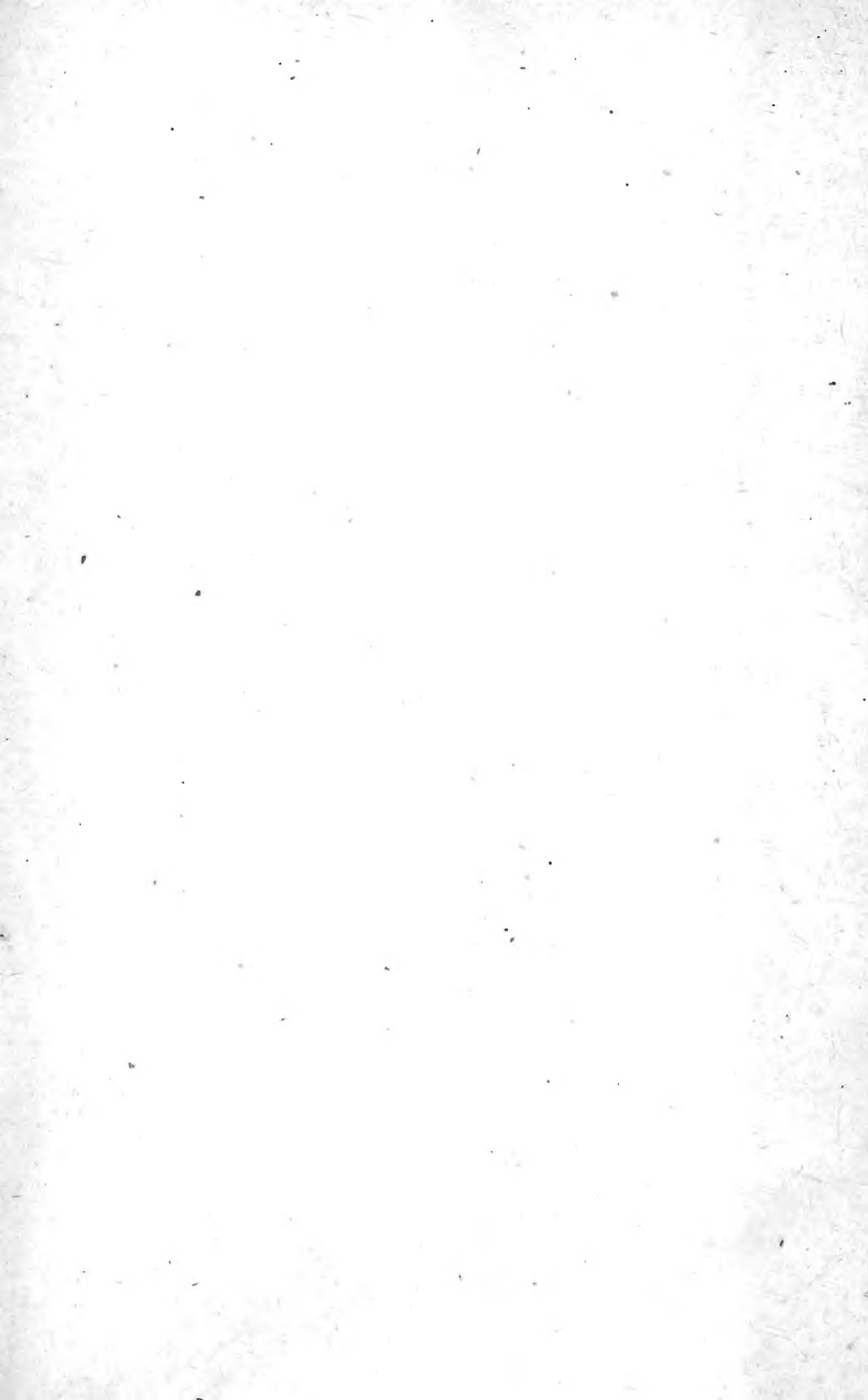




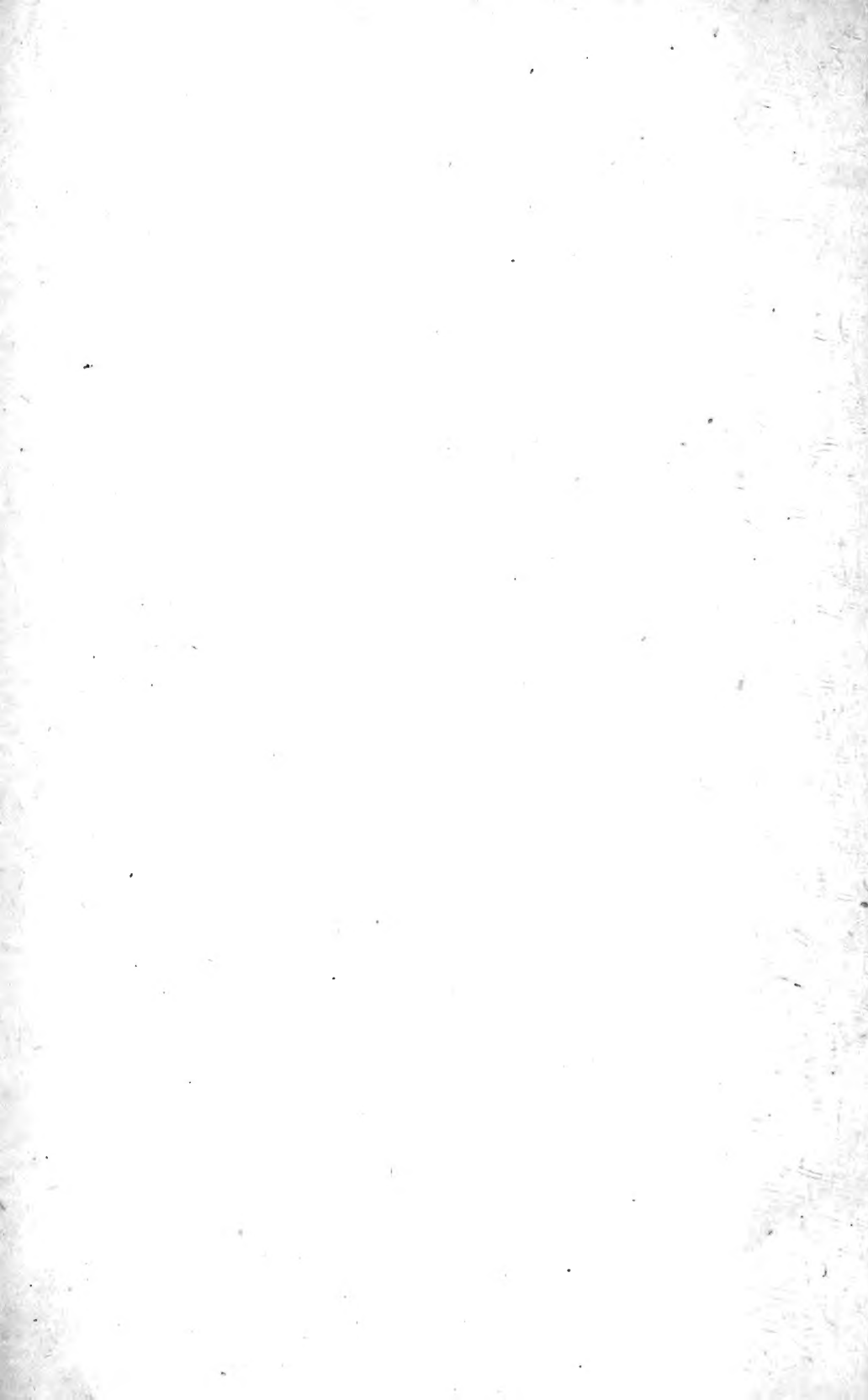
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THE
ZOOLOGIST:
A
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OF
NATURAL HISTORY.

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SECOND SERIES.—VOLUME THE THIRD.

(OR TWENTY-SIXTH FROM THE COMMENCEMENT.)



LONDON:
JOHN VAN VOORST, PATERNOSTER ROW.

M.DCCC.IXVIII.

Say, why does Man, while to his opening sight
Each shrub presents a source of chaste delight,
And Nature bids for him her treasures flow,
And gives to him alone his bliss to know,
Why does he pant for Vice's deadly charms?
Why clasp the syren Pleasure to his arms,
And suck deep draughts of her voluptuous breath,
Though fraught with ruin, infamy and death?
Could he who thus to vile enjoyment clings
Know what calm joy from purer sources springs;
Could he but feel how sweet, how free from strife,
The harmless pleasures of a harmless life,
No more his soul would pant for joys impure,
The deadly chalice would no more allure,
But the sweet potion he was wont to sip
Would turn to poison on his conscious lip.

Fair Nature! thee in'all thy varied charms,
Fain would I clasp for ever in my arms!
Thine are the sweets which never, never sate,
Thine still remain through all the storms of fate.

HENRY KIRKE WHITE.

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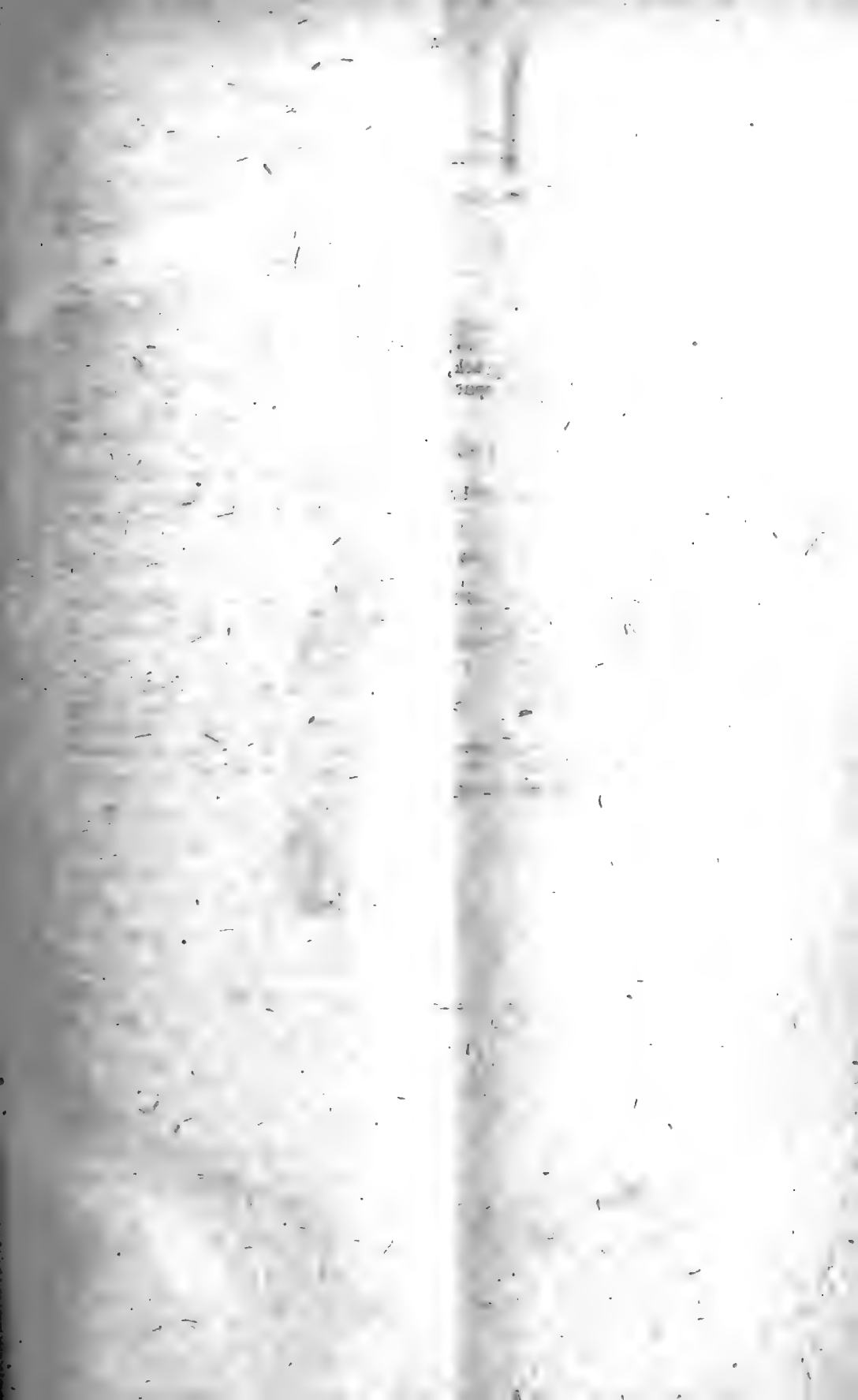
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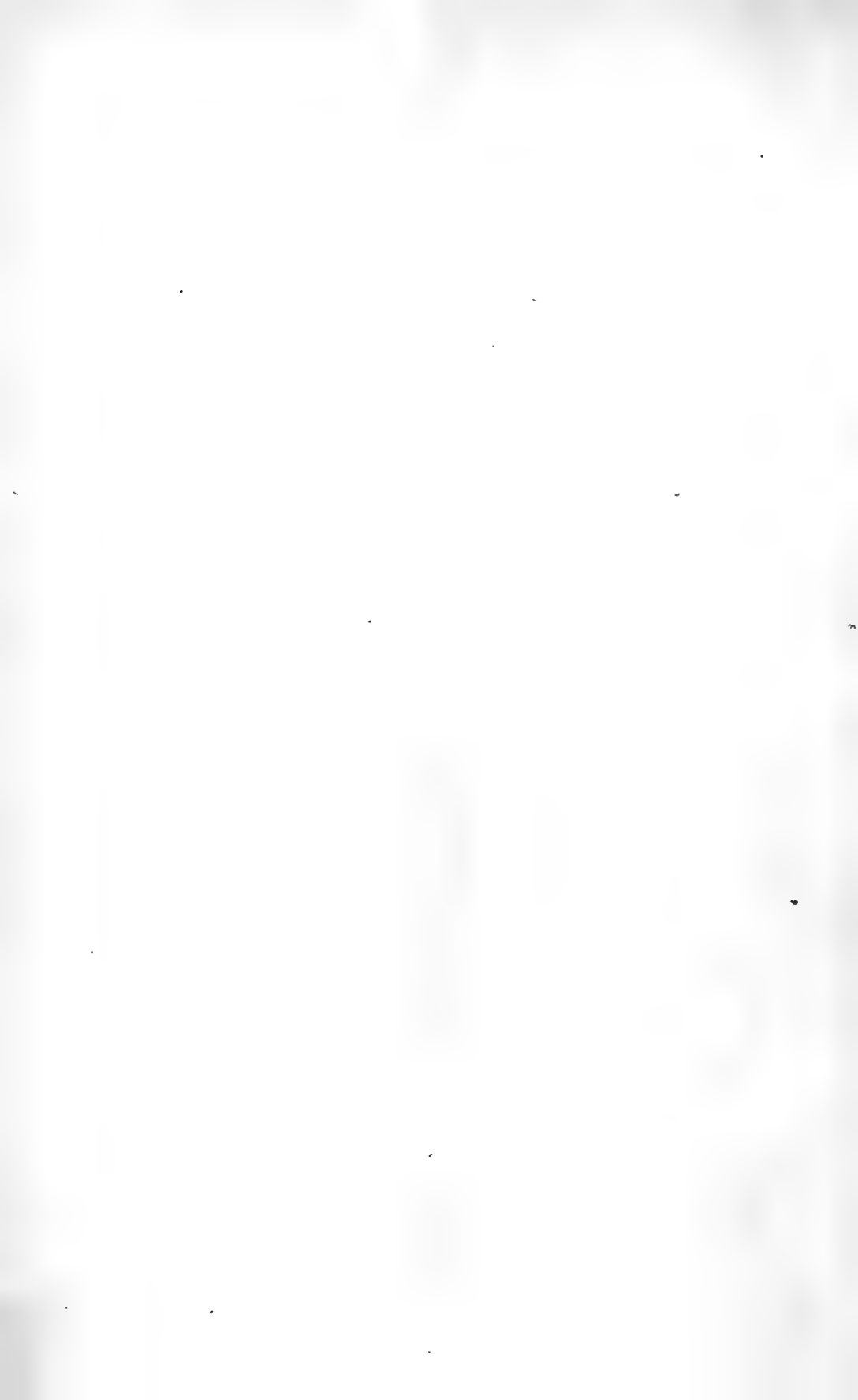
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THE ZOOLOGIST

FOR

1868.

Notes from Flamborough. By JOHN CORDEAUX, Esq.

(Continued from Zool. S. S. 1011.)

October 15. A narrow rocky beach, exposed at low water, skirts the foot of the headland. This reef is covered with a dense mattress of sea-tangle and bladder-weed, broken up and intersected by narrow channels and pools of salt and brackish water, for several fresh-water springs rise between high and low-water marks. Many of these rock-pools contained fish, sand-launce and a small species of goby, and several of those ferocious-looking little monsters, *Cottus scorpius*. I made several attempts to capture some sand-launce, and was invariably baffled by the nimble little fish burying themselves in the sand, which feat they accomplished with amazing dexterity. Myriads of sea-snails (*Nerita*) were crawling over the dank sea-tangle. The common dog-whelk (*Nassa reticulata*) is everywhere extremely abundant, and makes sad inroads into the mussel preserves. These mussels, which are used for baiting the fishing-lines, are brought from the Norfolk coast. The native mussel, found on these rocks near low-water mark, is extremely small and quite unfit for bait. Great pains are taken to keep these imported mussels safe from the attack of the dog-whelk, and women and children are employed, from time to time, in picking off these predacious mollusks, otherwise every shell would in time be emptied of its contents. On looking over one of these beds I found several of these destructive whelks quietly at work, closely attached to the bivalves. They bore a minute and perfectly circular hole through his hard shell, through which they suck out the life and substance of the helpless creature. Saw but few birds on the shore this morning, except the lively rock pipit (here particularly abundant), kittiwakes, hooded crows and a scoter.

October 16. Flamborough is remarkable for the number of rare birds shot in the neighbourhood. Notices of many of these captures appear from time to time in the 'Zoologist.' A considerable proportion of the land on this headland is strictly preserved, consequently, I have little doubt, many a rare visitor escapes undetected. A large owl chequered all over black and white, and, as the man said, "as large as a great blackbacked gull," was seen in a turnip-field on the 14th. The man who saw it went home instantly for his gun; on his return, however, the bird had disappeared—otherwise I might possibly have added *Surnia nyctea* to the Avifauna of Flamborough. I have no doubt if this place, like that wonderful little island Heligoland, possessed its Professor Blasius and Herr Gätke, with free permit to wander where they wished, many a rare visitor to our shores would be registered. In the 'Zoologist' (S. S. 541) mention is made of a small flock of shore larks seen during the spring of 1866. This flock, I am informed, numbered twelve birds; they were found in a grass field on the coast, near the highest portion of the Speeton Cliffs: they were very shy and wild, and it was after much difficulty and driving that two were shot, the remainder of the flock escaping, and I believe were not afterwards seen.

Mr. Roberts (Zool. S. S. 947), writes that this summer two pairs of peregrine falcons nested at Flamborough. I made particular inquiries about these eyries, and found that one nest had been plundered by some cliff-climbers. The other pair were more fortunate, and escaped unmolested, the young birds getting off.

That portion of the coast uncovered at low water, to the west of the northern landing-place, presents many attractions. The marine zoologist will here find ample employment in exploring the numerous clear and deep pools left by the receding tide. This limestone reef presents a curious appearance to the eye, as nearly every exposed portion of the rock is pitted with holes of various depth and size, and has a curious reticulated appearance, like a gigantic piece of lace-work. These shallow pits are the work of the limpet, here found in myriads; the rock is everywhere studded with their conical houses. If we pick off one of these limpets we find that it is slightly sunk below the rock surface, in a shallow pit the exact size of its own shell: the bottom of this little pit is tinged a light green colour, as if acted upon by some chemical substance. These shallow pit-marks cover every available space. The waves in time break down and wear away the narrow walls left between these pits; other limpets again attach themselves to the bottom of these shallow troughs, and thus in time

the rock is slowly eaten out. At last a pebble gets lodged in the cavity; every wave which then washes over the rock rolls it round its prison-house; thus these wonderful rock-basons are formed—perfect natural aquariums, their sides either smooth and polished, or fringed with delicate Algæ and pink corallines. In the round pebbles at the bottom we see the rude but effectual tools of the wave. Many of the larger pools contain fish. The water in these pools is wonderfully clear and transparent, their sides and bottom a garden of beauty, fringed with tangle and the waved blades of the oarweed, the beautiful tufts of the *Chondrus crispus*, bunches of Fuci, brown, pink and purple, and clusters of the pale green *Ulva*. I observed many fish darting in and out or hiding amongst these sea-weeds, and in one pool close under the cliff the common shanny: two of these little fish were basking in the sun, in the shallows near the edge of the pool, their backs barely covered with water.

On returning to the north landing I found several fishing-boats had arrived: they contained cod, haddock, ling, skate, pollack, whiting, conger and a few ballan wrasse, also an occasional large crab taken on the lines, and in one boat numbers of star-fish, amongst which I noticed some fine specimens of *Solaster papposa*. It is a pity that Flamborough possesses no marine zoologist, as rare fish are sometimes brought in by the boats. I saw at the house of Mr. Bailey a drawing, in coloured chalks, of a fish captured off this coast two or three years since. From this sketch and the description given I had no difficulty in recognizing the rare filefish (*Balistes capricus*). A fish-salesman informed me that a similar fish was taken this year, and had been sent to Manchester, where, as he said, "nobody had seen the loike afore." He thought it was a "sort o' sun-fish." Mr. Couch, in his 'Fishes of the British Isles,' mentions only three instances in which this rare fish has been captured in British seas—all on the southern coast.

When picking off with my knife some of the larger limpets from the rocks, this morning, in order to examine them, I found coiled up beneath the foot of one a curious-looking worm. It was about two and a half inches long, very slender, and had considerable power of elongating the body: pale sea-green colour; a minute fringe like small feet running down each side underneath. On leaving the limpet-shell it glided away over the wet rock with great ease. From its position beneath the limpet I thought it might probably belong to some species allied to that curious parasite *Lepidonotus Lordi*, described by Mr. J. K. Lord as lodging within the shell of the keyhole

limpet of Vancouver's Island. I find, however, since my return from Flamborough, that it answers the description given of the marine worm known to zoologists as *Phyllodore viridis*. It is singular that it should be found under the limpet, as the rock was perfectly smooth at the place of attachment, and, as far as I could perceive, there was no orifice by which it could have inserted itself beneath the shell. Near this north landing-place the geologist will find some good sections of the upper chalk formation, intersected at intervals with narrow belts of flint, as regular as if laid down by rule and plummet. The lower belt of flint, which is about a foot in thickness, and every tide washed by the waves, is stained a beautiful rich purple-brown, sometimes green or yellow. The limestone immediately in connexion with this bed does not exhibit any of this rich colouring, which seems to be peculiar alone to the lower chalk belt. In some instances this colouring matter appears to extend below the surface of the stone. Have any of my readers observed the same thing? and is this colouring matter attributable to the action of the salt water on the rock, or in any way connected with minute marine vegetation? I enclose a small portion of the coloured flint for Mr. Newman's inspection.

I went out this evening in a herring-boat from the south landing-place, which opens into Bridlington Bay. The bay herring fishery begins about the commencement of October and is continued often till Christmas, the boats going out for the night, often in very rough and inclement weather; occasionally, as the poor fellows said, everything in the boat covered with snow. On this occasion we crossed the bay till opposite the Bridlington Lights, and at the turn of the tide shooting the nets, and allowing nets and boat to drift; and thus hour after hour we slowly drifted seawards, without any very striking incident to narrate. Once a porpoise came wallowing past, and soon after a flock of wild geese passed flying southward. Several times after dark I heard the notes of small birds passing over. I thought I could make out the note of the lark; sometimes it was a wild and inexpressibly mournful note, which I failed to recognise. The hauling in of the net is an interesting sight, every mesh glittering with phosphoric sparks, like a stream of fireflies pouring in over the gunwale, the herrings gleaming like bars of silver. I noticed that these phosphoric gleams continued some time after the net was taken out of the water: after we had landed, in hauling the nets from the boat, they still continued to emit phosphoric sparks.

I must now bring my paper to a conclusion, trusting my readers will have found something to interest them in these rough "Flamborough Notes." I am informed that since my visit the pomarine skua, little gull and little auk have been shot at Flamborough.

JOHN CORDEAUX.

November 28, 1867.

Erratum.—There is a very obvious error in my "Flamborough Notes" (Zool. S. S. 1008, line 11); for "A year has passed," read "Ages have passed."—J. C.

Ornithological Notes from North Lincolnshire.

By JOHN CORDEAUX, Esq.

(Continued from Zool. S. S. 946.)

SEPTEMBER, OCTOBER AND NOVEMBER, 1867.

Knot (*Tringa islandica*).—September 18. First flock of knots observed on the flats.

Jack Snipe.—September 26. First seen, an unusually early appearance. I shot a jack snipe to-day in a turnip-field on the Wolds, in a very dry and exposed situation, and some considerable distance from the nearest water.

Dunlin.—September 28. Many thousands of dunlins, evidently fresh arrivals, have appeared on the flats during the last week. When the flats are covered by the tide, they then usually resort to the nearest ploughed lands. Nineteen dunlins killed this afternoon, for examination, were in transition plumage, and exhibited more or less traces of their black partial summer plumage.

Rook.—October 1. Have on several occasions lately, in early morning, observed flocks of rooks on the hawthorns in the marsh, eagerly consuming the haws; some of these bushes are stripped of their fruit by these enterprising foragers. They are now evidently driven to great straits to obtain a meal, their "happy hunting grounds" having been long closed from the long-continued drought. Some of the most determined have levied "black mail" on the corn already cut and "stooked." This I consider a most unusual occurrence, their depredations in this district invariably ceasing with the cutting of the crops.

Waterhen.—Are this autumn unusually plentiful on our streams, "blow-wells" and drains, which fact, I trust, betokens a good wild

duck season, as ducks will drop in those places where they perceive water-fowl swimming. I lately observed a mallard, flying across the low grounds, drop very suddenly and unexpectedly in the stream. On going up to the place I shot him as he rose, and at the same time the decoy, a little grebe, sought safety under water.

Common Snipe.—October 6. Considerable numbers arrived during the last few days. There is a peculiarity about these early arrivals of snipe: we at first seldom find them near water, almost invariably in dry situations, in pasture-land amongst the long grass or on stubbles. When flushed they fly slowly and lazily, a flight more resembling that of a peewit than their usual rapid and erratic pace later in the season. I have often thought that these birds are recent arrivals, and like the woodcock, when they first reach land, will drop anywhere, requiring a few days' rest before recovering their characteristic flight and habits. These early snipe are always very fat. If the weather remains fine and open they very soon depart, and in that case we seldom see snipe again before the first severe frost.

Hooded Crow.—October 1 to 7. Arrived on the East coast, in all their usual winter haunts, during the first week in this month.

Green Sandpiper.—October 9. Note the first appearance on our small stream. Have since this date seen several. To-day (November 18th) put up three altogether from a bend in the "beck."

Redwing, Fieldfare and Missel Thrush.—November 18. The dogs put up several redwings in the turnips to-day. I saw the fieldfare at Flamborough on the 14th. Several small flocks of missel thrushes observed in the lowlands during the latter part of September and early in October. I have also observed some flocks of this species flying over the parish, often at a considerable height. These autumnal flights of thrushes are constantly mistaken for those of fieldfares, and hence notices of the early arrival of these birds we occasionally see recorded in the "local luminaries."

Woodcock.—Several seen during the first week in November in the Humber district, and I understand are plentiful in some localities in this county.

Pied Wagtail.—Have noted these wagtails on several occasions during the past month (November) in this neighbourhood.

Fulmar Petrel.—November 20. I received to-day, from the Rev. M. G. Watkins, of Barnoldby-le-Beck, a fine specimen of the Fulmar petrel. It was knocked down with a stick by a groom, in a turnip-field at Barnoldby, on Monday, the 18th, apparently unable to fly:

the man, not knowing its value, pitched it into the ditch. The parish ratcatcher, hearing of the bird, went the next morning to get it for his ferrets; however, it stunk so, as he said, that he dare not use it for that purpose, but, noticing the curious bill of the "gull," carried it home on the end of a pointed stick and exhibited it to the rector, who at once recognized it as a rare capture. A large bird was shot in the same parish about six weeks since; unfortunately the skin was destroyed: from the description given me I have no doubt it was a gannet. In my idea the strong smell peculiar to the Fulmar petrel is anything but disagreeable: I found it impossible to distinguish it from musk.

White Starling and Pied Blackbird.—I saw to-day (November 23rd) a pure white starling, which was shot in this district. A friend informs me that he has lately frequently seen a pied blackbird in his garden: he described the entire back of the bird as pure white.

Wood Pigeon.—November 27. In the crop of a wood pigeon, shot this evening, I found several hundred grains of barley, a considerable quantity of the seeds of the common cow-parsnip (*Heracleum Sphondylium*), and several seeds of that troublesome weed the goose-grass (*Galium Aparine*).

JOHN CORDEAUX.

Great Cotes, Ulceby, Lincolnshire,
December 4, 1867.

Ornithological Notes from West Sussex.

By W. JEFFERY, jun., Esq.

(Continued from Zool. S. S. 814).

JUNE—NOVEMBER, 1867.

House Martin.—Mr. Cordeaux remarks (Zool. S. S. 808) on the scarcity of house martins this year in his district, in Lincolnshire. I certainly cannot say the same of this immediate locality, for I have counted more than fifty nests around the eaves of one building. It is a curious fact that a species should suddenly become so scarce in certain districts. Some time ago Mr. Boulton recorded, in the pages of the 'Zoologist,' the scarcity of the swift in the neighbourhood of Beverley, in Yorkshire, and I do not remember that any satisfactory conclusion was arrived at as to the cause. May we not look either to their winter quarters on their passage thence or hence for a solution?

There is little doubt that as birds are known to return to the same parts here, year after year, that they also repair to the same in their wintering countries, and birds of a certain locality would probably migrate together. Is there not room then to suppose that some casualty had befallen the Lincolnshire martins, either in their winter quarters or in one or other of their migratorial movements? This granted, it may take several seasons to replenish the stock.

Swallow.—On the 15th of October, in the passage from Dieppe to Newhaven, I was surprised at seeing swallows crossing the channel in small and widely-scattered parties, instead of, as I had always imagined they did, in flock.

Stock Dove.—Some time in May I took a pair of young stock doves from a hollow yew tree on our Downs. They are still alive and doing well, and are now in full plumage, having completely moulted since. The moult was commenced about the middle of July and finished by the middle of October, the wing and tail-feathers being shed and renewed, and the metallic tinge on each side of the neck acquired. I first heard them "coo" on the 26th of June. Can any reader inform me if I may expect these birds to breed next year?

Reed Warbler.—The reed warbler is a locally-distributed species in Sussex, as probably in other counties, being, *as a rule*, found only amongst or in the neighbourhood of reed-beds, which in this division of Sussex are of infrequent occurrence. Adjoining our rivers, the Arun and the Adur, here and there, where the draining tool has not done its work, and in some of our larger ponds, these reed-beds are still to be found. At the Burton Ponds, near Petworth, I have this last June found the reed warbler breeding, and also at a small pond near Chichester. This last-named pond is not more, perhaps, than three-quarters of an acre in extent, three-fourths of it being a bed of reeds. Here I should say, at a guess, some eight or ten pairs of reed warblers breed annually, and it was here that the cuckoo's eggs were taken in 1864 (referred to Zool. 9211); here also I obtained a supply of reed warbler's eggs this year; after about an hour's wading considerably over knee-deep on the unsound bed of reed-roots, I came out with four nests containing eleven reed warbler's eggs and one cuckoo's. The reed warbler is a late breeder. At Burton only one of the nests found on the 1st of June was finished, and this with one egg in it. Near Chichester, on the 27th of June, some nests contained four eggs, others only two, but all quite fresh. The nests vary greatly in their formation, being much neater when sheep's wool is the

principal ingredient: one nest, which I have, is a double one, one having been built on the top of the other, giving it altogether a depth of eight inches. What can have been the motive for this? Perhaps the first nest was too near the water. The note of this species is, to my ears, more harsh and less varied than that of its relative, the sedge warbler, being composed almost entirely of the “chit, chit, churrit, churrit,” often continued for a length of time, and without the imitated notes of other birds, which is so pleasing in the song of the sedge warbler.

Siskin.—July 3. I have just learned that a pair of siskins have this year built a nest, and hatched and reared their young, in the garden of the Vicar of Oving, near Chichester.

Meadow and Tree Pipits.—July 28. The meadow pipit is now migrating. Although this species breeds on and in the vicinity of our Downs, as well as on the sea-coast, even numerous on the bed of shingle between Pagham Harbour and the main sea, it is rarely that they do so in the flat lowlands intervening, and their “tit, tit, tit”—a note seldom heard in the breeding season—now sounds fresh and pleasing to the ear of the ornithologist. The tree pipit is heard passing over about the same time. I first noticed its sharp note on the 29th of July, and heard it frequently until the end of August.

Ray's Wagtail.—Passing over from the 11th of August until the 1st of September. Once heard as late as the 5th of October.

Sand Martin, Swift and Nightjar.—My note-book records the sand martin numerous, at various times from the 23rd of August to the 6th of October. A light-coloured (nearly white) specimen was shot here on the 31st of August, and is now in my collection. The other sand martins were mobbing it at the time it was shot. On the 28th of August I saw a solitary swift near Pagham Harbour, and on the 19th of September another, and also a nightjar at Bognor.

Shieldrake.—A bird of the year shot in Pagham Harbour about the 28th of August: it was in company with some domestic geese, and showed considerable reluctance in separating from them.

