenberg's garden, the Imperial gardens at Schönbrunn, &c.; but, above all, there is the Prater, an extensive wooded tract, the remains of an ancient forest which once occupied the greater part of the site of Vienna. The city has gradually encroached upon it; but still it is

* The substance of this paper was read to the Greenwich Natural History Club.

very considerable, and was laid out in 1766, by the Emperor Joseph II., in fine alleys stretching far away to the main stream of the Danube, which constitute the Rotten Row of Vienna. In this Prater fairs are held, fireworks exhibited, and the main alleys are crowded with rank and fashion; but let the naturalist diverge a little from the beaten track, and he finds himself in the forest, which affords him ample scope for his pursuits. This part is usually called "Der wilde Prater," and even within hearing of the roll of carriages, the tramp of the Imperial escort, the grinding of organs, the beating of drums, and the shouts of the Jack-pudding, he may observe animals and birds in a state of nature, which the English naturalist would sometimes give much to catch a glimpse of. The climate of Vienna is variable in the extreme,—cold in winter, hot in summer. The whole of December was colder than I have ever known it in England; January was foggy throughout, a somewhat unusual circumstance there; February and March were wintry, with strong and keen east winds, and snow and ice held their own till the very end of the latter month; April was delightfully fine and warm, the only drawback being the clouds of dust which sometimes darkened the air; for no rain fell until May during a period of nearly seven months. When I quitted the place early in May, the weather was unsettled and cold. With such a climate Vienna is dreadfully unhealthy. On my arrival at the beginning of November the cholera had just ceased its fatal work for the season; a severe epidemic of typhus fever raged during the dead months of winter, to be succeeded, in February and March, by abundant pneumonia, of a character as severe and with results as fatal.

There are few places in Vienna more striking, and to a naturalist more interesting, than the Wild-bret-markt, or game market; not that any very great variety of birds are seen there, but chiefly on account of the vast numbers of quadrupeds which are exposed for sale. It is a small and unpromising spot, but on a market day it offers a surprising spectacle to the visitor. If Leadenhall market carries off the palm for its regiments of geese, turkeys, poultry and pheasants, then must the Wild-bret-markt of Vienna be held superior for its heaps of deer and piles of wild boars. The market day is thrice weekly, and on those days a stranger would be perfectly astonished at the vast numbers of such animals which are laid out in rows upon the ground. I have counted eighty roebucks spread out before one little shop; they were of all sizes, from the well-antlered lord of the herd to the young fawn; all shot with the hunter's rifle, and now disembowelled. Wild boars, too, of all sizes, from the

fierce-looking monster, with tusks a foot long, to the little pig which has not forgotten its mamma. Heaps, literal heaps, of these huge black animals may be seen scattered over the market-place, and cart-loads may be met passing through the street. Then, perhaps, the hares are scarcely less extraordinary for their numbers, which amount to thousands daily; and they are carted away very systematically on poles, about sixty or seventy being hung by the hind legs to one pole, and the poles thus laid across the cart in rows, so that one cart-load contains, perhaps, nearly a thousand hares. These vast numbers of wild boars are obtained from the Imperial Thiergarten, an extensive enclosure a few miles from Vienna, whose walls encircle a space of country equalling the whole city and its suburbs. In this Royal park these fierce animals roam about unrestrained, and woe to the unwary trespasser who finds himself matched against their ruthless tusks. The deer and hares are found abundantly on all sides of Vienna.

Among these hecatombs it is not uncommon to see several chamois. They are by no means so common as roes; but still it is rarely the case that there are not at least two or three chamois hanging up in each shop on a market day. They are brought from the mountains of Steyermark, in Upper Austria, and would appear to be in these localities far more numerous than among the Alps, if I may judge from the few traces of them one sees or even hears of in a journey through their wildest and most elevated regions.

Besides these animals, a beaver (*Castor fiber*) is sometimes exhibited, taken in the Danubian meadows. This, however, is a rare occurrence. It is to be recollected that this beaver is probably specifically distinct from that of North America.

What becomes of such a vast quantity of wild animals I often puzzled myself to imagine. Their flesh is of course largely consumed in Vienna; but while roe and chamois are to be had at a tolerably cheap rate, wild boar is always charged high, for some unknown reason; but if any one is disposed to take my gastronomic taste for anything, he may rest assured that roebuck (Austrian roebuck) is by no means equal to our fallow venison, chamois is far inferior to South-down, and wild boar is but a poor substitute for an English porker.

Fallow deer are unknown here, and this beautiful ornament of our English parks is replaced by roe. These animals are kept in large numbers, and it is something striking to come suddenly, in the depth of the wood, upon a herd (if I may be allowed the expression with respect to these deer) of perhaps a hundred of them. They are

tolerably tame, and in general little heeded my proximity. They are somewhat larger than our fallow deer, but by no means so ornamental, either in form or colour, and much less graceful, while their uniform mouse-colour gives them an uninteresting sameness as contrasted with the elegant spotted denizens of our British parks. In the evening they are called by the sound of a horn, at which signal they assemble, and are fed and housed for the night. I have seen one of these animals take the water, and swim over the large arm of the Danube before a steamer, his antlered head appearing above the surface of the stream, exciting the liveliest sympathy among the kind-hearted Germans, who watched him with the utmost eagerness, exclaiming, "Das ist doch interessant! Armes Thier!" &c.

The Prater is, however, in some places, subject to the general law of exclusion, which is rendering some of our own woods so difficult of access. In more than one place my wandering feet have been arrested by the appearance of an ominous board, inscribed in German, French and English, to the effect that "By supreme authority no one is allowed to walk, ride or drive any further in this direction."

In Vienna there is not, as in some southern capitals, a bird-market to resort to, where the naturalist may, at his leisure, examine an array of ornithological specimens, and discover the Fauna of the country concentrated in the space of a few square yards. There are plenty of capercaillies from Steyermark, pheasants from Bohemia, partridges and the ordinary Grallæ, as "plover," ruffs, &c.; but Insectores there are none to be seen, although a dish of "kleine vögel" is to be had in every restaurant at a moment's notice. We must, therefore, repair to the fields and woods in order to find food for observation. But the first unusual bird which I remarked as British was an inhabitant of the city. On the glacis, between the inner and outer city, there are to be seen, all the winter, plenty of gray crows (*Corvus cornix*), feeding upon the heaps of refuse which, in certain parts of the glacis, are suffered to accumulate. About these heaps, and wherever that filthy stream the Wien (from which the city takes its name) meanders, the Royston crows may be seen very busily engaged. They go in pairs, or at most three or four together, and are far tamer than the rooks are with us, not at all heeding the passing and repassing of passengers among them all day long. These gray crows, too, are common in the vicinity of the city, and indeed exist there to the total exclusion of the rooks. I never saw a rook all the while I was residing in the city, and remarked the fact, feeling disposed to believe that their more powerful congeners kept them out of their

range; but early in May, happening to make an excursion to the very end of the Prater where it skirts the Danube, five miles from the city, I found there, to my great surprise, a very extensive rookery, in which the young birds were just ready to leave the nest-trees; although up to this time I had looked in vain for a single rook. But the rook is migratory in central Europe, so that it may have been that they really were absent up to the beginning of March; still that would not account for my not having seen one during the months of March and April.

The Danube, at the extremity of the Prater, is a fine field for the ornithologist; and a journey of a few miles from Vienna on either side reveals ornithological scenes of the greatest interest. The navigation of the Danube is very difficult at certain seasons, owing to the shallowness of the water, which leaves numerous small barren islets, either sandy and bare or covered with osiers, &c. These islets are the resort of numberless wild fowl. Ducks of various kinds dart over one's head at every half-dozen yards of progress, and wild geese are in considerable abundance. I have seen as many as 150 of these latter birds suddenly rise within a furlong, and, hurriedly forming one long, irregular line, scour away to a more secluded spot,—a sight not easily forgotten. Besides wild-fowl, also, numerous flocks of *Grallæ*, as ring plovers, dotterels, sandpipers, lapwings, &c., may be seen busily feeding in the soft mud, and the sandy islets are sometimes entirely black with thousands of rooks and jackdaws, while here and there one is occupied by a score of herons, which, standing motionless, like sentinels, a few yards apart, would almost be passed by unobserved. All alike are intent upon reaping the harvest of food which the retreating waters leave upon these apparently barren tracts.

The hawfinch (*Fringilla coccothraustes*) is by no means uncommon in the Prater, as well as in other situations, as the immediate vicinity of Schönbrunn for example. These birds I often observed, and was struck with the absence of that wildness and shyness described by Yarrell and Doubleday as pertaining to our British individuals. The first one I saw, indeed, soon after my arrival, being of course an interesting event, I watched for a considerable time perched on a bough a little distance above my head; and finally, desiring to see him on the wing, I cried out and clapped my hands in vain, for he did not care to stir. They may usually be seen feeding around the roots of the elms, and on a near approach they fly up one by one, in a perfectly straight line, into a neighbouring tree. They are quiet birds, and delight in woodland spots; and I often detected their presence

by hearing a single musical note, which, when I first heard it, at once arrested my attention, announcing, by its full tone, a bird above the average warbling size. Besides this note, they often utter a chirp like that of the spotted flycatcher, and a hissing note resembling the call of the redbreast, and these were sometimes succeeded by the first-mentioned musical note. Indeed, I have often mistaken them for one or other of these birds until this peculiar and characteristic note followed. Besides these notes, the hawfinch, in the beginning of April, has a low chattering song, which at a little distance sounds by no means unlike that of the starling.

The first bird I heard singing was the lark (*Alauda arvensis*), on a fine morning on the second of March. A fortnight afterwards I read the following paragraph in the 'Fremden Blatt' of March 15:—"The first larks were remarked here on the 11th of this month, and every place resounded with their spring song. It is singular that larks do not sing out immediately on their arrival, but day by day successively they raise themselves higher and higher in the air, singing a more and more complete and sustained song, so that their instinct of song is heightened the nearer they reach heaven." That they are migratory there, is by no means improbable; and the notion of their gradual improvement in song, though romantically expressed, is perhaps not without its foundation in truth.

Other birds, indigenous with us, succeeded, of which I shall presently give a list; but I must first remark that on the 28th of March I saw and heard a robin (*Sylvia rubecula*) for the first time. This bird, in the neighbourhood of Vienna at least, is rare; and I had often wondered at not seeing the red waistcoat and hearing the welcome pipe of the friendly bird which redeems our winter.

The following British residents took up their song as under:—

Lark	...	...	singing	...	...	...	...	March	2
Chaffinch	...	...	"	...	...	...	...	"	20
Great and Blue Tits			"	...	...	...	...	"	25
Thrush	...	...	"	...	...	...	...	"	28
Robin	...	...	"	...	...	...	...	"	28
Creepers	...	...	"	...	...	...	...	"	30
Ringdove	...	...	cooing	...	...	...	...	"	30
Blackbird	...	...	singing	...	...	...	...	April	6
Yellowhammer	...	...	"	...	...	...	...	"	13
Turtle Dove	...	...	cooing	...	...	...	...	May	8

The last I saw of fieldfares and redwings was on April 8th.

The little chiffchaff made itself heard on April 3rd, and was soon

succeeded by his brother travellers. Sitting at breakfast in my residence in the suburbs on the 9th, I heard the willow wren (*Sylvia trochilus*), for the first time, singing merrily in some poplars visible therefrom,—a circumstance which pleased me vastly, inasmuch as at home I have walked miles to hear him announce himself, while here, living as I was in the midst of a city, he made himself distinctly heard from my breakfast-table. The first novelty was the Serin finch (*Fringilla serinus*, Gould), which arrived on the 18th of April, and soon distinguished himself by his active habits and incessant song. He is almost as yellow as a canary, and about the same size, never quiet, and constantly singing, whether perched on a tree-top, or moving, Parus-like, among its branches, or flying cheerily from tree to tree. His song, too, is not monotonous and tiring like the willow wren's, but always fresh, cheerful and inspiring. It is on these accounts much esteemed by the people, and often seen caged. They always told me its name was "Zeissl," but Bechstein calls it "Der girlitz."

I spoke just now of the scarcity of the redbreast; but there is another bird here which bears a singular resemblance to our winter friend, and that is the redbreasted flycatcher (*Muscicapa parva*), which, in its peculiar actions, as well as in its general appearance, is such as often to lead the general observer to confound the two. This bird, however, is by no means rare around Vienna; and Mr. Gould has the honour of having first distinguished it. It is not quite so large as the common redbreast, and has grayish or bluish gray cheeks, which in our robin are red like the breast. It is remarkable how closely it resembles the pert and active movements of the robin, as though a similarity of external configuration must result in certain peculiarities of action; but I think it probable that its great resemblance to the familiar robin predisposes us to see our *Sylvia* in the form of a *Muscicapa*. Like the robin, too, the male and female have little, if any, difference in colour.

The golden oriole (*Oriolus galbula*) is pretty common about Vienna. This beautiful bird, the only European species of *Oriolus*, and which not unfrequently favours us with its presence here in Kent, even breeding with us occasionally, is a summer visitor at Vienna, arriving in the beginning of May; and the richly contrasted bright yellow and black of his plumage produce an effect of considerable splendour, as he flies along from tree to tree in the sunshine. But it is not easy to catch sight of him, for he confines himself to thickly-wooded districts, seldom appearing in the open country, and changes his position from tree to tree more quickly than in such spots it is easy to follow. The

note of the blackbird, deservedly admired for its rich mellowness, is in its turn outvied by the brilliant flute-like notes of its congener, the oriole. His note is a very loud whistle, which may be heard at a great distance, but in richness equalling the flute-stop of a fine-toned organ. But variety there is none in his song, as he never utters more than three notes consecutively, and those at intervals of half-a-minute or a minute. Were it not for his fine tone, therefore, his song would be as monotonous as that of the missel thrush, which in modulation it greatly resembles.

The black redstart (*Sylvia tithys*) is tolerably plentiful, resembling the common species in little more than the rufous tail. Its name of black redstart (or redtail) quite expresses its plumage. Its song, likewise, is inferior in variety and tone to that of its congener, but its actions are sprightly and interesting. I have often seen it, with outstretched wings, lying flat upon the tiles of a house-top, and basking in the sunshine.

The reed locustelle (*Locustella fluviatilis*) is a *protégé* of Natterer, the Vienna naturalist. He separated it from the genus *Salicaria* on account of some peculiarities of the beak and hind claw. I did not see it, but mention it, inasmuch as it frequents the reed-beds of the Danubian islets, and other marshy districts in the vicinity, and is a bird confined to eastern Europe.

I did not hear the nightingale till May; but when once they arrived they were in abundance here, as well as all over North Germany. It is very common to hear these birds in confinement in the streets of Vienna; I have often been arrested by their well-known notes in the most crowded thoroughfares. The first time I heard them, on searching for their author, I saw, in the window of an upper story, a sort of bundle, from which the sound seemed to proceed; but on directing my telescope to it (which I always carried for observation on the glacis, though in daily peril of being charged with treason) I discovered the nightingale cage wrapped up in an old-printed cloth; indeed, I never heard one sing which was not so concealed. But the Viennese have another and a stouter Philomel, called the thrush nightingale (*Philomela turdoides*) or Vienna nightingale, a species distinguished by the industry of Mr. Blyth; but, though bigger, it by no means attains to the delicacy of intonation of our queen of song. It rather emulates the *Merulidæ* in strength of voice; and while in the force of its sonorous notes it carries off the palm, it does not encroach upon the prescriptive domain of our pre-eminently "sweet

Philomel." Not only is it larger built, but, inasmuch as its call-note differs from that of *Luscinia*, it is undoubtedly distinct.

The following list shows the arrival of those summer birds whose advent I could remark with certainty:—

Chiffchaff	...	...	...	...	...	April	3
Redstart	...	...	...	...	...	"	8
Willow Wren	...	...	...	...	...	"	9
Swallow	...	...	...	...	...	"	13
Serin Finch	...	...	...	...	..	"	18
Martin	...	...	...	...	...	"	25
Blackcap	...	...	...	...	...	"	25
Cuckoo	...	...	...	...	...	"	27
Summer Snipe	...	...	...	...	...	"	30
Pettychaps	...	...	...	...	...	May	3
Titlark	...	...	...	...	...	"	4
Golden Oriole	...	...	...	...	...	"	4
Swift	...	...	...	...	...	"	7
Lesser Whitethroat	...	...	..	...	...	"	7
Nightingale	...	...	...	...	...	"	8
Whitethroat	...	...	...	...	...	"	9

As spring advances, every pond and marsh resounds with the croak, or rather shriek, of the edible frog (*Rana esculenta*). This very handsome species is far commoner in this neighbourhood, as well as in North Germany generally, than the *Rana temporaria* of Britain. The land cry uttered by the edible species, Mr. Jenyns tells us, has obtained for them the misnomer of Cambridgeshire nightingales. There can be no doubt that this is the species Aristophanes was accustomed to see, and which act so important a rôle in his comedy of the 'Frogs,' his expression, Βρενεκεκεκεξ κοάξ κοάξ, being an exact imitation of the croak of this frog when properly intoned; and at every note the translucent sacs beside the head swell out as big as marbles. Indeed, I have remarked that the slightest sound uttered by them seemed to dilate the sacs no less than the loud noise they can and do make at certain times, especially towards evening, when an assemblage of them in a large pond or marsh produces an effect ludicrous in the extreme. I did not see any of the spawn of this species, which I believe, indeed, is not deposited until June; but the spawn of the common frog I found in small quantities at the end of March. Notwithstanding the abundance of the edible frog, I never heard of its forming an article of diet in Vienna; but I may perhaps here mention that the edible snail (*Helix pomatia*) is constantly used for food, and in every bill of fare "Schnecken mit kren" (snails with mustard) are

included. I once ordered it: the mollusks were instantly forthcoming, and I tasted but did not finish the dainty. In the neighbouring Lake of Neusiedler-see, a fresh-water turtle, *Emys europæa*, is taken in considerable numbers. I frequently saw these animals in the laboratory of my friend Professor Brücke, who considers them, for physiological researches, far better adapted than even that physiologist's reptile, the frog, and was always kept supplied with specimens by the fishermen of the neighbourhood.

On Fridays, and especially during Lent, a fish-market is held in that part of the town which borders upon the small arm of the Danube, and is abundantly supplied by the produce of that river. The fish are brought to the spot in immense casks, alive, and are deposited in large shallow tubs, like washing-tubs. Here they may be seen in all conditions, active, lively, dead and dying. The staple of the market is the Danubian carp (*Cyprinus carpio*), called "Donankarpfen" or "Flusskarpfen," a handsome fish with large scales of a golden tinge. They are on an average a foot long, very lively, and cut very red. Such a fish sells for 20 to 25 kreutzer, 8*d.* to 10*d.* English. Great numbers of tubs contain nothing but this fish, sometimes 18 inches long. They are very tenacious of life, and possess great irritability: when taken away whole, they require many blows on the head with a heavy weight before they are quite motionless; and when one is rapidly cut in halves, by being ripped up along the back and belly, I have seen its movements continue even after the separation has been complete. Next to the Danubian carp the most common fish is the pike or "Hecht" (*Esox lucius*), which averages 18 inches long. With their characteristic heaviness, they remain quite quiet in the tub, in spite of the inconvenient activity of the lively and unwieldy carp. A pike about 16 inches long is sold for 30 kreutzer (about 1*s.*) These two fishes constitute about nine-tenths of the market; but there is one other fish which deserves mention. In about every tenth tub of carp and pike there may be seen a fish in form like a carp indeed, but whose monstrous, shapeless scales attract immediate attention. This is the large-scaled carp figured by Bloch as *Rex Cyprinorum*. In general the scales of this fish, which are very irregular, are arranged in two rows on each side, one parallel with the back and the other with the abdomen. Bloch supposes it to be a distinct variety, but more generally it is considered to be a mule between the carp and the tench, for the minute scales which exist, mingled in patches, among the immense scales of the carp, resemble very greatly those of the tench. In flavour it is superior to the com-

mon variety, and it reaches to a considerable size. It is called in Germany "Spiegel-karpfe," or mirror-carp, the blotches with large scales being regarded as mirrors. This mule is, I believe, sometimes found in Lancashire. Common carp are very favourite dishes throughout Germany, and many persons with large estates establish carp-ponds, and derive considerable revenue from the proceeds of their sale.

Of sea-fish I saw none of any kind in the Vienna market, except cod, or "Stockfisch," which is so often represented emblematically upon German houses that I presume it is a sort of national dish. I have often seen over a door-way a rude figure of a fish, with this inscription underneath,—

" Das Haus steht in Gottes Hant
Zum Stockfisch ist's genannt."

Inasmuch as the nearest place from which such are obtainable is Trieste, and the railway is not yet completed all the way there, sea-fish is a rare commodity here. I was surprised not to see any Salmonidæ among the finny treasures of this market, since salmon, salmon-trout and Hucho are to be obtained at Gmunden, Neusiedler-see, Platten-see, and other similar localities not far distant; but I have seen nothing of the kind, either in the market, in the bills of fare, or on private tables: I can only suppose it was owing to the season. Still the fish-market, although it present not the variety of Pisces which we see at Billingsgate, is worthy of a visit.

CUTHBERT COLLINGWOOD.

A Systematic List of Coleoptera found in the Vicinity of Alverstoke, South Hants. By ARTHUR ADAMS, Esq., F.L.S., Surgeon of H.M. Surveying Ship 'Actæon;' and WILLIAM BALFOUR BAIKIE, M.D., F.R.G.S.

(Continued from page 5555).

LAMELLICORNES.

1. Fam. CETONIADÆ, *MacLeay*.

1. *Cetonia*, *Fabr.*, *Steph.*

C. aurata, *Linn.*, *Steph.* Common; on rose bushes in gardens.

2. Fam. MELOLONTHIDÆ, *MacLeay*.1. *Phyllopertha*, *Kirby*, *Steph.*

P. horticola, *Linn.*, *Steph.* Occasional; on leaves of trees in shrubberies.

2. *Melolontha*, *Fabr.*, *Steph.*

M. vulgaris, *Fabr.*, *Steph.* Very abundant; flying about in the evenings during June and July.

3. *Rhizotrogus*, *Latr.*, *Steph.*

R. solstitialis, *Linn.*, *Steph.* Very numerous; flying about after sunset during July and August; seldom seen until after the disappearance of the "common chaffer."

4. *Serica*, *MacLeay*, *Steph.*

S. brunnea, *Linn.*, *Steph.* Rarely; taken in autumn, in the copse at Grange.

5. *Hoplia*, *Ill.*, *Steph.*

H. argentea, *Fabr.*, *Steph.* Not unfrequent; on trees in plantations.

3. Fam. GEOTRUPIDÆ, *MacLeay*.1. *Ceratophyus*, *Fisch.*

C. Typhæus, *Linn.* *Typhæus vulgaris*, *Steph.* In horse-dung; occasional.

2. *Geotrupes*, *Latr.*, *Steph.*

G. stercorarius, *Linn.*, *Steph.* Very abundant; in dung, along roadsides, &c.

G. mutator, *Marsh.*, *Steph.* Rather common; in dung, &c.

G. sylvaticus, *Panz.*, *Steph.* Frequent; on heaths and commons.

G. punctato-striatus, *Kirby*, *Steph.* Rare.

G. vernalis, *Linn.*, *Steph.* *G. lævis*, *Steph.* Not common; in rabbit-burrows on Hayling Island and on Browdown.

4. Fam. SCARABÆIDÆ, *MacLeay*.1. *Onthophagus*, *Latr.*, *Steph.*

O. cænobita, *Herbst*, *Steph.* Rather rare; in dung.

O. fracticornis, *Fabr.*, *Steph.* Very common; in dung.

O. nuchicornis, *Linn.*, *Steph.* Occasional; in dung.

O. ovatus, *Linn.*, *Steph.* Not common; in sheep's dung.

2. *Copris*, *Geoff.*, *Steph.*

C. lunaris, *Linn.*, *Steph.* Not uncommon; under dung in damp grass and swampy spots.

5. Fam. APHODIIDÆ, *MacLeay.*1. *Colobopterus*, *Muls.* *Aphodius*, *Steph.*

C. erraticus, *Linn.*, *Steph.* Not rare.

2. *Eupleurus*, *Muls.* *Aphodius*, *Steph.*

E. subterraneus, *Linn.*, *Steph.* Rather abundant.

3. *Teuchestes*, *Muls.* *Aphodius*, *Steph.*

T. Fossor, *Linn.*, *Steph.* Very common.

4. *Ostophorus*, *Muls.* *Aphodius*, *Steph.*

O. hæmorrhoidalis, *Linn.*, *Steph.* Common.

5. *Aphodius*, *Muls.*, *Ill.*, *Steph.*

A. scybalarius, *Fabr.*, *Steph.* Occasional.

A. fimetarius, *Linn.*, *Steph.* Very abundant.

A. ater, *De Geer.* *A. terrestris*, *Steph.* Rather common.

A. Lapponum, *Gyll.*, *Steph.* Rare.

A. terrenus, *Kirby*, *Steph.* Occasional.

A. rufescens, *Fabr.*, *Steph.* Not common.

A. lividus, *Oliv.*, *Steph.* Rather common.

A. sticticus, *Panz.*, *Steph.* Rather rare.

A. pusillus, *Herbst.*, *Steph.* *A. granarius*, *Steph.* *A. Granum*, *Steph.* Common.

A. merdarius, *Fabr.*, *Steph.* Somewhat scarce.

A. melanopus, *Kirby*, *Steph.* Occasional.

6. *Melinopterus*, *Muls.* *Aphodius*, *Steph.*

M. prodromus, *Brahm.*, *Steph.* ♂. *M. sphaclatus*, *Steph.* ♀. Common.

M. contaminatus, *Herbst.*, *Steph.* In profusion.

7. *Acrossus*, *Muls.* *Aphodius*, *Steph.*

A. rufipes, *Linn.*, *Steph.* Very common.

A. luridus, *Fabr.*, *Steph.* Frequent.

6. Fam. TROGIDÆ, *MacLeay*.1. *Ægialia*, *Latr.*, *Steph.*

A. arenaria, *Fabr.* *A. globosa*, *Steph.* At roots of the sea-holly, in sandy spots on the banks near Fort Cumberland, and in Hayling Island.

7. Fam. LUCANIDÆ, *Leach*.1. *Lucanus*, *Linn.*, *Steph.*

L. Cervus, *Linn.*, *Steph.* In elms and ash trees about Haslar, Alverstoke and Grange; rather abundant.

2. *Dorcus*, *MacLeay*, *Steph.*

D. parallelipedus, *Linn.*, *Steph.* In old trees, and under logs at Grange Farm.

STERNOXI.

1. Fam. ELATERIDÆ, *Leach*.1. *Melanotus*, *Esch.*, *Steph.* *Cratonychus*, *Erich.*

M. niger, *Fabr.* Not common; alights on *Pteris aquilina* in the sun.

M. rubripes, *Herbst.* *M. fulvipes*, *Herbst*, *Steph.* Rare; woods in sunny places.

2. *Lacon*, *Lap.* *Agrypnus*, *Steph.*

L. murinus, *Linn.*, *Steph.* On ferns, &c., in abundance.

3. *Athous*, *Esch.*, *Steph.*

A. hirtus, *Herbst.* *A. niger*, *Steph.* Rare; off foliage by beating.

A. hæmorrhoidalis, *Fabr.*, *Steph.* Taken abundantly by sweeping ferns.

A. longicollis, *Fabr.*, *Steph.* On *Pteris aquilina*; very common.

4. *Campylus*, *Fisch.*, *Steph.*

C. linearis, *Fabr.*, *Steph.* On flowers in the sun; Rowner Swamp and Grange Copse.

5. *Diacanthus*, *Latr.* *Prosternon*, *Steph.*

D. holosericeus, *Fabr.*, *Steph.* Taken in abundance off ferns at Grange.

6. *Agriotes*, *Esch.*, *Steph.*

A. Sputator, *Linn.*, *Steph.* About field-paths; very common.

- A. lineatus, *Linn., Steph.* Common; in fields.
 A. obscurus, *Linn., Steph.* Abundant; along field-paths.
7. Sericosomus, *Serv., Steph.*
 S. brunneus, *Linn., Steph.* Hedges by beating; common.
8. Dolopius, *Esch., Steph.*
 D. marginatus, *Linn., Steph.* Occasional; among herbage, Grange.

MALACODERMATA.

1. Fam. ELODIDÆ, *Shuck.*

1. Elodes, *Latr. Cyphon, Steph.*
 E. pallidus, *Fabr.* E. melanurus, E. lætus, *Steph.* Hedges by sweeping; not common.
 E. lividus, *Fabr., Steph.* E. testaceus, E. assimilis, E. obscurus, *Steph.* Copses; common.
 E. griseus, *Fabr., Steph.* Hedges; occasional.
 E. Padi, *Linn., Steph.* E. ater, *Steph.* Hedges; rather common.
 E. ochraceus, *Steph.* Not frequent.

2. Scirtes, *Ill., Steph.*

- S. hemisphæricus, *Linn., Steph.* Beaten off sedges in a marsh near Privet; rare:

2. Fam. LAMPYRIDÆ, *Kirby.*

1. Lampyris, *Linn., Steph.*
 L. noctiluca, *Linn.* Rare; roadsides at Elson.

3. TELEPHORIDÆ, *Leach.*

1. Telephorus, *Oliv., Steph.* Cantharis, *Schaum.*
 T. fuscus, *Linn., Steph.* In hedges; frequent.
 T. rusticus, *Fall., Steph.* On flowers and in grass during summer; most abundant.
 T. lividus, *Linn., Steph.* On Apiaceæ; abundant.
 T. bicolor, *Fabr., Steph.* On flowers; not uncommon.
 T. fulvicollis, *Fabr., Steph.* Occasional.
 T. thoracicus, *Oliv., Steph.* Not unfrequent.
 T. clypeatus, *Ill., Steph.* Not common.
 T. lituratus, *Gyll., Steph.* Among grass in meadows; occasional.