Ruff and other Waders.—An example of the ruff, in immature plumage, occurred at Pagham about the 28th of August. Other waders observed at this period were the oystercatcher, gray and ringed plovers, turnstone, knot, common sandpiper, redshank, dunlin, curlew sandpiper and little stint; also two little stints were shot there on the 1st of October. A blacktailed godwit at Bosham on the 11th of September.

Osprey.—September 16. An osprey shot at West Wittering, near Chichester: it was apparently a bird of the year: the feathers of the upper plumage edged with a lighter shade of brown, and the legs and feet lighter than in the adult bird: it measured five feet three inches from tip to tip of wing. About this time a second specimen was obtained at Littlehampton.

Jack Snipe.—Shot a jack snipe on the 7th of October. Seeing that this species is said not to breed in the British Isles, is not this an early arrival?

Sanderling.—November 6. Saw a sanderling, in winter plumage, which had been killed a few days before in Bosham Harbour: it is a species that I have rarely met with at this season in Sussex.

Snow Bunting.—November 25. Shot a female snow bunting on the beach at the mouth of Chichester Harbour. It is singular that the only specimen previously in my collection was killed at the same place. In the crop of the bird shot were two wheat-corns, some seeds of a rushy kind of grass growing on a sand-bank near, three small chrysalids, a fly (half an inch long) and two sandhoppers. In the gizzard a quantity of sand and small gravel.

Wild Fowl, &c.—November 25. Saw two sheldrakes, or “bier-ganders,” as they are here called, in Chichester Harbour, as well as about a dozen Brent geese, bagging two of the latter and an immature specimen of the razorbill: the stomach of the latter was crammed with young smelts. A considerable number of widgeon have been killed, and I saw a female redbreasted merganser killed this day.

Rock Pipit.—November 25. Shot two rock pipits on a small island in Chichester Harbour, and was surprised to find, in the stomachs of both, bones and other remains of small fishes. It often happens that small gobies and other fishes, numerous there, are left by the receding tide to die and dry up, and in this case would be an easy prey to the pipits; otherwise it is difficult to imagine in what way their capture could be effected by these birds. In addition to these fishy remains were small seeds of several kinds.

Water Rail.—The water rail also is a fish-eater; three small “miller’s-thumbs,” or “bull-heads,” were found in the stomach of one. I have noticed a variation in the plumage of this species, which at present I am unable to understand: I refer to a patch about an inch or less in diameter, black with white markings, on the lesser wing-coverts. In two *male* skins in my collection it is absent altogether;

in a *female*, shot on the 29th of October, it is well marked, and is also seen, though less prominently, in a *male* shot since. I should be glad of an explanation of this.

Ringed Plover.—The gizzard of a ringed plover contained a quantity of small marine univalve shell.

House Martin.—Nov. 27. To-day I saw four house martins in Chichester, apparently strong and active, but I fear the sharp frost of the following night found them out.

Falcon and Peewit.—Nov. 28. A farm-workman tells me that a few days ago his attention was attracted by a "large hawk" and a peewit high in the air above him. The hawk, which would appear from his description to have been a peregrine falcon, struck the peewit, and, as he says, carried it to the ground. He allowed some minutes to elapse, and perceiving no farther movement he walked up, when both birds rose, and the falcon, dashing again after the peewit, struck it into a hedge; here, though not dead, it was captured by the man and found to be severely cut about the breast.

Nesting of the Sedge Warbler.—In his interesting letter on "distinguishing characters" (Zool. S. S. 968), Mr. Harting states, as his own experience, I imagine, that the nest of the sedge warbler is placed on the ground. It has recently been shown, in the pages of the 'Zoologist,' that the reed warbler sometimes departs from its normal mode of nesting in reeds and builds its deep cup-shaped nest in lilac and other bushes, frequently at a distance from water and at a considerable elevation from the ground. Now in this district the sedge warbler places its nest, I may say almost invariably, at some height from the ground, perhaps on an average from one and a half to three feet, and I have found it at nearly four feet from the ground. It is also occasionally placed in low bushes over water. Several persons to whom I have mentioned this have expressed opinions that the habit is abnormal, and as such it is perhaps worth recording.

Chiffchaff and Willow Warbler.—In addition to Mr. Harting's "distinctive characters" in these birds, I will add that I have invariably found in the chiffchaff that the under parts of the feet, the soles, as it were, are yellow, while the same parts in the willow warbler match the general colouring of the legs, a fleshy brown.

W. JEFFERY, JUN.

Ratham, Chichester, December 4, 1867.

Letters on Variation in Lepidoptera. By EDWARD NEWMAN.

LETTER THE THIRD.—PAIRS OF SPECIES.

My dear Mr. Wollaston,—

My third epistle treats of a matter which has already caused much discussion, and will certainly cause much more before it is finally accepted or rejected by our fellow-labourers in the field of Science—I allude to the existence of *pairs* of species: and here I wish expressly to state that I employ the word “species” in its conventional and ordinary sense, and leave it a perfectly open question for future discussion, whether the moieties of the pairs to which I shall allude are species, races or varieties, or whether species have any absolute existence in Nature. Such questions are here avoided, because, however interesting and important as regards the science of Natural History, they would rather encumber and confuse the few simple views I am now endeavouring to express; but to my point.

It cannot escape the notice of the inquirer that natural groups of organized beings exhibit a tendency to a dichotomous division: this phenomenon is of frequent occurrence. Dr. Fleming, whose profound teachings in Zoology have never been sufficiently esteemed, was the first to point out the existence of this tendency; his only mistake was in assuming that a phenomenon which he saw so plainly portrayed on Nature’s face must involve the existence of an absolute law: he believed that all Nature’s laws were general; he carefully studied the seen, and imagined the unseen to be in exact accordance: now we may accept the axiom of the poet that Nature

“Acts not by partial but by general laws,”

without assuming that we possess a perfect knowledge of those laws; for instance, exceptions to natural laws may be of such frequent occurrence as to become laws themselves: it is an undoubted law that the females of our own race produce but one young one at a birth, nevertheless an exception occurs quite as regularly, that once in a certain number of births twins shall be produced: the exception by no means vitiates the rule; indeed, in my estimation, it would tend to establish the rule, but the exception must be regarded as having the same force as the rule which it contravenes, and must never be disregarded in our calculations or superseded by our inventions.

A few instances of these dichotomies at once force themselves on our notice. In the first place, organized beings are either animals or plants, and although we constantly meet with learned lecturers who raise objections to this obvious truism, and skilfully place a stumbling-block in their own way just to exhibit their ability to remove it, Nature takes no heed of their proceedings, but writes "plant" and "animal" on the forehead of each in characters so unmistakably plain that he who runs may read. The lecturer may talk of chemical tests, of the test of burning; he may immerse atoms in aquafortis or subject them to a white heat in order to ascertain their true character; it is all to little purpose, and we accept Nature's inscription in preference, and leave the lecturer to his experiments and his speculations.

I am often taught by the simple remarks of children how much of our labour is in vain. Sometimes I spend an hour or two in Regent's Park, where animals and plants have each their allotment of acres. One Thursday a learned professor at the Royal Botanic explained at great length the necessity of applying tests in distinguishing animals from plants; and a little boy who was my companion seemed

"To drink instruction with delighted ear."

We adjourned to the Zoo, where my juvenile friend enjoyed a ride on the elephant, and some time after he had dismounted he asked me, in perfect simplicity, "Mr. Newman, is the elephant an animal or a plant?" I saw of course what was going on in his juvenile brain, and told my youthful friend that in the case of such large creatures as elephants there could be no doubt; that we recognized them at once, instinctively, intuitively, and a little more in the same sagacious strain, and so I thought the matter was settled; but I could not escape so readily as this: when we reached the giraffes the subject was renewed by the inquiry, "Have the giraffes been calcined?" "No, certainly not, or we should not see them poking their noses almost in our faces as they are doing now." "Then you can't be *quite certain* whether they are plants or animals: Professor Smokey said so just now." I got out of the hobble as well as I could, but with a steadfast resolution never to take a child to hear another scientific lecturer. Nature herself was this boy's best instructor; philosophy only served to lead him astray. Animals and plants then are one of Nature's pairs, which even the learning of a professor will not serve to divorce.

The reptiles afford us another instance of a natural dichotomy. Cuvier, the great apostle of our Science, regarded sucklers, birds,

reptiles and fishes, as four equivalent classes of endosteate animals, but subsequent writers have divided the reptiles into two classes, first to gratify a fiction, once fashionable, that Nature prefers the number five, and, secondly and more remotely, because there was an intrinsic difference in their mode of reproduction: this difference is a true one, but I have shown elsewhere that it obtains also in sucklers, birds and fishes.* The difference is most strongly pronounced in fishes: it has its second degree of development in reptiles; its third in birds; and its fourth in sucklers. It is very interesting to observe how beautifully similarities develop themselves in the component parts of these dichotomous divisions as soon as this principle is understood: it is only necessary to glance at a lizard and a salamander, both comprised by Linneus in the genus *Lacerta*, but totally different in physiological characters, to appreciate and understand the whole theory of pairs. Two beings enter on life side by side, totally different from each other, and having a different external form, a different system of circulation and respiration, eating different food, the one aquatic, the other terrestrial, yet approaching each other hour by hour, week by week, until they become, in the estimation of a Linneus, members of the same genus, *Lacerta*.

It is exactly thus amongst insects; they commence life differently and end it alike, so truly alike that it is the pleasure, I may say the vocation, of some entomologists, to insist they are identical; and in those few instances in which this assertion is not made, as in the case of *Psi* and *tridens*, it is because these have, from long custom, acquired a prescriptive right to specific rank, not because any specific diagnosis has ever been proposed.

These natural dichotomies contrast in the most striking manner with scientific dichotomies, of which there is none more popular than those consisting of a positive and a negative; even such dichotomies are truthful but vague, like the poet's division of the world into two moieties:

“The one that small
Beloved and consecrated spot
Where Leah was, the other all
The dull wide waste where she was not.”

One moiety will be acknowledged to be clear and definite, the other vague, indefinite, and somewhat too comprehensive for our just apprehension.

* ‘Essay on the Physiological Classification of Animals.’ Van Voorst, 1852.

Of these false, or as they are termed scientific, dichotomies there are two preeminently popular. By this principle Lepidoptera are divided into Rhopalocera and *Heterocera*; animals into vertebrate and *invertebrate*. Let us glance at these dichotomies only for a moment. *First*, that of Lepidoptera into Rhopalocera and Heterocera,—Rhopalocera conveys in its very name the expression of a character, and *Heterocera* equally implying the want of a character. *Secondly*, an exactly parallel instance is the dichotomous division of animals into vertebrate and *invertebrate*; the *haute-école* of Science roll out these terms with great power of voice and immeasurable self-complaisance; but Nature fails to acknowledge them: as well might we divide animals into hairy and *not-hairy*, or feathered and *not-feathered*: such terms as *vertebrate*, *hairy* and *feathered* express positive characters, but no group can be based on the *non*-possession of these characters—a fact that must be only too obvious to every one who gives the subject a fair share of consideration.

Not only do these dichotomies, founded on a positive and a negative, find no support in Nature, but they have another fault equally embarrassing to the student: they give a measure—a small but notable measure—of character to one moiety of the pair, yet leave the other moiety a perfect chaos, and do not afford us the slightest clew to the arrangement or subdivision of its contents.

Now exactly such dichotomies as we find in kingdoms—I accept the term as prescriptive, not for its merits—exactly such do we find in all minor divisions known as provinces, classes, orders, families, genera and so forth, until we arrive at those species where the present inquiry properly begins; and here I would extend a word of caution to those who really desire to investigate the subject: let no one assume the universality of the law, since all that can be done in our present state of ignorance is to follow out these dichotomies where we see traces of their existence, and thus acquire such an amount of knowledge as shall dissipate that ignorance, and it is of the utmost importance that we take nothing for granted, that we assume nothing, that we test everything by repeated experiment.

I will select half a score examples from as many families to illustrate my meaning, and bring it more immediately under the notice of my readers, and I wish to invite especial attention to the fact that the moieties of each pair are produced under precisely parallel circumstances; that climatal or geographical or seasonal conditions have no influence over them; that they may be produced at the same hour,

may feed on the same leaf, and may never wander from the same garden. I do not say that these conditions are necessary, but merely that the pairs will unquestionably bear the test of the most rigid restrictions to similar conditions. The examples I select are by no means the best I could find. No. 1 I have chosen on account of a peculiar interest attached to the discovery; the other nine because the abundance of the individuals in each case affords the inquirer such ample opportunity of testing the soundness of my views.

1. *Bombyx Spartii* and *B. familiaris*.—During the summer which has just passed away my friend Mr. Doubleday sent me the larva of a *Bombyx* which he had received from the Continent under the name of *B. Spartii*, which was totally different from any larva I had previously seen: M. Guenée had previously described both the larva and imago of *Bombyx Spartii*, and this was the larva in question. Hübner had previously figured the imago: Boisduval had both figured and described it; and Herrich-Schæffer describes it in his 'Systematische.' Our countryman Stephens makes five British species out of the section of *Bombyx* now under consideration, three of which, *Rubi*, *Trifolii* and *Quercus*, he considers good and veritable species; two others, *Medicaginis* and *Roboris*, he places within brackets, thus implying a doubt whether they be really species; under *Roboris* we find the *Bombyx Spartii* given as a variety, with references to Hübner's figures of both sexes: thus it appears from this, that Mr. Stephens, the most species-making of all entomologists, raises *Bombyx Spartii* to no higher rank than the variety of a variety, and it may be added that no permanent character has been pointed out whereby its imago can be distinguished from that of the insect I have next to notice.

Bombyx familiaris is a new name: it was *Bombyx Quercus*, and also familiarly known in England as the "Great Oak Eggar." The reason for the change of name is simply this, that our familiar insect is not the *Bombyx Quercus* of Linnæus: we all know from the original description, from the habitat and from the Linnean specimen still extant, that the name of *Quercus* belongs of right to the insect we have within the last dozen years rechristened under the name of *Callunæ*.

The larvæ of *Spartii*, to which I have just alluded as received by Mr. Doubleday from France, underwent their metamorphosis and emerged as perfect insects in all respects identical with our *familiaris*. The larvæ are totally distinct, the moths perfectly identical.

In this as well as in the instances which follow, we must adopt one or the other of these two conclusions: *first*, that two perfectly distinct

species of larva are required to constitute one species of imago; or, *secondly*, that two species of Lepidoptera, entirely different in their preparatory stages, become precisely similar in their adult state. I accept the latter conclusion, and fully believe that pairs of species may in a thousand instances be so exactly alike in the imago state as to defy every effort to differentiate them. To all human perception this pair of species, when examined in their ultimate state, are absolutely identical.

2. *Boarmia rhomboidaria* and *B. perfumaria*.—I have had the pleasure of minutely examining, and most carefully describing, the larvæ of these two species. The differences between the two possess the invaluable attribute of constancy; neither ventures over its natural boundary line, whether in form, colour or food. Arrived at maturity, their similarity is so great that entomologists generally refuse to perceive any difference between them; but I cannot go quite so far as to say that none exists: those who like myself have repeatedly bred both from the egg, and closely scrutinized the adults as they entered on their winged existence, have observed differences which at the moment seemed to separate them, although soon to be lost after the moths have taken wing. The rhomboidaria of the Vienna Catalogue, of Hübner, Haworth, Duponchel, Guenée, &c., is correctly described by Guenée as *cedré-jaunâtre*, the dark cinereous ground-colour of the wings is suffused with a yellowish tint, while in the rhomboidaria of Stephens the colour is more uniformly cinereous and without any yellow tinge whatever. I should characterize this insect as *very smoky, perfumaria*: in accordance with its metropolitan habitat, it seems to be saturated with smoke: Guenée gives other characters of distinction, although he treats perfumaria only as a variety; he says it is a little larger, the fore wings are a little more pointed, and a little more prolonged at the tip; the pectinations of the antennæ are rather longer and are not appressed so closely on each other. Several writers, in a recently-established and highly scientific journal devoted exclusively to Entomology, also allude to both species in a manner that implies perfect familiarity with them.

3. *Cabera pusaria* and *C. rotundaria*.—In this instance we labour under a double difficulty: in the first place, *C. rotundaria*, in all its states, is very imperfectly known; and, in the second place, there is but little inclination exhibited to acquire a more perfect knowledge. In almost every cabinet certain individual insects are set apart from *Cabera pusaria* and are labelled “rotundaria.” Haworth was the first

to characterize *Rotundaria* thus—" *Alis rotundatis albis fusco-subatomosis, strigis duabus medio communibus subundulatis plumbescentibus antica anticarum geminata.*" He gives no *descriptio*, and entirely omits all reference to *Pusaria*, which follows next in order, and under which, in like manner, there is no reference to *Rotundaria*: his character of *Pusaria* runs thus—" *Alis albis fusco-subatomosis strigis tribus medio æquidistantibus, subundulatis plumbescentibus ultimis communibus.*" It will be seen that the anterior striga on the fore wings of *Rotundaria* is double: at p. 85 of my 'British Moths' this character is well shown in two of the figures; in the other two there are but two *strigæ*, and neither of these is double; but this character occurs also in *Pusaria*, some specimens having one double and one single *striga*, others two single *strigæ*; the roundness of the wings therefore remains as the only constant and reliable character. Herrich-Schæffer dismisses *Rotundaria* without the slightest hesitation as one of the synonyms of *Pusaria*. Freyer (pl. 60, fig. a) figures *Rotundaria* as a species under the name of *Confinaria*. Lastly, Guenée (*Uran. et Phal.* ii. 55) admits *Rotundaria* as a species with a doubt implied, but suppressed on the assurance that the larva of *Rotundaria* "had lately been reared in great numbers in England, and was found to be entirely different from that of *Pusaria*." This passage alludes to a discovery of Mr. Machin's. I have never been so fortunate as to see the larva of *Pusaria*, but I believe Mr. Machin's view of the entire difference of the larva is now generally accepted.

4. *Eupithecia linariata* and *E. pulchellata*.—The larva of *E. linariata* occurs commonly feeding on the blossoms of *Linaria vulgaris* (the common yellow toad-flax); that of *E. pulchellata* is equally common on those of *Digitalis purpurea* (the foxglove): they are totally distinct, as will be seen by a reference to the detailed descriptions, from the pen of Mr. Crewe, in my 'British Moths.' Guenée considers the perfect insects so similar that he would not have given *Pulchellata* as a species had not Mr. Doubleday informed him that he had bred more than a hundred individuals of *Linariata* without meeting with one of *Pulchellata* amongst them. "It is much to be desired," says M. Guenée, "that *Pulchellata* should be bred simultaneously with *Linariata*, so that we might verify its claim to specific rank, a claim concerning which I have always had my doubts." This has been done, and *Pulchellata* is acknowledged to be a species.

5. *Cidaria immanata* and *C. russata*.—These insects are extremely interesting, not only on account of their infinite variation, but also on

account of the parallelism of their variation; that is to say, each exhibits similar variations, while each has also one or more variations peculiar to itself. A brief sketch of the bibliography of these insects, which are almost ubiquitous, may possess some interest.

In 1776 the Vienna Catalogue gives but one species which can be regarded with any certainty as belonging to the group: this is called *Russata*.

In 1792 Fabricius, in his 'Entomologia Systematica,' also gives one only, which is called *Centum-notata*.

In 1803 Haworth combines these under the name *Centum-notata*, but describes four varieties called α , β , γ and δ ; he also adds four other species, which he calls *Immanata*, of which he describes four varieties, α , β , γ and δ ; *Marmorata*, of which he describes three varieties, α , β and γ ; *Perfuscata*, of which he describes three varieties, α , β and γ ; and finally *Comma-notata*, of which he says "Nunquam variat."

In 1829 Mr. Stephens adds three species, *Concinnata*, *Amænata* and *Saturata*, and Mr. Curtis adds a fourth, *Boreata*.

In 1850 Mr. Doubleday, for the first time, divides this formidable array of names into two species:

RUSSATA including		IMMANATA including
Russata	} <i>as synonymous.</i>	Immanata
Centum-notata		Marmorata, <i>as a var.</i>
Comma-notata, <i>as a var.</i>		Amænata, <i>as a var.</i>
Perfuscata, <i>as a var.</i>		
Saturata, <i>as a var.</i>		
Boreata, <i>as a var.</i>		

It will be observed that Mr. Doubleday omits *Concinnata* of Stephens, to which allusion has been made above.

In 1847 Herrich-Schæffer combines these eight described species with four others, *Passeraria*, *Strigulata*, *Truncata* and *Variata*, under the original name of *Russata*, without expressing a doubt as to their constituting but a single species.

In 1857 Guenée endorses this view, giving a long and learned dissertation on the subject; and finally,

In 1862 Mr. Doubleday, in a second edition of his 'Synonymic List,' again separates them, as before, into *Russata* and *Immanata*, and every entomologist in England now follows this master mind and guiding spirit.

Nevertheless much independent and pleasant diversity of opinion obtains in the application of this dichotomous division. On those pleasant evenings when we gather round a friend's cabinet, a discussion like this always arises when the drawer containing *Cidaria russata* is opened for inspection.

1st Critical Visitor. I think these insects are all *Russata*; *Immanata* is a larger insect—it has more the cut of a *Pyrale*, and looks altogether different.

2nd Critical Visitor. I can't agree with you there: *Immanata* is a smaller insect; indeed it seems to me a question of magnitude.

Host. I confess to finding great difficulty in separating them, and to having taken but little trouble about the matter.

3rd Critical Visitor. But I have thought. I think I ought to know the species, if anyone does; I have taken them by thousands. Let me see the drawer. (*Brings his optical focus to bear on the insects.*) You are all wrong here. Ha! ha! ha! I thought as much. In this first row the third, fourth,—no, not the fourth; yes, the fourth,—seventh, eighth and tenth are *Russata*; all the others *Immanata*. Ha! ha! ha! that is a joke! Now for the second row: here they are mixed in the same way; the third, sixth, seventh, ninth, tenth and eleventh are *Immanata*; the rest *Russata*. There is no difficulty in separating them when you once know the species: they are as easy as A B C: ha! ha! ha!

2nd Critical Visitor (taking the drawer and looking over it very intently). I can't agree with you there: I should call the first row all *Russata*, except the third, eighth and ninth—those are *Immanata*; but you have them sadly mixed in the second row. May I take off the glass, and set them right? It's a pity that a cabinet of reference like this should have them wrong.

3rd Critical Visitor. Well, I should not like your naming, Mr. Blank: ha! ha! ha! (*Looks at the drawer again.*) You may be right about the eighth; but I can't give in about the rest. Will you allow me to separate them?

Host. No, thank you: Mr. Doubleday has had the kindness to go through them, and has named them as they stand.

The Critics in chorus. Oh, that's a different thing! Well, I should not have named them so; but of course Mr. Doubleday must be right: no one will dispute his authority.

6. *Dicranura Furcula* and *D. bifida*.

7. *Notodonta dictæa* and *N. dictæoides* I believe it possible to separate these two species when in perfect condition; but it is a matter of great difficulty, unless to those who have made the subject their especial study: it seems to me that Haworth was unable to separate them, and that both species are included under his *Bombyx tremula*: the distinction between the two has not been made perfectly clear to my apprehension by the descriptions, yet so early as the time of Linneus two species were recognized, *Bombyx dictæa* and *B. tremulus*; but Haworth combines these names under that of *Tremulus*, and Doubleday under that of *Dictæa*: it is quite possible that it was intended thus to denominate the *N. dictæa* and *N. dictæoides* of our modern nomenclature. Be this as it may, the similarity of the two species is really marvellous, and nothing but a perfect knowledge of their larvæ could induce anyone to separate them: through the kindness of friends I have been supplied with the larvæ of both, and have described them with care; they are abundantly distinct, and cannot be combined, unless by the admission of the hypothesis, hitherto universally rejected, that there may exist permanent variations in the larva parallel to those hitherto supposed to be confined to the imago.

8. *Acronycta Psi* and *A. tridens*.—In this case the exact similarity of the two perfect insects is admitted on all hands. Haworth says of *Tridens*, "Too much like the preceding (*Psi*), and almost the same, but has a different larva." Haworth, however, in attempting their differentiation falls into a very common error: he says, "The colours (of *Tridens*) are always paler; the hind wings are whitish or white:" thus apparently referring to the males of both species. The larvæ are entirely different, and I have taken great pains to describe both from nature.

9. *Noctua festiva* and *N. conflua*.—Here we have a pair which Guenée separates by an intervening species (*Noctua collina*): he makes no allusion to the similarity of the two, but quotes the Vienna Catalogue, Hübner, Haworth, Treitschke and Godart as the authorities for the one; Treitschke, Freyer, Duponchel, Boisduval and Herrich-Schæffer as authorities for the other: I possess a fair series of both; they vary infinitely, and vary almost precisely in the same way, exhibiting similar colours and similar markings in their variation; yet there is no character, so far as I can ascertain, that belongs exclusively to either, and I have never yet met with an entomologist who, after inspecting my series, was perfectly convinced of their distinctness.

Still it appears that Guenée could detect a single specimen in Boisduval's cabinet mixed with his series of *Festiva*. The larva of *Festiva* is figured by Hübner, that of *Conflua* by Millière, and I have had the pleasure of writing descriptions of both: the discrepancies between them convince me they are perfectly distinct, and I believe that I could, without fail, separate a mixed series of the perfect insect into their respective species.

10. *Cucullia Verbasci* and *C. Scrophulariæ*.—Haworth does not appear to me to have been happy in differentiating these two insects; he describes the hind wings of the male *Scrophulariæ* as "albida non albæ," and as having the fringe "brown not black." These distinctions certainly are not apparent in my specimens, and Haworth himself seems dissatisfied with them, for he adds, "As the great lepidopterist Hübner gives the water betony moth as a distinct species from that of the mullein, and figures both as above cited, it is here also enumerated, as I possess English specimens of each, and have seen others, but unless they differ more in the larva state than they do in the winged, which is almost a constant characteristic of the section (*Cucullia*), I must still conceive they are not distinct, but very slight variations only; the chief difference is the paler colour of *Scrophulariæ*, whose upper wings, especially in the broad *plaga*, are of an ochraceous colour, as figured by Hübner, while those of *Verbasci* are nearly white in the same part." Guenée, with his usual conscientious painstaking, has endeavoured to differentiate these insects, but has not seized on the characters most insisted on by others. He says, "Les ailes superieures sont moins fortement dentées que chez *Verbasci*, proportionnellement plus large et moins aiguës au sommet. Leur couleur est plus jaune avec les parties foncées d'un brun plutôt noirâtre que ferrugineux; la côte plus cendrée; le côté terminale du triangle foncé, moins net, et n'atteignant pas la 2^{de} inferieure; les points discoïdaux plus marqués et plus nombreux, surtout dans les femelles. Les deux traits subcostaux plus noirs et moins isolées. Les ailes inferieures sont plus clairs, avec le bordure moins fondue. L'abdomen et plus court et plus conique; la partie anterieure du poitrine seulement un peu noirâtre." (*Noctuelites*, ii. 128.) It will be admitted, *nemine contradicente*, that Britain has produced no describing lepidopterist approaching Haworth in knowledge of species or accuracy of description, and that France has none equal to Guenée, and yet it will be seen from the preceding quotations that these most competent men, although carefully pointing out the differences between

these two species, do not perceive the same differences. The "lynx-eyed Haworth" has been unable to observe any of the differences on which Guenée insists, and Guenée, with Haworth's volume in his hand, declines to avail himself of the teaching of that eminent Englishman. My own bred specimens contumaciously ignore the differences laid down by both Englishman and Frenchman, and cannot be divided by any definitions hitherto printed. I confess myself entirely unable to separate the specimens were they mingled, and I doubt the ability of almost any other entomologist to do so. Nevertheless the larvæ of both are thoroughly well known, and differ in food, colour and even in form.

I could multiply instances to almost any extent, but I feel that there is too much of repetition already, and I have said quite enough to satisfy any truth-seeker. It may possibly be objected that by my calling the moieties of these pairs "species" I remove them from the scope of this paper,—namely, variation,—but this difficulty is very trivial: so that the subject is thoroughly ventilated, it matters little what terms we employ. Darwinianism would reduce all species to varieties, and all varieties to mere evolutions, so that precision in terms is almost hopeless, but this branch of the inquiry is open to future investigation.

The substance of this paper was read before the Entomological Society on the 2nd of February, 1857, and elicited the following observations, as reported by Mr. Shepherd, the Secretary (see Zool. 5525):—

"Mr. Stainton observed that the 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 Lepidoptera they were to be looked for? Was it intended that each species should be thus divided, as it were, into two subspecies? 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 higher 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. Westwood's profound remarks were received by the Meeting with almost tumultuous approbation: I confess myself unable to see their exact drift, probably owing to my not being sufficiently advanced in the study of affinities and analogies.

Believe me, my dear Mr. Wollaston,

Most faithfully yours,

EDWARD NEWMAN.

PS. My next letter will, I trust, present a little more of novelty, as the subject has scarcely been considered as regards Lepidoptera. I call the letter "Eugenesic Races."

Notes on Aphides. By F. WALKER, Esq., F.L.S.

KNOWLEDGE of the Aphididæ is more difficult of attainment and requires more persevering study than that of any other tribe of insects, on account of their migratory habits and ever-varying forms, and consequent frequent appearance in new aspects. A translation of the latest systematic arrangement of them,* with references to other works on the same subject, may serve as a guide to the investigation of the family.

APHIDIDÆ, *Passerini*.

- A. Antennæ seven-jointed. 1. APHIDINÆ.
 AA. Antennæ six-jointed, at least in the winged form.†

* 'Gli Afidi con un prospetto dei generi ed alcune specie nuove italiane,' par Giovanni Passerini. 1860. 'Aphididæ Italicæ hucusque observatæ,' à J. Passerini, M.D. 1863.

† When the winged form of a genus is known the character of the antennæ is especially to be sought for in this form, for in some genera the apterous form has four-jointed or five-jointed antennæ and the winged form has six-jointed antennæ.—*Passerini*.

- A. Winged form obvious or at least known.
 - A. Cubital vein twice-forked. 2. LACHNINÆ.
 - AA. Cubital vein once-forked or simple. 3. POMPIGINÆ.
 - AA. Winged form unknown. 4. RHIZOBIINÆ.
- AAA. Antennæ five-jointed or three-jointed.
 - A. Winged form unknown. 5. TYCHEINÆ.
 - AA. Winged form obvious or at least known. 6. CHERMESSINÆ.

1. APHIDINÆ, *Passerini*.

- A. Antennæ on a frontal tubercle.
 - A. Antennæ closely approximate at the base. Front grooved. 1. SIPHONOPHORA.
 - AA. Antennæ remote at the base. Front flat or convex.
 - A. First joint of the antennæ with a tooth on the inner side. 2. PHORODON.
 - AA. First joint of the antennæ not toothed.
 - a. Nectaries evidently clavate. 3. RHOPALOSIPHUM.
 - aa. Nectaries cylindrical, sometimes hardly attenuated at the base (*Myzus Ribis*), more often incrassated.
 - * Cubital vein twice-forked.
 - † Tail much shorter than the nectaries. 4. MYZUS.
 - †† Tail longer than the nectaries, rarely equal to them in length.
 - 5. HYALOPTERUS.
 - ** Cubital vein once-forked. 6. TOXOPTERA.
 - AA. Antennæ not on a tubercle.
 - A. Seventh joint of the antennæ longer or at least as long as the sixth.
 - A. Antennæ smooth.
 - a. Nectaries longer than thick; or if shorter or none, then the apterous viviparous female with a smooth back.
 - * Nectaries cylindrical, very rarely none (*A. Gallarum*). 7. APHIS.
 - ** Nectaries clavate. 8. SIPHOCORYNE.
 - aa. Nectaries shorter than thick; or if a little longer than the viviparous apterous female, and the pupa with a hairy back. 9. MYZOCALLIS.
 - AA. Antennæ pilose.
 - a. Nectaries cylindrical, at least twice longer than thick. 10. CLADOBIUS.
 - aa. Nectaries tubercle-shaped, much shorter than thick, sometimes almost on a level with the surface. 11. CHAITOPHORUS.
 - AA. Seventh joint of the antennæ shorter than the sixth.
 - A. Aerial species. Winged form very elegant. 12. PTEROCALLIS.
 - AA. Subterraneous species. Winged form unknown.
 - a. Third joint of the antennæ longer than the fourth. Hind tarsi with one joint. 13. TRAMA.
 - aa. Third joint of the antennæ as long as the fourth. Hind tarsi two-jointed. 14. PARACLETUS.

Genus 1. SIPHONOPHORA, *Koch*.

Typical species, *Aphis Rosæ*, Linn.—Antennæ on a frontal tubercle, longer than the body; seventh joint setaceous, longer than the sixth.

Front grooved between the tubercles. Nectaries long, cylindrical, slender. Tail generally long, often compressed, falcion-shaped. Legs slender, very long. Wings deflexed. Fore wings with four oblique veins; cubital vein twice-forked.

A. Apterous form green.

A. Nectaries wholly black.

a. Nectaries very long.

a. Border of the abdomen with black points in the winged form. 1. *Rosa*.

aa. Border of the abdomen without black points in the winged form.

2. *Cyparissia*.

AA. Nectaries moderately long, as long as the tail, or a little longer.

a. Apterous form of one colour. Tail shorter than the nectaries. 3. *Cerealis*.

aa. Apterous form with various spots. Tail as long as the nectaries.

* A continuous green dorsal stripe. 4. *Millefolii*.

** An interrupted green dorsal stripe, formed by triangular spots.

5. *Artemisia*.

AA. Nectaries pale, often green, blackish at the tips, or rarely from the middle to the tips.

A. Apterous form with setigerous dorsal tubercles, which are arranged in longitudinal series. 6. *Avellana*.

AA. Apterous form without dorsal tubercles.

a. Tail very short, hardly visible. 7. *Platanoides*.

aa. Tail more or less long, at least equal to one-fourth of the length of the nectaries.