2. Rhagionycha, *Esch., Steph.*

R. melanura, *Fabr., Steph.* In profusion, chiefly on umbelliferous flowers.

R. testacea, *Linn., Steph.* In hedges, by sweeping; common.

R. pallida, *Fabr., Steph.* In hedges, by sweeping; occasional.

3. Malthinus, *Latr., Steph.*

M. fasciatus, *Fallen., Steph.* On hawthorn flowers.

M. flaveolus, *Payk., Steph.* In hedges, by sweeping.

M. biguttulus, *Payk., Steph.* In hedges, by sweeping.

3. Fam. MELYRIDÆ, *Leach.*1. Malachius, *Fabr., Steph.*

M. æneus, *Linn., Steph.* On apiaceous flowers; occasional.

M. bipustulatus, *Fabr., Steph.* On flowers, especially of *Spiræa ulmaria*.

M. viridis, *Fabr., Steph.* On herbage; less abundant.

M. marginellus, *Fabr., Steph.* Rare; on flowers in Rowner Swamp.

M. rubricollis, *Marsh., Steph.* Hedges, by sweeping; rare.

2. Dasytes, *Fabr., Steph.*

D. cæruleus, *Fabr., Steph.* On flowers; rare.

D. æratus, *Steph.* Rare.

3. Byturus, *Latr., Steph.*

B. tomentosus, *Fabr., Steph.* On bramble blossoms; common.

4. Telmatophilus, *Heer.*

T. Sparganii, *Ahr., Steph.* On blossoms of *Sparganium ramosum*; tolerably abundant.

4. Fam. TILLIDÆ, *Leach.*1. Corynetes, *Herbst.* *Necrobia*, *Latr., Steph.*

C. cæruleus, *De Geer.* In carcasses near the shore.

C. rufipes, *Fabr., Steph.* In carcasses near the shore; not frequent.

C. ruficollis, *Fabr., Steph.* In carcasses near the shore; rare.

5. Fam. PTINIDÆ, *Leach.*1. Ptilinus, *Geoff., Steph.*

P. pectinicornis, *Linn., Steph.* Taken on a window-sill at Southsea by Mrs. Livesay.

2. *Dorcatoma*, *Herbst.*, *Steph.*

D. Bovistæ, *Ent. H.*, *Steph.* In some abundance from puff-balls in fields near Alverstoke.

3. *Hedobia*, *Sturm.* *Ptinus*, *Steph.*

H. imperialis, *Linn.*, *Steph.* In old hedges; rare.

4. *Ptinus*, *Linn.*, *Steph.*

P. hololeucus, *Fald.* Occasional; in houses.

P. Fur, *Linn.*, *Steph.* Frequent; in old houses.

6. Fam. ANOBIIDÆ, *Westw.*1. *Anobium*, *Fabr.*, *Steph.*

A. tessellatum, *Fabr.*, *Steph.* In plenty, in the interstices of some old oaks at Grange.

A. striatum, *Oliv.*, *Steph.* Common; in houses.

2. *Apate*, *Fabr.*

A. ———? Introduced.

3. *Lyctus*, *Fabr.*, *Steph.*

L. canaliculatus, *Fabr.* *L. oblongus*, *Steph.* In old oak palings at Alverstoke.

4. *Cis*, *Latr.*, *Steph.*

C. Boleti, *Scop.*, *Steph.* In dead *Boleti*; occasional.

C. hispidus, *Payk.*, *Steph.* Scarce.

C. bidentatus, *Oliv.*, *Steph.* In *Boleti*; abundant.

HETEROMERA.

I. MELASOMATA.

1. Fam. BLAPSIDÆ, *Leach.*1. *Blaps*, *Fabr.*, *Steph.*

B. mortisaga, *Linn.* In cellars and graveyards; common.

2. Fam. OPATRIDÆ, *Shuck.*2. *Heliopates*, *Dej.* *Phylan*, *Steph.*

H. gibbus, *Fabr.*, *Steph.* Not common; sandy banks near Fort Cumberland and at Hayling Island.

2. *Opatrum*, *Fabr.*, *Steph.*

O. sabulosum, *Linn.*, *Steph.* Rather common; sandy places in Stokes Bay and Hayling Island.

3. *Microzoum*, *Redt.*, *Steph.*

M. tibiale, *Fabr.*, *Steph.* Burrowing in sand near the shore in Hayling Island.

3. Fam. TENEBRIONIDÆ, *Steph.*1. *Tenebrio*, *Fabr.*, *Steph.*

T. obscurus, *Fabr.*, *Steph.* Occasional; in houses.

T. Molitor, *Linn.*, *Steph.* Occasional; in houses and ovens.

4. Fam. HELOPIDÆ, *Steph.*1. *Helops*, *Fabr.*, *Steph.*

H. cæruleus, *Fabr.*, *Steph.* On old trees and palings, in gardens and orchards; tolerably frequent.

H. caraboides, *Fabr.* *H. striatus*, *Steph.* In old trees, in fissures of bark; occasional.

5. Fam. CISTELIDÆ, *Leach.*1. *Cistela*, *Fabr.*, *Steph.*

C. murina, *Linn.*, *Steph.* On flowers; rather common.

6. Fam. LAGRIIDÆ, *Westw.*1. *Lagria*, *Fabr.*, *Steph.*

L. pubescens, *Linn.* *L. hirta*, *Steph.* Common; on flowers.

7. Fam. PYROCHROIDÆ, *Leach.*1. *Pyrochroa*, *Geoff.*, *Steph.*

P. rubens, *Fabr.*, *Steph.* On flowers and herbage; tolerably frequent.

8. Fam. NOTOXIDÆ, *Steph.*1. *Notoxus*, *Geoff.*, *Steph.*

N. monoceros, *Linn.*, *Steph.* At roots of coarse grass in sandy places near Southsea; scarce.

2. *Anthicus*, *Payk.*, *Steph.*

A. floralis, *Fabr.* *A. fuscus*, *Steph.* On flowers; not common.

A. antherinus, *Linn.*, *Steph.* On flowers; rare.

A. ater. Two specimens swept off grass in the Salterns, Island of Portsea, in October, 1856.

9. Fam. MORDELLIDÆ, *Leach.*

1. *Anaspis*, *Geoff.*, *Steph.*

A. frontalis, *Linn.*, *Steph.* On bramble blossoms; tolerably frequent.

A. ruficollis, *Fabr.*, *Steph.* On flowers in Rowner Swamp; common.

A. fasciata, *Forst.*, *Steph.* *A. nigricollis*, *Marsh.* Common.

A. flava, *Linn.*, *Steph.* On willow catkins; occasional.

10. Fam. CANTHARIDIDÆ, *Leach.*

1. *Meloë*, *Linn.* *Proscarabæus*, *Steph.*

M. Proscarabæus, *Linn.* *M. vulgaris*, *Steph.* Among furze and grass on commons.

M. violaceus, *Marsh.*, *Steph.* Among furze and grass on commons.

2. *Lytta*, *Linn.* *Cantharis*, *Steph.*

L. vesicatoria, *Linn.*, *Steph.* Taken rarely near Stokes Bay.

11. Fam. ŒDEMERIDÆ, *Leach.*

1. *Nacerdas*, *Schaum.* *Ischnomera*, *Steph.*

N. melanura, *Linn.*, *Steph.* Not common.

2. *Œdemera*, *Oliv.*, *Steph.*

Œ. Podagrariæ, *Linn.*, *Steph.* One specimen taken at Grange.

Œ. cærulea, *Linn.*, *Steph.* Common; on flowers, especially of wild roses.

12. Fam. SALPINGIDÆ, *Leach.*

1. *Rhinosimus*, *Latr.* *Salpingus*, *Steph.*

R. planirostris, *Fabr.*, *Steph.* Under bark of felled trees at Grange; rare.

WM. BALFOUR BAIKIE.

Larva of Colias Hyale.—A female of this species deposited some eggs on my setting-board, although I had poisoned her with oxalic acid; they duly hatched in five days, and have since fed on *Medicago sativa*, *Trifolium repens* and *T. subterraneum*; they are now feeding on the last-named plant. They are of a yellowish green colour; head small in proportion to the body. When in a state of repose they lie along the middle of the leaf's superior surface, so that at night, when the leaf closes (as most, if not all, the *Trifolia* do), they are quite inclosed by its segments, showing the all-wise provision of our Creator, in guiding the delicate larva to seek such a beautiful and effectual domicile, from the cold, cutting winds it would otherwise be exposed to: the edges of the leaves meeting quite close together, they appear almost hermetically sealed in. They appear to have the power of ejecting their excrement with some degree of force, for although they never leave the food-plant, being very sluggish in their habits, I find it nearly an inch above them, adhering to the glass lid of the breeding-cage, which by chance had a little spun silk on it.—*William Henry Tugwell*; 112, *Cheapside, London, September 8.*—*From the 'Intelligencer.'*

Lycena Hippothoë in Scotland.—Whilst botanizing over a marshy piece of ground in this neighbourhood, I was surprised to see a male specimen of this beautiful butterfly flit past me while I was arranging some plants I had just gathered. Being aware of its rarity, I was soon up and in pursuit; but, from my great weakness and the treacherous character of the ground, I was unable to capture it, although it settled several times in full view. I repeatedly fell in stagnant pools concealed by the tall reeds and grasses, and at last was so completely tired that I gave up the chase, hoping the insect would return another day, but that day has never arrived.—*Thomas Edward*; *Banff, August, 1857.* [It seems to me that Mr. Edward can hardly be mistaken as to the species. The most likely way to procure it would be to search the leaves of the water-dock for the larva wherever that species occurs in the fen district in his neighbourhood.—*E. N.*]

Sphinx Convolvuli at Stoke Newington.—I have just received a beautiful male of *Sphinx Convolvuli* taken hovering over flowers at Stoke Newington. Callers here speak of numerous similar captures. Can no one find the larva of this beautiful *Sphinx*? It would be a very conspicuous object; and if its occurrence bear a proportion to the imago similar to that in *Sphinx Ligustri*, it must also be profusely abundant. The captures of the larvæ of *Ligustri*, compared with these of the imago, are as 100 to 1. What a host of *Convolvuli* larvæ would this give!—*Edward Newman.*

Sphinx Convolvuli at Kingston.—A very fine female of this species was brought to me on Monday last, taken that day on Surbiton Hill, near this town. A little benzine collas soon put an end to its existence.—*A. F. Sheppard*; *Rutland House, Kingston-on-Thames, October 9, 1857.*

Note on Anthrocera Trifolii and A. Filipendulæ.—In a field at Keymer, near Hurstpierpoint, I observed these two species flying together, the former rather worn, and the latter just emerged from the pupa. Upon examining more closely I discovered several males of *Trifolii in copulâ* with females of *Filipendulæ*. It occurred to me that probably this irregularity had not then taken place for the first time, and I therefore searched the spot very carefully for hybrids, of which I soon took several, though not in good condition, as most of the specimens were more nearly allied to *Trifolii* than to *Filipendulæ*, and had therefore, as it was then late in June, been some time on the wing. In some cases the specimens showed the narrow border of the under wings of *Filipendulæ*, but with only five spots; others strongly resembled

Trifolii, but with the six spots of *Filipendulæ*. I have known the locality well ever since I have collected, and am quite certain that the two species have become common there only as the result of the improved drainage of the flourishing district in which I found them. Until recently *Trifolii* was very scarce there, and *Filipendulæ* occurred about in the proportion of one to a hundred at the present time. I mention this fact because it is satisfactory to think that cultivation in some cases is of advantage even to the entomologist.—*J. Jenner Weir*; 6, *Haddo Villas, Blackheath, S.E.*, October, 1857.

Positions of Lepidoptera.—The ordinary position of insects, whether at rest or in motion, is worth very attentive examination. We have all learned from Linneus that butterflies rest with their wings erect, moths with their wings deflexed; but how many years have passed away without our adding a jot or tittle to this fragment of knowledge! We may fairly assume that every natural group of *Lepidoptera* has its distinctive characters while living: we have only to observe them. Thus, a *Geometer* always exhibits its hind wings when at rest; if a *Eupithecia*, the entire hind wing is exposed; in other *Geometers* some portion is concealed. Again, if you start a *Geometer* and see it settle on a fence, it will almost invariably run with its wings erected and meeting above its back like a butterfly at rest; before going to sleep again it will give two or three flaps with its wings and then expand them, appressing them as closely as possible to the paling. No other *Macro-Lepidopterous* insect runs with erected wings; I will say nothing of the *Micros*. Then how strange is the attitude of a *Pterophorus* at rest; the narrow wings standing at right angles with the body, the entire body exposed; not a particle of it can by any possibility be concealed by the wings; and then the hind legs, jauntily cocked up in the air, like the little finger of a lady of the olden time, as though far too delicate and graceful to be of any use, and only to be worn for ornament; indeed, these said hind legs of *Pterophorus* are often crossed over the abdomen and rest there, as though not only not intended for use, but as being actually too delicate to bear their own weight.—*Edward Newman*.

How to rear the Death's Head.—I have been very successful in breeding *Acherontia Atropos*; the method I have adopted is this: I feed the larvæ in large flower-pots half-filled with light mould for them to effect their transformations in; after they have been under ground ten days, I take them out, and put them in pots partly filled with mould and sand, and well drained. I keep them in a warm room, and well saturate them with water once a week; to keep up the moisture I put damp moss over them every third day. In this way I have bred fourteen as fine specimens as ever were seen, some of them 5½ inches across the wing. One of them was only three weeks from the larva going under ground to the appearance of the perfect insect, but I find a month about the average time. It is time that entomologists should be on the look out for *A. saucia* and *A. australis*: I took a few specimens of both a fortnight ago.—*H. Rogers*; *Freshwater, Isle of Wight, September 30.*—From the '*Intelligencer*.'

Note on Cerura bicuspis.—I found a number of the deserted dwellings of *Cerura bicuspis* yesterday, the 7th. Was it not a day of humiliation?—*John Scott*; *Southfield Villas, Middlesbro'-on-Tees, October 8, 1857*.

Petasia nubeculosa in Scotland.—Although the modesty of our collectors will doubtless be in some degree outraged by the publication of the successful result of their most meritorious labours, I feel compelled, as an impartial chronicler of entomological events, to state that an unusual number of this most desired species have been taken during the past summer. The specimens are in remarkably good

condition ; and I would recommend the possessors to adjust the price to the increased supply, in which case every lepidopterist will become a willing purchaser.— *Edward Newman.*

Double-broodedness of Notodontæ.—The discussion which took place in the pages of the 'Zoologist' last year on the double-broodedness of the Notodontæ did not appear likely to produce any satisfactory result until additional data were obtained. I had at that time about seventy pupæ of *N. ziczac*, the produce of autumnal moths, which were obtained from the spring brood, and which I determined to apply to obtaining additional data. The imago from these began to emerge the beginning of May, and by the end of that month they had ceased to appear. About the latter end of June I carefully examined every cocoon, and found six pupæ dead ; the moths from four others had got entangled in the cocoon, and were also dead ; the rest had emerged ; not one remained over. When the sexes met, these moths invariably paired, and supplied about sixteen hundred eggs, most of which were distributed ; and I learn that several of my correspondents secured from them the autumnal brood, and have now a good store of pupæ. I continued my own experiments by selecting eggs from various batches ; and again, in July, I had about fifty pupæ, the moths from which emerged during the last week in that month and the first week in August. When these had for some time ceased to appear I again carefully examined the cocoons, and found one shrivelled pupa, and two moths entangled and dead ; all the others had emerged. This last brood always paired when allowed to do so, and produced fertile eggs. Surely Mr. E. Shepherd will admit that these experiments have been on a sufficiently extended scale, and will not, in reference to them, speak about one swallow not making a summer. It may not be out of place here to add that I do not find, as in Mr. Doubleday's case, the autumnal brood "small and faint in colour ;" they are quite equal in size and intensity of marking to the spring brood ; indeed, I see no difference whatever. The larvæ in both cases were reared on growing plants from the moment they left the eggs, and were not removed into confinement until indications of change to pupa appeared. A few words about *Notodonta dictæa* :—Mr. Doubleday says (*Zool.* 5166) that he "never saw an autumnal specimen of *Carmelita, trepida, dictæa* or *dictæoides*." I have now (August 29) a female *dictæa* busy laying her eggs ; she was bred from a larva taken full-grown at the end of July ; at the same time I took six smaller ones ; and in another part of the country I took five more, besides a male attracted by the female above mentioned. Thus thirteen instances of the second brood of *dictæa*, the produce of at least four or five maternal parents, have casually fallen to one collector the same year. The autumn brood does not, therefore, appear so rare as Mr. Doubleday's remark would imply. Here, also, is the proof asked for by Mr. E. Shepherd, namely, that the spring moths are the parents of the autumn-produced individuals : he admits (*Zool.* 5293) that if this be proved the chain of evidence is complete. Mr. C. R. Bree informs me that he has "some fresh-turned pupæ of *dictæa*, the produce of a female reared from eggs laid by another female in May." It will be seen from the above facts that the two broods of both *N. ziczac* and *N. dictæa* are fertile. Now, Mr. Doubleday says (*Zool.* 5765), and Mr. Newman "exactly coincides" with him :—"I believe the females of some species are mostly barren when disclosed in the autumn, but when there are two distinct broods of a species, a vernal and autumnal brood, both are fertile." If, then, where there are *not* two distinct broods the autumnal disclosures are barren, and where there *are* two distinct broods both are fertile, it follows that, *ziczac* and *dictæa* appearing in spring and

autumn, and both disclosures being fertile, these species are therefore double-brooded. PS.—Since writing the above I have taken a number of larvæ of *P. palpina* which have duly changed to pupæ. I hope to extend my experiments to this insect: I feel satisfied it is double-brooded.—*George Gascoyne; Newark, September, 1857.*

Phlogophora empyrea in *Sussex*.—This beautiful species has again occurred in its well-sugared localities, and in unusual numbers. The specimens are in splendid condition, but the males are more worn than the females. As is the case with most of our moths, the males are more prone to take wing than the females. I trust our Lewes entomologists will take the opportunity, which this abundant harvest affords, to supply liberally the cabinets of their friends.—*Edward Newman.*

Occurrence of Xanthia centrago at Leicester.—A living specimen of this insect was taken by my little boy in the Leicester Museum the latter end of August last. Finding it mentioned as a very rare species, this notice may possibly be worth inserting in the 'Zoologist.'—*J. E. Weatherhead; Town Museum, Leicester, September 28, 1857.*

Pacilochroma stabilana, St.—During the last few days I have taken a series of the above very distinct species from alder bushes. The other species in this genus run into the most extraordinary varieties: this scarcely varies at all, which is no doubt the reason why the late Mr. Stephens fixed upon the appropriate name of *stabilana*. It is a large and more robust insect than the other species; the males are of a shining pale brown, the females of a dark brown colour, with a paler oval patch in the middle of the inner margin, which in both sexes is bordered with very dark brown spots, but especially so in the female.—*R. S. Edleston; Bowdon, October 9, 1857.*

Nepticulæ at Bowdon.—

Atricapitella	Trimaculella	Gratiosella
Aucupariæ	Floslactella	Marginicolella
Ruficapitella	Salicis	Aurella
Anomalella	Microtheriella	Regiella
Pygmæella	Ignobilella	Weaveri
Oxycanthella	Argentipedella	Atricollis
Prunetorum	Plagicolella	Alnetella
Viscerella	Tityrella	Betulicola
Septembrella	Malella	Myrtillella
Subbimaculella	Angulifasciella	

During the present season I have bred the above species of *Nepticula*, and possess several others, in single specimens or pairs, which it would be premature to describe till I become acquainted with the larvæ. Next June I hope to breed them. Chestnut trees are tenanted by three, if not four, distinct species. Last season I could not find a single mine tenanted: this season I have been rather more successful. All the three species are excessively scarce: the first is a small blotch miner, formed by a pale green larva, which spins a brown cocoon; the second is a long spiral mine, three inches in length, excrement black in centre of mine, larva yellowish green, and forms a drab cocoon; the third is a visceriform miner, and, so far, never at home. What may produce a fourth is a pale green larva, with brown head, and, when young, mines along the midrib, discolouring the leaf, afterwards forming a small blotch mine: I

collected several of these a few days ago. Mountain ash is tenanted by another species besides *Aucupariæ*, with a very peculiar compressed spiral mine, and dark yellow larva: I found four of them, for the first time, this afternoon. Last season I met with *Vimineticola*, very rare, in osiers, but failed in breeding them. Most of the *Nepticulæ* are said to be double-brooded: my short experience inclines me to the opinion of a succession of broods. From June to October the larvæ of several species are always to be found. *Plagiolella*, like *subbimaculella*, has the singular habit of several larvæ, occasionally occurring in a single blotch mine. Among the singular freaks met with in this genus may be mentioned the following:—A month ago I placed a large birch leaf, tenanted by ten full-grown *argentipedella*, in a glass jar. A few days ago I examined this leaf: the former tenants had left and spun their cocoons, and the leaf was now occupied by nine nearly full-fed *Betulicola*, traversing the leaf in all directions. Of course the eggs were upon the leaf when I got it, but unobserved. We constantly meet with one or more larvæ in a leaf apparently not large enough to supply them with food. Strange to say, in the case I have mentioned, the perfect insects were quite as fine as others with a whole leaf to themselves. Of all the *Nepticulæ*, *Weaveri* is the most extraordinary. The singular appearance of the leaf of *Vaccinium Vitis-Idæa* when the larva is full-fed, with the cocoon inside the leaf, and elongated and lying between an upper and lower layer of silk, is a marvel of workmanship. The insect is exceedingly difficult to rear. I collected a sufficient number of full-grown larvæ, had they produced moths, to have supplied most collections with specimens. I bred some three dozen only, which were most irregular in their appearance, from June 21 to August 24. Had ichneumons made their appearance it would have been satisfactory in accounting for my mishap. On opening the cocoons the great bulk contained a shrivelled larva, which had apparently died of utter exhaustion in spinning these astounding cocoons.—*R. S. Edleston; Bowdon, September 26, 1857.*

Natural History of Nemotois Dumerillellus.—The case, which is very similar to that of *Nemotois violellus*, is found in spring (April) on the dry slopes of our Douanberg, so well wooded above: it keeps much concealed on the ground amongst grass and other low plants, especially where *Hieracium Pilosella* grows abundantly. The larva does not appear very particular in its eating, and devours readily the blossoms of several low plants. In captivity they first gnawed the lower and rather dry leaves of *Hieracium Pilosella*; afterwards I offered them the blossoms of several early flowering plants, *Gentiana verna*, *Anemone nemorosa*, and later *Helianthemum vulgare*, which they ate with avidity. They were always very sluggish and well concealed. In the beginning of June they assumed the pupa state, when the cases were almost buried in the earth or amongst the roots of grass, so that only one end of the case was visible. The perfect insects appear towards the end of June; our two specimens came out on the 23rd and 25th of June. As in *Nemotois violellus*, the pupa-skin protrudes a long way out of the case. Probably the larva of *Nemotois Dumerillellus* feeds in autumn, in a juvenile form, in the fructification of some low plants perhaps of *Hieracium*, and afterwards forms a case in which it winters on the ground.—*Ottmar Hofmann; Ratisbon, September 1.—From the 'Intelligencer.'*

Beware of the Wasps.—A few evenings ago I started with an un-entomological friend to beat some ivy for moths, expecting, from the nature of the evening and the bloom on the ivy, an abundant harvest. My friend held an inverted umbrella under the bushes: I thrashed away with a stick. Down came blossoms, leaves, and divers

creeping things, to the great delight of my friend, who believed that they were one and all lepidopterous. On inspecting our prize with a lantern I found that beyond a perfect swarm of wasps there was scarcely a living thing. My friend, however, was not to be deceived, and, observing something creeping up the umbrella, he seized it in his hand, exclaiming, "Here we are: I've got one!" The next instant a yell of agony apprized me of what had occurred. I hope others will be more fortunate, but my friend and I had quite enough of ivy-hunting for one night. We were quite covered with the "woppses."—*T. Vaughan Roberts; Oswestry, October 13, 1857.*

Sirex Juvencus and the Bullets.—The French papers have lately reported that a great number of bullets have been found with cylindrical holes drilled in them, and that the said phenomenon, having been submitted to scientific men, these holes have been identified as the work of an insect, which has been actually found in some of them, and that the insect has been pronounced by entomologists to be *Sirex Juvencus*. Whatever may have been the fact in a solitary instance, no entomologist will give the insect credit for preferring the mineral to the vegetable world, and for feeding on bullets in preference to deal. I have met with two or three instances in which *Callidium Bajulus* had absolutely gnawed its way through the sheet-lead covering a roof; but this I imagine to be nothing more than the exemplification of the energy displayed, by men and animals in general, to escape a prison-house.—*Edward Newman.*

Characters of Zuphium olens of Latreille, drawn from a single Specimen found near London.—Head exserted, separated from the prothorax by a distinct but short and very narrow neck, rounded posteriorly, intensely black, brilliantly glabrous; clypeus, mouth, palpi and antennæ ferruginous; the maxillary palpi quite as long as the head, the terminal joint long, slender, slightly incrassated exteriorly and obliquely truncate; antennæ long and slender, the basal joint stouter than the rest, quite as long as the head, and perfectly concolorous. Prothorax rather wider than the head, cordate, the posterior margin narrowed, truncate, the angles acute and slightly salient, the disk very finely and confluent punctured, and having a wide median longitudinal depression; the lateral margins narrowly reflexed; the colour ferruginous. Elytra rather wider than the head, depressed; they have nine wide, shallow and somewhat inconspicuous striæ, and are uniformly covered with very minute confluent punctures; the lateral margins are narrowly reflexed, and in the groove caused by the flexure are about ten large deep punctures, half of them situate near the humeral angle, and the other half near the outer angle of the slightly sinuous truncate apex: the colour of the elytra is dusky brown, with a slightly iridescent tinge, a large, bright ferruginous patch occupying the base of each, and a third smaller and nearly circular patch or spot of the same colour occupying the apical extremity of the suture. All the legs are ferruginous. The length of the specimen, exclusive of the antennæ, is four-tenths of an inch, and the breadth one-tenth. It will be seen from this description that the insect does not agree with Fairmaire's characters; indeed, it differs so materially as at first to induce a belief that a species new to Science had been discovered; but on comparison with European examples in the British Museum no doubt remains as to the identity of the species. The specimen was found near London, on the 19th of September, 1857, and is now in the cabinet of the Entomological Club.—*Id.*

Note on certain nearly-allied Dromii.—As it seems possible that more than a single species of *Dromius* may have been confounded, in British cabinets, under the name of "agilis," perhaps the following memorandum, which I made a few months ago whilst examining continental (typical) specimens of *D. agilis*, *fenestratus* and *testaceus*, may

be useful to some of our coleopterists. The note, extracted *verbatim* from my papers, is as follows:—"Apart from the elongated and conspicuous pale dash on the disk of each of its elytra (which is rarely absent), *D. fenestratus* may be known from *agilis* by being altogether a little larger and broader (this being especially observable in its head and prothorax, the latter of which is considerable wider and more transverse than in *agilis*), and by its having only a single series of punctures, and that almost (if not entirely) obsolete, down each of its elytra; whereas in *agilis* there are *two* rows, regular and well-defined. *D. testaceus* is nearly of the same form and size as *agilis*, but is perhaps a little slenderer and more straight in its outline; its prothorax is a trifle smaller, and less expanded at the sides; its colour is altogether paler and more testaceous, and the inner row of its elytral impressions is obsolete." I may add, moreover, that Dr. Schaum, of Berlin, writes me word that he is perfectly satisfied that *fenestratus* is a true species, and no variety or state of *agilis*; and although I had no occasion to interrogate him concerning *testaceus* also, it likewise, judging from his volume in the 'Deutschlands Fauna' just published, appears to be still recognized, in Germany, as specifically distinct. I should state, however, that amongst my own British *Dromii* of this peculiar type, and which were principally collected near Cambridge, I am not able to detect anything but the common *agilis*.—*T. Vernon Wollaston*; 10, *Hereford Street, Park Lane*.

Destructive Powers of Galeruca Caprææ.—I have been consulted by no less than eight applicants on the subject of a small beetle which has this year caused immense loss to the osier-growers at and near Hitchin, in Hertfordshire. On carefully examining the insect and its food, I find it to be *Galeruca Caprææ*, and the main injury to be occasioned by the perfect insect denuding of bark the tips of all the new shoots. The eggs are laid in masses on the young leaf, which the larvæ voraciously devour and skeletonize; the pupæ are attached by the tail, and the imago feeds indiscriminately on the leaves and bark, in the latter case inflicting the greater injury. In one osier-bed the damage occasioned exceeds a hundred pounds.—*Edward Newman*.

Earwigs and Cayenne.—The compounds to which we apply the general epithet Cayenne pepper are so various, both in the nature and proportion of ingredients, that we must not found any theory on the fact of an insect having been once found devouring a compound bearing this name. Still the following fact may be worth recording. My friend Mr. Hart, of Bath, observed one day, in a small stoppered cruet, the usual receptacle of so-called "Cayenne," two earwigs, of normal size and form, apparently enjoying themselves to the top of their bent. The fact was communicated to me by letter, and, probably influenced by that doubting disposition which has been the means of reducing British *Lathonias* to a mere drug, of banishing at least a thousand *Virgaureæ*, and *Chryseis* innumerable, from our collections, I requested to be indulged with ocular demonstration of the phenomenon. My wish was politely complied with, and the long-imprisoned earwigs arrived in safety. I sacrificed one of them in the cause of Science, and found its abdomen distended with the substance contained in the cruet. I also found that a great portion of this substance, converted into pellets of more uniform size and paler colour than the rest, had actually been converted into earwig fraas. No information can be obtained as to the time or mode of the earwigs entering the cruet; it is certain, however, that they remained there several weeks, apparently in the enjoyment of excellent health, despite the occurrence of an occasional shaking up by the *savans* of the renowned city in which the phenomenon was discovered.—*Id.*

The Locust at Hull.—For some short time past many specimens of the locust (*Gryllus migratorius*) have been captured in this neighbourhood. One very fine specimen was caught by my gardener flying over a bed of Verbenas. In order to kill it I tried the air-pump. After being under the exhauster for some few minutes, it fell on its side, and appeared to be quite dead. It was left thus for nearly an hour, when, on admitting air again, a slight motion of the legs and antennæ showed that it was not quite killed. A little cyanide of potassium was now introduced by puncturing the thorax with a penknife, and letting a drop of the saturated solution of this salt fall on the aperture. This plan seemed to work well, for it appeared to be dead immediately. On the 28th instant I had another locust brought me by one of the sea pilots. It had been captured at sea, the same day. On turning it out of the glass where it had been kept, it turned out to be a specimen of death's-head hawk-moth (*Acherontia Atropos*). When teased it became much irritated, and continually uttered its peculiar stridulant cry.—*George Norman ; Hull, September 30, 1857.*

Abundance of the Locust at Boulogne-sur-Mer.—Being at Boulogne from the 16th to the 20th of September, for the purpose of collecting Actiniæ for my aquaria, I observed hundreds of the migratory locust (*Locusta migratoria*) on the down above the cliff in the vicinity of Boulogne.—*Thomas Hall ; 75, London Wall, September 21, 1857.* [Owing, doubtless, to the heat of the past summer, the north-westward migration of the locust has been more observable than for many years past. The Straits of Dover have formed a natural barrier, preventing its coming to England in excessive numbers.—*E. N.*]

Honey Buzzards in Norfolk.—No less than five of these occasional visitants have been lately observed in this county. On the 25th of August two males in adult plumage were shot at Northrepps, and another was seen but not obtained. These birds exhibited, both on the upper part and sides of the head, the gray plumage of the full adult, and are the more worthy of remark since I believe, out of the many specimens that have occurred from time to time in this county, not more than one or two have been met with in other than immature plumage. A young female was killed at Salhouse on the 28th of the same month, and another, also immature, was taken at Woodbastwick on the 7th of September. About the same time a sixth specimen was shot at Flixton, in Suffolk.—*H. Stevenson ; Norwich, September, 1857.*

Snowy Owls in the Western Islands.—No less than five specimens of the snowy owl (*Strix nyctea*) have been shot this year in the Western Islands, all of them, I believe, by Mr. Millbank ; I am not certain whether in Lewis or Sky.—*David Graham ; Market Street, York, September 21, 1857.*