* Nectaries attenuated towards the tips, blackish from the middle.

8. *Ulmaria*.

** Nectaries black or brown only at the tips.

† Tail less than half the length of the nectaries.

‡ Frontal tubercle with a stout tooth on the inner side. 9. *Solani*.

‡‡ Frontal tubercle sometimes gibbous, but not dentate.

§ Abdomen above smooth, shining. Legs vinous-brownish.

10. *Urtica*.

§§ Abdomen above transversely rugose, more or less dull. Legs somewhat luteous. 11. *Malva*.

†† Tail as long as half the length of the nectaries or longer. Abdomen with pulverulent sutures. 12. *Lactuca*.

AA. Apterous form brown, or red, or nut-colour, sometimes powdered with white.

A. Tail black.

a. Abdomen brown, powdered with white, with a black dorsal spot.

13. *Absinthii*.

AA. Abdomen red or brownish rust-colour, more or less shining.

a. Tail as long as the nectaries. 14. *Campanula*.

aa. Tail shorter than the nectaries.

* Legs luteous; tarsi and tips of the femora and of the tibiae black.

15. *Solidaginis*.

** Legs black; femora luteous at the base. 16. *Jacea*.

AA. Tail luteous or lutescent.

A. Body brown or brownish rust-colour.

a. Abdomen above smooth, not tuberculate. 17. *Tussilaginis*.

aa. Abdomen above with tubercles in transverse series.

* Legs black; femora luteous at the base. 18. *Picridis*.

** Legs luteous tarsi and tips of the femora and of the tibiæ black.

19. *Sonchi*.AA. Body deep red. 20. *Tanaceticola*.

1. *S. Rosæ*, Linn.—The apterous form is very often red. It has the greatest development of the peculiar structure of the genus.

2. *S. Cyparissiæ*, Koch.—It has not yet been noticed as British. It feeds on *Euphorbia cyparissias* and on *E. peplus*.

3. *S. cerealis*, Kalténbach.—It may be the *Aphis Avenæ* of Fabricius and of Gmelin, but these authors give no description of the species. It is not the *A. Avenæ* of Schrank, and therefore that name, by which I have recorded it, must give place to *granaria*, Kirby, which is prior to *cerealis*, Kalténbach. It has been observed in North America.

4. *S. Millefolii*.—It frequents *Anthemis tinctoria* in addition to the plants that I have mentioned as its food.

5. *S. Artemisiæ*, Fonscolombe.—Passerini observes that the description of *A. Absinthii*, in Ann. Nat. Hist. ii. 202, includes the true *A. Absinthii* as well as this species, which he has found on *Achillea nobilis*.

6. *S. Avellanæ*, Schrank.—It differs much in structure from the other *Siphonophoræ*, and may be considered as the type of a new genus. It is not generally distributed on the hazel, but sometimes occurs in abundance.

7. *S. platanoides*, Schrank.—The genus *Drepanosiphum*, Koch, to which this species belongs, is very different from *Siphonophora* in structure and in habits, and the two genera represent two great groups of Aphidinae. *Drepanosiphum* has no viviparous wingless form, the successive annual generations are few, and it does not migrate. Four species have been described, *platanoides*, *acerina*, Wlk., *Tiliæ*, Koch, and *smaragdinum*, Koch. *D. Aceris*, Koch, is a synonym of *D. acerina*. The other group has more development of the peculiar characteristics of Aphididæ: the species are generally migratory, the successive annual generations are more numerous, the wingless viviparous form abounds, and there are more alternate generations: their migrations result from the failure of their food; they then seek new pastures to maintain their existence till they resume the comparatively imperturbable security of the egg state.

9. *S. Solani*, Kalténbach.—On *Solanum tuberosum* and on *Cydonia vulgaris*. Not recorded as British.

10. *S. Urticæ*, Schrank.—Migration is not so essential to this species as it is to many others. When the weather is mild it continues viviparizing during the winter season without the production of the egg state.

11. *S. Malvæ*, Mosley.—Passerini mentions *Aphis pallida*, *Wlk.*, and *S. Diplantheræ*, *Koch*, as synonyms of this species, and enumerates the following plants as its food:—*Althæa rosea*, *A. narbonensis*, *Nonnea lutea*, *Cuphea*, *Verbena*, *Calceolaria*, *Viola odorata*, *Diplanthera formosa*.

12. *S. Lactuæ*, Schrank?—Passerini observes that this species and *Rhopalosiphum Lactuæ*, *Kaltenbach*, are included in my *A. Lactuæ*. The description of *Kaltenbach* is hardly applicable to it.

13. *S. Absinthii*, Linn.—According to Passerini this is my *A. Absinthii*, exclusive of the synonyms. He mentions *Helichrysum angustifolium* as its food.

14. *S. Campanulæ*, Kalténbach.—On *Campanula rotundifolia* and on *Chrysocoma Linosyris*. Not recorded as British.

15. *S. Solidaginis*, Fabr.—Passerini says that my *A. Sonchi* includes this and the following species, as well as *S. Picridis* and the true *A. Sonchi*. Frequents the flowers of *Erigeron acris*.

16. *S. Jaccæ*, Linn.—*A. Cirsii*, *Linn.*, *A. Cardui*, *Fonscolombe*, at least partly, *Siphonophora Artemisiæ*, *Koch*? These are Passerini's references.

17. *S. Tussilaginis*, *Koch*.—This is certainly the species that I have described by the same name. Passerini observes that it deserts *Tussilago Farfara* during the summer.

18. *S. Picridis*, Fabr.—Passerini observes that *A. Cichorii*, *Dutrochet*, and *S. Cichorii*, *Koch*, are, in part at least, identical with this species. I have found *S. Cichorii* in June on the shoots of the chicory.

19. *S. Sonchi*, Linn.—According to Passerini, *A. Serratulæ*, *Linn.*, *S. Alliaris*, *Koch*, *S. Achilleæ*, *Koch*, and *S. Lactuæ*, *Koch*, are synonyms of this species. *S. Alliaris* feeds on *Sisymbrium alliaria* and *S. Achilleæ* on *Achillæa millefolium*.

20. *S. Tanaceticola*, Kalténbach.—Passerini says that I have included this species with *S. Absinthii*.

Genus 2. PHORODON, *Passerini*.

Typical species, *Aphis Humuli*, Schrank.—Antennæ on a frontal tubercle; 1st joint furnished on the inside with a stout tooth. Front flat between the antennæ. Nectaries very long, cylindrical or slightly clavate. In other characters like *Siphonophora*.

- A. Frontal tubercle with a stout tooth.
 - A. Viviparous apterous female pilose; the hairs capitate. Viviparous winged female with a black dorsal spot and with a clavate tail. 1. *Cannabis*.
 - AA. Viviparous apterous female smooth or slightly pilose; the hairs simple. Viviparous winged female with slender brown dorsal bands and with an acute tail. 2. *Humuli*.
- AA. Frontal tubercle not dentate.
 - A. Nectaries cylindrical.
 - A. Viviparous winged female with greenish brown dorsal bands. Nectaries tortuous. 3. *Inulæ*.
 - AA. Viviparous winged female with a large black dorsal spot. Nectaries not tortuous. 4. *Carduinum*.
 - AA. Nectaries clavate. 5. *Galeopsidis*.

1. *P. Cannabis*, *Passerini*.—On *Cannabis sativa*. Not recorded as British.

2. *P. Humuli*, Schrank.—*Passerini* observes that the synonym of *Fonscolombe* should be excluded from this species. Its history is still incomplete; it migrates from the sloe to the hop, and dwells there for awhile, and is called the hop-fly, and then returns to the sloe. The *Aphidinae* have a greater capacity for modification than is possessed by other insects, and in the study of them it is requisite that each form should be traced to its cessation or to its succession in the egg state, and that a division should be made between the permanent species and the annual or apparent species whose forms are varied by their migration and food.

3. *P. Inulæ*, *Passerini*.—*Passerini* suspects that in mentioning *Tussilago Farfara* and *T. Petasites* as the food of *P. Galeopsidis*, I have confounded *P. Inulæ* with it. *Aphis Inulæ* ('*Zoologist*,' vii. xlv.—1849) does not belong to this genus.

4. *P. Carduinum*, *Passerini*.—*Passerini* gives a very short description of this species. It appears, as he says, to be identical with my *Aphis Carduina*.

(To be continued.)

Notes from Walton Hall. By GEORGE ROBERTS, Esq.

EARLY in November I had the privilege of visiting the grounds at Walton Hall, and the woodland grave of Charles Waterton. The late residence of the lamented naturalist is, for the present, entirely unoccupied; and the beautiful collection of birds and other curiosities are now, I believe, at the Jesuit College, in Lancashire, where Mr. Waterton was educated, and will remain there, I am informed, till his grandson attains full age. The mansion, park and lake are at present in the care of one or two domestics and a game-keeper.

The readers of the 'Zoologist' will, I am sure, be glad to hear that some of the birds which Mr. Waterton protected and loved so well are still pretty numerous. The Canada geese yet enjoy their food and liberty on the lake: there are now two flocks, one of which is styled the "old flock." The herons breed annually in the wood which is within the wall: when passing through the park I saw one or two flying away from the water to the trees: this was the only opportunity I ever had of observing the heron at home. Kingfishers, dabchicks and moorhens are constantly to be seen at one end of the lake. The moorhens are numerous. Some pochards, mallards and other fowl had arrived on the day of my visit. Mr. Waterton was very scrupulous about the birds when they were newly come and unsettled: no gun was fired, nor trap set. When the water birds are arriving, in October and November, the keeper, who seems to have inherited some of his former master's veneration for the feathered tribes, permits no one to walk on the edge of the lake. The aquatic birds have been disturbed by foxes: a piece of the wall fell soon after the floods of last year, and is not yet rebuilt. The green, the greater spotted and lesser spotted woodpeckers occur in the park. A woodpecker's nest with eggs was taken from a tree, in Haw Park,* a few years ago, by poachers or trespassers, much to the annoyance of Mr. Waterton. Once a green woodpecker took a fancy to roost in one of the galleries of one of the bird-towers. Mr. Waterton used to go of an evening and sit in a grotto, and watch it enter its hole. If, in walking up to the house he should happen to meet any one, he would stop and observe, "I am as pleased as if I had found five pounds; my woodpecker is safe once more." Jays and magpies are not so numerous as they were,

* Haw Park is a wood outside the wall, famous for moths.

having been thinned to permit the increase of game. The hawks are reduced to the sparrowhawk and the kestrel. The carrion crow breeds both within and without the wall. Long strings of rooks fly away from and over Walton, after September, to Nostel Priory to roost now exactly as they did when Mr. Waterton wrote his 'Essays.' (See 'Essays,' vol. i. p. 132.) I once was standing in Walton Lane about dusk in winter, and I saw a vast number of rooks flying over towards Nostel from some place north-west of Walton: they flew in strings, and were above a quarter of an hour in passing over. At Nostel they, along with many jackdaws, roost in a row of large trees, and the clamour and commotion they make before they get settled is said to be really deafening.

In one of the darkest and quietest parts of the valley, at the upper or south end of the lake, lie the remains of Mr. Waterton. I should observe here, for the sake of perspicuity, that the lake is oblong, stretching from north to south, and that the Hall is built at the north end. The sides of the lake at the north end are dotted with trees, but at the other end both sides are covered with trees down to the water's edge. At the upper or southern extremity the water is not deep, being so constructed to favour the wading birds. In furtherance of this design there is also a flat of ground, planted with reeds and strong grass, for the moorhens and other birds to hide and breed in. The whole is hemmed in and shaded by trees. Here in gloom and silence rests the great naturalist. Between two ancient oaks, which grow close to the water and lean over it, stands a stone cross, erected on the spot in Mr. Waterton's lifetime, and behind, set back a little in the wood, is the grave. The mould is raised in the form of a coffin and planted with wild primroses; that is the only protection or covering.* On the plinth or foundation of the cross, close to the ground, on the side facing the water, is an inscription in Latin. The spot where Mr. Waterton hurt himself is marked by a rustic wooden cross, and, singular to say, is only about thirty yards from the grave. In the spring after Mr. Waterton's death, that is to say, the spring of 1866, a magpie built her nest in a tall elm tree which directly overlooks the sepulchre, and in a hole in one of the venerable oaks a "little blue dove" (I give the words as I received them) built her nest and reared her young. "That hole," said my guide, pointing to it, "was planned and made by my good old master for ullato." It is a very large cavity,

* Orders have lately been given for the erection of palisades.

extending upwards from the entrance towards a rotten part where an arm has been blown off. Part of the hole is covered with lead to prevent further rotting, and to darken the interior. This hole has been inhabited by owls as a diurnal retreat for numbers of years. Within a stone's throw, in a secluded nook known to few, the most beautiful of British water-birds, the kingfisher, rears its young year after year. It was in the dusk of a November evening when I visited this singular spot: the moorhens were just discernible, scudding in and out of the reeds; the ring doves were flapping in the tree-tops: the dry leaves were rustling on the ground: I stood a little apart and contemplated the scene with indescribable emotions.

While recrossing the open park I could hear the notes of the jay behind me: the herons were sailing slowly down from the trees to the margin of the water, and ducks were dropping down on to the quiet lake.

It was the delight of Mr. Waterton to promote the pleasure of others. At great expense he provided for the convenience of pic-nic parties; he built an elegant circular temple to sit or dance in, and a cot to make tea in, stables for the horses, grottoes, fountains, rustic chairs, swings and benches for musicians. But now the hilarious laughter of the pleasure-seeker is not heard; weeds are creeping into the walks; rust is tinging the swing-chairs, and moss is coating the rustic chairs: these little things attest forcibly to the loss of a watchful eye and an untiring hand. But I hope, we all hope, that the day is not distant when the gates will be re-opened, the fires re-lighted, and the musicians again take their stand in the shade of the fir-trees.

GEORGE ROBERTS.

Lofthouse, near Wakefield.

Interesting and Extraordinary.—Two of the largest and most ferocious-looking animals of the monkey tribe have just arrived in Liverpool. They are both males and young, being also nearly of a size, the larger standing fully four feet high. They are of very remarkable aspect, having a large lion-like snout or muzzle, with very powerful jaws and formidable teeth. Their limbs are very muscular, and their whole body is covered with a coat of rough shaggy hair, and they evidently possess very great strength and agility. A peculiar sort of comparatively hairless brow, which is at the will of the animal covered by a shaggy kind of caul, contains the eyes, which are large and strikingly piercing and expressive. From their great size and extraordinary conformation the suggestion is at once raised that they are a kind of hybrid between the gorilla and the lion, both of which animals abound in the central portions of Africa,

whence these two specimens were brought.—*Liverpool Courier*. PS. by my Correspondent.—I am reluctant to differ from so high an authority as the 'Courier,' but should rather regard these creatures as gorillas Darwinizing towards lions, and not as hybrids at all. In the "struggle for existence" the carnivore may very possibly be evolved from the frugivore; roots and fruit growing scarce, an appetite for flesh would be set up and the mane and claws of lions developed.—*Liverpool*, December 14, 1867.

A Cat killing a Squirrel.—For the last two years, off and on, we have had two squirrels in our garden, and young ones have also been bred there. We have also many cats, and one of these, about the middle of November, after watching one of the little animals hide up some food for the winter on our lawn, pounced upon it, shook it and killed it, as a dog would a rat, and then ran off with it in its mouth to a considerable distance. Is it not unusual for a cat to kill a squirrel?—*E. Charles Moor*; *Great Bealings, Woodbridge, Suffolk*, December 16, 1867. [I should not have supposed this an unusual occurrence; but I cannot remember a similar one well authenticated.—*E. N.*]

Large Game of the Kestrel.—On the 28th of November, when strolling over the cliffs near Herne Bay, I disturbed a kestrel at his dinner, which, on examination, I found to consist of a hooded crow: he had eaten all but the skin and head, over which latter he was neatly turning the skin to finish. The eyes of the crow were quite bright, and the bird had evidently not long been dead. In the same field there were many hooded crows feeding quite unconcerned at the presence of the enemy.—*John Hunter*; *Faversham*, December 16, 1867.

Roughlegged Buzzard near Truro.—I have never yet exactly identified this species in the Cornish Fauna, although it is said to have been seen. Mr. George Copeland, who first recorded the capture of the redbreasted flycatcher, informs me that a roughlegged buzzard, killed at Truro, is now in the Museum of that town.—*Edward Hearle Rodd*.

Diagnostics of the Roughlegged Buzzard.—The female of the common buzzard could not possibly be taken, even at the distance of four hundred yards, for the roughlegged, which has the under parts of a yellowish white, whereas the female of the former species is of a chocolate-brown beneath, and the back of so dark a brown as to appear almost black in the distance; but though so dissimilar in plumage, the female is nearly as large as the roughlegged species. The male of the common buzzard, as I have remarked (*Zool.* 9842), when seen soaring in the distance, is so unlike the female that it might be taken for a bird of a different species, and perhaps mistaken for the roughlegged buzzard, by the casual observer, though of inferior size and wanting the dark brown or black belt, which I agree with Wilson in considering the distinguishing mark in both sexes, though Gould says, the "white root to the tail is." As your correspondent asks my opinion, I will endeavour to give one, though so little being said as to colour of plumage, except the "upper part of the tail being white," (the upper tail-coverts of the male of the common buzzard are *whitish*), it is difficult to do so; however, as neither Lord Clifton nor his gamekeeper noticed the belt, though the bird was inspected by the former through a glass when but one hundred yards off, and was seen by the latter flying close overhead, I cannot but think this bird the male

of the common buzzard, which, being seen so near by the gamekeeper, accounts for its appearing so large, as it is somewhat similar to the roughlegged buzzard in the plumage of the under parts, the ground colour being of a yellowish white; if they again appear, the *belt*, the distinguishing mark, should be looked for: if one is dark beneath, and the other light, they must, if a pair, be the common buzzard; but should they appear of large size, and both birds whitish beneath, they may be set down as the roughlegged species, but then the belt should, with a good glass, be readily made out at some hundred yards off. As to its food, I am inclined to think with Wilson, that, if it preys on ducks, they must be "lame ones," though Mr. Selby has stated that those observed by him "pounced on wild ducks," possibly immature or wounded birds. Those observed in Canada were hawking mice, after the manner of the kestrel; and the one shot had some mice in the œsophagus and the remains of others in the stomach. If usually preying on wild ducks, and other birds, is it not strange that it should have escaped the notice of observers like Wilson and Audubon?—*Henry Hadfield; Ventnor, Isle of Wight, November, 11, 1867,*

Snowy Owl off the Scotch Coast.—A remarkably fine snowy owl was captured alive last Wednesday, on board a small Danish vessel about fifteen miles out at sea from Montrose: it was brought alive, in a seaman's chest, to Mr. Small, birdstuffer, of George Street, Edinburgh, on Saturday evening. Unfortunately I did not see it alive, as Mr. Small, being afraid of it damaging its plumage, killed it. It was very savage, snapping its bill, hissing like a cat, and throwing itself against the sides of its prison. I purchased it of him on Monday. It weighed $4\frac{1}{2}$ lbs.—*John A. Harvie Brown; 130, George Street, Edinburgh, December 17, 1867.*

Variety of the House Sparrow in Berkshire.—On the 21st of November a house sparrow was brought to Mr. Fisher, one of the Eton birdstuffers, with a purely white head; it had, however, no other white feathers about it. This bird was shot near Windsor, but I do not know the exact spot. It is being preserved for a clergyman.—*A. Clark-Kennedy; Eton, Bucks, November 25, 1867.*

Swallows in November.—One of the park-keepers at Windsor told me, a few days since, that he had seen some swallows and martins flying round the Albert Bridge, near Windsor, during the early part of November: I never knew them to remain in this neighbourhood so late.—*Id.*

Curious Variety of the House Martin.—In a birdstuffer's shop at Newton Abbot, on the 12th of November, I saw a very curious variety of the house martin, if it was genuine and not dyed: the rump and tail-coverts were a bright magenta, and the back wing-coverts and some of the quills, especially those nearest the body, were shot or glossed with the same colour, instead of the usual blue; the throat, breast and under parts were also slightly tinged with the same colour. The man declared that it was not dyed, but that it was as it had been brought to him, and that it had been knocked down by a little girl with a stone on the bridge over the Teign near Newton, some time in this summer, and that she had brought it to him immediately after, and he had stuffed it.—*Cecil Smith; Lydeard House, Taunton.*

Late Appearance of the Swallow.—I saw a swallow flying about hawking for flies, over a field near here, on the 28th of November. I also heard of one being seen at Taunton about the same day.—*Id.*

Animal Confidence.—I have been much struck with the confidence in the midst of danger shown by animals at the Kingston Rifle Range: the butt there is formed by a

bank of clay, flanked and surmounted by faggots. Thrushes and sparrows yearly nest and bring up their young in the faggots, in company with rabbits, although all day the bullets are crashing on the target and bank within a few feet of their nests, and sometimes even into the faggots. The six hundred yards firing point is an open wooden shed, about twelve feet square, built on the embankment of a mill-stream, the floor of the shed on the one side resting on the bank and the other supported by piles and rafters: on these rafters, immediately under the floor, a thrush built and reared its brood, and on a ledge under the roof, not more than seven feet from the floor, and quite visible, two swallows' nests were formed; one was deserted after a time; the other reared the young and departed. This little shed was in daily use, yet, notwithstanding the trampling of the men and firing of the rifles, these birds showed no fear.—*J. Hunter; Faversham.*

Ornithological Notes from Scilly.—The shooting party left Trescoe Abbey at the latter part of November with no very great success in their snipe and woodcock bag. The following are some observations made during the month:—A female or young surf scoter was obtained, a low latitude for this arctic duck: I reported an adult male, with its brilliant-coloured bill, had been obtained some time since. A young firecrest was also obtained, with the distinct white mark over the eye, but without any coloured crest. Flocks of stock doves had arrived, and the usual migration of redwings, chaffinches and bramble finches. Siskins had also appeared in considerable numbers, and a male redbacked shrike was observed. It may be remarked that this shrike has been lost sight of in the county for some years, except an occasional specimen.—*Edward Hearle Rodd; Penzance, December 2, 1867.*

Virginian Colin at St. Mary's Cray, Kent.—I beg to inform you that, through the kindness of Mr. W. L. Buster, of St. Mary's Cray, I have a male specimen of the Virginian colin, which was shot by him, on the 25th of last June, in the nursery of Messrs. G. and J. Lane. It was first seen by their foreman on the 23rd of June, and was killed by Mr. Buster two days afterwards, whilst perched in an apple-tree. It was preserved by Mr. Packman, of Orpington, but did not come into my possession until September last, and pressure of business has prevented my sending you a notice of it sooner.—*J. W. Stephenson; 2, Loudoun Place, Brixton Road, November 23, 1867.*

Flight of Bitterns.—We have had a large number of these birds in our district, extending, in fact, to the Scilly Isles, during the week. Some seasons consecutively we never see a single example.—*Edward Hearle Rodd; December 16, 1867.*

Jack Snipe in August.—In the December number of the 'Zoologist' (S. S. 1016), I see September noted as an early date for the appearance of this bird. This year, on the 24th of August, I flushed a jack snipe in some water-meadows close to the town here. When first disturbed it flew lazily for about thirty yards, and then dropped: on putting it up a second time it flew strong and well: it was apparently an adult bird.—*James Shorto, jun.; High East Street, Dorchester, December 14, 1867.*

Longtailed Duck at Exmouth.—During my recent visit to Teignmouth I was fortunate enough to get a specimen of this duck for my collection: it was killed by one of the boatmen at Exmouth, as he was on his way from that place to meet me at Starcross, on the 18th of November. He had seen a small flock of six or seven of the same birds about for a day or two before, and he afterwards told me he had seen one since. The one procured is a young bird of the year.—*Cecil Smith.*

Rednecked Grebe near Nottingham.—A specimen of the rednecked grebe (*Podiceps rubricollis*) was shot on the River Trent, at Shelford, about six miles from Nottingham, on the 17th of October, and came into my possession the same evening: it is in adult plumage, having the red neck and white throat. Although well acquainted with the Ornithology of this district for twenty-five years past, this bird is the first of the species I have met with.—*John S. Hedderly; Sneinton, Nottingham, November 15, 1867.*

Gannet on the Kentish Coast.—At the end of September a man found a gannet, in the plumage of the first year, behind the sea-wall on Whitstable Flats. The bird, although apparently un wounded, was stupid enough to allow himself to be knocked on the head with a stick.—*John Hunter.*

Storm Petrels and other Birds in the Firth of Forth.—On the 13th of November a friend and myself took a boat at Grangemouth, and went down the Firth as far as Queensferry, for the purpose of seeing what wild fowl were yet making their appearance. Amongst the common ducks we observed one pintail drake pass overhead: saw large flocks of scaups and pochards, about a dozen redthroated divers (two of which we wounded and lost, owing to their making to windward, and there being a fresh breeze blowing at the time), one great northern diver, eight Richardson's skuas, which were following the large companies of gulls, which, in their turn, were feeding on the sprats which had lately made their appearance. Besides the above we saw some eight storm petrels, three of which we shot: some of these were close to Grangemouth. The weather was fine, with a little wind from the south-west. The petrels were in poor condition, as were several others killed near Aberdeen, which I saw two days ago in the shop of Mr. Small, birdstuffer, Edinburgh. A blacktailed godwit was also obtained near Leith lately. Dunlins seem this season to be unusually abundant on this coast. At a right and left discharge of a 15-gauge shoulder-gun I killed one day some sixty dunlins on the breakwater at Grangemouth. The flocks are very large and numerous. Out of seventy dunlins, killed one day in October, only one had a buffish breast and a longer bill and longer legs than the rest: it closely resembled the curlew sandpipers which I before gave you notice of. The disparity in length of bill of many of the dunlins I have shot this season, and the unusual length of it in others, is very remarkable. Is this occasioned by age, sex, or local difference in breeding stations, or to what other cause, if any, can it be assigned? There is every appearance here of an early winter. Teal are coming inland in greater numbers and earlier than I have hitherto observed them; but as yet I have killed but few mallard at flight time. Woodcocks, as usual, arrived with the first hard frost, about a week ago. Fieldfares are arriving in large flocks. At the beginning of the frost large flocks of golden plovers came far inland, but were very wild and difficult of approach.—*John A. Harvie Brown; Dunipace, Falkirk, November 23, 1867.*

Storm Petrel at Bridlington Quay.—Mr. J. H. Gurney very kindly forwarded me a fine specimen of this little petrel yesterday: it was shot, on the 12th of November, at Bridlington Quay, Yorkshire. Mr. Gurney does not state whether there were more birds in company with this one, nor does he give further particulars.—*A. Clark-Kennedy; Eton College, November 15, 1867.*

Forktailed Petrel at Colchester.—On or about Thursday, the 5th of December, a boy connected with the Great Eastern Railway was rubbing up one of the engines, at five o'clock in the morning, at the Colchester station, when a bird flew against his lantern with great force, and, being stunned, was of course easily captured. It was

blowing strongly at the time, and I need not say that the gales during the week November 30—December 7 will long be remembered in every part of England. This bird was killed, and sent to Mr. Ambrose, of this town, for stuffing, where I saw it, and recognized it at once as Leach's or the fork-tailed petrel (*Thalassidroma Leachii*). It has been purchased for me by Mr. Ambrose, and is added to my collection. Like its congener, the storm petrel, this bird is frequently taken in England during or after strong gales, Yarrell says more frequently in the autumn. They are carried inland, and generally fly to light when captured. I have a storm petrel taken in this way twenty-five years ago, twenty miles from the sea.—*C. R. Bree; Colchester, December 10, 1867.*
—*From the 'Field.'*

Forktailed Petrel near Spalding.—I have this last fortnight received two forktailed petrels; both were alive when caught, but only lived a few days. I believe they are male and female, as they differ slightly in plumage and size. I have never heard of any being caught in this neighbourhood before. Both are being preserved by Mr. Evans, of Bourn.—*J. W. Harrison; Broad Street, Spalding.—Id.*

[Many instances of the occurrence of petrels inland have been recorded in the daily papers, but most of them are unauthenticated by a name.—*E. N.*]

Large Pike in Buckinghamshire.—On the 28th of September last a large pike was caught upon a "trimmel" on the ornamental water at Ditton Park, the seat of his grace the Duke of Buccleuch. This fish weighed 20½ lbs., and had a very large head in comparison with its body: the head was preserved by Mr. Fisher, of Eton.—*A. Clark-Kennedy.*

Monster Eel.—On Tuesday an eel of immense size was shown at Mr. Culling's, fishmonger, of Downham Market, which was taken out of the River Ouse, near Denver Sluice: it measured in length 5 feet 8 inches, girth 17¼ inches; and weighed 36 lbs. (28 lbs. after being cleansed). Yarrell, in his 'British Fishes,' mentions having seen the skins of two at Cambridge which together weighed 50 lbs. (one 27 lbs. and the other 23 lbs.), which were taken within a few miles of the spot where this was captured. The party who secured it left for Cambridge with their prize, and obtained at Ely upwards of £3 by showing it. Ely is said to have obtained its name from rents in the isle being paid in eels. The lords of the manors in the isle were annually entitled to upwards of 100,000 eels—not, we presume, of this monster size.—*From the 'Times' of October 28, 1867.*

PROCEEDINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY.

November 18, 1867.—Prof. WESTWOOD, Vice-President, in the chair.

Donations to the Library.

The following donations were announced, and thanks voted to the donors:—'Journal of the Linnean Society,' Zoology, Vol. ix. No. 37; and 'Proceedings of the Linnean Society;' presented by the Society.

Election of Subscribers.

Frederick Bates, Esq., of Leicester, and H. J. S. Pryer, Esq., of Highgate, were severally balloted for, and elected Annual Subscribers.

Exhibitions, &c.

Mr. Bond exhibited eight specimens of *Sterrhæ sacraria*, bred from the egg by Mr. Rogers, of Freshwater, Isle of Wight; together with two females by which the eggs were laid. One of the females was captured at midday on the 14th of August, 1867, and on the 16th laid three eggs; the other was taken at sugar on the 16th of August, and on the 19th laid six eggs. All the nine eggs were hatched on the 23rd and 24th of August, and the larvæ were fed on *Polygonum aviculare*. On the 14th of September three larvæ began to spin up, on the 19th four more, and on the 23rd the remaining two. The moths emerged, one on the 17th of October, two on the 19th, three on the 25th, and two on the 27th; one died in pupa. The times of development in the cold and wet season of 1867 thus agreed very nearly with those of the specimens bred by Mr. Hellins in the hot and dry season of 1865, and described by Mr. M'Lachlan (see *Trans. Ent. Soc.* 3rd series, vol. ii. p. 453, pl. xxiii. figs. 2—7), and the food-plant was the same; but the specimens now exhibited were unlike Mr. Hellins's specimens, being all of the same pattern, plain, buff-coloured, but very dark.

Mr. M'Lachlan mentioned that this species, which was originally described by Linnæus from specimens captured in Barbary, and which was extremely abundant at the Cape of Good Hope, had been found as far north as Perthshire.

Mr. Stainton exhibited a specimen of *Ebulea catalaunalis*, a new British *Pyralis*. It was captured at Cheshunt on the 18th of September last, by Mr. W. C. Boyd, whose attention was attracted by its peculiar flight, resembling that of a house-fly. The insect was quite distinct from *Nascia cilialis*; but in consequence of Stephens having erroneously given *catalaunalis* as a synonym of *cilialis*, continental authors were in the habit of quoting the latter insect as identical with *catalaunalis*.

Mr. Higgins exhibited a large collection of butterflies from Labuan and Borneo; amongst them were *Ornithoptera Brookiana*, *Prothoe Calydonia*, *Amathusia*, &c., &c., and several species hitherto unique among Mr. Wallace's captures.

Mr. Trimen exhibited a fine species of *Papilio* from Uruguay, allied to *P. Americus* of Kollar.

Prof. Westwood had recently received from Dr. Hooker the cocoon and chrysalis of a *Saturnia*, from the larva of which the Chinese obtained the "gut" used by fishermen: the moth was not yet known, but he hoped to breed it. The "gut" was in fact the silk-reservoir of the larva, which was drawn out about twenty-four hours before the larva would in the ordinary course begin to spin, the precise time being of great importance; it was dipped first in vinegar, then in water, after which the silk-vessel was capable of being extracted in many cases to the length of from twenty to thirty feet.

Mr. Janson said that in the South of Europe "gut" was obtained from the common silkworm.

Prof. Westwood added that one of the *Saturnia* cocoons contained a *Chalcis* and another *Hymenopterous* parasite, but the pupa was nevertheless quite perfect.

Mr. M'Lachlan mentioned that Dr. Balbiani had recently called the attention of the Soc. Ent. de France to the facility with which the silkworm disease might be communicated to the healthy larvæ of other Lepidoptera. He had taken larvæ of the same brood of *Bombyx neustria*, and fed some upon healthy leaves of *Scorzonera*, others upon leaves of the same plant, which he sprinkled with water in which diseased silkworms had been pounded; the former were healthy and well developed, the latter were small, soon filled with corpuscles, and died at the first moult. Dr. Balbiani had also inoculated with muscardine the larvæ of clothes-moths, by throwing on the infested clothes a powder formed of the *débris* of muscardined silkworms; the infection being more rapid and certain when the powder was fresh, less so when dried.

Mr. Stainton had to record a new habitat for the larva of a *Tinea*; Mr. Swanzy had shown him the larva-case of a *Tinea* which was taken from the horn of a kooloo from Natal, and there could be little doubt that the larva must have been burrowing in the horn of the living animal.

Mr. Swanzy added that, since Mr. Stainton's visit, he had found a living larva in the horn.

Mr. Trimen had seen the skull of a hartebeest, the base of which was eaten by what he had no doubt was the larva of a *Tinea*.

Mr. Trimen exhibited a grasshopper of the genus *Pæcilocerus*, of which he had found the pupæ *in copulâ*: it was not an isolated case, but he had seen hundreds of pairs of the nymphs at Natal at the beginning of the present year.