Nesting of the Lapland Owl (*Strix lapponica*, *Temm.*) and *Tengmalm's Owl* (*S. Tengmalmi*, *Gmel.*)—Two nests of the Lap owl were found in Finnish Lapland in 1856. In one near Sodankyla there were two eggs, and when one of the birds was shot a third egg was found ready for exclusion. They were placed on the jagged end of the stump of a large Scotch fir, about twelve feet from the ground, at which spot the tree had been snapped across by some storm, the upper part not yet entirely separated, but sloping downwards till the greater part of its weight was supported by the ground. The other nest was near the Aunasjoki, at the top of a lowish Scotch fir. Some time

previously in the same year a bird had been shot at this spot, which was found to be a female with eggs inside. The nest was not observed until after the shot was fired. At the second visit, on the 28th of May, there were two eggs in the nest, and again a bird was shot, which turned out to be a new female with a fully-formed egg inside, through which the bullet had passed. The skin is now in England. The birds seemed on both occasions remarkably fearless. The eggs are smoother, and, as might be expected, considerably smaller than those of the eagle owl. The dimensions of the two in the last-mentioned nest are 2 in. \times 1.6 in. and 2.1 in. \times 1.65 in. At the meeting of Scandinavian naturalists in Christiania last summer, before I heard of these two nests having been found, I was able to announce that the Lap owl generally makes its nest on the top of a stump. I had received several reliable accounts from different woodsmen, but had never found a nest myself, or been able to get the eggs, which indeed have, I believe, hitherto been unknown to ornithologists. It appears that three is the ordinary number of eggs. Tengmalm's owl lays its eggs in holes of trees and occasionally in egg-boxes. When once established it cannot easily be made to leave its quarters, and it can, as it is said, keep possession against a much larger bird; yet from the present nest (the only one I have had the good fortune to meet with), after having laid four eggs, the mother was ejected by a golden eye. The dimensions of the egg accompanying this paper are 1.32 in. \times 1.5 in.—*John Wolley; Muoniovara, February 2, 1857.*

Occurrence of the Rosecoloured Pastor (Pastor roseus) in Scotland.—The rose-coloured pastor has again made its appearance in our neighbourhood, a young male having been killed here three weeks ago. Owing to his youth, he wanted a great deal of that beauty which distinguishes the adult male.—*Thomas Edward; Banff, September 18, 1857.* [Several other specimens have been recorded in the newspapers as having been shot or seen in their southward passage at the beginning of September.—*E. N.*]

Occurrence of the Lesser Whitethroat (Sylvia curruca) at Scilly.—The same packet which brought over the brown snipe brought also another bird new to Cornwall in the lesser whitethroat, which I have just examined. It appears to be an adult bird, and it is the first example that has come to my knowledge as having occurred in any of the western counties.—*Edward Hearle Rodd; Penzance, October, 1857.*

Note on the Nidification of the Swallow (Hirundo rustica).—I have seen at Pembury the nest of the swallow under the eaves of a house. Unlike that of the martin (*Hirundo urbica*), the nest was not attached or closed at the top, but supported underneath by the bend of a zinc water-spout.—*J. Jenner Weir; 6, Haddo Villas, Blackheath, S.E., October, 1857.*

The Land Rail (Gallinula crex) in Scilly.—Amongst other well-known migratory birds that have appeared in large numbers at Scilly during the last few days was the land rail. A friend writes me that he bagged in one day eight couple, and killed one couple besides; and that nearly every tuft of long grass in the swamps and morasses were safe in holding two. They mostly appeared in pairs.—*Edward Hearle Rodd; October, 1857.*

Occurrence of Temminck's Stint (Tringa Temminckii) at Scilly.—Mr. Pechell has observed several of these diminutive stints at Scilly, and he writes me word that he shot two this week.—*Id.*

Occurrence of the Brown Snipe (Scolopax grisea) at Scilly.—I have just examined a very interesting specimen of the above rare bird, in immature plumage, killed among

the past week by Augustus Pechell, Esq., at Scilly. The exact locality I am not made acquainted with, nor, in fact, with any particulars. This is an addition to our Cornish Fauna, and a valuable bird, as a rare species, anywhere in England. The description of this example I give briefly, for the benefit of your readers:—Bill, length $2\frac{1}{2}$ inches, dilated at the tip, very rugose. Top of the head dark brown; a dusky streak from the corners of the mouth to the eye; above this a broad white streak, extending, in an indistinct form, over and to the back part of the eye. Neck smoke-gray, palest in front. Breast and belly white, with a strong shade of yellow buff. Primaries dark, shaft of first quill-feather white; secondaries hair-brown, broadly edged at their tips with white. Feathers on the back and scapulars black, edged with rust-red. Tail and upper tail-coverts elegantly barred with narrow black and white lines; under tail-coverts and flanks the same, but fainter; wing-coverts cinereous, the centre of the feathers darker.—*Id.*

The Great Snipe (Scolopax major) shot near York.—A very fine specimen of the great snipe was sent to me for preservation on Saturday last, the 19th instant. It was shot about three miles from York, at a place called Askbam Bog, and was flushed in company with some of the common snipe. It was one mass of fat, and weighed nine ounces.—*David Graham; Market Street, York, September 21, 1857.*

Food of the Storm Petrel.—In the 'Zoologist' for last month (Zool. 5799) I see a query as to what is the seed of the gulf-weed alluded to by Wilson. I will relate my observations on a specimen of *Thalassidroma Wilsoni* which flew in at the port of the steward's pantry in the ship I was on board of one evening in August, 1856, homeward bound, latitude 12° North. First as to the bird flying on board. None of the crew had seen an instance of it before. It could not have been from bad weather, as the sea was smooth and the wind nearly calm; and I can only suppose that it was attracted by the light of a lamp hanging there. This bird was put into a cage for the night, during which it was very uneasy, continually fluttering, and uttering a sharp squeak. Finding it dead the next morning, I skinned it. On opening the stomach I found nothing but about six semi-transparent globular bodies, of the size of duck shot, all of them hollow, except one, which contained a cottony substance. These globular bodies I considered to be the air-vessels of some species of Algæ; they were very similar to those so abundant on the gulf-weed (but we were hardly in its latitude), and which obtained for that plant the name of sea grapes from the early navigators. Now, these air-vessels are very commonly mistaken for seeds, and were most probably so mis-called by Wilson. There is no doubt that the object of the bird in following ships is to pick up the refuse thrown overboard. I have not seen them more abundant in rough weather than in fine, and think that rule does not hold good. They were particularly abundant in the Southern Ocean, in 45° of latitude, and appear to be far less numerous in the tropics, and are again more plentiful in the North Pacific and Atlantic. I think *Thalassidroma Wilsoni* is the most common in the southern, and *T. pelagica* in the northern, hemisphere. I also once saw what I considered to be *T. Leachii* in the Southern Ocean.—*Robert M'Lachlan; Forest Hill, October 5, 1857.*

Note on the Nutcracker (Nucifraga caryocatactes), &c.—In the beginning of September last I was staying a few days at Zermatt, in the Canton of Valais, Switzerland. I there found the nutcracker very abundant, and so tame that I was able to observe its habits with ease. The forests about Zermatt are composed of larch and *Pinus Cembra*, the cones of which last tree seem to form the principal food of the nutcracker. The popular name of the *Pinus Cembra* in that neighbourhood is Arven, and

the nutcracker, in consequence of its fondness for the cones, is called Arven Fögel. I found these birds particularly numerous in the forest, which the path leading to the Riffelberg traverses, which must be familiar to every visitor to Zermatt. They were so tame that I have often approached within ten yards of them before they flew away, and I have frequently watched them, perched on the topmost branch of a Pinus Cembra, hammering vigorously with their powerful bills at the cones, which contain hard nut-like seeds, the kernels of which they seemed to prefer to any other kind of food. I have occasionally seen them alight on the stem of a tree like a woodpecker. With the assistance of a native Chasseur I obtained specimens. I found the bill considerably longer than it is represented in the Plate in Yarrell's 'British Birds,' and not so stout. In flying the white under tail-coverts are conspicuous. I observed these birds also in some other parts of Switzerland, in fact wherever I saw Pinus Cembra, but nowhere in such abundance as at Zermatt. At Chamounix I saw several specimens of that beautiful bird, the wall-creeper, running about the masses of rock on the moraine of the Mer de Glace.—*E. Cavendish Taylor; Doncaster, October 15, 1857.* [There are two supposed species of nutcracker on the Continent: *Nucifraga caryocactes*, with a long slender bill; and *N. brachyrhynchus*, figured by Mr. Yarrell, with a short conical bill. An admirably illustrated paper on this subject will be found at p. 1073 of the 'Zoologist.'—*E. N.*]

Occurrence of rare Sea Birds near Cambridge.—On the 28th of September a magnificent young male of the pomarine skua (*Lestris pomarinus*) was shot at Marston; it is just in that state of plumage so admirably figured by the late lamented Mr. Yarrell in his excellent work on British Birds: a few days subsequently an adult male was procured. On the 9th of the present month (October) some boys caught a tired-out bird on the turnpike road near Cottenham, which proved to be a female of the great skua (*Lestris catarractes*); and since then no less than six have been killed, three of each sex. One specimen of the arctic skua (*L. parasiticus*) has also occurred here, but I do not know the date. On the afternoon of Thursday, October 8, a farmer shot a specimen of the common tern (*Sterna hirundo*); it was sitting on his cow-shed at Hardwick, in this county.—*Samuel Parker Saville; 13, Regent Street, Cambridge, October 15, 1857.*

The Great Weever (Trachinus Draco) taken near Banff.—A very fine specimen of the great weever, or king bull, was taken near this place about a fortnight since. This fish appears to be rare in our firth; at least I know of but one other captured here, and that so long ago as 1810; neither did any of our fishermen who saw this specimen thrown on shore know what it was, a fact that shows its great rarity.—*Thomas Edward; Banff, October 19, 1857.*

Lithobius forcipatus Luminous.—The phosphorescent properties of *Geophilus electricus* have long been known, and the reported phosphorescence of a second species, *Scolopendra phosphorea*, has been taken for granted, although we have no very precise data whence to derive conclusions either as to the species or properties of the last-named animal. I have to announce a third Myriapod gifted with the phosphorescent properties. My relation, Mr. Samuel Hallam, a chemist residing at Weston-

super-Mare, thus writes to me:—"A few evenings ago, having occasion to cross a back yard after dark, I observed a number of luminous spots on the ground, most of them moving. On my attempting to take hold of one of them it started off at a great pace, and the others in succession followed the example as soon as I touched them. At last I secured one, which appeared brighter than the rest, as it was ascending a wall. In the capture I injured it slightly, and the phosphorescent matter remained so long and so conspicuous on the wall that I showed it to a neighbour who afterwards called in. The animal is a brown centipede." In reply to Mr. Hallam I stated that I knew only one luminous Myriapod, and that was very slow in its movements, and I think only luminous when trodden on or otherwise injured; and that I thought this could not be identical with his active insect. The captured animal came to me by return of post, and proved to be a large specimen of *Lithobius forcipatus*.—*Edward Newman*.

Extraordinary Migration of Woodlice.—On Saturday last, October 3, I observed, at 3 o'clock in the afternoon, a phenomenon that I think has not hitherto been recorded. Thousands upon thousands of the common pea woodlouse (*Oniscus Aspidion*) were crossing the road from a rubbishy-looking hedgebank towards the little row of houses in which I live. They were of all sizes, and I suppose of all ages, and the movement was entirely in one direction, from the west towards the east; no two individuals seemed to preserve the same line of march, and all moved, as by a common impulse, in precisely the same direction. Their progress could only be described by an infinite number of closely-ruled parallel lines. The crop in the opposite field is mangel wurzel, a plant peculiarly free from the attacks of ordinary vermin; and whether they travelled from the hedgebank, from the mangel wurzel field, or from some unexplored region beyond, I feel myself totally unable to pronounce.—*Id.*

Spider Silk.—The Vienna papers report a successful attempt lately made to obtain silk from spiders, and that several pairs of excellent silk stockings have resulted from the experiment. The species of spider is not mentioned, and no information is given as to the process by which the silk is obtained. Entomologists corresponding with Vienna should institute inquiries on this interesting subject. I have already done so, but at present without success.—*Edward Newman*.

Entomological Club.

THE Entomological Club was established in London, in the year 1826, and existed up to the year 1836 without any printed code of laws or by-laws. At that time a code of laws was agreed on, and printed in the 'Entomological Magazine' for July, 1836; that periodical having originated in the Club, and its cost having been defrayed by its members.

A portion of Rule I. is as follows:—"That it be a special object

of the Club to form a model named Cabinet of Insects unquestionably British ;” and a portion of Rule III. is as follows :—“ That the Cabinet be open at the house of the Curator on [here the days and hours are specified] ; and that all entomologists consulting the same shall be at perfect liberty to make any notes, memoranda, descriptions or drawings of any insect contained therein.”

These Rules have been in great measure carried out. There has been a constant endeavour to form such a collection : £105 has been expended on cabinets ; and the collection was open at the residence of the first Curator, Mr. Newman, for more than ten years ; it was then moved to the residence of Mr. Edward Doubleday, the second Curator, where it still continued open to visitors ; on the lamented death of Mr. Doubleday it was moved to the residence of Mr. Walker, the third Curator ; and, lastly, has been removed to the residence of Mr. Newman, a second time appointed Curator, at No. 7, York Grove, Queen’s Road, Peckham, where entomologists are invited to avail themselves of it, for obtaining names, &c., on every Thursday from October to March, both months inclusive, from 6 to 9 o’clock in the evening. Mr. Newman devotes these three hours exclusively to comparing and naming any insects that may be brought to him, and to communicate any other information he possesses. The entire collection has been so long in the process of formation that a great number of the specimens are in a somewhat dilapidated state ; and, moreover, so numerous are the changes in nomenclature, rendered necessary by the works of Guenée, Fairmaire, and other continental entomologists, that a rearrangement of the entire collection has become absolutely necessary. This has already been commenced at two points, Lepidoptera and Diptera ; the works of Boisduval and Guenée being taken as guides in the Lepidoptera, and Mr. Walker’s ‘*Insecta Britannica*’ in the Diptera. The following general arrangement will be observed :—

- A. Insects having amorphous pupæ.
 - 1. Lepidoptera.
 - 2. Diptera.
- B. Insects having necromorphous pupæ.
 - 3. Hymenoptera.
 - 4. Coleoptera.
 - 5. Stegoptera.
- C. Insects having isomorphous pupæ.
 - 6. Neuroptera.

7. Orthoptera.

8. Hemiptera.

The arrangement of the Lepidoptera is finished as far as the end of the Noctuidæ, and the following species are required to make the series complete :—

Thecla Pruni	Xylomyges conspicillaris
„ W-album	Laphygma exigua
Polyommatus Arion	Pachetra leucophæa
Trochilium Vespiforme	Mamestra abjecta
„ Chrysidiforme	„ furva
„ Sphegiforme	Apamea ophiogramma
„ Scoliæforme, ♂	Miana expolita
„ Allantiforme	Celæna Haworthii
„ Formicæforme	Acosmetia caliginosa
Cerura bicuspis	Agrotis saucia
Stauropus Fagi	„ cinerea
Notodonta Tritophus	„ Ripæ
Drymonia Chaonia	„ obelisca
„ Dodonæa	„ agathina
Gluphisia crenata	„ porphyrea
Leiocampa dictæoides	„ pyrophila
Lophopteryx Carmelita	„ Ashworthii
Petasia nubeculosa	Triphæna subsequa
Lithosia complana	Noctua glareosa
„ pygmæola	„ depuncta
Eulepia cribrum	„ ditrapezium
„ pulchella	„ rhomboidea
Lasiocampa Callunæ	„ Dahlii
Gastropacha Illicifolia	„ sobrina
Drepana sicula	„ neglecta
Psyche and Fumea, all	Pachnobia alpina
Heterogenea Asellus	Tæniocampa leucographa
Limacodes Testudo	Orthosia suspecta
Cymatophora fluctuosa	Cerastis erythrocephala
„ ocellaris	Dasycampa rubiginea
„ ridens	Xanthia, all
Diphthera Orion	Cirrædia xerampelina
Acronycta strigosa	Euperia flavago
„ Alni	Dianthæcia Cucubali
„ Salicis	Dasyptolia Templi
Synia musculosa	Epunda lutulenta
Meliana flavinea	„ nigra
Gortyna flavago	„ lichenea
Nonagria concolor	Aplecta occulta
Xylophasia scolopacina	Hadena saturata

Hadena assimilis	Agrophila sulphuralis
„ suasa	Erastria venustula
Cloantha, both	Bankia
Cucullia Scrophulariæ	Hydrelia
„ Lychnitis	Micra
„ Asteris	Plusia orichalcea
„ Gnaphalii	Stilbia anomala
„ Absinthii	Ophiodes lunaris
Heliothis, all	

In a very few instances there is a specimen, and in two instances there are two specimens, of the insects named in the foregoing list; and yet the species cannot be considered sufficiently represented for a cabinet of reference. It may be stated that more than four examples of a species are not desired, unless very marked varieties. Contributions of specimens are most earnestly solicited, since it is evident that the desire which the Club has in view cannot be carried out without the earnest co-operation of entomologists throughout the kingdom. Boxes to be addressed to Mr. Newman, 9, Devonshire Street, Bishopsgate Street, London, N.E.: the postage and box will be immediately returned. The names of Mr. Doubleday, Mr. N. Cooke, Mr. Edwin Shepherd, Mr. Edleston, Mr. Bond, and Mr. Reading may be mentioned among those who have contributed most generously to the formation of the collection; but very many others have kindly contributed desiderata, and in many ways assisted the Club in carrying out its object. The Curator had also the satisfaction, last winter, of distributing more than a thousand duplicates among those visitors to whom such species were desiderata.

As soon as a list of the Pyralidina (including Crambus) and Geometrina can be prepared, the desiderata will be published in the 'Zoologist,' and a list of desiderata supplied to the cabinet subsequently to the 1st of November, together with the names of the donors, will be given monthly in the same journal.

In the Lepidoptera it has been considered desirable to place the cocoon, pupa and ichneumon by the side of the perfect insect. This, however, has only been accomplished in a few instances; but it is an object kept constantly in view, as likely to render the collection more generally useful, and more decidedly educational. Wherever the larva, pupa, imago and parasite can be obtained, a history of the species is obtained at a glance. It is unnecessary to dwell on an advantage which must be so self-evident; but entomologists are respectfully reminded of the great assistance they can render the Club in this department of its labours.

In Diptera the cabinet is remarkably rich, all the descriptions in the first volume of the 'Insecta Britannica,' unless otherwise specified, being derived from this source. The Neuroptera have been recently examined, and the nomenclature rectified by Dr. Hagen. The names of the Apina, Vespina and Sphecina are in accordance with Mr. Smith's nomenclature; the names of the Lepidoptera are in accordance with those in Mr. Doubleday's cabinet; the Geodephaga are arranged and named in accordance with Mr. Dawson's work. The arrangement of the remaining Coleoptera must remain in abeyance until we have some guide to its accomplishment.

In presenting specimens, donors are most respectfully requested to observe that, however desirable it may be to accompany each specimen with its name, yet so vast a majority of our British insects are as yet unnamed, that this can only be accomplished in a few of the more popular groups. Hemiptera, Orthoptera, Coleoptera and Neuroptera are acceptable without names.

The names and addresses of the members of the Club are given below, and any additional information will be cheerfully given on application to the Secretary or Curator.

James B. Bevington, Neckinger Mill, Bermondsey.

John Birkett, F.L.S., 59, Green Street, Grosvenor Square, W.

J. S. Bowerbank, F.R.S., 3, Highbury Grove, N.

J. W. Douglas, 6, Kingswood Place, Lee, S.E.

Ferdinand Grut, 9, King Street, Southwark, S.E. (*Secretary*).

Samuel Hanson, 47, Botolph Lane, E.C.

Thomas Ingall, Bank of England, E.C.

Matthew Marshall, Bank of England, E.C.

D. W. Mitchell, M.A., F.L.S., 11, Hanover Square, W.

Edward Newman, F.L.S., 7, York Grove, Peckham, S.E. (*Curator*).

Dr. Power, 52, Burton Crescent, W.C.

W. Wilson Saunders, F.R.S., Lloyd's, E.C.

Frederick Smith, 27, Richmond Terrace, Islington, N.

William Spence, F.R.S., 18, Lower Seymour Street, Portman Square, W.

Samuel Stevens, F.L.S., 3, Clayland's Place, Clapham Road, S.

Francis Walker, F.L.S., St. Michael's House, The Grove, Highgate, N.

Robert Warington, Apothecaries' Hall, E.C.

Alfred White, F.L.S., 10, Castle Street, Saffron Hill, E.C.

The meetings are held monthly, at the residences of the members, in alphabetical rotation, at 6.30 P.M.

Notes of a Naturalist on his Passage towards the Far West.

By THOMAS BLAKISTON, Esq., Lieut. R.A.

Ship 'Prince of Wales,' at sea,
July 14, 1857.

I HAVE now been a month on board ship, and twenty-three days out of the Thames. We have for the most part had fine weather and fair winds until three days ago, when a stormy head-wind sprung up, and we did nothing but knock about for a couple of days, about 300 miles south of Greenland, which position you will readily make out on the map. Yesterday, however, a fair wind sprung up in the afternoon, and we are making fair way, steering for the entrance of Hudson's Straits, about 600 miles distance at noon to-day. Our consort the 'Prince Arthur' is in company, but retards our progress considerably, as she does not sail anything like equal to this ship.

The weather for the last few days has been damp, cloudy and cold; this latter, however, we must expect, for we are nearing the regions of ice, and are preparing for the same by getting ready "ice anchors," large iron-shod poles, and other contrivances for the difficult navigation amongst the ice.

* * * * *

The forms of animal life seen on this northern route across the ocean are but few. We have not seen a whale. Since clearing the coast of Ireland, until we approached Greenland (which we have not seen), the only birds observed were a few storm petrels and a solitary martin. This little wanderer must have been a good 300 miles off the coast. He stayed about the rigging of the ship for the greater part of a day. Since we got well across this side of the Atlantic numerous shearwaters have made their appearance, as well as some one or more species of fulmar (*Procellariæ*), and an occasional "boatswain," with his "marlingspike" looking tail: this I believe to be a species of skua (*Lestris*). Not a true gull has been seen, but only these "borderers" of the genus, if I may so call them, *Laridæ* of the ocean. What puzzles me is how all these birds come to be away out on the ocean without young: surely this is just the time of year that they should be bringing up their offspring on the coasts. Do they hatch their young? — or do they simply deposit their eggs, and then away to the sea and there live, in the hope that their eggs will be cared for by an all-wise Providence? This I offer as a question for naturalists; and should any be inclined to say that it is but few

that are on the ocean at this time of year, they had better cross the Atlantic and judge for themselves. There are not only many, but there must be immense numbers, or so many would not be observed from one ship. I speak more particularly of the shearwaters (the species I am not certain of).

Another point about which I have been thinking is, that the storm petrels (*Thalassidromæ*) have the credit of being precursors of stormy weather. Now, there is no doubt that they are seen in greatest numbers when the sea is rough, as I have myself observed; in fact, it is unusual to see any in a calm sea; but the explanation appears simple enough, viz., that they only resort to those parts of the ocean where the water is being stirred up by the wind, because their natural food (marine plants and animals), which during a smooth sea might float at a little distance from the surface, are on such occasions continually thrown to the surface, within reach of these birds.

* * * * *

On board ship 'Prince of Wales,'
Hudson's Bay, Aug. 5.

We are now in the "Bay," after having passed through the difficult passage of Hudson's Straits, the entrance of which being the first land we made, on the 24th of July, after having experienced contrary winds among the icebergs in Davis's Strait. Hudson's Strait was particularly free of ice this season, the only part where we met with it thick being about the middle, where we lay for three days, made fast among the field-ice. This sailing among ice requires considerable care and judgment, and it is rather alarming to the nerves, striking a large block, and making the ship creak and rattle as if she was going to pieces; this, however, is an occurrence of every few minutes when boring through the ice. The ships are extra planked all round with very thick pieces on the bows. Sailing among the ice on a clear day, with the water calm (as it necessarily is among the ice), is, however, pleasant. The nights are very cold, and the thermometer during the day often not much above freezing point.

Animal life in the "Straits" was confined to a good many seals, a few walrusses, one polar bear, a number of what I took for the foolish guillemot (*Uria troile*), a few, but very few, of the black guillemot (*U. grylle*), and an occasional pair of gulls.

Something in the entomological line was observed when we were

made fast to the field of ice, viz., a moth, which I dug out of the ice. It was about three inches below the surface, and had evidently fallen there, and then thawed its way in, as any substance will do.

There is always plenty of fresh water to be found on the ice in pools, and these ships always calculate on filling up their tanks from such sources.

Since we got well into Hudson's Bay there have been no birds, save what I took for a skua (*Lestris*) at a distance to-day; nor have we yet come to any ice, excepting a few scattered pieces. The region of the large "bergs" is neither here nor in Hudson's Strait, but outside in Davis's Strait, down which they come from the far North. We saw some of all sizes, from 150 feet above water and of great extent, down to the smallest pieces. * * * We have been as high as latitude 63° 8' N., and have been able to read a book clearly without the moon all night.

York Factory, Hudson's Bay,
August 20.

After knocking about in the ice for two days and a half, we arrived here on the 9th of August; and, as I was some days on board before disembarking, I amused myself with several trips to the "mud flats" during low water, where I shot a few sandpipers and gulls.

York Factory is composed of a number of stores, dwelling-houses, &c., enclosed with palisading in form of a square of 200-yard sides. It is situate on a point of land between two rivers, and this point is covered with scrub spruce, poplar, aspen, and other trees and shrubs, and is of a very boggy nature. * * * The extremes of heat and cold are experienced to a great degree, and suddenness of change in the weather is a feature in the climate, caused, no doubt, by the great quantity of ice which remains all the summer in Hudson's Bay. Mosquitoes and other flies swarm in summer, but by this time they have thinned off considerably.

Stormy weather has commenced, but I expect that we shall have better weather as we proceed inland, which, however, will most likely be slow work, on account of the low state of the water in the rivers flowing this way, caused by the unusually dry and hot summer which has been experienced here this year; in fact, I am told by those who have been in the country for many years that this is the driest summer they have ever known.

I have been very hospitably entertained at the Fort since my arrival. The officers of the Company and people on their way up the

country all mess together in one large room, and our usual fare is white fish, carebon venison, buffalo tongues, wild ducks and geese, plover, &c., besides which we have eaten one beaver, and to-morrow shall make a sturgeon look foolish I have no doubt.

I ought to add that the 'Letters of Rusticus' have afforded me much amusement as well as instruction during my passage across the Atlantic.

"To the West" is the cry.

T. W. BLAKISTON.

A Systematic List of Coleoptera found in the Vicinity of Alverstokey, South Hants. By ARTHUR ADAMS, Esq., F.L.S., Surgeon of H.M. Surveying Ship 'Actæon;' and WILLIAM BALFOUR BAIKIE, M.D., F.R.G.S.

(Continued from page 5821).

RHYNCOPHORA.

1. Fam. BRUCHIDÆ, *Leach.*

1. *Bruchus*, *Geoff., Steph.*

B. Cisti, *Fabr., Walt.* *B. canus*, *B. tibialis*, *B. debilis*, *Steph.*
Abundant on broom.

2. *Brachytarsus*, *Schönh., Steph.*

B. scabrosus, *Fabr., Steph., Walt.* A specimen captured at Haslar by Mr. C. Barron.

2. Fam. ATTELABIDÆ, *Westw.*

1. Sub-fam. *Rhynchiniæ.*

1. *Rhynchites*, *Herbst, Steph.*

R. Betulæ, *Linn., Walt.* *Deporaus Betulæ*, *Leach, Steph.* Local and not abundant; at Grange, on birches when in full flower.

R. megacephalus, *Germ., Walt.* *R. lævicollis*, *R. cyaneopennis*, *Steph.* Rather scarce.

R. æquatus, *Linn., Steph., Walt.* On flowers of the hawthorn.

R. æneovirens, *Marsh., Steph., Walt.* Hedges, by beating; scarce.

2. Sub-fam. *Apioninæ*.2. *Apion*,* *Herbst*, *Steph.*

- A. Craccæ*, *Linn.*, *Steph.*, *Walt.* On *Vicia cracca* and in hedges.
A. Pomonæ, *Fabr.*, *Steph.*, *Walt.* Not uncommon.
A. subulatum, *Kirby*, *Steph.*, *Walt.* Occasional.
A. violaceum, *Kirby*, *Steph.*, *Walt.* Common; meadows, by sweeping.
A. Hydrolapathi, *Kirby*, *Steph.*, *Walt.* Occasional, on *Rumices*.
A. frumentarium, *Linn.*, *Walt.* *A. hæmatodes*, *Steph.* Common; especially in grass, and on the great dock.
A. rubens, *Ing.*, *Steph.*, *Walt.* Rather scarce.
A. Onopordi, *Kirby*, *Steph.*, *Walt.* Occasional.
A. Radiolus, *Marsh.*, *Steph.*, *Walt.* Rather common.
A. æneum, *Fabr.*, *Steph.*, *Walt.* Not rare.
A. Carduorum, *Kirby*, *Steph.*, *Walt.* Abundant.
A. rufirostre, *Fabr.*, *Steph.*, *Walt.* Common; on *Malva sylvestris*.
A. striatum, *Marsh.*, *Steph.*, *Walt.* Occasional.
A. Ervi, *Kirby*, *Steph.*, *Walt.* Not common.
A. virens, *Herbst*, *Steph.*, *Walt.* Occasional; in grassy places.
A. Loti, *Kirby*, *Steph.*, *Walt.* On *Lotus corniculatus*; occasional.
A. flavipes, *Fabr.*, *Steph.*, *Walt.* In fields; common.
A. assimile, *Kirby*, *Steph.*, *Walt.* Abundant; among grass.
A. Trifolii, *Linn.*, *Walt.* *A. æstivum*, *Steph.* In grassy places; not frequent.
A. varipes, *Germ.*, *Steph.*, *Walt.* Not rare.
A. ebeninum, *Kirby*, *Steph.*, *Walt.* Occasionally in fields, by sweeping.
A. Pisi, *Meg.*, *Steph.*, *Walt.* Not common.

3. *Oxystoma*, *Dum.*, *Steph.*

- O. fuscistrotris*, *Fabr.*, *Steph.*, *Walt.* On furze.
O. Ulicis, *Fost.*, *Steph.*, *Walt.* On broom and furze; common.
O. Genistæ, *Kirby*, *Steph.*, *Walt.* On broom; less common.

3. Fam. CURCULIONIDÆ, *Leach.*1. Sub-fam. *Brachycerinæ*.1. *Cneorhinus*, *Schönh.* *Philopedon*, *Steph.*

* Many of our species of *Apion* have been kindly compared and determined for us by G. R. Waterhouse, Esq.