Mr. Trimen exhibited a Mantis with minute fore legs, remarkable for its resemblance to a *Phasma*.

Mr. Bates remarked that its likeness to a *Bacillus* was very close, and suggested that it would be found to feed upon *Bacillus*, which, deceived by the imitation of its own form, would fall an easy prey to the Mantis.

Mr. M'Lachlan reported that *Boreus hyemalis* had been lately taken by Messrs. Douglas and Scott, amongst moss, near Croydon.

December 2, 1867.—Sir JOHN LUBBOCK, Bart., President, in the chair.

Additions to the Library.

The following donations were announced, and thanks voted to the donors:—‘Proceedings of the Zoological Society,’ 1867, Part ii.; presented by the Society. ‘Descriptions of American Lepidoptera,’ No. 2, by A. R. Grote and C. T. Robinson; by the Authors. Newman's ‘Illustrated Natural History of British Moths,’ No. 12; by the Author. ‘The Zoologist’ for December; by the Editor. ‘The Entomologist's Monthly Magazine’ for December; by the Editors. Also, a portrait of Lyonet; by H. Hartogh Heys v. d. Lier.

The following additions, by purchase, were also announced:—‘British Moths,’ Nos. 1–5; ‘Genera des Coléoptères d'Europe,’ Livr. 136.

Election of Members.

W. C. Boyd, Esq., of Cheshunt; Herbert Druce, Esq., of Ealing; A. H. Haldiday, Esq., of Carnmoney, County Antrim; and Joseph Ince, Esq., of 26, St. George's Place, S.W.; were severally balloted for, and elected Members.

Exhibitions, &c.

Mr. Pascoe exhibited a new species of *Thysia* from Sumatra, which he proposed to describe under the name of *T. viduata*; and pointed out that *T. tricineta* of Laporte, from Java, was distinct from *T. Wallichii* of Hope, from Upper India.

Mr. Pascoe also exhibited several other interesting Coleoptera, including new forms of Trogositidæ from Penang, of Tenebrionidæ from Ceylon, Sumatra and N'Gami, of Brenthidæ from Batchian, of Curculionidæ from Peru, of Anthribidæ from the Philippine Isles and Malacca, and of Lamiidæ from Java and Malacca.

Prof. Westwood exhibited the only known British specimen of *Serropalpus striatus*, captured some years ago in Leicestershire. It was the identical insect recorded in the 'Zoologist' for 1844, p. 701.

Prof. Westwood also exhibited a small spherical nest, made of mud, with a white silken casing inside; it was found on the common ling near Reigate, in July, 1866, on the occasion of the Society's visit to Mr. W. Wilson Saunders, and was then thought to be the nest of a spider. It had, however, produced the hymenopterous *Eumenes atricornis*.

Mr. F. Smith remarked that the *Eumenes atricornis* of Curtis was the *coarctatus* of Linnæus; he had found many of the females at Bournemouth, carrying off a Lepidopterous larva (probably *Eupithecia nanata*) which fed upon ling. It was an error to suppose that the larvæ of *Eumenes* were fed upon honey.

Mr. F. Smith exhibited a piece of dead willow-wood found at Mitcham, in which were no less than ten cocoons of *Megachile Willughbiella* within a radius of an inch. The burrows or perforations in the wood were lined with rose-leaves, but the same species of leaf-cutting bee did not always confine itself to the same kind of leaf—rose, elm, laburnum, and others were used; in one instance he had known them to use lilac-leaves, and he believed that they would take almost any leaf that happened to grow near the nest. Some species made an inner lining of a different kind of leaf from the outer coating; he had known *Megachile argentatus* to form an inner lining of the petals of *Lotus corniculatus*, and *M. centuncularis* of the petals of the scarlet geranium.

Papers read.

The following papers were read:—

"Contributions to a Knowledge of the Coleoptera," part 1; by Mr. Pascoe.

"On some Undescribed Species of South-African Butterflies, including a new Genus of *Lycænidæ*;" by Mr. Roland Trimen. Eighteen new species were exhibited and described, including two species of *Papilio*, an *Acræa*, a *Panopea*, a *Deloneura* (n. g.), three species of *Zeritis*, an *Aphnæus*, four *Lycænæ*, a *Pyrgus*, two *Cyclopidæ*, and two *Pamphilæ*.

New Part of 'Transactions.'

The publication was announced of *Trans. Ent. Soc.*, 3rd series, vol. iv. part 3; being the fifth Part issued during 1867.—*J. W. D.*

Natural History Notes from Morayshire.

By GEORGE NORMAN, Esq.

DURING the year 1867 I resided, from the month of June until the end of October, at Forres, in Morayshire, and having made a few notes I venture to make a selection which may interest the readers of the 'Zoologist.'

To the sportsman and naturalist the country round Forres has been rendered classic ground since the late Charles St. John resided there during the time he wrote his interesting 'Natural History and Sports of the Highlands.' I quite agree with St. John in his estimation of the varied beauties of the country in this district; certainly no part of the British Isles that I am acquainted with contains within the same limits so great a variety of aspect, and presents so many attractions to the naturalist and sportsman, as the country around Forres. Miles of magnificent pine, spruce and larch forest; numbers of fine rivers and lochs, abounding with salmon and trout; extensive upland moors; a wonderfully mild climate and dry soil: these, with a sea-coast within half-an-hour's journey, are features not often so happily combined in one locality. Indeed, to one fond of Natural History and sporting, it is a glorious country. During the whole five months I resided in Forres we experienced a remarkable freedom from electrical disturbance, for I do not remember noticing either thunder or lightning. The climate is very much milder than the part of Yorkshire I am now writing from: as an instance of this, I may mention having eaten both peaches and nectarines quite as well ripened as any I have seen in Covent Garden: these were grown in the open air by the kind and hospitable Laird of Dalvey, Norman M'Leod, Esq. In the garden at Dalvey I noticed remarkably fine specimens of *Ailanthus glandulosa*, forty feet high, *Magnolia acuminata* (?), perhaps twenty feet, and a tall shrub sent by the late Dr. Wallich from India, all flourishing without any protection in the open air. These facts are given to show how mild the climate is in a locality so far North.

Cole Tit.—This is perhaps the most common bird in the extensive plantation at Cluny Hill, the place where I resided. The woods seem alive with them. I looked out for the marsh tit, but in vain, and if found in this district it must be rare. The cole tits more generally associated with goldencrests, large and blue tits.

Bullfinch, &c.—Bullfinches are by no means rare, and I saw, on one occasion, a pair of these birds collecting nesting materials. I had eggs of this species given me afterwards. Swifts, swallows, martins and corn crakes were very abundant by the beginning of June, when I found a willow wren's nest and eggs.

Banks of the Findhorn.—On the 3rd of June I visited Relugas and Glen Ferness, both stations on the glorious River Findhorn. At both places the high crags, forming the boundary of the stream, are of fine red granite erupted through the old red sandstone. There are acres of *Polypodium Dryopteris* and *P. Phegopteris*, with *Trientalis europæa* and *Goodyera repens*. Noticed by the way-side large quantities of *Agaricus gambosus*, which, when cooked, is in my opinion quite as nutritious and delicate in flavour as the common mushroom: I made many gatherings of this early fungus and enjoyed them amazingly.

Redstart.—I noticed this bird at Glen Ferness, and afterwards found them to be not uncommon.

Wheatear, &c.—Wheatears, stonechats and whinchats, although noticed in this district, are by no means common.

Oystercatcher.—Early in June I took a stroll on the banks of the River Findhorn, between Forres and its embouchure into the bay on the Moray Firth. Here I saw numbers of oystercatchers, evidently nesting among the loose shingly islands: they were very bold, flying within ten yards of my face. Two days afterwards I took down my gun, wishing to procure a specimen in full plumage, but found them excessively wary.

Common Sandpiper.—Among the whin-bushes and alders growing on the banks of the Findhorn, I found several nests of the common sandpiper, mostly with four eggs. One nest was on a branch quite in the centre of an alder-bush: the eggs were strongly incubated. A young bird was captured, after a long chase, in some shallow pools, where it dived and swam about quite as expertly as a water vole.

The Culbin Sandhills.—On the 8th of June I visited the Culbin Sandhills, an enormous deposit of pure white sand, blown up from the Moray Firth into small mountains, and covering many villages and much cultivated land, it is said. The sand-hills are mostly bare, but in some places they are covered with extensive tracts of broom, whin or heather. Saw here a fox, evidently on the look-out for rabbits, which abound here in thousands. Here, growing where the sand was

damp, was a very peculiar brown scaly fungus, which may turn out to be *Agaricus Bongardii*, and if so probably new to our lists. I saw many ring plovers evidently near their nesting-places; but I failed in finding the nests, from not knowing the exact localities where to look for them.

Colony of Terns.—Noticing a great outcry from a vast assembly of terns (*Sterna Hirundo*), I directed my steps to a large expanse of stony ground near the sea, evidently a former beach, though now separated from the ocean by a range of high sand-hills. Here the colony of terns were breeding, and I soon found five nests with eggs, the number in each varying from two to four. Watching the birds flying overhead, I noticed several of a much smaller size and uttering quite a different cry from the larger birds: these I fancy were the roseate tern (*S. Dougallii*), although at the time I did not succeed in shooting one. Some weeks afterwards my friend Captain Ruxton shot an adult specimen, which he described to me as having a rose-coloured breast. I afterwards shot a young bird of this species, so that in all probability it is not uncommon on this coast.

Kingfisher.—This bird is very scarce here, and has apparently reached its utmost northerly limits. It has, however, been occasionally shot on the Findhorn, and I saw a specimen in Mr. M'Leod's museum at Dalvey.

Fishes.—The River Findhorn is a capital salmon stream, and late on in the season I frequently got a moderate basket of trout, with a few "finnock," the local name for the grilse of the sea trout. In the fish market I saw very few good fish: what one sees exposed for sale are principally small cod, coal-fish, sea-bream, whiting, haddocks, gurnard and herrings. Deep-sea fishing is entirely neglected, nor are the open boats at all adapted for the purpose. I was often struck with the fact of the people sitting the whole morning in the streets selling a few miserable handfuls of small fry, which on the English coast would have been disposed of by the hundredweight or ton in one-tenth of the time. The Scottish people may be very much ahead of the Southerners in many respects, but are certainly far behind us in deep-sea fishing. The dogger bank, that unfailing source of wealth to the deep-sea fisherman, is quite as convenient of approach from the Scotch as from the Yorkshire coast.

Darnaway Forest.—On the 12th of June I walked over to the magnificent Darnaway Forest, in order to visit a colony of black-headed gulls (*Larus ridibundus*). We found in various parts of the

forest three or four distinct colonies of this bird: they had chosen for their nesting-places islands in the centre of a loch, also some rushy patches in the centre of a swamp. Very few of the young birds were off yet, but most of the eggs were too strongly incubated for blowing. These colonies reminded me of the one at Twigmoor, near Brigg. In both places I noticed the gulls occasionally settle on the pine and spruce firs. A nest was taken of what we supposed was the spotted rail. In this forest, and also at Altyre, the common crossbill is found throughout the year in great numbers, and the nests are, I am told, not uncommon in the early spring. I have an egg given me by a youth who took a nest last spring. The siskin also breeds here, according to the testimony of the keeper. Among the heather I noticed many *Argynnis Euphrosyne*, and several three-spotted dragon-flies. I never saw a more likely place for adders, and although I searched diligently for them I never saw one. It is strange that, although the country is so well adapted for these reptiles, they are very rarely seen, and then only of small size. The common ringed snake (*Coluber natrix*) is unknown, and the only other reptiles I have seen were the small lizard among the heather, probably *Zootoca vivipara*, the blindworm, land efts and frogs.

Knock of Brae Moray.—On the 18th of June, in company with Messrs Hislop and Terry, drove, by way of Duniphaill, to the "Knock of Brae Moray," a moory eminence 1300 feet high, and some twelve miles from Forres. The whole way there was through the glorious Altyre woods, quite studded with beautiful Fungi, now becoming more plentiful. Noticed many species of *Lactarius* and several *Boleti*. Caught several lizards on the top of a stone wall. On the Knock I found a grouse's nest with eggs, which is very late. Saw many young grouse recently hatched. The view from the top of the Knock was magnificent: the picturesque Loch Endorb just below us, while towards the N.W. were Ben Wyvis and other high lands in Sutherlandshire and Caithness, all more or less snow-flecked, while towards the South were the Cairngorm group, with Ben Muich Dhui, yet heavily mantled with snow. Caught among the heather a specimen of the ruby tiger moth (*Arctia fuliginosa*). Squirrels are excessively numerous in the woods here, doing much damage by biting off the tops from the larch and pine trees, thus destroying the lead. I noticed the tails of some specimens were very pale, almost white in colour.

By the 24th of June Fungi were very plentiful, and I gathered the following:—*Boletus edulis*, *B. scaber*, *B. luridus*, *Cantharellus cibarius*, *Agaricus arvensis*, *Russula alutacea* and *Amanita rubescens*: many of these are excellent as food. Among insects I noticed *Smerinthus Populi* and *Biston betularia*: *Erebia blandina* was in great profusion.

Goatsucker.—Goatsuckers are very abundant here, and I obtained several specimens. On the Califer Hill I saw as many as six or seven on the wing together; and even after ten^o'clock at night I could easily distinguish the males from the females by the white spots on the tail. This bird, in addition to its well-known jarring note, often utters when flying a shrill piping cry.

Woodcock.—Frequently I have seen the woodcock flying over the woods just before dark, and have then remarked that this bird also utters a shrill piping cry, although invariably mute when flushed during the day-time.

Dunlin, Redshank, Spotted Flycatcher and Water Ouzel.—On the 30th of June I took a walk down to the "Carse," a tract of low-lying waste ground bordering the Bay of Findhorn, in hopes of finding a late nest of the dunlin: among the tufty hillocks I found several old nests. Picked up a dead redshank, and on cutting it open found an egg quite uninjured. Spotted flycatchers are not uncommon; and the water ouzel, as might be expected, is found on every burn: I noticed under an old bridge over the Forres Burn a nest of this species, and was told that it builds there every season.

Califer Hill.—On the 8th of July I took a walk to the Califer Hill, and noticed several pretty plants, *Pyrola*, *Narthecium ossifragum*, *Goodyera repens*, *Erica cinerea* and *Habenaria bifolia*. In the pine woods there I found a fruity-smelling fungus, with blue cap and stem and cinnamon-coloured gills: this I take to be *Cortinarius glaucopus*: it seems very abundant in this locality.

Culbin Sands.—On the 23rd of July I walked down to the Culbin Sands, by way of Brodie and the Dalvey woods. Found an abundance of *Cantharellus cibarius*, *Lactarius rufus*, and the singular but offensive *Phallus impudicus*, by the way. On the Culbin Sands I saw hundreds of teal, shieldrakes and oystercatchers. I was much amused by watching the numerous Richardson's skuas, here called "dirten-allens." These sat in numbers on the sands, closely watching the fishing operations of the various gulls and terns: immediately a catch was observed the crafty skua would fly up, and attack the poor bird

until he disgorged his hardly-earned meal, which fell to the share of this filibustering knave.

Cuckoo.—Cuckoos were not very numerous: I saw a young flyer on the 28th of July.

Fungi.—Among the Fungi now out were early specimens of the beautiful *Agaricus muscarius*, together with *Hydnorum repandum*, *H. zonatum* and *Lactarius deliciosus*. I may here mention an adventure I had with *Agaricus muscarius*. Knowing that the Siberians use this fungus in the preparation of one of their beverages, I was anxious to verify or not its reputed intoxicating properties. I consulted Lightfoot, who misled me by stating that two or three specimens might be eaten with impunity. Having boiled a few I partook of little more than a whole specimen: this was about five o'clock in the afternoon; by 7 P.M. I noticed symptoms of slight giddiness, which gradually became more and more apparent until half-past nine o'clock, when the intoxicating effects increased to such an extent that I began to be alarmed: however, I went to bed at ten, and slept for a few hours, and awoke quite free from any trace of its effects. I mention this as a warning to future rash experimenters.

By the end of July the heavy rains in the mountains had filled the burns, and I often filled my basket with fine river trout.

On the 10th of August I again visited the Culbin Sands and the little fishing village of Findhorn. I saw plenty of "grayling" butterflies on the sand-hills. I took my gun to the coast, and soon saw a fine pair of *Lestris parasitica*: the adult male, with a black cap and yellowish cheeks, I killed at a long distance, when the female, in her uniform brownish garb, flew circling round her fallen mate: a second shot procured me this likewise. I also shot a young roseate tern.

August 26. "Red Admiral" butterflies are now appearing, but no *Cynthia Cardui*, although my friend Dr. Innes informs me that it was common enough last season.

Cossus ligniperda.—Near the lime-kilns at Cothall I found an old birch tree completely riddled by the larvæ of *Cossus ligniperda*: the juice had run down the trunk, making the whole vicinity smell like a distillery, and collecting hundreds of wasps by its vinous odour. I dug into the tree, and took out at least fifty larvæ. In the rotten wood of the tree were many Coleoptera of two species, *Soronia punctatissima* and *Synodendron cylindricum*. The woods of Altyre and Darnaway are much infested with the goat moth larvæ, for in driving

through one sees dozens of fine oak trees with the sap flowing from the infected parts.

In August I found many larvæ of *Smerinthus Populi*, *Cerura vinula*, *Saturnia pavonia-minor*, and, later on, *Notodonta dromedarius*.

In the woods I have frequently seen huge white Fungi growing from the limbs of the birch trees: this is *Polyporus betulinus*, which, when dry and cut into thin slices, makes a good substitute for cork in lining the drawers of an insect cabinet.

Crossbill.—On the 5th of September I saw a small flock of crossbills flying over the trees at Cluny Hill, but the great mass of these birds are not seen near the grounds here until the larch-cones are ripe. On the 15th of October I spent the day in Altyre Forest, along with the head keeper, and although we looked diligently for hours we neither saw nor heard them. The keepers say that some days they see them by hundreds. The owner of a timber sawing-mill also informed me that he has frequently caught them with a sieve and string. On the 27th (Sunday) I heard, in the Cluny grounds, the well-known ringing call-note of this bird, and saw a flock of ten pitch into some larch-trees, and busy themselves in separating the seeds from the cones. Being anxious to have a specimen I was sorely tempted to take out my gun, but, knowing the prejudices of the people, refrained from doing so, hoping to see them the next day. The next morning before breakfast I took out my gun, and soon procured three fine males, all more or less red, one particularly so. I had to leave Forres a few days afterwards, which was annoying enough, for I had a wish to study more closely the habits of this interesting bird. I am told they remain about the grounds at Forres all the winter.

Noctuidæ.—During September and October I tried the plan of sugaring trees for moths; and although the pages of the 'Zoologist' (alas!) are no longer open for the announcement of insect captures, I trust the small list of *Noctuidæ* found in the locality will not be deemed unworthy of insertion.

Hydræcia nictitans. Once or twice at sugar.

„ *micæa*. One at light.

Xylophasia polyodon. Abundant at sugar.

Charæas graminis. Abundant on ragwort.

Luperina testacea. Occasionally at sugar.

Agrotis valligera. One at sugar.

„ *suffusa*. Not unfrequent at sugar.

- Agrotis exclamationis*. At light.
 „ *Tritici*. Very frequent at sugar.
 „ *agathina*. On heath.
 „ *præcox*. At light.
Triphæna orbona and *T. pronuba*. Both frequent at sugar.
Noctua glareosa. Not unfrequent at light.
 „ *depuncta*. Once at sugar.
 „ *C-nigrum*. At light.
 „ *xanthographa*. At sugar.
Anchocelis rufina. Plentiful at sugar.
 „ *litura*. Abundant at sugar.
Cerastis Vaccinii. Abundant at sugar.
 „ *spadicea*. Not unfrequent at sugar.
Scopelosoma satellitia. Abundant at sugar.
Xanthia Cerago. One at light.
 „ *ferruginea*. Abundant at sugar.
Polia Chi. Abundant on palings and sugar.
Epunda nigra. Very abundant on palings and sugar.
Miselia Oxyacanthæ. Abundant at sugar.
Agriopsis aprilina. Abundant at sugar.
Phlogophora meticulosa. Abundant at sugar.
Hadena protea. Abundant at sugar and on pine trees.
Calocampa vetusta and *C. exoleta*. Abundant at sugar.
Plusia Gamma. Abundant on heath.
Amphipyra Tragopogonis. Abundant at sugar.
Stilbia anomala. Once at light.

Next season I intend hunting the locality more completely, and shall be glad if a gentleman or gentlemen will join me.

GEORGE NORMAN.

Ben Rhydding, Yorkshire,
 December 5, 1867.

The Walrus at the Zoological Gardens.

By EDWARD R. ALSTON, Esq.

No account of the young walrus (*Trichecus rosmarus*, Lin.), which has recently been added to the collection of the Zoological Society, having yet appeared in the 'Zoologist,' I am induced to give a short description of its form and history.

As most of your readers probably know, the walrus or morse has long been a much-lamented want at the Zoological Gardens. Last year Professor Newton gave some account of former attempts (Zool. S. S. 203), and pointed out what an attraction such a huge and yet sagacious amphibious monster would prove to the general public. The last live walrus brought to England was at the Gardens, he states, in 1853, but it succumbed in a few days to a diet of oatcake!

The present specimen, a young male, supposed to be about a year old, was captured in Davis's Straits, on the 28th of August, 1867, by the crew of the whaler "Arctic." It was one of a large herd, and was still in company with its mother, who was harpooned: the poor young beast refused to leave the body of its parent, and was eventually noosed and dragged on board. At first it sulked and refused all food, but after some days consented to eat some fat pork and a mess of boiled oatmeal. On the arrival of the "Arctic" at Dundee, the Zoological Society were at once communicated with, and the purchase was soon negotiated.

The walrus was soon removed to London and put on a diet more suitable to its tastes and habits than pork and porridge. As is well known, the food of this animal has long been a matter of dispute; the shortness and bluntness of its molar-teeth showing that it could not live exclusively on fish, while Sir Everard Home stated, in the 'Philosophical Transactions,' that a friend of his had found its stomach to contain sea-weed only. Much reliance cannot, however, be placed on any statement of that singularly inaccurate and fanciful writer, and Mr. Lamont, in his 'Seasons with Sea-horses,' states that those he examined in the North contained the remains of various molluscous, annulose, and radiated marine animals, although he believed that they sometimes do eat sea-weed. This account, being variously confirmed, and according with the structure of the teeth, which are well calculated for crushing hard shell-fish, induced Mr. Bartlett to try it with mussels and whelks. The experiment proved completely successful, and its principal food is still various Mollusca, although it also greedily devours sprats and other fish. Hitherto it has obstinately rejected all proffers of sea-weed. It would be an interesting experiment to test its capabilities as a fisher by turning a number of live fish into its tank.

In the end of November I had an opportunity of paying my respects to the sea-horse, and found him comfortably settled in the habitation of his lamented relative the sea-bear, which animal many of your

readers may remember, and to which the young walrus bears a very striking resemblance in general form and appearance. I do not know any illustration in books of Natural History which gives a good idea of the creature; the ordinary drawing is much too rounded, smooth and bulky, while that in Professor Bell's work is too seal-like in its attitude; Mr. Wood's portrait of the present specimen, in the 'Field' of November 16th, has a flattened and depressed look, and is too rough and woolly-looking: the engraving in 'The Illustrated London News' is much better. In shape the young walrus is singularly ungainly and angular; his skin is marked all over the neck and flanks with deep wrinkles and is covered with closely-lying brownish hairs. Professor Bell describes the *adult* animal, however, as having only "a very few short stiffish brown hairs, principally on the feet" ('British Quadrupeds,' p. 289). His tusks have not yet made their appearance, but he possesses a most formidable beard of stout stiff bristles, which makes him resemble, according to a friend of mine, "an old baldheaded dragoon officer with a heavy gray moustache." The eye is small but intelligent, the orifice of the ear inconspicuous, and the mouth rather small.

In his ordinary position the fore feet or flippers are turned outwards and backwards, while the hind feet are directed forwards. In this way the walrus manages to walk, or rather shuffle, along in an awkward waddling manner, very like the gait of the sea-bear, but very different from the still more grotesque manner in which the seals in the next inclosure hop along on their bellies. His swimming and diving are of course much more dexterous than his movements on shore, and his "headers" from the sides of the tank are very neatly executed. The keeper informs me that on the walrus being released from his house one morning he found his pond covered with a thin sheet of ice; at once he plunged through it, and then swam round and round, bringing up his head at intervals with such force as to break the ice, and continuing to do so till he had smashed it all up. Dr. Kane, in his 'Arctic Adventures,' gives drawings of the "atluk," or walrus- and seal-holes in the ice, at which these animals are often waylaid and shot.

The present specimen already recognises his keeper and comes to his call, but has not yet learned any accomplishments, which he will probably do in time.

Many interesting particulars as to the haunts and habits of the walrus will be found in Mr. Lamont's work, already quoted, and a full

description of one killed in the Hebrides in 1817 is given by Mr. Macgillivray in the 'Naturalist's Library,' vol. xvii. p. 223.

EDWARD R. ALSTON.

Stockbriggs, Lesmahagow, N. B.,
December 23, 1867.

[On the day on which Mr. Alston's paper reached my hands a notice appeared in the 'Times' of the death of the walrus, since which a most careful dissection of the animal has been made by Dr. Murie, the Prosector to the Zoological Society, at the gardens in the Regent's Park, with the twofold purpose of examining and recording the anatomical structure of the animal, and of ascertaining the cause of its death: this was, apparently, the presence of a large number of Entozoa in the stomach. These amounted to many thousands, averaging from one to three inches in length, and in thickness from that of a thread to a good-sized knitting needle, both ends tapering to a point. The exact species of worm has not yet been determined, and it is not known when or how they were introduced into the stomach. Their presence, however, was accompanied with ulceration of the mucous lining of the stomach, which caused the death of the animal. It is singular that these worms were confined to the stomach, not being found in the intestinal canal, and no evidence of their existence was manifested during life. Dr. Murie has had the opportunity of contrasting the anatomical structure of the walrus with that of the sea-bear, and the record of the distinctions between them will be of great service to naturalists. It may interest our readers to know that the skin and skeleton of this animal have been secured for the British Museum, and that the anatomical preparations to illustrate the structure of the viscera will form part of the collection in the Museum of the Royal College of Surgeons.—*E. Newman.*]

Letters on Ornithology. By HARRY BLAKE-KNOX, Esq.

(Continued from S. S. 631).

LETTER VI.—BRITISH LARIDÆ. Genus LARUS. Species CANUS.

Part II.—*Being an Account of its Plumages and Transformations from the Nestling to the Adult Bird.*

"May this magnificent study, second to none but Theology, daily gain more favour in the eyes of the public; and be the time not far distant when observers shall arise capable of giving greater accuracy and precision to our knowledge of British birds. While the world endures—be it a thousand years or a million of centuries—the works of God will never be fully comprehended by man; and thus there is delightful occupation in view for all time."—Prof. W. MACGILLIVRAY, *Preface*, Vol. iv., '*History of British Birds.*'

PERHAPS the plumages of no bird are so apt to be curtailed as are those of the common gull, authors describing it adult at one and two

years old; yet nevertheless it takes, I find from years of observation, over four years to attain the adult appearance, and in consequence, I believe, irrespective of internal examination, it does not propagate its kind till the fifth spring—that is, five years old, within a month or so. In this respect it allies itself closely to the true gulls (*Larus*), though in change of plumage it is strikingly dissimilar, slightly approaching, however, in this respect, the genus *Xema*, or blackheaded gulls. I find that the generality of sea-fowl assume a dress very similar to the adult the summer before they breed, though in the gulls there is an immature aspect discernible about the quills called the primaries. Why the plumages of this gull have been so curtailed by authors (refer to any writer British or foreign) seems to me to be, that after the third summer and autumn moult, two years old, there is no glaring distinction between old and young; yet still it must be quite obvious to the student of Nature that the plumage is not matured till after the fifth autumn moult. To the student and researcher it is equally easy to learn that the birds do not breed till they are five years old: this can be proved conjointly by the character of the plumage, and dissection, of those birds which we see in apparently adult plumage during the breeding season, associating together or mixed with still younger birds, often far from any breeding haunt (in this species of gull particularly, hundreds of miles may intervene), though it is generally more natural to find them in the vicinity of bird-rocks, collected there by the numbers of other sea-fowl,—a habit of the gulls,—and also because these bird-rocks are by Nature placed in the direct track of the migratory fishes on which such millions of birds feed. Authors have called these apparently adult, though still, in reality, young birds, barren gulls, or very old worn-out individuals. Without a critical knowledge of plumage and dissection this would not seem so very improbable an opinion, for young birds do not change plumage by moult till about June or July—there are exceptions both ways—till late in the autumn, consequently the feathers they bear at the breeding season are those which have weathered the winter, and are of a necessity worn and faded. A lesser blackbacked gull in the fifth summer—that is, four years old—is generally, to all appearance, a tremendously old bird, the dun-coloured black plumage having worn and faded to brownish black, the tail, the quills and, in fact, all the plumage looking quite mangy, and the most part of it dead and ready to fall out as the moult advances. The lavender-backed gulls, being of a more subdued colour, do not show the effect so much; still the worn plumage is the

same. On the other hand, in adult birds the plumage is revived, rejuvenated, reimpigmented in the spring, when their plumage becomes most lovely, perfect and soft, at once giving the idea of youth and vigour, though not of necessity.

SYNOPSIS OF THE PLUMAGES.

First Year.

First Plumage or First Summer.—Head and neck white, spotted with brown. The upper surface of the body and wings, except the upper tail-coverts, dark brown, barred with paler brown. Wing-quills brown and black. Tail black and white, as are its upper coverts. Under surface of the body white, transversely marked with cinereous-gray or dull brown, the centre of the belly being generally, however, plain white. Bill, basal half flesh-colour, point half black. Feet dull flesh-colour. Orbits black. Irides dark brown. Lips and inside of mouth dull flesh-colour.

First Winter Plumage.—Markings on head and neck sharper, darker and more distinct. Back and scapulars intermixed with lavender-gray feathers. Secondary large coverts more lead-colour, as is also the rump. Under plumage a purer white, with the dark markings sharper and better defined. Feet greenish flesh. Lips and mouth yellowish flesh. Rest as in first plumage.

Second Summer Plumage.—In its early part a faded addition of first winter. From June, often earlier, the bird is in perpetual moult, and shows great diversity of dress as the new feathers for the approaching winter appear. The basal portion of the bill and the feet change to greenish gray.

Second Year.

Second Winter Plumage.—Head and neck white, sharply and intensely spotted with black. The upper surface, except the wing-coverts, as in the adult; the secondary coverts as the adult, but still tinged or dusted with brown. The primary coverts, the bastard wing and its appendages leaden gray, indiscriminately and vigorously clouded with black. Breast still lightly marked with dun-colour transverse wavy bars. Bill, basal half grayish or greenish lead-colour, tip half black. Lips and mouth, flesh tinged with orange.

Third Summer Plumage.—Head and neck mostly wear nearly to white, though generally are still mottled; the breast generally loses its dark markings. The bastard wing and the primary coverts are

still well marked with black, which generally fades to rich brown. The base of the bill becomes more of a yellow-green, the tip still dark. Feet more of a green lead-colour. Mouth orange.

Third Year.

Third Winter Plumage.—Very like the adult, but the dark markings extend further down the neck to the shoulders, and are also still marking the sides of the breast. *Sometimes* the bastard wing and some of the primary coverts are still marked with black: this is not a rule. The bill is gray-green, inclining to lead-colour, sometimes yellow-green, a dark bar across it at the angular knot; about this angle and the tip canary-yellow. Feet greenish lead-colour.

Fourth Summer Plumage.—As the adult, but that the bill is greenish yellow at the base, the tip brighter yellow, the dark bar sometimes crossing the angle like a cloud, sometimes replaced by a gray shadow. Feet green-gray, tinged with yellow. *Sometimes* the head and neck retain a few of the mottles of winter. Feathers generally old and worn.

Fourth Year.

Fourth Winter Plumage.—Very like the adult, but that the bill is greenish gray at base, sometimes yellowish gray, yellow at the tip; the dark bar crossing the angle is now a mere spot or is represented by a cloud of gray. Feet green-gray, slightly tinged with yellow.

Fifth Summer Plumage.—Very similar to the adult. Bill yellow, tinged with grayish, at the angle generally of a dull stony tinge. Feet not so yellow as the adult; under parts *plain white*.

The irides for these four years are brown, gradually paling each season in colour.

The primary wing-quills are different to those of the adult till the fifth autumn, after which they closely approximate: I fully describe them in my account of the plumages.

Fifth Year.

Fifth Winter Plumage.—No very striking difference from old adults. The yellow of the bill and feet are hardly so bright, and the markings of the head and neck are generally more extended and smudgy. I consider it adult from this time.

Sixth Summer Plumage.—Identical with the adult at the same season. Breeds this year. It is five years old.

Adult Years.

Male and female similar in plumage; the female, as a general rule, is considerably smaller every way than the male.

Spring and Summer.—Head, neck, throat, tail with its upper and under coverts, under wing-coverts, tips of scapular, secondary and tertial quills, unsullied white. Back, scapulars, rump and wing-coverts, lavender. Under parts salmon-colour or delicate rose-pink. Bill and feet deep canary-yellow. Orbits red. Mouth and lips orange-red. Irides cinereous-gray or pale drab, full of little flecks of silver.

Winter.—Head and neck mottled with black. Bill and feet not so intense a yellow. Orbits duller red. Under parts more tamely tinted with salmon-colour.

ACCOUNT OF THE PLUMAGES.

No. 1. *Young in Down.*—The down is grayish; irregularly blotched and streaked with brown and black. Feet dull flesh.

No. 2, Link 1. *First Moul.*—A mixture of the down and the first plumage. The down remains some time attached to the tips of the feathers of almost all sea-fowl.

No. 3. *First Plumage.*—We find this plumage during part of June, July and August; the common gull being an early breeder, like the blackhead.

Upper or Celestial Surface.—Head: the basal half of the feathers dull white, top portion brown, the edges pale. Neck similar, but the brown more extended. Before the eye many black bristly hairs; the feathers about the eye smoke-colour. Back, scapulars, rump and lesser coverts of secondary quills—concealed portion of the feathers white, exposed part brown, edges pale; the rump often is tinted with lead-gray. Tail, two-thirds of the basal portion white, remainder black, forming a deep band at end; extreme tip of the feathers pale; sometimes where the black and the white meet the white is clouded, rarely mottled with black. The greater coverts of secondaries dull gray, with a brown tinge; primary coverts dark brown; upper tail-coverts white, barred irregularly with brown. Secondary quills dark on the outer web; the inner web pale gray or whitish, a blotch of brown near tip; tip white.

Under or Terrestrial Surface.—Chin white. Throat, sides of neck and the sides of the breast and flanks white, irregularly marked with

brown. Centre of breast and belly white. Under tail-coverts white, often with transverse dark markings. Feet dark flesh; instep or front of tarsus brown; ankle tinged with livid. Bill flesh at base, black at point. Inside of mouth and lips livid flesh-colour. Irides brown; orbits dark.

Type of the Primary Wing Quills.—First six blackish brown, getting grayer and the gray more extended, consecutively, from the pen upwards through the filaments of the inner web; the same occurs in the outer web, but not so bold or conspicuous. Seventh and eighth may be called gray, with more or less of a dark end and white tip. Ninth and tenth more subdued than the two preceding; often the end of the tenth is all white; part of the outer filament at the edge is brown. These quills remain till the following autumn, the bird being then more than a year old: they of course bleach and wear with the seasons, and consequently their appearance changes considerably. To follow these bleachings would be endless and unnecessary here—unnecessary because the quills cannot be confounded with any other age, each year having quite a distinct primary-quill plumage. At any time in its first year the quills will distinguish it. The secondary quills also vary more or less, but are also quite distinct in the second year.

No. 4, Link 2. *First Autumn or Second Moult.*—The moult begins in August, extending sometimes to December and January. The head, neck, some of the back and scapular plumage, the throat, breast and belly, alone partake in this moult. The new feathers of the back and scapulars are the colour of the adults; those of the other parts but a purer and more solid feather than that of first plumage.

No. 5. *First Winter Plumage* (from a well-developed bird shot in the month of December). *Celestial Surface.*—Head and neck white, each feather having a spot of black at the tip; towards the shoulders these spots assume more the appearance of blotches; before the eye is clouded with dark—there are many black hairs before it. The difference in this part of the plumage is not very striking from that of first plumage, except that the markings are better defined and of a darker colour. The back and scapulars consists of three kinds of feathers: *first*, many of the first plumage's brown feathers; *secondly*, some of the brown feathers of the first plumage transmuting by change of pigment to lavender (these feathers appear gray, shaded and marked with brown); *thirdly*, those assumed by moult, which are, as the adult, lavender. It is extremely rare to get a first winter common

gull with the back and scapulars all lavender, as is the case with the blackhead, these birds differing strikingly this way in their first winter. The rump is much more lead-colour, as are also the greater coverts of the secondaries. The remainder of the celestial surface, tail and quills as in first plumage, but of course, as the year advances, more faded.

Terrestrial Surface.—Has been, all but the under wing and tail-coverts, renewed by moult. Differs little but in the better quality of the feathers, the greater purity of the white and the greater definiteness and darkness of the markings. The base of the bill has changed to green or livid flesh-colour, the feet also becoming greatly suffused with that colour.

No. 6, Link 3. *First Spring.*—I may say that since August there has been almost an incessant dropping out and replacing by moult of individual feathers; after December this cannot be called a moult, for from that time the bird seems to have some rest in its plumage, but with April and May the same gradual moult begins again, extending itself this time to the feathers that have not been affected before, *viz.* the secondary coverts and the remaining brown feathers in the back.

No. 7. *Second Summer* (from a bird killed in June). *Celestial Surface.*—Head and neck similar to the last winter. The entire back, scapulars, rump, and a very large proportion of the lesser coverts of the secondaries, the dark lavender of the adult, perhaps approaching more the lead-colour of the kittiwake; like that bird, too, the central parts of these coverts have not moulted yet, and thus form a brown bar through the wing. The tail and the wing-quills have not as yet begun to moult.

Terrestrial Surface.—The dark markings have considerably decreased. The bill is greenish lead-colour at the base; the feet also of this colour. The irides and the orbits brown. The mouth yellow flesh-colour.

No. 8, Link 4. *Second Summer and Autumn Moult.*—The general moult begins in July, though sometimes earlier, and extends into October; by November it is always perfected. All the plumage is renewed at this moult, even that which came in the spring past. The primary quills and the tail are generally the last feathers assumed, the primaries commencing at the tenth quill,—in other words at the carpus,—renewing in succession to the first, which is frequently incipient when all the rest are matured; the tail generally comes all

at once, and normally is pure white. Sometimes its growth is premature, coming in June or July; it often then, and I should say very naturally, resumes an abnormal appearance; that is, it is irregularly spotted at the end with black, which is retained in cases all through the winter. This abnormality is caused by the partially immature state of the pigment or colouring matter; the bird being under the normal age of assuming a particular coloured plumage must unite the pigmentary fluids of both ages, thus accounting for the dark spots. It would be out of place here to speak further on the subject of moult, pigmentary influences, transmutation and regeneration of plumage without moult, albinism, real and bleaching, &c.; besides it would take this letter to undue bounds: at some future time I will relate some curious facts and dissections relative to these subjects.

No. 9. *Second Winter Plumage. Celestial Surface.*—Head and neck white, the former speckled, the latter blotched with black: this appearance is caused by each feather, which is white, having a spot or blotch of black in the centre and tip; when first assumed the fringes of the feathers are also pale whitish. Immediately before the eye are a patch of black hair-like feathers; in the region of the eye the speckles are generally closer and smaller. The dark markings of the neck extend well down to the shoulders, where they almost form a *collar*. The back, scapulars, rump, tail-coverts, tail and the secondary quills as the adult. The secondary coverts are dull lavender-gray, generally *dulled with brown*, being marked along the margin, as also sometimes the tips of the large secondary coverts with that *colour*. The bastard wing and its appendages, and also the primary coverts, *lead-gray, strongly and irregularly clouded and marked with black*; margin from the carpus white, *marked with black*. Some of the tertials occasionally have a black spot or two.

Terrestrial Surface.—Region of the chin white, as is the very centre of throat; the sides of the throat marked like the head; the breast and part of the sides are *marked with black*. Belly, vent, under tail-coverts and under wing-coverts white, the latter lightly marked with *brown*, particularly along the margin. Bill green lead-colour at base, dark at tip, rarely being slightly tinged with yellow at the tip and angle. Feet leaden gray-green. Irides and orbits brown. Moults yellow-orange.

Type of the Primary Quills.—1, 2, 3, 4, 5, no white tip; 6, 7, 8, 9, 10, have white tips; 1, 2, have each a large white spot after the black tip, the spot of 1 being larger than that of 2; in 1 it includes the

shaft, more or less; in 2 the shaft is black; each of these spots is more or less margined with black at the fringe of the greater web, and sometimes also in the lesser web: 3, 4, 5 have no such spot, but in 4, 5, 6, where the black and gray of the feather should meet, there is a more or less distinct cloud of white. In the rest of the quills, 7, 8, 9, 10, this cloud and the tip are all in one. The leading colour of 1, 2, 3, 4 is black, 3 having no white at all, but from the pen, in all, upwards (towards the tip) gray usurps this colour, increasing in volume consecutively, forming more than half of both webs of 4, and becoming the body colour of 5, 6, 7, 8, 9, 10. After the white tip in 6 the end is black for about one inch, this constituting nearly all the black in the feather, except at the fringe of the outer web. 7 has always a large or small spot or bar of black on one or both webs at the end; 8, 9, 10, all gray, ends white.

Variations—The primary markings are more variable at this than at any other age: but the year is at all times branded on the wing by the dark markings on the coverts. The most frequent variations are noticed in the depth and extent of the white markings. The white spot in 2 is often only apparent in the greater web; 4 and 5 I have rarely seen with incipient white tips; 8 I have seen with more or less black at the end; 1 not having the shaft white in the spot. The shafts of 1, 2, 3 are black; in the rest they consecutively become from dark to light horn-colour. Fading and wear frequently change the colour of the dark portions, often making false dirty white tips to the feathers, merely the effect of fade, and as often wearing away the black ends till they become very short.

No. 10, Link 5. *Second Spring Plumage*.—Is but a continuation of the winter dress, generally speaking more faded. The orbits are more of a mahogany colour; the mouth redder and the bill more tinged with yellow.

No. 11. *Third Summer Plumage* (June, July).—Very much faded and worn, same as in the winter past, but that many of the spots on the head and neck, and some of the markings of the breast, have either bleached or worn off. The orbits are of a better red, as is also the mouth; the bill is yellow at the angle and tip. The feet are green lead-colour, tinged on the front with pale stone-colour.

No. 12, Link 6. *Third Summer and Autumn Moults*.—Commences as early as June and July, is generally completed by September or October. In the interval between these months the bird is more or

less in the new or old plumage, and not to be confounded with any other age.

No. 13. *Third Winter Plumage* (from a bird shot in October). *Celestial Surface*.—Not very dissimilar from the adult. The markings of black on the head and neck are, however, more crowded and blotchy, *extending further down the neck and the shoulders*. The bastard wing, the margin and also some of the primary coverts are occasionally, but rarely, marked with dark, these parts in general being as the adult. The primary quills differ from the adult. The bill is *grayish or yellowish green at the base, crossed at the region of the angle by a bar or cloud of black*, the tip region being yellow. The feet are *grayish green*, not uncommonly tinged with stone-colour. Orbits mahogany; irides brown. Mouth orange-red.

Type of the Primary Quills.—Though the difference between the primary quills of this age and that of two years old is very plain, still there is such a strong resemblance that it will be only necessary for me to point out the distinctions without entering on a separate description. In all the quills we have the tip represented by a genuine and naturally white spot. In 1, 2 we have the same white spots as in the second year, that in 1 being much more developed, and rarely fringed on either web with black. The whole cloud in 4, 5, 6 is much better developed, and almost separates the gray from the black of the feather; at all events in the greater web. The gray, which increases consecutively in each feather, is considerably more usurping of the black, purer, less sullied and clouded by dark markings; 7 is also marked at the end with more or less black.

No. 14, Link 7. *Third Spring Change*.—The feathers of the head and neck lose the dark markings, turn white partly by moult, partly by transmutation. The sides of the breast begin to discard any dark markings they may have had. The bill, orbits, irides and feet are changing to a more mature colour.

No. 15. *Fourth Summer Plumage* (June).—The head and neck have become, like the adult in summer, pure white. The under surface also has become *pure white*, in this respect *unlike* the adult. The bill is generally *dull yellowish* at the base, canary-yellow at the tip, *the dark bar at the angle* represented either by a dark or a stone-coloured cloud. Irises a paler brown. Orbits orange-red. Feet dull yellowish green, tinged with stone-colour.

No. 16, Link 8. *Fourth Summer and Autumn Moult*.—Begins in July; is completed in October. There is little remarkable, except

the assumption of the new speckled feathers of the head intermixed with the old white, and that the new feathers of the breast and belly are very faintly tinged with obscure salmon-colour. Unity of feathers alone causes this tint, for no trace of it can be detected on a solitary feather. Can be always known from the adult by the bill and feet.

No. 17. *Fourth Winter Plumage* (November). *Celestial Surface*.—Differs but little from the old adult; the markings on the head and neck are not so neat, and are more extended towards the shoulders. The primaries are still different from the adult.

Terrestrial Surface.—Like the adult, but the salmon-colour tinting seems only to shine out of the feather, and is not perceptible except the feathers are in unity. The orbits are dull red, the irides something like the adult. The bill is a gray-yellow, inclining to stone-colour at the angle. The feet are dull yellow, inclining to stone-colour tinted by a succession of numerous small dottings of green.

Type of the Primary Quills.—Do not differ very essentially from the third-year primaries; like them all end with a white spot. Nos. 1, 2 have the second white spots, but are more developed than last year. No. 2, unlike that of last year, has often the shaft white in the white spot. The white separating the gray from the black in 4, 5, 6 is very intense and as white as snow; it also, unlike last year, includes the shaft contiguous, in its *pure colour*. No. 7 is quite devoid of black, and, like 8, 9, 10, lavender-gray with extensive white tip.

No. 18, Link 9. *Fourth Spring Moult*.—The head and neck moult to pure white; the orbits change to vermilion; the feet and bill to yellow, still showing a green tinge.

No. 19. *Fifth Summer Plumage*.—Very much as the adult. The bill and feet are not of so good a colour, nor the eye so bright. The breast and belly are not so rich a salmon-colour. Individuals may breed at this age, but from having met them away from the breeding haunt in the breeding season, and from finding no eggs in the ovaries, I have always been under the impression that they do not breed till the following summer.

No. 20. *Fifth Autumn Moult*.—Is over in October, when the bird presents all the appearance of the adult in winter.

No. 21. *Adult in Winter*. *Celestial Surface*.—Head, neck and sides of throat white, delicately and distinctly marked with black, the order of markings being a dark spot on a white feather; before the eye

many black bristles. The shoulders white, as are also the tail and its upper coverts. The back, scapulars, rump, wing-coverts, also the tertial and secondary quills, lavender-gray; the tips of the scapular quills, those of the tertials and secondaries, and the margin of the wing for its entire length, white.

Terrestrial Surface.—Except the sides of the throat, which are speckled with black, the entire under parts are white, the breast and belly being tinged with delicate maize or salmon-colour. Bill and feet are of a uniform *dull yellow*, not unfrequently tinged with *stone-colour or gray*, the feet sometimes having a faint tint of green through the yellow.

Type of the Adult Primaries.—There is not a very striking difference in the adult quills from those of the fourth and fifth year. The white tips are more developed; the large white spots in 1 and 2 more extended (generally), that in 2 including the shaft, as well as the fringes of both webs. The white clouds in 4 and 5 very conspicuous and pure. The gray and black very intense and decided. No. 6 has generally no dark markings, unlike any immature age, but, with 7, 8, 9, 10, is lavender-gray, with an extended white tip. It will be seen that as the bird advances in age the white spots at the ends of the quills become more developed, as do also the second spots in 1 and 2; that the white cloud in 4 and 5 becomes purer and better seen, and that all dark markings leave the 8th, 7th and the 6th quill, giving them the gray and white character of 9 and 10.

As each set of quills lasts a year, some difference of course is caused by the tips wearing off; late in the year the white tip is frequently quite worn away.

No. 22. *Adult Spring.*—The head and neck transmute to white; the bill, feet, orbits and irides are changing to a purer colour.

No. 23. *Adult in Summer (May).*—An unseen change, because there has been no moult, has taken place in the whole bird. The plumage has rejuvenated and repigmented, looking fresh and blooming. The head and neck are now unsullied white, as are also the sides of the throat; the other parts of the plumage as in winter, but more beautiful, if such could be possible: the breast and belly are vividly suffused, like a sunset tint, with maize, salmon, or rose-colour, the latter much the rarest; I have never seen these parts white. The bill is *bright pure chrome-yellow*. The irides are *cinereous or drab-gray*, full of little particles resembling silver dust. The mouth red-orange. The feet are *intense canary-yellow*. The orbits are vermilion.

In autumn the whole plumage is renewed by moult; the old skin or cuticle of the feet falls off, and is replaced by that bearing the winter colour.

I cannot conclude this letter without some remarks on the careless way that *publishing* naturalists describe the feet, bill, and other fading parts of birds. An hour will make a difference in the bloom, a day destroy the colour of these parts. It is, therefore, necessary to note at *once* the colour of the feet, bill, irides, orbits, mouth, cere, &c., of whatever bird is for description. Do not trust it to memory or even to words, if possible paint it. I use a few water colours in a little tin box, with a white enamelled pallet—quite light and portable; so I can defy any fish or bird to make a fool of me by changing colour. I am sorry to say I think most writers either copy each other, or describe these parts from a dried skin, making calculations for change of colour; or else they describe immature as adult birds. Supposing that I am a young beginner in Natural History, and seek information with avidity, I want the colour of the feet of the adult common gull, I own a lot of “good” works on Natural History, I refer to them and the following is all I learn:—

Latham, Syn. Birds. Legs (!) dull greenish white.

Pennant, Brit. Zool. Legs (!) dull white, tinged with green.

Montagu, Orn. Dict. Legs (!) dull white or tinged with green.

Newman's Montagu. Same.

Macgillivray, Brit. Birds. Winter. Feet deep green-gray. (No account of the summer given).

Jenyns, Brit. Vert. Winter, legs (!) greenish gray, the webs blotched with yellowish. Summer, legs pale ochre-yellow, spotted with bluish ash (fourth summer).

Atkinson's Compendium. None.

John's Brit. Birds. Feet greenish ash (fourth winter).

Thompson, Nat. Hist., Ireland. Tarsi and toes brilliant yellow. (In other parts this clever author falls into error by making his birds adult too soon).

Jardine. Greenish gray.

Yarrell. Dark greenish ash.

Notes by the Author.—Of course being ignorant I should follow the majority and be led astray. These errors may arise from the habit of quoting, or from making an account when the part has changed colour,

or from, as I said before, describing the adult from an immature bird. It is with no disrespect I refer to these authors, or to correct errors in their writings, which would occupy these pages for years, but only to show the British zoologist that he need not *yet* go from home to do a little good towards a true history of this particular branch of Ornithology. The heading of this letter speaks my sentiments, my hopes. It should be a comfort and a solace to the naturalist, tied down by many a reason to his native land. It should be one matter, that one confirmed or new fact in British Ornithology is worth a cabinet full of foreign skins. Instead of egg taking and breaking,—the curse, I emphatically state it, the curse against the progression and increase of species,—the curse that has thinned our noble sea-fowl,—remorseless slaughter of birds that a child could kill, either for pleasure or emolument,—the picking off of every poor stranger that storm or the increasing design of Nature has driven to our shores,—which seem now the most noble pursuit of the British ornithologist:—instead, I say, of these, if a deeper attention was paid to the habits, the ways, the secret life of birds, the result would be different: beautiful and wonderful knowledge *versus* egg-midwives, abortive bird-stuffers, and accounts of butchery or the amount of feathers in the stomach of every poor grebe that is shot.

HARRY BLAKE-KNOX.

Dalkey, County Dublin.

Errata.—Letter V., page 625, for “Kingston,” read “Kingstown.” Page 628, first line, for “from slowly moving clouds of smoke,” read “form slowly moving clouds like smoke.”—H. B.-K.

Ornithological Notes from the Isle of Wight.

By Captain HADFIELD.

(Continued from Zool. S. S. 987.)

OCTOBER, 1867.

Sky Lark.—October 8. Larks observed in flocks. The thermometer had fallen fifteen degrees between the 2nd and 4th.

Grasshopper Warbler.—Has occasionally been met with. On the 11th one rose close to me in a turnip-field and alighted on a hedge, into which it quickly crept out of sight. The elongated tail and wavering flight reminded me of the Dartford warbler.

Linnet.—October 11. First seen flocking together.

Wood Wren.—Occasionally observed towards the middle of the month.

Redwing, &c.—October 20. A small flock passed over the town in a northerly direction, and on a subsequent day a few fieldfares were observed.

Wood Pigeon.—October 23. A very large flock rose from an oak wood near Brading, having been disturbed by a passing train: this is recorded, because flocks containing some hundreds are seldom met with in the island. These birds are now in fine condition: a female lately shot weighed a pound and a quarter; its crop contained both wheat and vetches, in about equal proportions; the moult had apparently but recently commenced about the neck, but the central tail-feathers had attained to within an inch or so of their full length; the third primaries and the first secondaries were the only quills in the course of renewal, and they were but half-grown.

Martin.—Though the main body has migrated, still martins are to be seen in considerable numbers in the Undercliff, but not out of it; for instance, on the 23rd not one was observed between Shanklin and Ryde, but the following day many were seen at St. Laurence hawking and sporting about in circular and undulating flight, as their habit is. They are, I believe, mostly birds of the season.

Swallow.—October 24. Though less numerous than the martin, they are still to be met with in the Undercliff, but they are chiefly young birds, the tails but slightly forked. That the mildness of the season is the chief attraction there can be no doubt; but the shelving inland cliffs, full of fissures and holes, afford them ready refuge from the storm, as well as safe roosting quarters. Their food is still abundant, as flies and gnats are swarming.

Great Northern Diver.—One was seen off Shanklin lately.

Woodcock.—Have heard of one being found.

NOVEMBER, 1867.

Snipe.—November 5. Several snipes seen to-day, there having been a sudden change of wind from south-west to north-east, which has brought the glass down to 43°.

Sparrowhawk.—November 5. One observed to-day, the first seen for some time, though formerly commonly met with.

Partridge.—A large covey again observed; though too wild to be readily counted, I am told that it still contains twenty-eight birds. The flocking together of partridges this season is very remarkable,

and when once on the wing they will fly a mile or more. The sense of hearing in the partridge is wonderfully acute, for they will take wing before one gets within two or three hundred yards of them, and that too without a word being spoken, or even a whistle: I say the sense of hearing, for in a turnip-field seeing one at such a distance is impossible. They have been frequently found this season in the grasslands, where they roost when sufficiently open and bare of trees.

Cuckoo.—I have lately seen a caged cuckoo belonging to a butcher at Ventnor: it was taken from a hedgesparrow's nest early in the summer, and fed on raw beef, on which it has continued to thrive. Though very tame it is rather pugnacious, and emits a hissing noise, and has already learned to imitate the barking of a dog. Though it has lost its tail-feathers, I do not see that the moult has commenced, the plumage of the neck and back being still marked with light red, reddish white and brown.

Fieldfare.—Not observed in this neighbourhood till the third week in October; but I see that a correspondent (Zool. S. S. 989) reports having met with them about a month earlier (on the 25th of September). I might not perhaps have questioned this, though the date is an early one, had it not been stated that they were seen by two other persons, for that looks as if the writer had been in doubt: if so, the question is, are the individuals referred to well acquainted with the fieldfare and its manner of flight? If not, I shall be inclined to think it may have been the missel thrush, a bird about the same size and not very dissimilar in plumage or manner of flight. I lately saw a small flock, which in the distance might readily have been mistaken for the fieldfare.

Rednecked Grebe.—A handsome male was captured off Shanklin towards the end of the month in a very strange way. A boatman, well known to me, found the bird preening its feathers, and so intent was it in performing its morning's ablutions that it allowed the boat to approach within a few yards—close enough for the man to strike it a stunning blow with a boat-hook or oar. I had no opportunity of seeing it, it having been sent out of the island to be preserved, but I am told it was a splendid specimen.

Redthroated Diver.—First observed towards the middle of November.

HENRY HADFIELD.

Ventnor, Isle of Wight,
December 10, 1867.

Notes on the Folk-lore of Zoology. By EDWARD R. ALSTON, Esq.

(Continued from S. S. 1008.)

Nightingale.—I need do no more than allude to the old poetical fable of the Queen of Song leaning her breast against a thorn, whence the plaintive melancholy of her notes. The ancients also believed that the nightingale never slumbered, and Ælion adds that its flesh was believed to cause sleeplessness in those who partook of it.

Skylark.—In Scotland the skylark and the linnet are on the bird-nester's free-list :—

“ The lav'rock and the lintee,
The robin and the wren,
If ye harry their nests
Ye'll never thrive again.”

The Scotch and old English name of “laverock,” used by Isaac Walton, is derived from the Anglo-Saxon “læverk.” The idea that the lark changed eyes with the toad has been noticed by Mr. Harting (Zool. S. S. 421).

Yellow Bunting.—A strange and unaccountable prejudice against the “yellow-yite” or “yellow-yorling” exists in Scotland, as evinced in the following popular rhyme, several versions of which are given by Chambers :—

“ Half a paddock, half a taed,
Half a yellow-yorlin',
Drinks a drap o' de'il's bluid
Every May morning.”

Crossbill.—The Thuringian mountaineers, says Bechstein, believe that this bird takes upon itself any illness or pain that may afflict its master, and accordingly it is a favourite cage-bird with them. If the upper mandible turns to the right it has the power of relieving the male sex, if to the left the female, of their ailments. They also regard the water left in its drinking-glass as a specific against epilepsy. A pretty German legend, paraphrased by Mosen, has been translated by Longfellow. It relates that a little bird attempted to release our Lord from the cross, in reward for which

“ — The Saviour spake in mildness,
' Blessed be thou of all the good!
Bear in token of this moment
Marks of blood and Holy Rood!'

And that bird is called the crossbill,
 Covered all with blood so clear,
 In the groves of pine it singeth
 Songs, like legends, strange to hear."

Raven.—The raven was sacred to Thor; two, named Hugin and Munin (Thought and Memory), sat ever on his shoulders, and were sent daily to spy the times and bring news to their lord. (Simrock, *Handb. der Deut. Myth.*) Hence the dreaded raven-flag of the Danish Vikings, and hence the bird is still held sacred in Norway and Sweden, where the peasants will hardly kill one. In other lands the raven is generally detested as a bird of evil omen, as Mr. Harting's extracts from Shakspeare sufficiently show (*Zool. S. S.* 465). Marlowe also, in the 'Jew of Malta,' sings of

" — The sad-presaging raven that tolls
 The sick man's passport in her hollow beak,
 And in the shadow of the silent night
 Doth shake contagion from her sable wings."

To Mr. Harting's notes I may also refer for an account of the mysterious nourishment of the young ravens.

Hooded Crow.—The following popular rhyme celebrates the destructiveness of this bird:

" The gule, the Gordon, and the hoodie crow
 Are the three warst things that Moray e'er saw."

The "gule" is a noxious weed, while the raids of the Gordon clan were probably more destructive than either of the other two. Another version substitutes the "water crow" or water ouzel, which was believed to be destructive to salmon-spawn.

Magpie.—A very old superstition augurs good or evil from the number of magpies seen in company (Harting, *Zool. S. S.* 471). Singularly enough the deductions are contrary in England and in Scotland. In the former:—

" One is grief, two is mirth,
 Three's a marriage, four's a birth."

But in the "land o' cakes":—

" Ane's joy, twa's grief,
 Three's a wedding, four's death."

In many parts of Northern Europe the magpie is a protected favourite, and there it lays aside much of the shyness which characterizes it in

Britain, building in low bushes close to the peasant's houses. But perhaps the most extraordinary instance of superstition in a highly educated people of the nineteenth century is that mentioned by the Rev. J. G. Wood (Pop. Nat. Hist., vol. ii. p. 412), as follows:—"In the latter part of 1860 an official dispatch was presented to the Chamber of Deputies of Dresden, requesting a supply of magpies for the purpose of manufacturing a powder all potent against epilepsy. Great stress was laid on two points, that the birds must be neither deficient in claws nor feathers, and that they must be shot between the 24th of December and the 18th of January. This extraordinary document was not only presented and read in good faith, but was backed by many noble names." Unfortunately Mr. Wood neither mentions the result nor gives his authority.

Great Black Woodpecker.—This species is called "Gertrude's bird" in Norway, and the origin of the name and of the colours and habits of the bird is related to be, that Gertrude was an old woman of Palestine, who refused bread to our Lord and St. Peter; in punishment for which she was changed into a bird and flew up the chimney, and to this very day you may see her flying about "with her red *mutch* on her head, and her body all black because of the soot of the chimney; and so she hacks and taps away at the trees for food, and whistles when rain is coming, for she is ever athirst, and then she looks for a drop to cool her tongue" (Dasent, Norse Tales). Here we have another version of the tale told of the owl (Harting, Zool. S.S. 412, 1006): both are perhaps older than Christianity itself, for, as Mr. Dasent has shown, most of these legends of the wanderings of our Lord and St. Peter are merely adaptations from the old Northern Mythology.

Wren.—As already mentioned (Zool. S. S. 1007), the wren is held, in rustic tradition, to be the wife of the robin; but, if we may believe a curious old Scotch song, in Herd's Collection, she is no faithful wife, being accused of an intrigue with the "ox-e'e" (ox-eye, great titmouse). Robin asks

"And where's the ring that I gi'ed ye, that I gi'ed ye, that I gi'ed ye,
And where's the ring that I gi'ed ye, ye little cutty quean, oh!"

Wren. "Oh, I gi'ed it tae an ox-e'e, an ox-e'e, an ox-e'e,
I gi'ed it tae an ox-e'e, a true sweetheart o' mine, oh!"

Like the robin, the wren is sacred to bird-nesters: an old Scotch couplet invokes

“ Malisons, malisons mair than ten
That harry the Lady of Heaven’s hen !”

(Chambers).

In the Isle of Man, says Simrock, the wren is hunted at Christmas, and any feathers she may drop in her flight are preserved as a charm against shipwreck in the ensuing year. I find another account of this superstition in a little work locally printed (*‘A Sailor-boy’s Experience,’* Hamilton, 1867), where it is stated that the bird is caught, and some feathers plucked and tossed up in the air, when, according as they fall or are carried away by the wind, the success of the herring fishery is prognosticated. The Germans call the wren “*taunkönig*” (the hedge-king), and relate that it is the monarch of all flying creatures. A curious story in Grimm’s Collection relates how the wren was insulted by the bear, and how it won a victory over the assembled army of the quadrupeds by the help of the gnat.

Hoopoe.—In Sweden the hoopoe is believed to be the harbinger of war, and even in this country its visits are said to be evil omens.

Cuckoo.—Very numerous and widely spread are the popular fancies and superstitions regarding this mysterious bird. “Sacred is the spot,” says Simrock, “where you first see the swallow or first hear the cuckoo in spring; therefore you must stand still and dig up the ground in this place, for it has healing powers. The cuckoo is also termed the “time-bird” (*Zeitvogel*), for he can tell what span of life is allotted to us, or how long a maiden must wait for her husband, and Goëthe has pre-historic authority when he makes him also foretell the number of her children.” (*Handb. der Deut. Myth.* p. 541). So also in Scotland, where it is lucky to be walking when the cuckoo is first heard, sitting when the swallow is first seen, and to see the first foal of the year walking in front of its mother:—

“Gang and hear the gowk yell,
Sit and see the swallow flee,
See the foal afore its mither’s e’e,
’T will be a thriving year wi’ ye.”

The Scotch name of “gowk” or “golk,” also used in some parts of England, is said by Jamieson and other Scotch scholars to be allied to the ancient Swedish “goek” and the Icelandic “goukr.” Broderip derives it from the bird’s midsummer note, “an indistinct gowk.” (*‘Zoological Recreations,’* p. 79); possibly this may be the origin of all these names. My friend Mr. Gray writes me that, in the Hebrides,

“If anyone hears the call-note of this bird for the first time after its arrival *before breakfast*, it is looked upon as a foreboding of death to that individual. The Hebridians, therefore, are most careful, at the time the cuckoo is expected, not to go out of doors before taking that meal.” In Martin’s curious ‘Voyage to St. Kilda’ (London, 1698), it is stated that the cuckoo is only seen there “upon extraordinary occasions, such as the death of the proprietor, Mack-Leod, the steward’s death, or the arrival of some notable stranger.” At first Mr. Martin was inclined to doubt this, but on making inquiry he learned that the cuckoo had been seen “after the death of the two last proprietors, and the two last stewards, and also before the arrival of strangers several times,” which evidence seems to have convinced him, as it doubtless will the readers of the ‘Zoologist.’ In many parts of Britain popular belief brings the cuckoo through various wonderful transformations, starting as the inhabitant of the white froth known as “cuckoo-spit” (formed by the larva of *Aphrophora spumaria*), and ending by changing it into a hawk. Several English popular rhymes give a good account of its life-history; these have been so often quoted that it will be needless to repeat them here.

Kingfisher.—Yarrell’s remarks (‘British Birds,’ vol. ii. p. 210) and Mr. Harting’s notes (Zool. S. S. 533) have nearly exhausted the superstitions concerning the halcyon’s floating nest and its inexplicable power over the boundless winds; it was also believed that its embalmed body moulted annually, but Aldrovandus was unable to observe this in one suspended in his Museum. The ancients preserved its dried body as a safeguard against thunder and family quarrels, and the Tartars are said to use its feathers as a love-philter.

Swallow and Martin.—On the interesting subject of the “swallow-stone” I cannot do better than refer to Dr. Lebour’s remarks (Zool. S. S. 523), and to Mr. Harting’s notes (Zool. S. S. 744). As already noted (under the heading Cuckoo) it is considered lucky in Scotland to be sitting when the swallow is first seen in spring: it also bodes good fortune when numbers of these birds build about one’s house. Both species are very generally confused together, and the same belief applies to both. According to Lord Hailes, as quoted by Jamieson, the origin of the name of “martin,” or “martlet,” is that the bird “is supposed to leave this country about St. Martin’s day in the beginning of winter.”

Nightjar.—The old belief, to which this bird owes its names of

“Caprimulgus” and “goatsucker,” is too well known to require further notice.

Pigeon.—The dove was the bird of Venus and Cupid, the type of love and chastity, of innocence and beauty. One species, the wood pigeon, is hence known in many parts of England and Scotland as the “cushat,” or “cushie,” which is said to be derived, through the Anglo-Saxon “cusceate,” from “cusc,” chaste. (Yarrell, ‘British Birds.’) The dove is sacred to Christians as the emblem of the Holy Spirit, and to Mahometans as the favourite of their Prophet, who is always represented with one perched on his shoulder (an attribute also of many of the mediæval saints). Hence it is protected in many countries, particularly in Russia and in Egypt. Sir J. G. Wilkinson, in his work on the ‘Ancient Egyptians,’ mentions an Arab legend which relates that the dove sent by Noah out of the ark returned with its feet stained with red mud, in memory of which all pigeons have red feet to this day.