C. geminatus, *Fabr.*, *Steph.*, *Walt.* *C. scrobiculatus*, *Steph.* On bushes in copses.

C. exaratus, *Marsh.*, *Steph.*, *Walt.* *C. plumbeus*, *Marsh.* On *Arundo arenaria* in Hayling Island.

2. *Strophosomus*, *Billb.*, *Steph.*

S. Coryli, *Fabr.*, *Steph.*, *Walt.* On hazel; common.

S. Faber, *Herbst*, *Walt.* *S. pilosellus*, *Steph.* Under loose stones on banks at Browndown.

3. *Sciaphilus*, *Schönh.*, *Steph.*

S. muricatus, *Fabr.*, *Steph.*, *Walt.* In hedges, by sweeping.

4. *Tanymecus*, *Germ.*, *Steph.*

T. palliatus, *Fabr.*, *Steph.*, *Walt.* In hedges; rather scarce.

5. *Sitones*, *Germ.*, *Schönh.* *Sitona*, *Germ.*, *Steph.*

S. hispidulus, *Fabr.*, *Steph.*, *Walt.* Very common.

S. regensteinensis, *Herbst*, *Steph.*, *Walt.* Common; on furze.

S. lineatus, *Linn.*, *Steph.*, *Walt.* In hedges; common.

S. flavescens, *Marsh.* (var.), *Steph.* *S. caninus*, *S. nigriclavis*,

S. longiclavis, *Steph.* In meadows, by sweeping.

S. tibialis, *Herbst.* In meadows, by sweeping.

6. *Polydrosus*, *Germ.*, *Steph.*

P. pterygomalis, *Schönh.* In hedges, by sweeping; rare.

P. confluens, *Kirby*, (var.) *Steph.* *P. chrysomela*, *Steph.* In grassy places; occasional.

2. Sub-fam. *Cleoninae*.

7. *Cleonus*, *Meg.*, *Steph.*

C. sulcirostris, *Linn.*, *Steph.*, *Walt.* Rare; first taken on thistles near Stokes Bay, by Master H. B. Adams.

8. *Alophus*, *Schönh.*, *Steph.*

A. triguttatus, *Fabr.*, *Steph.*, *Walt.* Rather scarce; on field-paths.

9. *Liophlæus*, *Germ.*, *Steph.*

L. nubilus, *Fabr.*, *Steph.*, *Walt.* Roadsides and paths; scarce.

10. *Barynotus*, *Germ.* *Merionus*, *Steph.*

B. obscurus, *Fabr.*, *Steph.*, *Walt.* Occasional.

B. mærens, *Fabr.*, *Walt.* *B. elevatus*, *Steph.* In old hedges, by beating.

3. Sub-fam. *Molytinæ*.11. *Hylobius*, *Schönh.*, *Steph.*

H. Abietis, *Linn.*, *Steph.*, *Walt.* Common; among felled trees and in houses.

12. *Molytes*, *Schönh.*, *Steph.*

M. coronatus, *Latr.*, *Steph.*, *Walt.* On chalky banks and in old hedge-rows; not unfrequent.

13. *Leiosomus*, *Kirby*, *Steph.*

L. ovatulus, *Clairv.*, *Steph.*, *Walt.* On banks under sticks and leaves.

14. *Phytonomus*, *Schönh.* *Hypera*, *Steph.*

P. punctatus, *Fabr.*, *Steph.*, *Walt.* Fields and hedges; very common.

P. Polygoni, *Fabr.*, *Steph.*, *Walt.* Rare; in damp places at Grange, on *Polygonum Persicaria*.

P. Rumicis, *Linn.*, *Steph.*, *Walt.* Rare; on docks in swampy spots.

P. murinus, *Fabr.*, *Steph.*, *Walt.*

P. nigrirostris, *Fabr.*, *Steph.*, *Walt.* Common; in mossy banks.

P. variabilis, *Herbst*, *Steph.*, *Walt.* *Villosulus bimaculatus*, *Steph.* In hedges, by beating; common.

4. Sub-fam. *Phyllobiinae*.15. *Phyllobius*, *Schönh.*, *Steph.*

P. Alneti, *Fabr.*, *Walt.* *P. Pyri*, *Steph.* On trees in shrubberies.

P. vespertinus, *Fabr.*, *Walt.* *P. Pyri*, *Linn.* *P. Mali*, *Steph.* On foliage at Grange.

P. argentatus, *Linn.*, *Steph.*, *Walt.* On foliage; rather rare.

P. oblongus, *Linn.*, *Walt.* (*Nemoicus*), *Steph.* Rather common; on grassy banks.

P. Pomonæ, *Oliv.*, *Steph.*, *Walt.* (var.) *albidus*, *Steph.* Common; in hedges and on banks.

P. uniformis, *Marsh.*, *Steph.*, *Walt.* *P. parvulus*, *Steph.* Very common; among grass and clover.

5. Sub-fam. *Omiinae*.16. *Trachyphlæus*, *Germ.*, *Steph.*

T. scabriculus, *Linn.*, *Steph.*, *Walt.* *T. digitalis*, *Steph.* Under stones; not common.

17. *Omius*, *Germ.*

O. hirsutulus, *Fabr.*, *Walt.* (*Brachysomus*), *Steph.* Sandy places ; rare.

O. brunripes, *Oliv.*, *Walt.* (*Otiiorhynchus*), *Steph.* Under stones on damp banks and along hedge-rows ; very common.

6. Sub-fam. *Otiiorhynchinae*.18. *Otiiorhynchus*, *Germ.*, *Steph.*

O. sulcatus, *Fabr.*, *Steph.*, *Walt.* Under stones in sandy places and in chalk pits.

O. picipes, *Fabr.*, *Walt.* Under small stones and at roots of grass on Browndown ; common.

O. rugifrons, *Gyll.*, *Steph.*, *Walt.* In hedges.

O. ovatus, *Linn.*, *Steph.*, *Walt.* Occasional ; in hedges.

O. niger, *Fabr.*, *Steph.*, *Walt.* On commons, and by sweeping among tall grass ; rather common.

O. scabrosus, *Marsh.*, *Steph.*, *Walt.* Not frequent.

O. ligneus, *Oliv.*, *Steph.*, *Walt.* Occasional.

7. Sub-fam. *Eriirhininae*.19. *Magdalinus*, *Germ.* *Magdalis*, *Steph.*

M. atramentarius, *Marsh.*, *Steph.*, *Walt.* *M. carbonaria*, *M. aterima*, *M. asphaltina* (♂), *Steph.* In hedges, by sweeping.

M. Pruni, *Linn.*, *Walt.* (*Rhinodes*), *Steph.* In hedges, by sweeping ; rare.

20. *Eriirhinus*, *Schönh.* *Notaris*, *Steph.*

E. acridulus, *Linn.*, *Steph.*, *Walt.* By sweeping among grass in swampy places.

E. bimaculatus, *Fabr.*, *Steph.*, *Walt.* Among damp grass, by sweeping.

21. *Dorytomus*, *Schönh.*, *Steph.* *Eriirhinus*, *Walt.*

D. pectoralis, *Panz.*, *Steph.*, *Walt.* A single specimen taken off birch, by sweeping, at Grange.

D. Tortrix, *Linn.*, *Steph.*, *Walt.* Off herbage, by sweeping.

22. *Anthonomus*, *Germ.*, *Steph.*

A. pedicularius, *Linn.*, *Walt.*, (var.) *Steph.* On hawthorn flowers.

A. Rubi, *Herbst*, *Steph.*, *Walt.* *A. obscurus*, *Steph.* On brambles ; occasional.

23. *Balaninus*, *Germ.*, *Steph.*

B. turbatus, *Gyll.*, *Steph.*, *Walt.* *B. Elephas*, *Steph.* Two specimens captured in the vicinity of Portsmouth, by C. Willcox, Esq.

B. Nucum, *Linn.*, *Steph.*, *Walt.* On hazels; not unfrequent.

B. venosus, *Germ.*, *Walt.* *O. Glandium*, *Steph.* One specimen taken near Haslar.

B. villosus, *Fabr.*, *Steph.*, *Walt.* One captured in Rowner Copse.

B. pyrrhoscerò, *Marsh.*, *Steph.*, *Walt.* Hedges, by sweeping; rare.

24. *Orchestes*, *Ill.*, *Steph.*

O. Quercus, *Linn.*, *Steph.*, *Walt.* On oaks; rather rare.

O. Alni, *Linn.*, *Steph.*, *Walt.* Rather scarce; on alders.

O. Ilicis, *Fabr.*, *Steph.*, *Walt.* *O. pubescens*, *Steph.* One specimen taken off ivy.

25. *Tachyerges*, *Schönh.*, *Steph.*

T. Salicis, *Linn.*, *Walt.* *T. Capreæ*, *Steph.* On willows; rather abundant.

T. Stigma, *Germ.*, *Steph.*, *Walt.* *T. Orchestes*, *T. Populi*, *Steph.* Not abundant.

8. Sub-fam. *Cryptorhynchinæ*.26. *Cryptorhynchus*, *Ill.*, *Steph.*

C. Lapathi, *Linn.*, *Steph.*, *Walt.* Not uncommon; on willows.

27. *Cæliodes*, *Schönh.*

C. Quercus, *Fabr.*, *Walt.* (*Ceutorhynchus*), *Steph.* Rare; swept off *Osmunda regalis* near oaks, at Grange.

C. ruber, *Marsh.*, *Walt.* (*Ceutorhynchus*), *Steph.* Not common.

C. Geranii, *Payk.*, *Steph.*, *Walt.* One taken by sweeping among grass.

C. didymus, *Fabr.*, *Steph.*, *Walt.* On nettles; common.

28. *Hydronomus*, *Schönh.*, *Steph.*

H. Alismatis, *Marsh.*, *Steph.*, *Walt.* Rare; on *Alisma plantago*

29. *Rhinoncus*, *Schönh.*, *Steph.*

R. pericarpus, *Fabr.*, *Steph.*, *Walt.* *R. Spartii*, *Steph.* Off hazel-bushes, by beating.

R. subfasciatus, *Gyll.*, *Walt.* *R. tibialis*, *Steph.* Occasional.

30. *Ceutorhynchus*, *Schönh.* *Nedyus*, *Steph.*

C. assimilis, *Payk.*, *Steph.*, *Walt.* Common.

- C. Erysimi*, *Fabr.*, *Steph.*, *Walt.* Occasional.
C. trimaculatus, *Fabr.*, *Walt.* *C. Litura*, *Steph.* On thistles : abundant.
C. pollinarius, *Steph.*, *Walt.* Very common ; on nettles.
C. quadridens, *Panz.*, *Walt.* *C. Boraginis*, *Steph.* Occasional.
C. Echii, *Fabr.*, *Steph.*, *Walt.* Abundant on *Echium vulgare*, on Hayling Island.
C. Troglodytes, *Fabr.*, *Steph.*, *Walt.* In clover fields, by sweeping.
C. sulcicollis, *Gyll.*, *Walt.* (*Ceutorhynchus*), *Steph.* Sweeping among herbage ; common.
31. *Orobitis*, *Germ.*, *Steph.*
O. cyaneus, *Linn.*, *Steph.*, *Walt.* One specimen taken in moss.

9. Sub-fam. *Cioninæ*.

32. *Cionus*, *Clairv.*, *Steph.*
C. Scrophulariæ, *Linn.*, *Steph.*, *Walt.* On *Scrophularia nodosa* while in flower ; not very abundant.
C. Verbasci, *Fabr.*, *Steph.*, *Walt.* Very rare ; on *Verbascum Thapsus*, at Rowner and at Grange.
33. *Gymnetron*, *Schönh.*
G. Veronicæ, *Germ.*, *Walt.* Rare ; on aquatic plants in ditches at Grange.
G. Antirrhini, *Germ.*, *Walt.* (*Rhinusa*), *Steph.* Hiding in flowers of *Linaria repens* ; rather scarce.

34. *Mecinus*, *Germ.*, *Steph.*
M. Pyraister, *Herbst*, *Steph.* *M. semicylindricus*, *Steph.* In clover fields, by sweeping.
M. circulatus, *Marsh.*, *Steph.*, *Walt.* *M. hæmorrhoidalis*, *Steph.* Sweeping in meadows ; rather abundant.

35. *Nanophyes*, *Schönh.* *Sphærule*, *Steph.*
N. Lythri, *Fabr.*, *Steph.*, *Walt.* On *Lythrum salicaria* ; rather plentiful.

36. *Sitophilus*, *Schönh.* *Calandra*, *Steph.*
S. granarius, *Linn.*, *Steph.*, *Walt.* Occasional, on walls ; one taken at Grange.

4. Fam. HYLESINIDÆ, *Shuck.*1. *Hylastes*, *Erich., Steph.*

H. ater, *Payk., Steph.* Not common.

H. fuscescens, *Steph.* Rare; in old trees.

2. *Hylesinus*, *Fabr., Steph.*

H. crenatus, *Fabr., Steph.* One specimen taken.

H. Fraxini, *Fabr., Steph.* Local; occasionally seen flying in little clouds in the sun.

5. Fam. BOSTRICHIDÆ, *Schaum.*1. *Dendroctonus*, *Erich., Steph.*

D. piniperda, *Linn., Steph.* A single specimen captured.

2. *Scolytus*, *Geoff., Steph.* *Ekkoptogaster*, *Herbst.*

S. Destructor, *Oliv., Steph.* *Ekkoptogaster Scolytus*, *Herbst.* In old elms, burrowing under the bark; common.

S. pygmæus, *Fabr., Steph.* In felled trees, under the loose bark; rare.

WM. BALFOUR BAIKIE.

*Determination of the Species of Panorpina, Ephemerina, Hemero-
biina, &c., described by Mr. Stephens in his 'Illustrations of
British Entomology.'* By H. HAGEN, M.D.*

PANORPINA.

Boreus hiemalis, *Steph. Ill. Brit. Ent. Mand. vi. 51* = *Panorpa hiemalis* of Linneus.

Panorpa communis, *Id. p. 52* = *P. communis* of Linneus.

Panorpa affinis = *P. germanica* of Rambur, not of Linneus.

Panorpa apicalis is a new species, and = the *P. montana* of Brauer.

Panorpa borealis, *Id. p. 53.* Of this species there is no specimen.

Panorpa germanica = *P. germanica* of Linneus.

EPHEMERINA.

Ephemerella vulgata, *Id. p. 55* = *E. vulgata* of Linneus.

Ephemerella cognata, *Id. p. 56* = *E. danica* of Müller.

* Obligingly communicated by Dr. Gray, of the British Museum.

Ephemera Stigma = *Potamanthus marginatus* of Zetterstedt, female; and *E. talcosa* is referrible to the same species.

Ephemera lutea is the female of a new species of *Baëtis*, and *E. marginata* is the male of the same.

Ephemera submarginata, *Id.* p. 58, is the female, and *E. dispar* the subimago of the male of a new species of *Potamanthus*; it must stand as *Potamanthus dispar*.

Ephemera fusca is the male of a new species of *Potamanthus*.

Ephemera diluta. Of this species there is no example.

Ephemera apicalis, *Id.* p. 59, is a new species of *Cloe*.

Ephemera rufescens = *Potamanthus fuscus*, male and female; and *E. rosea* is the same species.

Ephemera helvipes = *Potamanthus apicalis*, female.

Ephemera dubia is the male of a new species of *Cloe*.

Ephemera minor is the female of a new species of *Potamanthus*.

Cænis macrura is a new species, male.

Cænis dimidiata, *Id.* p. 61, is the male of *C. grisea* of Pictet; *C. brevicauda* is the subimago of the female of the same species, and *C. pennata* is the imago.

Cænis Harrisella and *C. interrupta*, *Id.* p. 62, are both wanting.

Cænis chironomiformis = *Ephemera halterata* of Fabricius, female.

Baëtis dispar, *Id.* p. 63, is the male, and *B. venosa* the female, of a new species.

Baëtis longicauda, *B. costalis*, *Id.* p. 64, and *B. subfusca*, constitute a new species: *costalis* and *subfusca* are females.

Baëtis elegans is a new species, the male a subimago, the female an imago.

Baëtis semicolorata is a new species, male.

Baëtis lateralis, *Id.* p. 65, is a new species, male and female.

Baëtis obscura is the female of *Ephemera rosea*.

Baëtis carnea. There is no specimen.

Baëtis striata is the female of a new species of *Cloe*.

Baëtis bioculata, *Id.* p. 65, is the male, and *B. fuscata*, *Id.* p. 66, the female of a new species of *Cloe*.

Baëtis culiciformis = *Ephemera diptera* of Linneus, male, and *Cloe dipterum*, p. 68, are females, the imago and subimago, of the same species.

Baëtis horaria is the male, and *B. verna* the female of a new species of *Cloe*. The name *horaria* must be adopted. *B. singulata*, p. 67, is another male of the same species, and *Cloe ochraceum*, p. 68, is a female.

Baëtis autumnalis. There is no specimen.

Cloëon hyalinatum, female ; C. albipenne, *Id.* p. 69, male ; C. unicolor, female ; and C. Virgo, *Id.* p. 70, female, constitute but one species : it is the C. bioculata of Zetterstedt.