EDWARD R. ALSTON.

Stockbriggs, Lesmahagow, N. B.,
January, 1868.

(To be continued.)

Albino Shrew (*Sorex araneus*).—September 2, 1867. Observing a playful young tom cat that we have, jumping and skipping about the yard with something alive that he was playing with, evidently neither bird nor mouse, but something light-coloured, I went to him, and found it was a white shrew he was diverting himself with, which he had caught in the field and brought home. It was running about before him, apparently not hurt: having succeeded in rescuing it from him without further injury, I permitted it to escape, of which permission it quickly availed itself, by making its way down through the grating of the cellar-window and into the outlet drain from the cellar to the wood opposite the house. The colour was rather a yellowish white, entirely concolorous, without any spots or markings indicative of its normal colour.—*James Bladon; Albion House, Pont-y-Pool, December 27, 1867.*

Albino Mole (*Talpa europea*).—A few years ago an albino mole was discovered, in a very curious manner, in a cottager’s garden at Pontrewynydd, near this town (Pont-y-Pool). The owner was in his garden working, and observing a mole heaving the earth near him, waited for some time until he thought he had nearly ceased, struck at the hillock with a hoe he had in his hands, and actually cut the mole right through across the middle of the body into two nearly equal portions: he skinned both parts, filled them with cotton-wool, and kept them in a small paper box to show to his friend: it was of the same yellowish white tinge as the shrew alluded to above.—*Id.*

Bohemian Waxwing at Leiston, Suffolk.—I have just received a beautiful male specimen of the Bohemian waxwing, which was shot in the vicinity of a farm-house about a mile distant: it answers to the description given in Yarrell's 'British Birds,' with a few slight exceptions; the wax-like appendages, eight in number, are confined to the tertials, which are all tipped with them, the centre ones having the longest; the secondary and also primary quill-feathers having the yellow patch with a white margin on the outer web, which diminishes in size towards the first primary, which is without it.—*Edward Neave; Leiston, Suffolk, January 16, 1868.*

Hawfinches at Weston-super-Mare.—We have now a flock of hawfinches in our neighbourhood. Eight were brought to the local birdstuffer in one day. The hawfinch is a rare visitor to this part of the county, and is one of those birds the law of whose migrations is somewhat unaccountable. Flocks will suddenly make their appearance in a part of the country where perhaps only a single specimen had been observed during a long term of years, without there being anything particular about the season to account for their arrival. They will all at once be so numerous that every urchin who goes out to pop at small birds will be sure to number several in his bag. After remaining in the district a week or two the survivors will depart, and then nothing more will be seen of the hawfinch for years. The only explanation I have seen given of their appearances does not remove the difficulty involved in their uncertainty. It has been said that the hawfinch is a shy bird, preferring the thickest parts of woods and the most overgrown lanes and hedgerows, where, while the foliage is dense, it is able to escape notice, but that when winter lays bare its lurking places it can remain hidden no longer, and, leaving the woods, appears in flocks wherever it can meet with its favourite berries. If this were the case we should expect to see the hawfinch every winter. There is no explanation here of its irregular migrations, and of its suddenly appearing in numbers in a neighbourhood where before it had been almost unknown.—*M. A. Mathew; Weston-super-Mare, December 21, 1867.*

Small Birds Mobbing a Green Woodpecker.—Not long since I was walking in a lane, when a green woodpecker flew off a tree and was at once mobbed and chased by a number of finches. I watched until the woodpecker was out of sight, and all the time the small birds made angry swoops at it, and gave utterance to shrill notes of passion, as they often do when they are seeking to drive away their natural enemy the sparrowhawk. Was this sheer wantonness; or did the finches really take the harmless woodpecker to be some dangerous character?—*Id.*

Gathering of Starlings.—A somewhat curious circumstance which I observed in Sutherland has just recurred to my memory. When birdsnesting with Mr. Jesse last spring on the Badcall Islands, off the west coast of Sutherland, we flushed a lot of starlings from under some loose boulders and rocks. Being curious to see what had brought them there, we examined the holes and openings in these rocks, and were surprised to see a large quantity of fresh blood lying on one of the stones. We in vain tried to find out what had occasioned this, but, save the supposition that there had been a general battle among the males, we could come to no decision upon the matter. Perhaps some of your readers might have met with a parallel case, and be able to explain it.—*John A. Harvie Brown; Dunipace House, Falkirk.*

Late stay of Martins.—November 28, 1867. On the afternoon of this day, it being bitterly cold, I observed a pair of martins going in and out of an old martin's nest, apparently to roost there.—*John Dutton; Eastbourne.*

American Bittern in Pevensey Marshes.—On the 26th of November last a strange bird was flushed from one of the dykes in these marshes, and several people were soon in hot pursuit. Mr. Albert Vidler (who has contributed many rarities to the Avifauna of East Sussex) came out with his gun, and soon succeeded in shooting it. It proved to be a beautiful specimen of the American bittern (*Ardea minor*), which exactly agrees with Morriss's fine plate; indeed I never saw a more perfect resemblance. On comparing the two birds, the common and the American bittern, there is a very great difference, the former being much larger and much paler than the latter, the difference being perceptible at a glance, even were it not for the greater size. The cere of the latter is *pale green*, while that of the former is flesh-colour. It was exhibited at the first meeting of our newly-formed Natural History Society, and excited a great deal of attention. The following are the measurements, &c., taken from the stuffed specimen: length 21 inches; tarsus $3\frac{1}{2}$ inches; foot $6\frac{1}{4}$ inches. I may here remark that "the descending streak of black down the arch of the neck" is peculiarly striking.—*John Dutton.*

Bittern (Ardea stellaris).—Two of these birds were obtained last week in the vicinity of Slapton Lea. The first was observed to settle on some reeds, and was approached and killed without difficulty. The second was procured in the evening, during flight time, at the Torcross end of the Lea. The latter is a very fine bird, and has come into my possession. On skinning I found it was an old male and immensely fat.—*G. F. Mathew; Barnstaple, December 21, 1867.*

Double-yelked Hen's Eggs.—One of our domestic fowls lately laid in six days three double-yelked eggs, which together weighed close upon 14 ounces; it afterwards laid two more about the size of duck's eggs: all of these five eggs were badly formed, having a pinched and contracted appearance at one end. Is not the size of these eggs very remarkable? I once had one which weighed three ounces and a half, and I remember thinking it very large at the time.—*John A. Harvie Brown; Dunipace House, Falkirk, January 10, 1863.*

Purple Sandpiper near Beachy Head.—December 18, 1867. Four of these graceful and pretty waders have been shot during last month, most of them on the rocks near Beachy Head. Last year I procured three about this time.—*John Dutton.*

Redcrested Whistling Duck near Braunton.—I have just seen, in our birdstuffer's shop, a very beautiful mallard specimen of this fine species, which was shot yesterday near Braunton. I was unable to ascertain whether it was in company with any others when it was killed, or whether it was a solitary individual.—*G. F. Mathew; Barnstaple, December 21, 1867.*

Great Northern Diver on the River Taw.—One of these birds was shot last week on the river Taw, near Instow, by one of the local boatmen.—*Id.*

Wide-awake Terns.—My friend Mr. E. R. Alston inquired what terns Dr. Collingwood referred to as breeding in such large numbers in Ascension. As no one has offered to answer, I may be permitted to ask an additional question. Do sooty terns breed in Ascension, and if so are those the terns which Dr. Collingwood refers to? I received a nest of eggs from Ascension this year, through Mr. Sim, naturalist in Aberdeen, which were taken at the former place by Dr. Sutherland, and the birds shot off the nest. From the description of the egg in Dr. Collingwood's paper (Zool. S. S. 983), I am inclined to think that the "wide-awake tern" is identical with the sooty tern. My four eggs resemble those of the Sandwich tern, but have a creamier tint in

the ground-colour and a more purple hue in the blotches. They are very handsome indeed, and have a rare appearance about them.—*John A Harvie Brown.*

Sabine's Gull in Dublin Bay.—An example of this arctic Xema, in the first plumage, was shot off Kingstown Harbour on the 18th of September, 1867, by Mr. Walton T. K. Atkin, brother of the gentleman who shot one on the 28th of September, 1866. Both birds are closely similar, and are both preserved in the latter gentleman's collection.—*H. Blake-Knox; Dalkey, County Dublin.*

Sabine's Gull in the County Down.—A Sabine's Xema, shot off Bangor, County Down, in the second week in October, 1867, has been added to my museum. It is similar to that above, and in the first plumage.—*Id.*

Pomarine Skua at Eastbourne.—November 7, 1867. A few of these birds generally occur about our sprat season, which mostly commences about the 9th of November, but is, like all sea-fishing, very precarious, and did not this year begin at that time. Four specimens have been procured; as usual, all immature, and are in the hands of Mr. Bates, birdstuffer.—*John Dutton.*

Five Forktailed Petrels near Lynn, Norfolk.—In my last notes from this county (S. S. 1012) I referred to the abundance of storm petrels that appeared on different parts of our coast, after having gales, during the early part of October, and have now to record the extraordinary number of five forktailed petrels (*Thalassidroma Leachii*) all killed near Lynn, and, with one exception, immediately after the great storm on the 1st of December. To Dr. Lowe, of Lynn, I am indebted for the following particulars as to date, sex and locality, and was certainly not a little astonished to find this rare petrel all at once doubling the number hitherto known to have been killed in Norfolk.

November 14. A female killed near Lynn.

December 2. A male, Lynn Harbour.

December 2. A male, Seabank, between Lynn and S. Wootton.

December 7. A male, same locality.

December 14. A female, same locality.

Of these birds one has been placed in the Lynn Museum and the rest are all in private hands. From the same authority I learn that on the 5th of October Mr. F. J. Cresswell, of Lynn, saw nearly a dozen storm petrels (*T. pelagica*) skimming along over the water at the entrance of the Ouze; one of them, he says, passed within two or three yards of him when standing at the helm of his yacht.—*Henry Stevenson; Norwich December 23, 1867.*

PROCEEDINGS OF SOCIETIES.

ZOOLOGICAL SOCIETY.

December 12, 1867.—Dr. GRAY, V.-P., in the chair.

The minutes of the last Meeting having been read and confirmed:—

Dr. Peters communicated a note on the question of the homology of the quadrate bone in the class Aves, in which he controverted the view recently maintained by Prof. Huxley as to its supposed correspondence with the *incus* in the Mammalia.

The Secretary called the attention of the Meeting to the fact of an eland, bred in this country, having been exhibited by Lord Hill at the recent Cattle Show, being the first instance of the introduction of this animal to the meat-markets of Europe.

Mr. St. George Mivart read some additional notes on the osteology of Lemuridæ, in continuation of a former communication on this subject.

Dr. J. Hector communicated a notice of the discovery of an egg of the great moa (*Dinornis gigantea*) containing an embryo, found in the province of Otago, New Zealand, at a depth of about two feet below the surface.

Dr. Gray gave a description of a new spider monkey discovered on the affluents of the Peruvian Amazon, by Mr. E. Bartlett, and proposed to be called *Ateles Bartletti*.

Messrs. Sclater and Salvin communicated a list of birds collected at Pebas, Upper Amazon, by Mr. John Hauxwell, with notes and descriptions of new species. Mr. Hauxwell's collection was stated to have contained 135 species, four of which were considered to have been hitherto undescribed.

Messrs. Sclater and Salvin likewise communicated a list of the first collection of birds formed by Mr. H. Whitely, jun., in South-Western Peru, in the neighbourhood of Lima and Arequipa. The series consists of upwards of fifty species, many of them of great interest.

Dr. Gray made some observations on the skins and skeletons of the rhinoceroses in the British Museum. He believed that amongst these he had detected a skull belonging to a species hitherto undescribed, and proposed to call it *Rhinoceros simocephalus*.

January 9, 1868.—Dr. GRAY, F.R.S., V.-P., in the chair.

Professor Newton exhibited the humerus of a large species of extinct pelican from one of the Cambridgeshire fens, and stated that, in the opinion of himself and Mr. Parker, it belonged to a young bird, and that consequently it was probable that, at some remote period, the species not only lived but nested in this country.

The Secretary exhibited, and made some remarks upon, a drawing of a new species of Impeyan pheasant, taken from the original specimens lately purchased for the British Museum. It has been named, by M. St. Hilaire, *Lophophorus l'Huysi*.

Mr. Parker, F.R.S., read a paper on the osteology of the kagu (*Rhinochetus jubatus*), and after a critical examination of the structure, and a comparison of the sternum, coracoids and clavicles, with the same parts in other species, he concluded by observing that this bird might be regarded as the type of a distinct family, most nearly allied to *Psophia* and *Eurypyga*.

The Secretary read a note from Dr. Hartlaub and Mr. O. Finsch, with reference to a collection of birds from the Pelew Islands, and called attention to two new types belonging to the Fauna of these islands, for which the names *Psammathia Annæ* and *Tephros Finschi* were proposed.

A communication from Lieut.-Col. Playfair was read by the Secretary, relating to a collection of fishes made in Madagascar. Amongst these were two new species, and it was proposed to name them *Gobius Grandidieri* and *Mugil Smithii* respectively after the naturalists who discovered them.

Mr. Henry Adams communicated some descriptions of new species of shells collected in Mauritius, as well as descriptions of some new species from other parts of the globe.

Mr. Bartlett exhibited the skin of an otter from Sumatra, which gave rise to some discussion, on account of the singular appearance of the tail. As the skin lay upon the table, with the fur downwards, it was observable that a narrow groove or furrow passed

Down each side of the tail, meeting ovally at the extremity. Mr. Bartlett was of opinion that this was a natural peculiarity in the animal, having tried in vain to eradicate the furrow, and in this view he was supported by Mr. Blyth, and to some extent by the Secretary. Dr. Gray, on the other hand, considered that the peculiarity had been caused by a strong wire, over which the skin had probably been stretched, and had contracted in drying round the wire, and so formed the furrow which could not now be made to disappear.—*J. E. H.*

ENTOMOLOGICAL SOCIETY.

January 6, 1868.—Sir JOHN LUBBOCK, Bart., President, in the Chair.

Additions to the Library.

The following donations were announced, and thanks voted to the donors:—*Journal of the Linnean Society*, Zool. No. 38; presented by the Society. *Bulletin de la Société Imperiale des Naturalistes de Moscou*, 1867, No. 1; by the Society. *Zeitschrift des Ferdinandeums für Tirol und Vorarlberg*, iii. 13; by the Ferdinandeum. *Tijdschrift voor Entomologie*, Ser. 2, Vol. i. Parts 3—6, Vol. ii. Part 1; by the Entomological Society of the Netherlands. *Proceedings of the Essex Institute*, Vol. v. Nos. 3 and 4; by the Institute. Hewitson's *Exotic Butterflies*, Part 65; by W. Wilson Saunders, Esq. *On certain Scales of some Lepidoptera*, *On the Plumules or Battledore Scales of Lycænidæ*, and *Further Remarks on the Plumules or Battledore Scales of some Lepidoptera*; by the Author, John Watson, Esq. *On the Lepidopterous Insects of Bengal*; by the Author, F. Moore, Esq. *The Entomologist's Annual for 1868*; by H. T. Stainton, Esq. Newman's *British Moths*, No. 13; by the Author. *The Zoologist* for January; by the Editor. *The Entomologist's Monthly Magazine* for January; by the Editors.

The following additions by purchase were also announced:—*Record of Zoological Literature*, Vol. iii. *Naturgeschichte der Insecten Deutschlands*, Coleoptera, Vol. i. Part 2. No. 1.

Election of Members.

Alfred Newton, Esq., Professor of Zoology in the University of Cambridge; Stephen Barton, Esq., of Bristol (previously an Annual Subscriber); G. A. J. Rothney, Esq., of Addiscombe; and the Baron Edgar von Harold, of Munich; were severally ballotted for, and elected Members.

Exhibitions, &c.

The Rev. Douglas C. Timins exhibited a specimen of *Ch araxes Jasius* bred (from a Continental pupa) at Winchelsea. Also, three abnormal specimens of *Argynnis Lathonia*, from the neighbourhood of Boulogne; one had the outer margin of the anterior wings strongly incurved, another had the right fore-wing of but half its proper size, and the third was remarkable from the suffusion of the black markings of the wings.

The Secretary read a letter from Mr. J. Caldwell, of Mauritius, dated Port Louis, November 3, 1867, respecting the occurrence of *Papilio Phorbanta* in Madagascar.

Referring to Trans. Ent. Soc., third series, Vol. v. p. 330, Mr. Caldwell wrote as follows:—

“Mr. Trimen considers it probable that, in the collection examined by Mr. Bates, I may have mixed up the Malagasy insects with the Mauritian. This did take place after I had packed those for England; but I may almost venture to state positively that those I sent home were *all* taken from the original Malagasy collection before any mixture was possible.”

Mr. F. Smith exhibited two specimens of a *Polistes* captured at Penzance by a lady residing in that town; one specimen was caught in the summer of 1866 on the window-sill of a house, and three more were taken at the end of July or beginning of August, 1867, in the very same situation in the window of the same house. The insect did not agree exactly with any described species of *Polistes*, but appeared to be intermediate between the North-American *P. biguttatus* and the Brazilian *P. versicolor*. The captor suggested that they had probably been introduced in wood from a dock-yard situate about a hundred yards from her house; but Mr. Smith could scarcely believe that they were imported: the species of *Polistes* were not wood-boring wasps, but paper-makers, and their slight nests were attached to the outside of a tree, post, wall, &c.; untrimmed wood was not imported from America. (See the ‘Entomologist’s Annual’ for 1868, pp. 87, 96).

Mr. Bates also had difficulty in believing that an insect with the habits of *Polistes* could have been imported; the nests were mere strings of cells hanging by a peduncle from the rafter of a house, a shrub, the trunk or branch of a tree; they were of loose construction, incapable of withstanding exposure. Such a nest could hardly be transported in safety, either with timber on board ship or washed across by the gulf-stream. Such was the rapidity of life in Brazil, and so quick the succession of broods, that the eggs would not remain unhatched during the voyage, and if hatched the young larvæ must perish. Nor did he think it likely that perfect wasps would be brought over alive; at any rate the specimens would be worn, and very different from those exhibited.

Mr. M'Lachlan exhibited a Trichopterous insect new to Britain, *Neuronia clathrata* of Kolenati, captured at Bishop’s Wood, Staffordshire, by Mr. Chappell, of Manchester.

The Secretary exhibited a small box of South-American Coleoptera, sent to the Society by Mr. F. Schickendantz, of Pilciao, who found them on the flowers of a new species of *Hydnora*.

The Secretary exhibited specimens of the coffee-tree attacked by the “borer,” and of the larva, pupa and imago of the insect, which had done great damage in the coffee-plantations of Southern India. These were sent by the Rev. G. Richter, Principal of the Government Central School, Mercara, Coorg. The insect proved to be a species of *Clytus*.

The Secretary made the following observations on the nomenclature of Australian Buprestidæ adopted by Mr. Edward Saunders in a paper read at the meeting of the 4th of November, 1867 (S. S. 1022):—

“The rejection by Mr. Edward Saunders, in his ‘Revision of the Australian Buprestidæ described by the Rev. F. W. Hope,’ of certain published names, in favour of the names given by Mr. Hope in the so-called ‘Synopsis of Australian Buprestidæ,’ raises a question of some importance as regards priority of nomenclature. I have

always understood the rule to be this—that the specific name by which an insect is to be called and known is the name under which a sufficient description of the species was first published.

“Names contained in a paper which is privately printed, but not published, rank only as MS. names: however freely the paper may be disseminated among the author’s friends, however wide the circle of his acquaintance, it must still remain inaccessible to the public,—it is not published within the meaning of the rule.

“What then are the facts concerning the paper which Mr. Edward Saunders (following Laporte and Gory and others) cites as Hope’s ‘Synopsis of Australian Buprestidæ’?

“The paper in question consists of thirteen printed pages, at the top of the first of which is the word BUPRESTIDÆ; this is the only title which it bears. There is no title-page, preface, introduction or explanation whatsoever; no author’s name, no printer’s name, no date; no name of any bookseller or of any place at which the public might obtain it; and as to many of the insects described, there is nothing to show that they are Australian species, or to point out the collections in which the type-specimens were deposited.

“At the same time there is no doubt that the author was Mr. Hope, that the date of printing was the year 1836, that the insects are all from Australia, and (when no other collection is mentioned) were in Mr. Hope’s own cabinet; and lastly, besides the descriptions of sixty-six new species, the paper contains references to all the previously-described Australian Buprestidæ, (twenty-seven in number) so that ‘A Synopsis of Australian Buprestidæ’ would have been a very appropriate title to have given it.

“There can be little doubt that a print of this paper was in the hands of Laporte and Gory when they prepared their Monograph of the Buprestidæ, and it must be admitted that they cite the ‘Synopsis of Australian Buprestidæ’ as if it were a published work. Other writers have done the same, probably following Laporte and Gory, without having their attention directed to the question of publication or non-publication. It is true also that Hope himself (Col. Man. iii. 173) in 1840 speaks of ‘a Prodrômus which I published some few years back.’ ‘Published’ in the sense of being communicated to his entomological friends, I have no doubt it was; but ‘published’ in the sense of being made accessible to or obtainable by the public, I believe it never was.

“Out of sixty-six forms described by Hope in ‘Buprestidæ’ as new species, it appears from Mr. Edward Saunders’ investigations that three are unrecognizable, the type-specimens having been lost, and fourteen sink either as synonyms or varieties. Of the remaining forty-nine, the Hopeian names were in twenty-eight instances adopted and rightly applied by Laporte and Gory; fourteen have been published subsequently to 1836 under names different from Hope’s, and these have been rejected by Mr. Edward Saunders, and the unpublished Hopeian names preferred. Of the residue, seven in number, descriptions (under Mr. Hope’s names) are now for the first time about to be published by Mr. Edward Saunders.

“The necessity for the laborious examination which Mr. Edward Saunders has made is sufficient evidence that the insects in question have not become known, and do not pass current in the entomological world, by the names assigned to them by Hope. Such of his names as are in use have come into use in consequence of their adoption and publication by Laporte and Gory. So far from the printing of

'Buprestidæ' having given them currency, it seems that Laporte and Gory in some cases applied Hope's names to the wrong insects; and it is the species to which the names were thus erroneously applied that are known by the names which Hope intended for other insects.

"I submit that the unpublished names of the anonymous print 'Buprestidæ' must give way to published names, whatever the date of the latter may be."

Prof. Westwood argued that Mr. Hope's paper, though privately printed, had in fact been so widely disseminated as to amount to publication; at any rate, that it might be treated as published *sub modo*—i.e. as against all persons who had notice of its existence.

The Secretary remarked that, if that were so, the Hopeian names would prevail over those of Laporte and Gory; and as publication must be taken to be notice to all the world, every author subsequent to Laporte and Gory had, through the publication of their Monograph, constructive, if not actual, notice of the existence of Hope's descriptions. But he thought the ground untenable, and that even as against Laporte and Gory (and *a fortiori* as against those who had only constructive notice, through them, of the existence of the unpublished paper) the Hopeian names were of no authority. The adoption of them was not obligatory on Laporte and Gory, but was commendably courteous to Mr. Hope. In one instance only had they knowingly rejected Mr. Hope's name, *Calodema Kirbii*. Upon this Prof. Lacordaire (who probably thought that Hope's descriptions of 1836 were published) had remarked "MM. de Castelnau et Gory ont changé à tort le nom de l'espèce en celui de *Cal. regalis*." (Gen. Col. iv. 61). But the reason why Laporte and Gory did not adopt Hope's name was doubtless this, that there was already a *Stigmodera Kirbyi* of Guérin, described in the 'Voyage de la Coquille.' *Calodema* with Laporte and Gory was only a division of *Stigmodera*; when it was recognized as a separate genus, the two names *Calodema Kirbii* and *Stigmodera Kirbyi* might have co-existed, if *regalis* had not been published in the interim. That the publication of *Calodema Kirbii*, Coleop. Man. iii. 173, fig. frontisp. (1840), was subsequent to Laporte and Gory's *regalis* might be seen by reference to the Manual itself.

The President, Mr. Bates, Mr. McLachlan, Mr. Pascoe and other members, agreed that accessibility to the public could alone constitute publication within the meaning of the rule of priority in nomenclature.

Papers read.

The following papers were read by the Secretary:

"Remarks on Mr. Wallace's *Pieridæ* of the Indian and Australian Regions"; by Mr. W. C. Hewitson.

"On the Coffee-borer of Southern India"; by the Rev. G. Richter. (A species of *Clytus*; see above).

"On *Burmeisteria*, a new genus of *Melolonthidæ*"; by Mr. Frederic Schickendantz.

New Part of 'Transactions.'

Trans. Ent. Soc., third series, Vol. v., part 7, being the sixth part published during the year 1867, was on the table.—*J. W. D.*

On Certain Peculiarities in the Life-History of the Cuckoo, more especially with reference to the Colouring of its Eggs.

By the Rev. A. C. SMITH.*

“And listen to the vagrant cuckoo’s tale.”

I HAVE long had the intention to write some account of the cuckoo, as I intimated in one of my former papers on the “Ornithology of Wilts,” † because there is so much misconception abroad about the habits of that bird, ‡ and because it is one of such extraordinary interest. It is even now a common popular belief, handed down from the time of Aristotle, that the cuckoo changes in the course of the summer into a hawk; while Pliny, § who wrote on Natural History, gravely asserted (and that assertion is still upheld by many in these days), that the young cuckoo devours its foster brethren, and finally its most attentive foster parents: hence the Swedish proverb, “en otacksam gök,” || implying “an ungrateful fellow.” Even Linnæus gave credence to this absurd slander; and in our own country Shakspeare utters the same calumny. In the play of Henry IV. he makes that monarch exclaim:

“And being fed by us, you used us so
As that ungentle gull, the cuckoo’s bird
Useth the sparrow: did oppress our nest:
Grew by our feeding to so great a bulk
That even our love durst not come near your sight
For fear of swallowing: but with nimble wing,
We were constrained for safety’s sake to fly.”

And again, in ‘King Lear,’ the fool is made to say

“The hedge sparrow fed the cuckoo so long
That it had its head bit off by its young.”

* [Read before the Wilts Archæological and Natural History Society, during the Annual Meeting at Salisbury, September 14th, 1865, and printed here as an introduction to a translation by the Rev. A. C. Smith of a paper by Dr. Baldamus, which will follow in course.]

† ‘Wiltshire Magazine,’ vol. ix. page 57.

‡ Among other errors abroad with regard to this ill-used bird, the English translators of the Bible included it in the list of unclean birds, which the children of Israel were forbidden to eat. (Levit. xi. 16, Deut. xiv. 15.) But Bochart, Gesenius and others have long since proved that not the cuckoo, but the sea-gull was the species intended. (Smith’s ‘Dictionary of the Bible.’)

§ Pliny Hist. Nat. lib. 10, cap. 9.

|| “Gök,” is no other than the old Saxon “geac,” and the cuckoo is still often called “gowk” in some parts of England. (Bosworth’s ‘Anglo-Saxon Dictionary.’)

Then again we are told that the fate of an individual for the current year depends on the direction in which he first hears the cry of the cuckoo in the spring: if it proceeds from the north, for instance, it is a lucky omen; but if from the south, it portends death.* And again it is universally considered unlucky to be without money in your pocket, on first hearing the welcome notes of this bird.†

These are but samples of the many superstitions current in our day, and in our own county, with regard to the cuckoo;‡ and it is with the hope of substituting, in their stead, the very interesting and peculiar economy of its real life-history, that I venture to introduce so simple a subject.

And then again it so happens that I have for the last year or two given more attention than usual to the cuckoo, by reason of a very interesting paper on the subject written in German, which has been put into my hands for translation. The article to which I allude "On the strange Variation in the Eggs of the Cuckoo," § was written, so long as twelve years ago, by the celebrated ornithologist, Dr. Baldamus, of Stuttgart. The opinion which he then expressed, and the theory which he built upon the facts he had accumulated with reference to this subject, were published in the principal ornithological periodical of Germany, the 'Naumannia' for 1823, of which the same Dr. Baldamus is the talented editor. This opinion, however, has never been presented to the British public in an English dress, and consequently has never met with the attention in England which it deserves: moreover, the rarity of meeting with the book which contains it, as well as the lengthy article, and scientific German, in which the author has developed his facts and his opinion, have helped

* Lloyd's 'Scandinavian Adventures,' vol. ii. p. 347.

† 'Naturalist' for 1852, p. 841.

‡ As the story of hedging in the cuckoo, and so securing the permanence of spring, has been attempted to be affiliated on the moonrakers of Wilts, I must, in common honesty, quote from the voracious chronicle entitled, 'The Merry Tales of the Wise Men of Gotham,' in which the following anecdote occurs:—"On a time the men of Gotham would have pinned in the cuckoo, whereby she should sing all the year; and in the midst of the town they had a hedge made, round in compass, and they had got a cuckoo, and put her into it, and said, 'Sing here, and you shall lack neither meat nor drink all the year.' The cuckoo, when she perceived herself encompassed within the hedge, flew away. 'A vengeance on her,' said the wise men; 'we made not our hedge high enough.'" ('Sharpe's Magazine,' vol. x. p. 6.)

§ "Neue Beiträge zur Fortpflanzungsgeschichte des Europäischen Kukkuks (*Cuculus canorus*)," von E. Baldamus. ('Naumannia,' 1853, pp. 307—326).

to deter the general inquirer from entering upon a question which to the ordinary observer will be found to be of considerable interest, and to the out-door naturalist is worthy of most patient attention, as well as diligent investigation; and yet which, notwithstanding its deep interest, and curious and extraordinary as it is, has probably never yet come before the notice (I may almost venture to say) of any one in this Society.

Having thus introduced Dr. Baldamus and his paper, so that I need not hereafter break the thread of my story, I will begin by saying a few words upon other peculiarities of the cuckoo, before I come to the chief subject of this article, the extraordinary colouring of its eggs.

I have already, in my last paper on the "Ornithology of Wilts," given some general account of the bird, so that I need now only briefly recapitulate some of its chief characteristics. Thus I will remind my readers that it belongs to the large order of perching birds, and to the tribe of climbers; that it is migratory, arriving in this country in April, and leaving in July; that its general appearance at a short distance often leads the casual observer to mistake it for a hawk, though a single glance at the small weak legs and feet, and the straight powerless slender beak, would at once undeceive on a nearer examination; that, with the exception of the honey buzzard (*Buteo apivorus*), it is the largest of British insectivorous birds;* for its food consists of insects of many sorts, but more particularly of the several species of hairy caterpillars which abound in the early summer, and which long-haired caterpillars are rejected by almost all birds, with the exception of the cuckoo; so that it has been thought by some, that the reason why that bird leaves the country so early is the failure, by the middle of July, of its favourite food.† I may observe, too, that it is the male bird alone which gives utterance to the peculiar note which we hail so gladly as an announcement of spring, though, among other popular errors, the following old couplet attributes the song to the female: ‡—

"The cuckoo is a pretty bird, and sings as *she* flies,
She brings us good tidings, and tells us no lies."

Possibly, however, this may be only the indiscriminate use of the masculine and feminine pronoun so common in Wiltshire: I am

* Jesse's 'Gleanings of Natural History,' p. 125.

† Wood's 'Illustrated Natural History,' vol. ii. p. 574.

‡ 'Naturalist' for 1852, p. 84.

bound, too, in honesty to add, that the well-known cry of the cuckoo has been declared by some naturalists (though I think erroneously) to be common to both sexes.* Lastly, I will repeat that the female has that strange peculiarity of depositing her eggs singly in the nests of other species, which she selects as suitable foster-parents to her own young,—a peculiarity not shared in by any others of our British birds, though by no means unknown among the feathered tribes of other countries, the cowbird, for example, of America,† which belongs to the starling tribe, several species of the African cuckoos and others. It is from this last eccentricity of conduct that so many strange and unlooked for habits of the cuckoo take their rise: let us examine them one by one; but first let me earnestly protest against the unmeaning outcry and charge of unnatural, unfeeling conduct often preferred against the cuckoo,‡ as if she did not follow out the instincts of her nature as truly as every other bird, and as if there was not *some* good and sufficient reason (though we may be unable to fathom it) why some species delegate the care of their young to other birds: rather, I think, should we admire the wonderful instinct which leads them to select, as foster-parents, those species only whose feeding is similar to their own, and so would provide their young with suitable nourishment; and that dexterity which enables them to insert their eggs amongst others, just at the right moment when the foster-parent is preparing to sit. §

Now, first I beg to state without hesitation that *never*, by any possibility, does our British cuckoo either build a nest of her own, or incubate her eggs on the ground. We hear constant tales of such occurrences: every year our periodicals and newspapers contain statements of such marvellous incidents, which would be marvellous indeed if true; but I venture to assert most positively, without fear of contradiction, that all such stories have originated from some error; and either the common nightjar,|| of nearly the same size, fluttering away from her marbled eggs at the root of an old oak, or some other bird, has been mistaken for the cuckoo, which never, in any single instance, has been known to sit on her own eggs.

* 'Magazine Nat. Hist.' vol. viii. pp. 329—382. 'Naturalist' for 1851, pp. 11, 172.

† Wilson's 'American Ornithology,' vol. ii. p. 162.

‡ Bishop Stanley's 'Familiar History of Birds,' vol. ii. p. 80.

§ Gilbert White's 'Natural History of Selborne,' letter iv.

|| Montagu's 'Supplement to Ornithological Dictionary,' vol. ii. Rennie's 'Architecture of Birds,' p. 380. Gilbert White's 'Selborne,' letter vii.

The cuckoo then, houseless and vagabond though she is, and the veritable "gipsy of the feathered tribes," as she has been styled, soon after her arrival here in the spring, begins to busy herself no less than other birds, in making preparations for her future progeny; but instead of preparing a nest as other birds do, her occupation is to scour the hedgerows and plantations, and watch the busy nest-makers with more eager eye than any schoolboy; * observing day by day the progress made, and anxiously selecting those which may be most convenient for her purpose. Into these nests it is not her habit to intrude herself for the purpose of laying her egg, as all other birds do; indeed, from her superior size in proportion to the nest, such a course would be generally impossible; but she lays her egg on the ground, and then she takes it in her beak, † and gently deposits it in the nest she has chosen. And that the cuckoo does thus avail itself of her beak to place her eggs in nests which otherwise would have been inaccessible to her, is not only *a priori* established from those cases where no other means were possible, as in certain domed nests with entrance-holes at the side only, or those which are laid in the holes of trees, as for instance those of the wren, the redstart and others; but we have a very interesting account, from a charcoal burner in the Forest of Thuringer, who happened to be in his rude woodman's hut in the forest when a cuckoo (which he had long observed flying about in the neighbourhood) flew into the hut, not perceiving the owner, perched upon a bench near the entrance, laid an egg, then seized it in her beak and placed it in a wren's nest, which was built against the inner side of the hut, while the man looked on in amazement, and soon after related the "wonder" to the German naturalist who recorded the event. But I believe this to be her invariable method, whether the small nest of the foster-parent be accessible to her or no: and then, again, this habit of taking the egg in her beak, and so depositing it in the chosen nest, considered in conjunction with the similarity of her egg to that of several species of small birds as detailed farther on, will readily account for the frequent assertion on the part of eye-witnesses of the cuckoo eating the eggs of small birds, which they triumphantly declare they have themselves seen between the mandibles of that bird's beak. ‡

* Rennie's 'Architecture of Birds,' p. 374.

† 'Zoologist,' 3145, 7757, 7935, 8165. Hewitson's 'Eggs of British Birds,' vol. i. p. 205. Temminck's 'Manual d'Ornithologie,' vol. i. p. 384. Rennie's 'Architecture of Birds,' p. 378.

‡ 'Naturalist' for 1851, p. 162; for 1852, pp. 33, 233.

It is not until after an interval of several days that the cuckoo lays another egg in the same manner, and then deposits it in another nest which she has previously selected; and so on till her whole complement of four or five or six eggs is laid;* but never on any occasion does she lay two eggs in the same nest; so that, although it is true two cuckoo's eggs have been sometimes found in the same nest, these were without doubt from different parent birds, and by no means the eggs of the same individual.†

But now if the egg of the cuckoo was at all proportioned to the size of the bird, it would not only at once attract the attention and alarm of the foster-parent, but it would be impossible for so diminutive a nurse to brood over and hatch it; and therefore Nature, who never does anything by halves, but provides for every emergency, has given a strange disproportion in the egg of the bird to the size of the parent cuckoo (the egg of the cuckoo being no larger than that of the lark, ‡ though the relative size of the two birds is as four to one)—a disproportion, however, the necessity for which is most apparent, if the little foster-parent is to be duped into believing the egg of the intruder to be her own.

The cuckoo, then, having laid her eggs of comparatively diminutive size, and entrusted each to the charge of carefully selected foster-parents, is by many supposed to leave them to their fate, and to take no farther interest in the matter.§ But this does not seem to be the case.|| On the contrary (and for this I have the high authority of Dr. Gray of the British Museum), the cuckoo has been observed to frequent the neighbourhood, and watch near the nest during the whole period of incubation; and then, when the eggs are hatched, it is the parent cuckoo,¶ and not the young one (as Dr. Jenner supposed,** and so led many into error) which generally removes from the nest the young

* Colonel Montagu dissected a cuckoo which had in her four or five eggs. (Ornith. Dict.). Mr. Rennie thinks it lays a second time. Blumenbach says she lays six eggs in the spring *from time to time*. Jessie's 'Gleanings in Natural History,' p. 125. 'Naturalist' for 1851, p. 162.

† 'Zoologist,' 8823, 9325. Yarrell's 'British Birds,' vol. ii. p. 192. Montagu's 'Ornithological Dictionary,' Introduction, p. ix.

‡ Yarrell *in loco*, vol. ii. p. 191. Bewick, vol. i. p. 108.

§ 'Zoologist,' 1638.

|| 'Ibis,' vol. iv. p. 384. Wood's 'Illustrated Natural History,' vol. ii. p. 572.

¶ 'Zoologist,' 2589, 2603, 4895, 6676, 8166, 8195, 8235, 8681. Jesse's 'Gleanings in Natural History,' p. 123.

** 'Philosophical Transactions,' vol. lxxviii.

cuckoo's foster brethren, and any unhatched eggs there may be,—a fact which my friend, the late lamented naturalist, Mr. Waterton, proved* to be quite impossible for any newly-hatched bird, however precocious that bird might be.

Whether or no this is the last office which the parent cuckoo undertakes for its young, I will not venture to affirm: though it is the opinion of some experienced naturalists that she really feels an anxiety for her young not less than that shown by other birds;† while others maintain that she has occasionally, though very exceptionally, been known to feed her own young, of which several most convincing proofs have been adduced;‡ and others again declare that she sometimes even takes the young under her protection, when they are sufficiently fledged to leave the nest.§ But be that as it may, towards the end of July the old birds are preparing to migrate, and the male has already changed his note to that stammering repetition of the first syllable which (as all observers know) heralds the cessation of his so-called song, and which an old writer, John Hayward, who flourished about A. D. 1580, has described in the following quaint but very graphic rhymes.

“ In April the cuckoo can sing her song by rote.
 In June oft'times she cannot sing a note.
 At first, koo ; koo ; koo ; sings till can she do
 At last, kooke, kooke, kooke ; six kookes to one koo.”

By the beginning of August, then, the parent cuckoos are gone southwards, but the young cuckoo is notoriously a tedious nursling, and indeed, having to grow from the inmate of a very small eggshell to a bird of considerable dimensions, requires time for such development, and taxes, to a very large extent, the powers as well as the assiduity of its foster-parents: by degrees this overgrown infant not only fills the little nest which was never meant for such a monster, but is forced to vacate it, and sits perched on the edge, while the foster-parents, unable to reach up to it from below, alight on its back in order to feed it.||

* 'Essays in Natural History,' first series, p. 228.

† Wood's 'Illustrated Natural History,' vol. ii. p. 572. 'Naturalist' for 1851, p. 67, 162.

‡ 'Naturalist' for 1851, p. 11.

§ Yarrell, vol. ii. p. p. 572. 'Naturalist' for 1851, p. 233.

|| 'Gardener's Chronicle,' 1851, p. 469. 'Mag. Nat. Hist.' vol. ix. p. 638, 'Naturalist,' 1851, p. 132, 1852, p. 33.

It is at this period of its existence that the young cuckoo is said to possess, or to acquire for a time, the note of its foster-parents,* whatever it may happen to be; but this point in its history requires corroboration, as, though asserted by many, it has never yet been satisfactorily settled. And then again, when they have at length attained their full size, the young cuckoos, though left to their own devices, and without their elders for their guides, as all other migratory birds have, follow towards the end of September, in the track of their parents who have gone long before, and migrate to a warmer climate: though what instinct teaches them when to go, or whither to bend their course, who shall say? Indeed, to my mind, this is one of the most astonishing points in their life-history which we have now touched upon.

And now I come to the most remarkable peculiarity of all: and indeed amongst these so many anomalies which we have seen to belong to this extraordinary bird (and the more one studies its habits the more numerous, and the more apparent do they become), there is nothing so strange, or indeed so startling, as the opinion put forth, as I said just now, in Germany by Dr. Baldamus, and afterwards followed up and demonstrated by proofs of apparently the most satisfactory character, on the part of himself and his friends,—that the cuckoo, while she lays her eggs singly in the nests of other birds, *is able to assimilate them in colour to the eggs of those birds whose nests she selects*: † and thus it is by no means an uncommon occurrence to see the egg of the cuckoo taken from a hedgesparrow's nest, partaking of a greenish blue tinge; another from the nest of a robin of a reddish hue; another from a pipit's nest of a brownish colour; and so on through the twenty or thirty species, in whose nests the egg of the cuckoo has been found. Feeling keenly, as I do, the startling nature of this bold statement, and the scepticism it is likely to call forth, I will not linger over it with any comments of my own, but proceed at once to give a short *resumé* of the article in question.

Dr. Baldamus begins his paper by calling attention to the great variety in colouring as well as in marking in a collection of cuckoo's eggs, and the astonishing resemblance these eggs severally bear to the eggs of a variety of small birds usually chosen as the foster-parents of cuckoos,—a fact which he says was well known to the great ornithologists and oologists of Germany, including Naumann, Thiënemann,

* Thompson's 'Natural History of Ireland,' vol. 1, p. 361.

† 'Zoologist,' 3988.

Brehm, Gloger, von Homeyer and others, and I may add that this point was equally well known to our British ornithologists as well.* But Dr. Baldamus seems to have been the first to suspect that at the root of this striking phenomenon there was a fixed law, perhaps a law which might be discoverable; and his suspicions in this direction having been aroused, he proceeded to pay diligent attention to the subject. To this end he not only made most careful personal observations, but, by means of oological correspondents in various parts of Germany, collected a large series of facts bearing upon the matter, which were convincing to his own mind,—convictions which seem to have been shared in by many of the leading ornithologists of Germany. I will not weary the patience of members of this Society by taking them through the several instances which Dr. Baldamus details; but pass on at once to the results he arrived at, merely remarking, by the way, that he followed up his investigations with such earnest zeal, that when he wrote his paper he had before him no less than one hundred cuckoo's eggs, special care being taken to ascertain accurately from the nest of what particular species every one of these eggs was taken.

Now the first thing which Dr. Baldamus established to his own satisfaction, by means of these repeated observations, was, that the cuckoo lays its eggs in the nests of no less than thirty-seven species, including not only every species of chat, warbler, wagtail, pipit and lark, but even exceptionally certain of the grain-eating finches and buntings; these exceptions being doubtless in cases only where the cuckoo was deprived, by some accident, of the nest she had selected for her egg, and which when ready to be laid she was obliged to consign to the care of the best nurse she could find at short notice. To this seeming inconsistency on the part of the parent bird, I may, however, add that the grain eating species have been known to bring up young cuckoos; and the explanation is, that even the hard-billed birds are accustomed to feed their young, at any rate at first, with insects.

From the thirty-seven species alluded to above, which have been ascertained to act as foster-parents of the young cuckoo, Dr. Baldamus enumerates no less than twenty-eight, to whose several eggs he affirms the cuckoo will assimilate her egg in colouring; and this he then proceeds to prove from the specimens lying before him, and which

* Wood's 'Illustrated Natural History,' vol. ii. p. 572.

(as I before remarked) are all carefully authenticated, in regard to the nests from which they were taken: all these specimens he examines singly, and describes their colouring as nearly all partaking, in a greater or less degree, of the character, ground colour, and markings of the eggs of the species in whose nests they were severally laid; while some are so extremely similar that but for the *grain** or texture of the shell and certain characteristic specks, it would be difficult to distinguish them apart. The exceptions to this general rule are those laid in the nests of corn-eating species, and our author adds that it would be extraordinary indeed if the cuckoo's eggs should resemble the eggs of these exceptional and never-intended foster-parents.

"The fact then," says Dr. Baldamus, "is quite established and beyond all doubt, that there are cuckoo's eggs which, both in colour and in marking, are very like the eggs of those species in whose nests they are generally laid;" and then he proceeds to argue that Nature, who never trifles nor acts without purpose, has plainly given the parent cuckoo this faculty, in order to facilitate the continuance of the species under peculiar conditions; for (he well remarks) had this not been so, we are driven to the alternative that the warblers and others, which generally recognize so easily all strange eggs, casting them out of the nest,† or else deserting it, in regard to the cuckoo's eggs are quite blind, and cannot recognize the red eggs among their green clutches,‡ and *vice versa*. "Therefore," continues our author, "I do not hesitate to set forth, as a law of Nature, that the eggs of the cuckoo are in a very considerable degree coloured and marked, like the eggs of those birds in whose nests they are about to be laid, in order that they might the less easily be recognized by the foster-parents, as substituted." §

* "Das Korn:" the German word exactly answering to our English idiom "grain." The grain or texture of the shell is too often overlooked by oologists, but amongst the very similar eggs of some species, as more particularly among the duck tribe, this is one very important means of identification, more especially when the egg is placed under a low magnifying power.

† Montagu's 'Ornithological Dictionary,' Introduction, p. iv.

‡ Or "loiters" as our Wiltshire rustics say: "gelege" in German.

§ It is worthy of remark that, whereas it has been often asserted that the egg of the cuckoo is by no means found in any proportion to the number of old birds (for it is not a rare species), and every female would seem to lay annually from four to six eggs, the difficulty is at once disposed of, if Dr. Baldamus' theory is correct, inasmuch as the great similarity of the egg of the cuckoo to those of the nest in which it is placed, may deceive human eyes no less than those of the foster-parents.

The next question examined is, “whether the same hen cuckoo lays eggs of the same colour and markings only, and so is she limited to the nests of but one species? or else, does the same individual lay eggs of different colour and markings, according to the character of the eggs amongst which her own will be intruded?” Both these theories have their advocates; those in favour of the last view advancing the hypothesis that the sight of the eggs lying in the nest has such an influence on the hen which is just about to lay, that the egg which is ready to be laid assumes the colour and markings of those before her, and for this physiological reasons are adduced, and analogies, not forgetting the well-known and successful experiments of the patriarch Jacob.* But Dr. Baldamus rejects this opinion, and contends for the other view (*viz.* that the same cuckoo lays eggs of one colour and markings only, and so is limited to the nests of but one species): and this he proves by personal experience and observation; by the fact that he has found two differently marked cuckoo’s eggs in one nest; that he has also found similarly marked eggs laid by one and the same cuckoo, in the nests of different species; and that he has found cuckoo’s eggs (though rarely) in such nests as have not yet received any eggs of the owner,† in which case the cuckoo is without any pattern of a fixed form of colour for its egg. All these points in the argument are very carefully worked out at considerable length, and a large array of proofs and instances brought forward to support his views; and then our author deduces the conclusion that all experience hitherto known declares in favour of his assertion “that every cuckoo lays eggs of one colouring only, and consequently (as a general rule) lays only in the nest of one species;” and he sums up his argument as follows:—“Every pair or rather each individual cuckoo is endowed with the instinct to lay its eggs in the nests of some one species of birds, which are fit to act the part of foster-parents; so in order that these latter may the less readily observe the strange egg, it is found to be of similar colouring to their own; and for the same reasons it is also so disproportionably small. Then every pair of cuckoos seeks its old district, or that spot where it breeds, just as all other birds do.‡ Here it generally finds those species of insectivorous birds which it requires for its peculiar circumstances: but assuredly they are not always in the necessary numbers, or perhaps they may for some cause

* Genesis, chap. xxx. 37, *et seq.*

† This is corroborated in the ‘Naturalist’ for 1852, p. 33.

‡ Blyth’s edition of White’s ‘Selborne,’ p. 78.

be breeding earlier or later than its six to eight weeks' time for laying* lasts; it will therefore be unable to find for each of its eggs a fitting nest of that species to which it was prepared to entrust it, and to which it was accustomed; and so it finds itself obliged to introduce one and another egg into the nests of some other species, if haply by good chance it can do so.† Thus, then, it comes to pass that there are, and from the nature of the circumstances there must be, proportionably *many* exceptions to the rule. Thus, too, it comes to pass that by far the greater number of cuckoo's eggs bear the type of the eggs of the whitethroat (*Sylvia cinerea*) and of the pied wagtail (*Motacilla Yarrellii*), the most common foster-parents of the young cuckoo;‡ and perhaps in some localities of the meadow pipit (*Anthus pratensis*), the hedge accentor (*Accentor modularis*), and of the reed wren (*Sylvia arundinacea*); and that, on that account, eggs of such colouring form the most frequent exceptions,—that is to say, are most frequently found in the nests of other species. Thus, too, lastly, it comes to pass that these two above-named prevailing colours of the cuckoo's eggs are spread over *most localities*, whilst at the same time they also appear, *almost everywhere*, as exceptions in other nests. For the diffusion of these two species (the common whitethroat and the pied wagtail) is very extensive, and their haunts usually offer to the cuckoo also the requirements of its existence: it is therefore not without signification that one seldom finds in their nests cuckoo's eggs of other colours, but one does very frequently find, in the nests of other birds, cuckoo's eggs of their type.

I will just quote, before I take leave of Dr. Baldamus, the three following deductions, which he draws from his observations, and with which he concludes his paper.

* "Legezeit" is the concise German word, for which we have no English equivalent.

† The cuckoo, however, alone of British birds, is generally supposed to have the faculty of retaining her egg in the ovarium, after it is arrived at maturity, for a limited period of time. (Montagu's 'Ornith. Diet.' Introduction to vol. i. p. 8. Jesse's 'Gleanings in Nat. Hist.' vol. ii. p. 125.) If this be correct, it will account for the egg laid by the cuckoo as it fell to the ground after it was shot, recorded by Mr. S. S. Allen, ('Ibis,' vol. v. p. 358), and by my friend Mr. Chambers ('Ibis,' vol. v. p. 475). See also M. Vaillant's account of the African cuckoo shot by himself, and his faithful attendant, the Hottentot Klaas, and the frequent occurrence of the egg laid by the cuckoo as she fell wounded from the tree. (Rennie's 'Architecture of Birds,' p. 378.)

‡ The pied wagtail, the meadow pipit, and the hedge warbler, are perhaps most frequently chosen as the foster-parents in this country.

I. "Nature must have some special motive in the circumstances above detailed, so many, so connected together, but so peculiar.

II. That motive is plainly to be seen; *viz.* that by means of certain laws originally made she may ensure and facilitate the preservation of a species otherwise much exposed to danger.

III. She attains this end by a very simple method: in that she invests every hen cuckoo with the faculty of laying eggs coloured like the eggs of the bird of whose nest she prefers to make use, according to the locality; or in other words, every hen cuckoo lays eggs only of a fixed colour, corresponding with the eggs of that warbler in whose nest she lays them (as a general rule); and she only lays in other nests when, at the time for her laying, one of the species, of her own peculiar type, as we may say, which is fitted for her in every particular, is not ready."

Such is the very interesting and well-sustained argument of Dr. Baldamus: and, however new and startling his hypothesis, however unprecedented his conclusions, yet he supports his argument with such a battery of facts that his position seems almost impregnable. Facts are proverbially stubborn things, and not to be overthrown by opinions held only from the force of habit and not from conviction of their truth. At the same time I am far from advocating any acceptance of conclusions until we have tried them and ascertained their value. And so I would urge upon every out-door observer (and everybody who lives in the country ought to be an out-door observer) to assist in investigating this curious question, and I would invite them to communicate to this Natural History Society any discoveries they may make, or any well-ascertained facts they may elicit. We have a new point before us in the history of the cuckoo suggested for our consideration: we all hear the cuckoo's cry every spring all around us; we know then that the bird is with us, laying its eggs in our neighbourhood: it requires only diligence and observation and patience to make us acquainted with its habits. But yet again I would repeat the caution against rushing too quickly to conclusions: it is not an isolated fact here or there that would warrant any inference; it is only by careful comparison of many well-authenticated particulars that we are able to arrive at any satisfactory decision; while, on the other hand, the question before us is not to be set on one side as the dream of an enthusiast, or the fancy of a superficial naturalist. It is deliberately proposed by a leading ornithologist, of mature judgment and deep scientific attainments: it is the result, moreover, of patient

research, and a long course of inquiry among men well calculated to form a right conclusion. Let me advise, then, that while we keep our eyes open in order to see for ourselves, and investigate the mystery, we do not turn scornfully away from propositions which amaze, but respectfully listen to the opinions of those who have acted as our pioneers on this unknown track, and who have been busy in searching for the truth upon a point which even now, at the end of twelve long years, comes to us as a startling novelty.

ALFRED CHARLES SMITH.

Yatesbury Rectory, Calne.

Notes on Aphides. By F. WALKER, Esq., F.L.S.

(Continued from S. S. 1059.)

Genus 3. RHOPALOSIPHUM, Koch.

Typical species, *Aphis Persicæ*, Sulzer.—Front flat between the antennæ, which are remote from each other at the base. Nectaries clavate. In other characters like Siphonophora.

- | | |
|---|------------------------|
| A. Nectaries twice the length of the tail. | 1. <i>Lactuæ</i> . |
| AA. Nectaries thrice the length of the tail. | |
| A. Viviparous winged female wholly luteous. | 2. <i>Berberidis</i> . |
| AA. Viviparous winged female with the head and thorax black. | |
| A. Viviparous apterous female green or luteous. Antennæ pale. | |
| a. Viviparous winged female with the frontal tubercle gibbous on the inner side. Abdomen green or reddish, excepting the black spots. | 3. <i>Persicæ</i> . |
| aa. Viviparous winged female with the frontal tubercle not gibbous on the inner side. Abdomen luteous, excepting the brown spots. | 4. <i>Ligustri</i> . |
| AA. Viviparous apterous female olive-green. Antennæ brownish black. | 5. <i>Nymphææ</i> . |

The genus *Rhopalosiphum* is restricted by Passerini to the preceding five species, which belong to not less than four genera.

1. *R. Lactuæ*, Kalténbach.—Kalténbach mentions that his *Aphis Lactuæ* is erroneously cited by Koch as identical with *Siphonophora Lactuæ*. Passerini has observed it on *Picris hieracioides* and on *Cichorium endiva*. Its oviparous form, so far as is known, appears only on species of *Ribes*, where its occurrence is very irregular. A wingless viviparous female, which I have described as a variety of

R. Lactuæ with cylindrical nectaries, is supposed by Passerini to be Siphonophora Lactuæ.

2. *R. Berberidis*, Kaltenbach.—It is very remote from *R. Lactuæ* in structure and in habits, and forms a new genus, which may be thus briefly described:—

Genus LIOSOMAPHIS.

Fœmina vivipara aptera.

Corpus ellipticum, vix convexum. Frons plana. Antennæ corporis dimidio vix breviores. Nectaria subclavata, subscendentes, corpore quintuplo breviores. Cauda nectariis plus duplo brevior. Pedes graciles, breviusculi.

The wingless viviparous female.

Body rather flat, increasing in breadth from the head to two-thirds of the length, rounded from thence to the tip of the abdomen. Head flat in front. Antennæ nearly half the length of the body. Nectaries subclavate, slightly curved upward, about one-fifth of the length of the body. Tail distinct, less than half the length of the nectaries. Legs slender, rather short.

3. *R. Persicæ*, Sulzer.—This species was first noticed by Sulzer in his *Abgekürzte Geschichte der Insecten*. Passerini has identified it with *Aphis Dianthi*, *Schrank*. The reference to *Aphis Persicæ*, *Kaltenbach*, as a synonym of *A. Persicæ*, *Sulzer*, in *Ann. Nat. Hist. Ser. 2. v. 72*, is erroneous. Morren described and illustrated fully the anatomical structure of this species, and named it *A. Persicæ*, supposing that it had not been recorded. His conclusion that it migrated from another country and radiated over Belgium appears to be wrong. The winged female appeared in countless millions through various parts of Belgium from the 28th of September to the 15th of October, in 1834. Morren remarks that the winter of 1833-34, was extremely mild, and that the next summer was excessively hot and dry, there being entire months without rain. These seasons were both very favourable to the increase of Aphides. The first season enabled them to multiply incessantly without the renovation of the egg state. The next season was equally favourable for increase, as wet is very destructive to Aphides: The hot weather was also the means of the appearance of the winged form, so that, while it shrivelled the sustenance of the Aphides, it preserved their lives by enabling them to

remove to fresh food. Morren believed that this occasion was the first appearance of *A. Persicæ* in Belgium, and that all its swarms migrated from one spot. It feeds on a great variety of plants, peach leaves are not its usual food, and it abounds in Europe generally. A long continuance of hot dry weather much develops the winged viviparous form of Aphides, and the time of this result varies locally; the swarms that appeared successively here and there throughout Belgium may not have been really migratory. Their numbers, which are said to have darkened the light of day and to have hidden the walls of houses, seem to prove that they did not all radiate from one focus. Morren suggests that, as it first appeared very near the west coast, it may have come from England, and cites *Schizoneura lanigera* as an example of migration. The latter, of which one individual has been calculated to multiply to a quintillion and to thirty times that number of eggs in one year, is stated to have come from N. America to England, and to have spread thence over Europe, but there is no proof that it has migrated by long flights. Morren's opinion that in Aphides generally the viviparous *Aphis* is winged appears to be incorrect. He cites *A. Persicæ* as an exception to this rule. The fact that a cold atmosphere is the means of developing the perfect form of Aphides was noticed in 1802 by Mr. Curtis. Passerini suggests that an artificial atmosphere may be the means of continuing the preparatory state *ad infinitum*, and of thus annulling the ultimate condition. At the end of September, in 1866, the winged female of *A. Persicæ* appeared in abundance on the peach leaves at Wanstead. It is very different from the common *Aphis* of the peach.

4. *R. Ligustri*, Kalténbach.—This species is widely different in form from the type of *Rhopalosiphum*, and may be included in *Liosomaphis*, with *L. Berberidis*, till it is established as a new genus.

5. *R. Nymphææ*, Linn.—This and some others belong to a group that is quite distinct from *R. Lactuæ* and from *R. Persicæ*, and is more nearly allied to the limited genus *Aphis*. Passerini, in his 'Gli Afidi,' makes *R. Nymphææ* the type of his genus *Siphocoryne*, but in his 'Aphididæ Italicæ,' he cites *A. Xylostei* as the type of that genus.

Genus 4. MYZUS, *Passerini*.

Antennæ remote from each other at the base, seated on a short tubercle; first joint not dentate. Nectaries cylindrical, longer than the tail. In other characters like the preceding genera.

Typical species, *Aphis Cerasi*, Fabr.

- A. Viviparous apterous female wholly black or brown.
 - A. Tail more or less long, never very small.
 - a. Nectaries long, cylindrical, more than twice longer than the tail. 1. *Cerasi*.
 - aa. Nectaries short, a little thicker at the base, hardly longer than the tail. 2. *Pyrarius*.
 - AA. Tail very small or none.
 - a. Viviparous winged female with a reddish abdomen. Stigma and veins whitish. 3. *Persicæ*.
 - aa. Viviparous winged female with a black abdomen. Stigma and veins brown.
 - a. Body black, shining. Stigma black. 4. *Lychnidis*.
 - aa. Body brown, dull. Stigma pale, or slightly brown. 5. *Oxyacanthæ*.
- AA. Viviparous apterous female never black or brown.
 - A. Apterous female with a rust-coloured abdomen and with a large black dorsal spot. 6. *Tanaceti*.
 - AA. Apterous female wholly green, or whitish green, or luteous lemon-colour, or ochraceous.
 - a. Viviparous winged female with a brown abdomen. Apterous female whitish green. 7. *Plantagineus*.
 - aa. Viviparous winged female with the abdomen never brown.
 - a. Apterous viviparous tuberculate-setose above. Bristles capitate. 8. *tetrahoda*.
 - aa. Apterous viviparous female not tuberculate-setose.
 - * Antennæ longer than the body. 9. *Ribis*.
 - ** Antennæ shorter or not longer than the body.
 - † Body orange-colour. 10. *Asclepiadis*.
 - †† Viviparous apterous female green.
 - ‡ Nectaries very long. Stigma gray. 11. *Lythri*.
 - ‡‡ Nectaries moderately long. Stigma greenish. 12. *Mahaleb*.

1. *M. Cerasi*, Fabr.—In this vicinity, during 1866, *M. Cerasi* appeared in June and passed away in August, and reappeared in the middle part of October, when the male, which has not yet been described, was of frequent occurrence. The latter month is generally the season for the second especial swarming of Aphides, and is the time in which they should be more particularly observed, in order to determine what are permanent species and what are annual or apparent species, or are modified by the agency of the plants on which they feed and pass away without attaining the last state, and in following years are replaced by other forms whose peculiarities are also owing to their food and to local circumstances.

2. *M. Pyrarius*, Passerini.—Not recorded as British.

3. *M. Persicæ*, Passerini.—The characters by which Passerini distinguishes this species from *Aphis Persicæ*, *Fonscolombe*, will be noticed in the sequel.

4. *M. Lychnidis*, Koch.—Passerini excludes the synonyms which Koch has recorded of this species, and observes that the *Aphis Lychnidis* of authors has perhaps been sometimes confused with it, and that it differs from *A. Lychnidis*, *Kaltenbach*, not only in its generic characters but also in the wholly black colour of the winged viviparous female. This is also a matter for examination. The comparative length of the nectaries appears to be uncertain as a specific character.

5. *M. Oxyacanthæ*, Koch.—Passerini observes that this is not the *Aphis Oxyacanthæ* of Schrank.

6. *M. Tanaceti*, Linn.—Passerini remarks that this is the *Siphonophora Tanaceti* of Koch, and partly the species which I have described as *Aphis Absinthii*, but I believe that all the specimens which I have noticed of the latter species are quite distinct from the *S. Tanaceti* of Koch.

7. *M. Plantagineus*, Passerini.—On *Plantago media*. Not recorded as British.

8. *M. tetrarhoda*. Wlk.—*Siphonophora Rosarum*, Koch.

9. *M. Ribis*, Linn.

10. *M. Asclepiadis*, Passerini.—Not recorded as British.

11. *M. Lythri*, Schrank.

12. *M. Mahaleb*, Fonscolombe.—Passerini conjectures that I have combined this species with *Phorodon Humuli*, from which it differs in the frontal tubercle not being dentate. He observes that the viviparous winged females appear suddenly on *Prunus Mahaleb* in October, and inquires "from whence do they come?"

Of the preceding twelve species *Plantagineus*, *Tetrarhoda*, *Ribis*, *Asclepiadis*, *Lythri* and *Mahaleb* should be separated from *Myzus*, and it is doubtful whether *Oxyacanthæ* and *Tanaceti* belong to it. *Tetrarhoda* and *Ribis* are much more allied to the genus *Phorodon*.

Genus 5. HYALOPTERUS, Koch.

- A. Viviparous apterous female more or less powdered with white. Abdomen of the viviparous winged female green, with three deeper green stripes.
- A. Apterous viviparous female thickly powdered. Tail green. . . . 1. *Pruni*.
- AA. Apterous viviparous female slightly powdered. Tail brown. . . . 2. *Arundinis*.
- AA. Apterous viviparous female never powdered. Abdomen of the viviparous winged female luteous-green, most often with dorsal black bands and with marginal black points. 3. *trirhoda*.

1. *H. Pruni*, Fabr.

2. *H. Arundinis*, Fabr.

I have described these as one species, and I believe that the *Aphis* on *Elymus Arundinis* and on *Salsola Kali*, which I have named *A. Arundinis*, is not the *Arundinis* of Fabricius. Passerini makes no mention of *Aphis Vitis* among the Italian *Aphididæ*, and his observation of the occurrence of *H. Pruni* on *Vitis vinifera* suggests the probability that *Pruni* and *Vitis* are identical.

3. *H. tetrarhoda*, Wlk.—*Aquilegiæ*, Koch.

Genus 6. TOXOPTERA, Koch.

Antennæ seated on a short frontal tubercle. Cubital vein of the forewings once forked. In other characters like *Myzus*. This genus has not been recorded as British.

- | | |
|---|----------------------|
| A. Viviparous apterous female black or brown. | 1. <i>Aurantii</i> . |
| AA. Viviparous apterous female bright green | 2. <i>Graminum</i> . |

1. *T. Aurantii*, Fonscolombe (*Aphis Cameliæ*, *Kaltenbach*).—On *Citrus limonum*, on *C. Aurantium* and *Camelia Japonica*.

2. *T. Graminum*, Passerini.—On various species of *Gramineæ*.

(To be continued.)

Ornithological Notes from North Lincolnshire.

By JOHN CORDEAUX, Esq.

(Continued from Zool. S. S. 1031.)

DECEMBER, 1867.

Little Gull.—December 3. A wild and stormy day. Saw a little gull this morning in the marsh near the Humber: it passed just out of shot, and joined some brownheaded gulls feeding on the grass lands. I found it impossible to get near it.

Tree Sparrow.—Flocks of this species frequently observed during the autumn and winter. I have for some years been on the look out for the tree sparrow in this parish, but, previous to this season, have not obtained specimens: indeed they seem very locally distributed through this district. Unlike their domestic congeners they, as a rule, shun the habitations of men, collecting in small flocks and feeding in

the stubbles. To-day, December 17th, I saw a flock numbering not less than 150, crowded together along the the top of a close-clipped quick fence. They may be readily distinguished from the house sparrow, even at a distance, by their smaller size, white collar, and the two white bars on the wing; indeed they more nearly resemble in size the blackheaded bunting of our drains, and at a distance have a certain general resemblance to the male of that species. They are altogether a smaller and weaker bird than the house sparrow: this is very apparent when we compare the feet and claws of these species. Their flight is weak and undecided, and their note peculiar, and not as strong and clamorous as that of the common bird. The mingled notes from a flock remind one more of a chorus of linnets than the noisy, rattling gabble of the domestic bird. During severe weather I have seen them in the stack-yards, not associating with the common species, but keeping apart. In the fields the flocks keep together, feeding alone, and not mixing with other birds. Montagu appears to have been the first to note the similarity in the plumage of the sexes.

Little Grebe.—The fish-keeper brought me, this evening, a little grebe captured on the “beck.” It is a bold and fearless little bird, and struck fiercely and repeatedly at my hand when I lifted it out of the basket. The next morning I put the little fellow into my shooting-coat pocket, and went down to the stream, turning it loose in a quiet corner near the osier-beds. The little bird went off at once in a direct line, flying along the surface of the water, its wings moving rapidly, and its feet at the same time working alternately like paddles, the tip of each foot catching the water at every stroke—exactly the same motions as it would have used in diving. It is seldom we have an opportunity of seeing the little grebe fly.