Cloëon cognatum and C. dimidiatum are male and female of a new species. The first of these names must be adopted.

HEMEROBIINA.

Osmylus maculatus, *Id.* p. 99 = Hemerobius chrysops of Linneus.
Drepanopteryx phalænoides, p. 100 = Hemerobius phalænoides of Linneus.

Chrysopa fulviceps, p. 101 = C. capitata of Wesmael.

Chrysopa capitata, p. 102 = C. capitata of Schneider.

Chrysopa reticulata and C. maculata = Hemerobius Perla of Linneus.

Chrysopa abbreviata, p. 103 = C. abbreviata and C. phyllochroma.

Chrysopa immaculata = C. abbreviata.

Chrysopa carnea, p. 103, C. alba, p. 104, and affinis = C. vulgaris of Schneider.

Chrysopa ventralis, p. 103 = C. ventralis and C. aspersa.

Chrysopa angustipennis, p. 104, is a new species.

Chrysopa Perla, p. 105 = C. vittata of Wesmael.

Chrysopa subfalcata = C. flava of Scopoli.

Hemerobius hirtus, p. 106 = H. hirtus of Linneus and H. variegatus. The latter is placed as the type of the species.

Hemerobius angulatus = H. intricatus.

Hemerobius concinnus = H. cylindripes of Wesmael.

Hemerobius fuscus, p. 107, and H. subnebulosus = H. nervosus of Fabricius.

Hemerobius nebulosus, H. Humuli, p. 108, H. obscurus, H. lutescens, p. 109, H. affinis, H. paganus, p. 110, H. apicalis, H. subfasciatus, p. 111, H. irroratus = H. Humuli of Linneus.

Hemerobius fasciatus, p. 108, H. perelegans, p. 109, H. Pini, p. 111, H. Stigma, p. 112, H. crispus = H. phaleratus of Hoffmannsegg.

Hemerobius nervosus = H. nervosus and H. Humuli of Linneus.

Hemerobius marginatus, p. 109, is a new species.

Hemerobius nemoralis, p. 110 = H. paganus of Vill.

Hemerobius punctatus, p. 111, and H. pallidus, p. 112 = H. micans of Olivier.

Hemerobius variegatus, p. 113 = H. variegatus of Fabricius.

Hemerobius fimbriatus, *Id.* p. 113. There is no specimen to illustrate this species.

Hemerobius elegans, p. 113, and *H. Marshami*, p. 114 = *H. pygmaeus*.

Hemerobius fuscatus, p. 114, *H. nitidulus* and *H. confinis*, p. 115 = *Sisyra fuscata* of Fabricius.

Coniopteryx tineiformis, *Id.* p. 116 = *Phryganea alba* of Fabricius.

Coniopteryx aleurodifformis, *Id.* p. 116, is a new species.

Coniopteryx psociformis, *Id.* p. 117, is a new species.

PSOCINA.

Psocus pilicornis, *Id.* p. 117, male; *P. picicornis*, *Id.* p. 118, female; *P. fasciatus*, female; *P. varietus*, female; and *P. atomarius*, male = *P. variegatus* of Latreille.

Psocus maculatus, *Id.* p. 119, and *P. subfasciatus*, are male and female of a new species.

Psocus lineatus = *P. lineatus* of Fabricius.

Psocus nebulosus is a new species.

Psocus similis, *Id.* p. 120, is a new species.

Psocus bifasciatus, *P. contaminatus* and *P. megastigmus* constitute a species previously undescribed, for which the name of *bifasciatus* must be adopted.

Psocus subnebulosus, *Id.* p. 121, is a new species.

Psocus longicornis is a new species, and = the *Psocus Naso* of Rambur.

Psocus immunis is a new species.

Psocus venosus = *P. strigosus* of Curtis.

Psocus vittatus, *Id.* p. 122 = *P. vittatus* of Dalman.

Psocus ochropterus, *P. flavidus*, *P. flavicans*, *Id.* p. 123, and *P. obsoletus*, constitute a new species, for which the name of *ochropterus* must be adopted.

Psocus hyalinus, *P. bipunctatus*, *P. sexpunctatus* and *P. quadrimaculatus*, *Id.* p. 124 = *P. 4-maculatus* of Latreille.

Psocus striatus and *P. flavipes* constitute a new species, for which the former name must be adopted.

Psocus subocellatus, *P. quadripunctatus*, *Id.* p. 125, and p. *costalis*, p. 126 = *P. cruciatus* of Linneus.

Psocus immaculatus, *Id.* p. 125, *P. rufescens* and *P. flavescens* = *P. strigosus* of Curtis.

Psocus subpunctatus, *Id.* p. 126, is a new species.

Psocus nervosus is a new species.

Psocus maculipennis is a new species.

Psocus nigricornis, *P. phæopterus*, *Id.* p. 127, and *P. abdominalis*, constitute a new species, for which the name of *nigricornis* must be adopted.

Psocus nigricans = *P. domesticus*, *B.*

Psocus dubius is a new species.

Atropos pulsatorius = *P. pulsatorius* of Linneus.

Atropos fatidicus. The specimens thus named are the larva and pupa of a species of *Psocus*.

RAPHIDIINA.

Raphidia ophiopsis, *Id.* p. 130, and *R. megacephala* = *R. media* of Burmeister.

Raphidia londinensis = *R. Schneiderii* of Ratzeburg.

Raphidia affinis, *Id.* p. 131, and *H. maculicollis* = *R. ophiopsis* of Linneus.

Raphidia confinis = *R. xanthostigma* of Schummel.

Sialis lutarius, *Id.* p. 132 = *Hemerobius lutarius* of Linneus.

PERLINA.

Perla marginata, *Id.* p. 135 = *P. bipunctata* of Pictet.

Perla cephalotes, p. 136 = *P. marginata* of Pictet.

Perla bicaudata = *P. microcephala* of Pictet.

Isogenus Nubecula, p. 137 = *P. Nubecula* of Pictet.

Chloroperla fuscipennis, p. 138, *C. lateralis*, *C. media*, p. 139, *C. venosa* and *C. rufescens* = *P. Rivulorum* of Pictet.

Chloroperla flava and *C. pallida* = *Chloroperla apicalis* of Newman.

Nemoura nebulosa, p. 140, *N. fuliginosa*, p. 141, *N. pallida*, *N. cruciata*, *N. affinis* and *N. annulata*, p. 142, constitute together a new species, *N. nebulosa*.

Nemoura pusilla, p. 142, and *N. luteicornis* = *N. variegata* of Pictet.

Nemoura pallipes, p. 142, and *N. fumosa*, p. 143, constitute a new species, *N. pallipes*.

Nemoura pallicornis, p. 143, and *N. nitida*, constitute a new species, *N. pallicornis*.

Nemoura cambrica, p. 143, is a new species.

Nemoura fulvicollis is a new species.

Nemoura variegata, p. 144 = *N. nebulosa* of Pictet.

Leuctra geniculata, p. 145, is a new species.

Leuctra fusciventris = *L. cylindrica* of Pictet.

Leuctra abdominalis is a new species.

H. HAGEN.

Occurrence of Deilephila Euphorbiæ at Taunton.—Perhaps it may be worth recording that *Deilephila Euphorbiæ* was captured here two or three weeks ago. It is rather singular, as we are twenty miles from any sea coast, and more than that distance from any place likely to afford food for the larva. There is also a specimen in the collection (now in the Museum) of the late W. Baker, Esq., which I suppose to have been taken in this neighbourhood.—*W. G. Rawlinson; Taunton, October 21, 1857.*

Note on Pterophorus Loewii, Zeller, a Species new to Britain.—Last August, while at Southport, amongst other things I took a plume which I did not know. As I could not go again, I requested my friend Mr. Davis to take all the plumes he could for me, and shortly afterwards he sent me several specimens, evidently the same species as the one I took, but much finer; and I at once concluded it was a species new to our list. Having forwarded a pair of fine specimens to Mr. Stainton, he writes me, "Your plume, as you anticipated, is quite new to this country; it has hitherto only been found in Italy and at Rhodes."—*C. S. Gregson; Edge Lane, Stanley, Liverpool, November, 1857.*

Capture of Hydroporus ferrugineus.—On the 10th of March, last year, I had the pleasure of taking, out of a horse-pond near us, an interesting-looking *Hydroporus*, bearing some resemblance to a pale specimen of *memnonius*, yet in many points unlike anything I had previously picked up, either in this neighbourhood or anywhere else. On referring to the descriptions in Stephens's 'Manual' of the species still unrepresented in my collection, I found that that of *H. ferrugineus* came nearest the characteristics of the little stranger; but, for the sake of greater certainty, the specimen was submitted to the scrutiny of Dr. Power, whom I, like the editor of the 'Zoologist,' delight in regarding as "the referee from whose decision in such cases there is no appeal." After comparing the Scotch insect with the specimen in Stephens's cabinet, his verdict was "Not *ferrugineus*." Some time ago I fell in with Aubé's description of *H. Victor*, which Dr. Schaum, in his 'Revision of the British Hydrocantharidæ' (Zool. 1887), gives as a synonym of *H. ferrugineus*, and little doubt was thereafter left on my mind that I had found the insect's name as well as its local habitation. Both Dr. Schaum, to whose labours British entomologists are largely indebted, and Dr. Power have homologated my conclusion; the former, however, still believing that he is correct in his statement as to the synonymy. This, as he observes, may be easily reconciled with the opinion of the latter, by supposing that the original specimen of *H. ferrugineus* has been inadvertently misplaced. Still it might be asked, With what has it changed place? This rare species, which my friend the Rev. Hamlet Clark, who has given so much attention to our native water beetles, has not met with in any of the collections with which he is acquainted, has occurred again, sparingly, this summer, but not in the horse-pond, notwithstanding many an anxious search. The truth is, stagnant water does not seem to be its element, any more than the salt water was to the insects found by Mr. Darwin off the coast of South America. It delights in streams, and companies with *H. Davisii*, *Agabus guttatus* and *A. font-*

nalis, of which I have at length obtained a full series, and some to spare. After my attention had been drawn to this prized addition to our Scotch Hydroperi, I detected a specimen in Mr. Young's collection of Renfrewshire Coleoptera, and Dr. Power informs me that has found another in the cabinet of Mr. Syme, who probably took he it near Dollar.—*R. Hislop; Blair Lodge, Falkirk, November 10, 1857.*

Locusts in Leicestershire.—During the recent flight of locusts several were taken in different parts of this county; one at Wymeswold, a second at Little Glen, and a third at Smeeton, Westerby, about a mile from hence.—*Alfred Merle Norman; Kibworth, Leicestershire, November, 1857.*

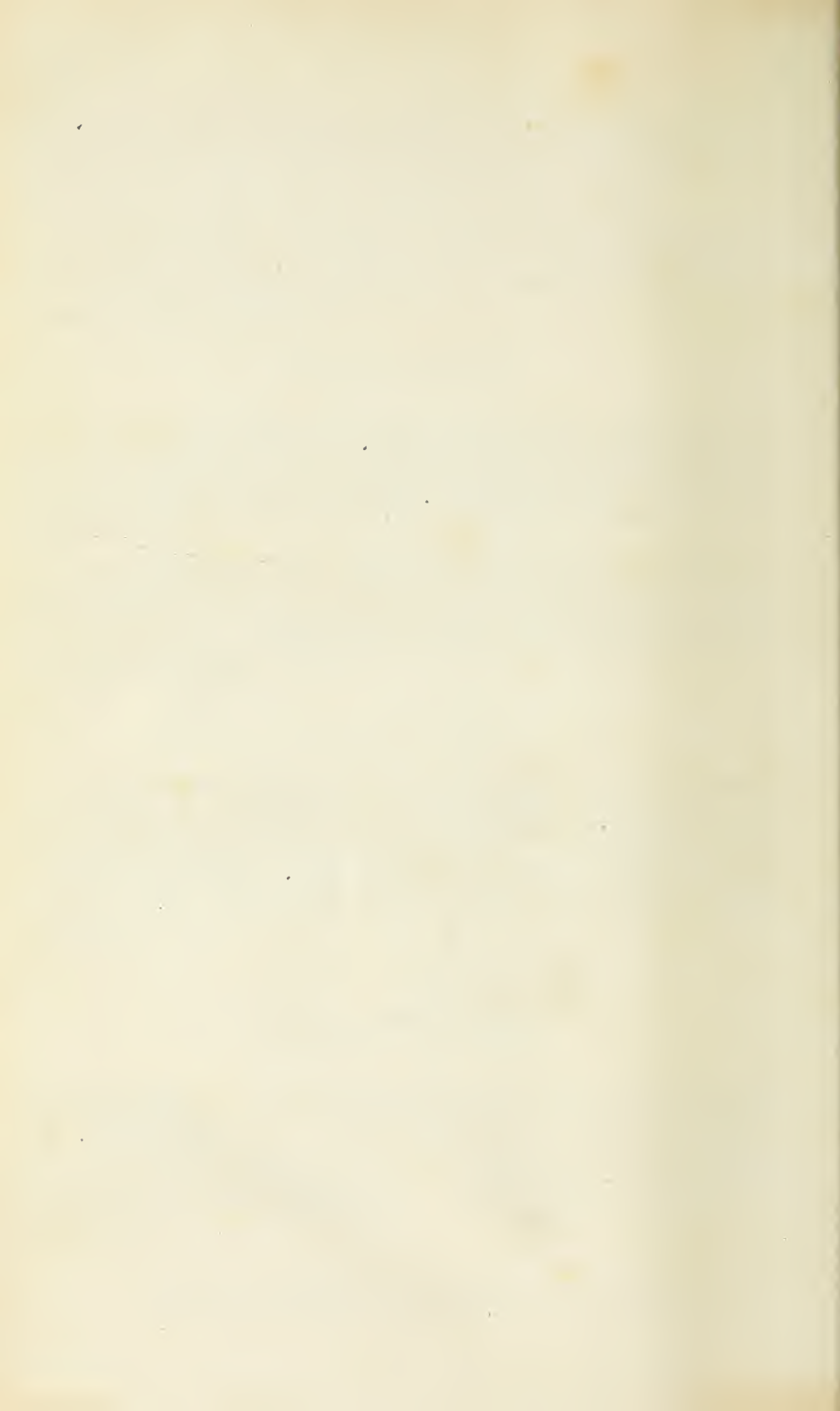
Note on the Occurrence of the Honey Buzzard near Lowestoft.—About six weeks since a male specimen of the honey buzzard was killed at Somerleyton, near this place, on the estate of Sir S. Morton Peto, Bart., a locality where this species has not unfrequently occurred on previous occasions. The present specimen appears by its plumage to be a bird of the second year.—*J. H. Gurney; Lowestoft, October 26, 1857.*

Occurrence of the Great Snipe at the Land's End.—A specimen of the great snipe (*Scolopax major*) was killed at St. Levan, near the Land's End, last week; it was in a very emaciated state. The occurrence of the solitary or great snipe is so rare in the western counties that each example deserves a record.—*Edward Hearle Rodd; Penzance, November 2, 1857.*

On Preserving Sea Anemones.—In answer to the application in the last number of the 'Zoologist' as to the best method of preserving the Actiniæ for the cabinet, I beg to enclose you an extract from the admirable 'Manual of Scientific Enquiry,' p. 361; it is published by Murray. I should recommend all who are interested in Science to purchase a copy. "Sea anemones must be preserved entire, in alcohol or saline solution, and of the latter the following (No. 1 of Goadley's solutions) has been found successful:—

Bay Salt	4 oz.
Alum	2 oz.
Corrosive sublimate	2 grains
Rain water	1 quart

In order to preserve the specimens expanded they must be removed, and placed alive in a dish of sea water, and when they have protruded and expanded their tentacles the solution should be slowly and quietly added to the sea water, when the animal may be killed, and fixed in its expanded state. So preserved, the specimens should be transferred to a bottle of fresh solution."—*William Thompson; Weymouth, November 5, 1857.*







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