Hérons.—Occasionally I see seven of these birds together on the grass lands in the marsh. My idea is that they spend the winter in the marshes, fishing during the night in the drains, in almost any of which we may see their foot-prints, and sleeping, during the short time they devote to that purpose, near the centre of some fifty-acre field, where it is impossible by any stratagem to get any where near them; and, indeed, they will hardly permit anyone to stand for a moment and look in their direction without rising and flying off to the “flats,” where they are not likely to be disturbed.

Bernicle Goose.—Small flocks of these geese—here known as “Spanish geese”—seen on the flats and neighbourhood during the

month of December. It is many years since I noted their last appearance in this district.

Wild Fowl.—Quite an average season in the Humber district. Those species which have come under my own observation, shot on the Humber, are, *Anas boschas*, *Penelope*, *tadorna*, *fuligula*, *marila*, and *ferina*.

Glaucous Gull.—When at Chester, on the 28th of December, I was shown a rather small specimen of this gull, in immature plumage, recently shot on the coast of North Wales.

JANUARY, 1868.

Pied Wagtail.—Seen more or less during the last three months in the turnip-fields, in close attendance on the folds of sheep.

Blackbird and Thrush.—Were singing on the mornings of the 17th, 18th and 19th of January.

Merlin.—By no means common. I generally, however, see one or two in the course of the autumn and summer. January 23. Saw a merlin in chase of a lark, which it struck at and missed and then immediately gave up the pursuit.

Snow Bunting.—Not observed before the 29th of January, when I put up a small flock, late in the evening, in a field covered with rough grass. These buntings feed during the winter almost entirely on the small seeds of various grasses and weeds. They thread their way amongst the long rough grass, running much after the manner of larks. There is a great diversity in the plumage of these birds. I seldom get two quite alike. I fancy the flocks which visit us during the winter consist of several families which pack together, perhaps the produce of certain localities; the young broods and old birds keeping together for the winter: the proportion of old birds usually seen in the flocks seems to bear out this supposition. It is curious how authors differ in their description of the plumage of these birds.

JOHN CORDEAUX.

Great Cotes, Ulceby, Lincolnshire,
February 4, 1868.

Errata.—There is a printer's error in my notes (Zool. S. S. 1029), paragraph "Dunlin," line 6, for "partial" read "pectoral." There is also an error of my own at page 1030, paragraph "Redwing, &c.," for November 18th read October 18th.—
J. C.

Ornithological Notes from Norfolk.

By HENRY STEVENSON, Esq., F.L.S.

(Continued from S. S. 1014).

NOVEMBER, 1867.

Crossbill.—On the 19th one red male and two females were shot at Mousehole, near Norwich.

Snipe.—A rather unusual number of these birds (*Scolopax gallinago*), after three rime-frosts, were met with in the marshes between Norwich and Yarmouth, about the 20th, and on the 30th thirty or forty couple appeared for sale in our fish-market, killed nearly all within five or six miles of the city. The weather not severe enough for much fowl.

Spotted Crake.—A bird of this species, as Dr. Lowe informs me, was killed at Gayton on the 30th of November, and sent to the Lynn Museum.

DECEMBER, 1867.

This month commenced with severe gales, followed by snow and sharp frost, which fully accounts for the snipe shifting their quarters and the large flocks of small birds observed everywhere in the county just prior to the change.

Gannet.—A fine adult bird, carried inland by the gale, was taken alive on the 7th at Harford Bridge, close to this city, between twenty and thirty miles from the nearest point on the coast, and was exhibited at a fishmonger's shop as a "wandering albatross."

Shovellers.—On the 11th, in our fish-market, I saw a young male, which, like one sent to a birdstuffer in Norwich on the 20th of November, had the point of the wings and lesser wing-coverts blue, as in adults; and on the 13th of December I saw an old male, killed a few days before, which had not yet completed its change, and still showed traces of its temporary female dress.

Peregrine.—A fine old male was killed at Haverland, about the 28th, and besides being a very small bird was frightfully thin. On dissection the stomach was found empty, but on the outer surface were a considerable number of long thin worms, averaging about $5\frac{1}{4}$ inches in length.

Whiteeyed Duck.—A specimen of this rare pochard, said to have

been killed at Yarmouth, was exhibited in Leadenhall Market on the 18th, and also an eared grebe, from the same locality.

Eider Duck.—A female, as Dr. Lowe informs me, was shot in Thornham Harbour on the 16th, and purchased for the Lynn Museum.

Hawfinch.—Several of these birds have been killed during the month in different parts of the county.

Bittern.—December 8th. Two fine birds in our fish-market, and another killed at Hickling on the 19th.

Redthroated Diver.—Several killed at Lynn since the end of November, attracted apparently by the sprats, which at this time are found in shoals in the estuary, and are caught in large quantities by the fishermen.

Longtailed Duck.—An immature female killed at Hickling on the 12th.

JANUARY AND FEBRUARY, 1868.

In spite of somewhat severe frosts at times we have had no continuance of hard weather this winter, which accounts for the absence of wild fowl generally, in any considerable quantity, and of the adult male birds of the rarer species. But few wild swans have made their appearance, and of these I have heard of but three or four being killed, and all of the common or whooper species.

Hen Harrier.—A fine adult male, at Hickling, on the 9th of January; a still older bird than one shot on the 2nd, at Burgh, near Yarmouth.

Waxwing.—I have seen but one specimen this winter, though I have heard of three or four more in different parts of the county, but they are evidently as scarce as they were plentiful last year.

Bittern.—The usual flight of these regular winter migrants has been distributed on our coast, being decidedly not the *rara avis* of newspaper paragraphs. Some six or eight have been killed, to my knowledge, on the broads and in the Lynn district.

Smew.—Old females and young birds somewhat numerous, but I have not heard of a single adult male. Female mergansers and goosanders have appeared, in like manner, apart from their more conspicuous consorts.

Divers and Grèbes.—Several immature specimens of both the red and blackthroated diver have been killed during the month of January. Two eared grebes, in winter plumage, were shot, one at

Barton and one at Reedham, about the 11th of January, and a red-necked grebe, with slight appearance of red on the throat, on the 8th of February.

Longtailed Duck.—As an exception to the general rule, a fine adult male of this species was shot on the 8th of January, at Titchwell, near Brancaster; but rarely met with, except during very severe weather.

Pectoral Sandpiper.—Through the kindness of Dr. Lowe, of Lynn, I had the opportunity of examining a specimen of this rare American sandpiper (making the fourth known to have occurred in Norfolk), which was caught in a net on Terrington Marsh on the 9th of January. This bird proved, on dissection, a female, and in immature plumage, but from the reddish margins to one or two of the feathers indicated already a state of change.

Redcrested Whistling Duck.—I was recently shown a very fine female of this extremely rare species, which had been shot, early in December, on Hickling Broad, and sold as the female of the velvet scoter. I am happy to say that it is now in good hands, and, its real value being known, will be properly cared for.

Shag.—Amongst other effects of the heavy gales, which, commencing on the 1st of February, lasted for several days, was the appearance of a fine adult female of this rare visitant on our eastern coast. This bird was sent up to Norwich on the 8th, having been picked up dead on the beach in the neighbourhood of Cromer, and was in most beautiful plumage, the rich bottle-green of its feathers contrasting with the bright yellow round the gape of the beak. The stomach, I am informed by Mr. T. E. Gunn, contained some five or six large white worms, like those recently found in the stomach of a cormorant.

Lesser Spotted Woodpecker.—On the 15th of February I saw, in the flesh, an adult male of this scarce species, which had been killed at Shottesham, near Norwich, and another was said to have been seen.

HENRY STEVENSON.

Norwich, February 19, 1868.

The Ermine in White Apparel.—On Tuesday, the 10th of February, a stoat in the ermine dress was trapped a short distance from here: it was sent to me, and as it is very rare that stoats are found in the white dress in this neighbourhood, I have taken the trouble to set it up. It is almost perfectly white: the only brown hairs on it are

around each eye, and a very slight sprinkle on the cheeks. I have never had one before, and I inquired of an old gamekeeper, of more than forty years' standing, who tells me he never saw one during his long experience. A rather curious circumstance took place whilst I was skinning the stoat: I happened to cut one of the glands which secrete the very pungent matter so disagreeable in animals of this class; my dog, on coming into the room where I was at work, became very excited, running around the room as fast as he could go, at the same time giving tongue as if he had been in full pursuit of vermin.—*Stephen Clogg; Looe, February 15, 1868.*

Gray Hare in Suffolk.—About the 12th of last January a beautiful variety of the common hare, a female, was killed on the Rendlesham estate near Wangford, in Suffolk, the whole surface of its coat being of a silver grayish hue, suffused with a pale reddish tinge on the head, ears, neck and flanks.—*T. E. Gunn; 21, Regent Street, Norwich.*

Do Cats kill Squirrels?—In the January number of the 'Zoologist' (S. S. 1057) I noticed an inquiry, "Is it not unusual for cats to kill squirrels?" In rather a wild district, in the western part of the county of Durham, I have seen a cat go out into the woods before breakfast, and soon return with a squirrel in its mouth; and the person to whom the cat belonged assured me that it was a frequent practice of this one to hunt them, and that both squirrels and rabbits often fell victims to its foraging propensities. The house was situate in the midst of a wood, which accounted for the cat's often possessing much more of the wild cat nature than her more domesticated cousins of the town.—*Eliza Barclay; Blackwell, Darlington, February 4, 1868.*

Badger in Lincolnshire.—These animals, notwithstanding the breaking up of many of their old haunts, and the constant persecution of gamekeepers, &c., are still found in two or three localities in North Lincolnshire. Two of these animals have lately come under my notice. One, a male, was captured alive; the other, a remarkably large and fat female, and suckling at the time of her capture, was brought into Grimsby by some poachers about the 20th of January, and sold to a bird-preserver: from the circumstances of its capture this man could not learn the exact locality where it was taken: it is the largest I have ever examined, weighing four stone nine pounds. The following are the dimensions taken at the time:—

Length from tip of nose to end of tail, including hair	-	3 feet 3 inches.
" of tail, including hair	- - - - -	8½ "
" of head	- - - - -	7½ "
" of middle claw	- - - - -	1¼ inch.
Girth behind shoulders	- - - - -	2 feet 2 inches.
" of fore leg	- - - - -	6 "

—*John Cordeaux; Great Cotes, Ulceby, Lincolnshire.*

Birds of Stirlingshire.—Being at present engaged in collecting materials for a small work on the birds of Stirlingshire, I should feel deeply grateful to any of the correspondents of the 'Zoologist' if they would let me know of any occurrences of our rarer birds in that county, with any particulars of their capture, &c. As I have hitherto had some difficulty in finding many works from which to compile, I should also be much obliged to any one who would direct my attention to any such. The

Ornithology of this county has in former years, I feel sure, been much neglected. Its position with regard to others of the midland counties is very favourable indeed in an ornithological point of view, having a good coast line to the east, and the queen of Scottish lochs to the west.—*John A. Harvie Brown; Dunipace House, Falkirk, January 3, 1868.*

A few Suggestions in connection with a future Great Work on British Ornithology.—I offer the following suggestions for the consideration of the readers of the 'Zoologist.' I send them, from a desire on my part, which I think must be shared by many other lovers of our British birds, to see some future large and exhaustive work upon their Natural History, and to see that work undertaken upon some systematic plan by a *body* of our best British ornithologists, each member of that body having his own portion of the work to perform. It is then with this hope that I wish to draw attention to the subject, and to induce the readers of the 'Zoologist' to express their ideas concerning the plan or method on which this future work should be undertaken. In all humility I submit the following for consideration, hoping to see it improved upon by others. I would then suggest that a committee be appointed by ornithologists, by vote or otherwise, as may be agreed, and that that committee be empowered to choose from amongst their number three, six, or more members, on whom shall devolve the labour of preparing a new great work on British Ornithology for the press. Also, supposing that the individuals chosen are perfectly willing to undertake the task, that they do so, after some such plan as the following:—1. Give the name of the species, using the most generally accepted nomenclature and adopting the best arrangement as yet known to naturalists. 2. Give a list of all synonyms, if practicable. 3. Give a list of all local names, or the most important of them. 4. A description of the birds, male and female, as relating to measurements, colour of plumage, &c. Also include a description of any varieties which have occurred within the experience of the author, such as albinos, &c. 5. Give the geographical distribution of the species in other countries. 6. Give the local distribution of the species in this country, with an account of the local or universal migrations, and a history of their habits, as connected with such. 7. Give a full description of the nest and eggs of the species, both of the type and of varieties, along with the habits of the species whilst engaged in nidification and incubation. 8. Give a description of the young in the downy state. 9. A description of the young in their different changes of plumage before attaining to the adult stage. (See "Log of the Gray Gull," Zool. S. S. pp. 243, 328, 361, 518). 10. An account of the habits of our migratory and rarer birds, as observed by naturalists abroad. 11. A short account of closely allied species on the Continent or elsewhere, with a reference to works upon European or other Ornithology in which they may occur. 12. Where practicable, a description of the down of the different species of Anatidæ as found in the nest, for the assistance of collectors in identifying their eggs. I might add to these suggestions *ad infinitum*, but as the list may already seem somewhat lengthy I will now conclude, leaving to the readers of the 'Zoologist,' should they consider the subject worthy of their attention, to alter, add to, or improve upon them.—*Id.*

Merlin near Barnstaple.—While driving from Barnstaple to Braunton, a few days ago, I saw a merlin sitting on a gate-post by the road-side. It was so fearless that it did not fly off until I was quite close to it. The next day the bird was in our bird-stuffer's shop: it had been shot, within a hundred yards of the spot where I noticed it,

by a gunner with a walking-stick gun. This pretty little hawk is scarce with us in the North of Devon.—*G. F. Mathew; H.M.S. "Britannia," Dartmouth, February 3, 1868.*

Kestrel feeding on a Frog.—In examining the stomach of a female kestrel, on the 15th of December last, I found the contents entirely composed of the remains of a frog, including the bones of one of the anterior legs almost entire. I think this an unusual occurrence. Have any of the readers of the 'Zoologist' met with any similar instance?—*T. E. Gunn; Norwich, January 7, 1868.*

Reply to Captain Hadfield's Note on the Buzzards seen in Kent.—I am very much obliged to Captain Hadfield for his kindness in offering an opinion about the buzzards seen in Kent. I have since made further inquiries, and the keeper states that both the birds were light-coloured underneath, and had white feathers on the upper part of the tail. Captain Hadfield reminds me that the tail-coverts of the male common buzzard are whitish, but it is not the tail-coverts that are white in the roughlegged buzzard, but the basal part of the tail-feathers, and this white prevails more or less in different specimens, according to the chief writers on Ornithology, but is never absent. If the tail-coverts only had been whitish in these buzzards, the white would not have struck my eye so readily. No doubt Captain Hadfield is perfectly right in preferring the distinction of the dark bar to that of the white base of the tail, but this latter distinction should not, I think, be set aside. In the two specimens I have examined both peculiarities are most strongly marked. It is easy to see that the white base of the tail would be observed sooner than the dark bar on the belly, in the case of the bird being seen at a distance, and not immediately over the observer's head. All these points being considered, I think I am justified in calling these birds rough-legged buzzards. It is a pity they did not stay longer to be more closely observed.—*Clifton.*

Brown Owl breeding in Confinement.—Is it not unusual for barn owls to breed in confinement? A few years ago, at Catteshall, I kept some in a small aviary which I built, about four feet by six feet: three eggs were laid, two of which were hatched, and the owlets brought up till full grown.—*Thomas Sweetapple, jun.; Eashing, near Godalming, February 17, 1868.*

Thrush with Malformed Beak.—On the 26th of December I shot a thrush in a field at Lakenham, near this city: the upper mandible of its bill I found was malformed by curving over one side of the lower mandible. Notwithstanding this mishap (which was doubtless caused by some accident when young) the bird was in good condition and rather fat.—*T. E. Gunn.*

Scarcity of the Redwing in North Devon.—This bird has been remarkably uncommon in the neighbourhood of Barnstaple this winter: I do not think I have seen more than two dozen altogether. I shall be glad to hear if it has been as scarce in any other part of the country, as with us it is usually so plentiful.—*G. F. Mathew.*

Buff Variety of the Hedge Accentor.—A few days since a variety of this familiar species, a female, was brought me for preservation: it was in a rather advanced state of decomposition, having been killed somewhere in this neighbourhood about the middle of December. The whole of the upper parts of its plumage were of a uniform buff colour; flanks the same; throat and breast grayish, inclining to dull white on its abdomen; bill and legs pale yellowish brown; eyes much paler than in ordinary specimens. Varieties in plumage of this species are, I believe, seldom met with. Two

former instances have come under my notice; one in which the plumage was somewhat similar to that described above, and in the other instance it was piebald; the occurrence of these I recorded in the 'Naturalist' for 1864-5, vol. i. p. 146.—*T. E. Gunn; January 8, 1868.*

Bohemian Waxwing in Yorkshire.—Mr. Charlesworth tells me that great numbers of this rare straggler were observed frequenting the neighbourhood of Richmond, Yorkshire, in the winter of 1866-67. A gamekeeper shot some, and two were preserved and are now in the possession of Mr. Charlesworth: this gentleman also states that the common cross-bill is a regular winter visitor to some woods about twelve miles from Richmond.—*A. Clark-Kennedy; Eton, Bucks.*

Bohemian Waxwing at Newmarket.—A very fine specimen of the Bohemian waxwing (a female) was brought for me to stuff this morning. It was shot by Mr. Wright, farmer, at Newmarket. When shot it was feeding on a fir tree.—*William Howlett; Newmarket, January 1, 1868.—From the 'Field.'*

White Lark near Eastbourne.—December 14, 1807. I have this day seen a female sky lark, pure white, without a blemish; eyes hazel; feet flesh-colour. It was shot by Mr. Osbourne, farmer, Eastbourne.—*John Dutton; Eastbourne.*

Wood Lark—I saw one passing over on the 8th and two on the 14th of January; one of the latter, which I more particularly noticed, seemed to be very dark-coloured.—*Clifton; Eton College, January, 1868.*

Blackheaded Bunting in Dry Woods.—On the 28th of December I was much surprised to see a male blackheaded bunting in a dry coppice, the last place in which I should have expected to see one. The nearest water to the wood is the Medway.—*Id.*

Snow Bunting at Hastings.—As I have not yet seen a note on the occurrence of this bird near Hastings in the 'Zoologist,' I may as well give the following short extract from a letter, dated the 11th of December, 1867, from my friend Mr. R. B. Sharpe, of the Zoological Society. He says, "At Hastings, last Saturday, I got a snow bunting, just shot, which I bought, making the second one I have got which is British-killed." Mr. Sharpe observes, in a late number of 'Land and Water,' that this bird was a male, and that it was killed on the 7th of December; and he further states that he had received, on the 19th of December, another beautiful specimen, which had been shot at Rye by his friend Mr. James Norden. The flock which frequented the neighbourhood was very wild, and consisted of about twenty individuals.—*A. Clark-Kennedy; December 31, 1867.*

Erratum.—Under the heading "Large Pike in Buckinghamshire" (S. S. 1061), for "trimmel" read "trimmer."—*Id.*

Nesting of the Yellowhammer.—In the 'Zoologist' for October Mr. Clogg mentions the fact of having found the nest of the yellowhammer (*Emberiza citrinella*) as late as the 26th of August. In 1864 I found one in a wheat-field, when we were harvesting in September; it contained five eggs, hard-set. In 1856 I found another on the Whitby Moors, in a hedge, the boundary of a wheat-field, on the 6th of October; it contained two young ones: a notice of this fact found its way into a Malton paper. In 1865 some mowers showed me one they had found among some laid wheat; it contained four eggs, hard-set. I believe the yellowhammer rears two or more broods a year. They are amongst the earliest builders, taking rank next to the hedgesparrow, blackbird and thrush; and long after all other birds have done breeding, their nests are

found, certainly as late as the 6th of October. They are very plentiful in this neighbourhood. In a stroll up the lanes they are scarcely ever absent from view for five minutes at a time, and during the winter they frequent the stack-yards in great numbers to receive their tithe of the corn, the wages of their summer's service.—*John Ranson; Linton-on-Ouse, York.*

Rosecoloured Pastor.—I believe, as you write, that “the rosecoloured pastor is extremely rare in this country.” My father was a very careful observer of birds for half a century, and I have heard him say that he never knew of but one being shot, and he had heard of a second, both in the East Riding of Yorkshire. For a quarter of a century I have noted the occurrence of rare birds in the neighbourhood of my dwelling, and I have never seen but one, and have never heard of another. The one I have seen is in the possession of a gentleman farmer near York, and was shot by him in his orchard. There were two, but the other escaped. The person who stuffed it, a man of great experience, told him it was very rare indeed.—*Id.*

The Hawfinch at Epping.—This bird is resident here throughout the year, and breeds in considerable numbers in the forest and neighbouring woods and plantations, but I believe their numbers are increased in some seasons by arrivals from the Continent: this was the case in the winter of 1865-6, when large flocks were scattered all over the forest. The seeds of the hornbeam are the favourite food of this species, and in the autumn of 1865 there was an unusual quantity on the trees. The hawfinch is an extremely shy and wary bird, and I am quite sure that no “urchin who goes out to pop at small birds” would have the slightest chance of getting hold of any of them here.—*Henry Doubleday; Epping, February 18, 1868.*

The Crossbill breeding successfully in County Kildare.—I was informed last March, by Mr. Glennon, taxidermist, of Wicklow Street, Dublin, that crossbills were breeding in the grounds of Kilkea Castle, Margeney, County Kildare. The weather was so severe, and wild-fowl shooting so good, that I could not get to Margeney to see the interesting sight, and later in the spring I was so busy with the sea-fowl (not shooting them) that I deferred till too late my visit to Mr. Roussel, the steward of Kilkea Castle, but got the following full particulars from him, which may be interesting to some of the readers of the ‘*Zoologist.*’ “This is the fourth winter I have spent,” says Mr. Roussel, “at Kilkea, but until last winter did not see a single crossbill. There were about five or six pairs which had *nests*; I shot two and a half pairs at first, never thinking that they would breed here, and had them stuffed. Very early, about the middle of February, I happened to see the birds building—found one nest, a little later another, and afterwards two more much later: I think the last two must have been second nests. One night, about the 10th of March, we had a very severe storm and high wind: the following day I got a person to go up the tree, who found that a large cone had, unfortunately, fallen into the nest, and four pretty strong birds were killed. Another nest, the female sitting, was destroyed the same night. I had only one nest safe, out of four, containing five young birds. There were many young birds in the plantation about the 1st of May: I often saw them in great numbers, say twenty or twenty-five together: they all left in the middle of summer. But for the storm I should have had three beautiful clutches: I found them easy reared, getting much attached to the person who feeds them. I lost a most beautiful male bird, killed by a hawk, at my window: Mr. Glennon has it now stuffed for me. The male has a very sweet note when the female is sitting: he keeps a little away.

from the nest, but upon the same tree, looking down at her from time to time. It is very curious to see them feeding, suspended from the cones, making, as it were, a part of them. I sent one of the nests to Mr. Glennon, and have not the least doubt but that they would have bred in frost and snow had the nests not been destroyed and blown down. I have been every day this winter on the look-out for them, but could not see a single bird, though I have been told by one of our men that he saw a couple very early in the season." Thompson, in his 'Natural History of Ireland,' mentions them as having bred at Tollymore Park, County Down, in 1836, and probably 1846. Seen with their young in 1839, at Ballibrado, near Cahir, and supposed to have bred there also the year previous. They were seen in numbers in County Dublin in March, 1838. In 1837 many were seen in June, at the Dargle, County Wicklow. Since the publication of Thompson's work I have not heard of the crossbill breeding in Ireland, till last March at Kilkea. In no former instance was the proof so decisive as that afforded by Mr. Roussel, who deserves the thanks of Irish ornithologists for his observations.—*Harry Blake-Knox; Dalkey, Co. Dublin; January 27, 1868.*

Nuthatch in Ireland.—It seems to be the general opinion that the nuthatch is never found on the other side of St. George's Channel: notwithstanding this, my brother informs me that he saw a nuthatch in County Meath in 1866. He knows the bird well.—*Clifton; Eton College, February 12, 1868.*

Pigeons perching on Trees.—Several pigeons, probably escaped from the dovecote, frequent a large building in the middle of the park at Cobham: I believe they breed there: from four to six are generally seen there. Those I have seen appear to be like the wild rock dove, light blue with black bars on the wings, but I have been told there is one particoloured bird. One of these birds, to my great surprise, flew to the top of a high tree and sat there for some time. I believe it is well known that the common pigeons often reassume the habits of the rock dove, and frequent rocks and old buildings. Mr. Meyer seems to me hardly accurate when he states that *wild rock doves* frequent some old buildings in Surrey. I should imagine they were escaped house pigeons that he saw.—*Id.*

Thickkneed Plover in the County of Dublin.—A great or thickkneed plover (*Ædicnemus crepitans*) was killed in this county, on the 4th of January, by Henry Jameson, Esq., of Hermitage Roebuck. In answer to an inquiry Mr. Jameson very kindly wrote me that he had shot the bird in the grounds of his brother, John Jameson, Esq., Saint Marnock's, between the Velvet Strand and Baldoyle, in the borough of Saint Marnock's. The bird made very short flights before being shot, and from that circumstance it was presumed had not long arrived in Ireland. I saw the bird at Mr. Glennon's, taxidermist, Dublin.—*Harry Blake-Knox; Dalkey, County Dublin, January 31, 1868.*

Common Bittern in Aberdeenshire.—An adult male, in fine plumage, of this species, which occurs only now and again in Scotland, and fully as often in Aberdeenshire as in any of the other counties, was shot on the 20th of December, 1867, at Badenscoth, and sent to Mr. George Sim, taxidermist, 20, King Street, to be stuffed, and to whom I am indebted for the opportunity of making a description of the bird while in the flesh. It weighed two pounds and a quarter. Its stomach contained beetles, some moss and a few grains of quartz.—*W. Craibe Angus; Aberdeen.*

Bittern near Pontefract.—My friend Mr. Charlesworth informs me that a bittern was shot by the gamekeeper, near a small stream in the vicinity of Pontefract, during

the year 1867: he examined it after it had been preserved.—*A. Clark-Kennedy*; *Eton, February 20, 1868.*

Bittern in Berkshire.—Early in December, 1867, a fine male bird of this uncommon species was seen near Cookham, in Berkshire, by Mr. Robert Hill, who, however, failed to procure the specimen, which was eventually shot by a man named John Wig, who killed another male of the species about six years ago, which is at present in the collection of Mrs. De Vitre, of Formosa, near Cookham.—*Id.*

Spoonbill in the North of Yorkshire.—The head keeper of Mr. J. C. D. Charlesworth killed a fine specimen of the spoonbill in one of the early months of 1867, on a marshy tract of country, the property of the above-mentioned gentleman, in the neighbourhood of Richmond, Yorkshire. This bird was shot in the head, and was so mutilated that it was unable to be preserved.—*Id.*

Whimbrel in January.—On the 20th of January I saw two of these birds feeding on some mud-flats on the banks of the Taw. They were unfortunately rather wild, and would not allow me to approach quite within shot. One had been killed out of a small flock a few days before, at Instow, and so probably these were the remaining birds. I was astonished at seeing this species at this time of the year.—*G. F. Mathew.*

Mute Swan on Northam Burrows.—Two of these fine birds were seen on Northam Burrows about a fortnight since, and one of them shot. The other frequented the neighbourhood for several days, but was so wary it could not be approached. I examined the bird killed, and it presented no appearance of domestication.—*Id.*

Eider Duck on the Thames.—On the 12th of December, 1867, an interesting specimen of the female eider, a bird of the year, was shot on the Thames, in the lower end of the "Jenkin Swatch," near the mouth of the Medway, by Mr. Godfrey Walmsley, and presented to me by his father.—*Arthur W. Crichton.*

Storm Petrel in Yorkshire.—Since my last communication on this subject (*Zool. S. S. 1060*), I have received another letter from Mr. J. H. Gurney, jun., informing me that no less than nine of these little birds were procured near Bridlington Quay, Yorkshire, about the same time as the one of which I sent you a notice.—*Alexander Clark-Kennedy*; *December 31, 1867.*

Parasites of Birds.—There is a question I should like to ask, and that is, has any one ever given a list of the parasites which infest birds? I fancy a paper on this subject would be interesting. I for one would much like to have some information on the subject, and possibly it might bring to light some new facts as regards the life-history, and the death, of some of our British birds.—*John A. Harvie Brown.*

PROCEEDINGS OF SOCIETIES.

ZOOLOGICAL SOCIETY.

January 23, 1868.—*JOHN GOULD, F.R.S., V.-P.*, in the chair.

A letter from Mr. Gerard Krefft, corresponding member at Sydney, was read in which the writer stated that amongst the fossil remains in the Australian Museum, he had discovered a portion of the humerus of an extinct species of *Echidna* from the Darling Downs.

The Secretary read an interesting communication from Mr. E. P. Ramsay, of Dobroyde, N. S. W., with reference to the habits and nesting of the lyre bird (*Menura*

superba). Skins of both sexes were exhibited, together with a newly-hatched chick, and egg. A lengthy discussion followed upon the affinities of this remarkable species; some naturalists present considering it to be an Insectorial, and others a Rasorial, bird. The possession of a newly-hatched chick was a most important point in determining the question, and it was observable that the feet, which, in the young of all the Rasores are sufficiently developed in the shell to bear the weight soon after its extrusion, were in this case remarkably small and weak. This of itself, is a strong argument in favour of its affinity to the Insectores. It has generally been considered as most nearly allied to the Birds of Paradise.

Messrs. Sclater and Salvin exhibited some new species of birds from America belonging to the families Strigidæ, Dendrocolaptidæ and Columbidae, and communicated descriptions of them.

Dr. Gray read a description of a new species of Macaque, from the province of Szechuen, lately presented to the Gardens of the Society, and proposed to name it *Macacus lasiotus*.

He also made some remarks upon the margin-tailed otter of Guiana (*Pteronura Sandbachii*) and exhibited some skins of the animal, together with a stuffed specimen from the Liverpool Museum.

With reference to the recent loss of the walrus in the Gardens of the Society, Dr. Murie described the cause of death. This resulted from ulceration of the stomach caused by the presence of hundreds of Entozoa which attached themselves in patches to the internal membrane. They appeared to belong to a new species, and as such have accordingly been described by Dr. Baird, who has proposed the name *Ascaris bicolor*. Dr. Murie exhibited a large glass jar full of these Entozoa. Slender and vermiform in appearance, they average in length about an inch and a quarter, and are of two shades of colour, light and dark brown. It was this latter peculiarity which suggested to Dr. Baird the name which he has proposed for them.—*J. E. H.*

ENTOMOLOGICAL SOCIETY.

Annual Meeting, January 27, 1868.—Sir JOHN LUBBOCK, Bart., President, in the chair.

An Abstract of the Treasurer's Accounts for 1867 was read by Mr. Grut, one of the Auditors, and showed a balance in favour of the Society of £75 8s. 4d.

The Secretary read the Report of the Council for 1867.

The following were elected Members of the Council for 1868:—Messrs. Bates, Dunning, Grut, Sir John Lubbock, M'Lachlan, Salvin, G. S. Saunders, W. W. Saunders, F. Smith, Stainton, S. Stevens, Trimen and Westwood.

The following Officers for 1868 were afterwards elected:—President, Mr. H. W. Bates; Treasurer, Mr. S. Stevens; Secretaries, Messrs. Dunning and M'Lachlan; Librarian, Mr. E. W. Janson.

Sir John Lubbock read the President's Address. (See 'Entomologist' for March.)

Mr. Pascoe proposed a vote of thanks to Sir John Lubbock for his conduct in the chair throughout his tenure of the Presidency, accompanied by a request that the admirable Address just delivered might be published in the Society's 'Journal of Proceedings.' This was seconded by Mr. Grut, and carried by acclamation.

Sir J. Lubbock returned thanks, and acceded to the request.

The thanks of the Society were also voted to the other Officers, the Auditors, and the Members of Council for 1867, and were acknowledged by Mr. S. Stevens, Mr. Dunning, Mr. Janson and Mr. J. Jenner Weir.

February 3, 1868.—H. W. BATES, Esq., F.Z.S., President, in the chair.

The President, after thanking the Society for the honour conferred upon him by his election to the chair, nominated as Vice-Presidents, Sir John Lubbock, Mr. W. Wilson Saunders, and Mr. Stainton.

Donations to the Library.

The following donations were announced, and thanks voted to the donors:—
 ‘Proceedings of the Royal Society,’ Nos. 93—97; presented by the Society. ‘Abhandlungen herausgegeben vom naturwiss. Vereine zu Bremen,’ vol. i. part 2; by the Society. ‘Coleoptera Hesperidum, being an Enumeration of the Coleopterous Insects of the Cape Verde Archipelago,’ by T. V. Wollaston; by the Author. Newman’s ‘British Moths,’ No. 14; by the Author. ‘The Zoologist’ for February; by the Editor. ‘The Entomologist’s Monthly Magazine’ for February; by the Editors.

Exhibitions, &c.

Mr. Bond exhibited a female specimen of *Drilus flavescens*, the second specimen of that sex, he believed, which had been found in this country. On the 1st of April, 1867, Mr. J. E. Harting was collecting shells on the South Downs at Harting, Sussex, and the *Drilus* was discovered in a shell of *Helix ericetorum*. The larva has for some time been known to live in snail shells (see Proc. Ent. Soc. 1858, p. 9), and Mr. Bond suggested that the female had been hatched in the shell in which it was discovered, and had never quitted it until disturbed by Mr. Harting.

Mr. Bond exhibited larva-skins of a species of *Dermestes*, which he was at first informed had not only destroyed the bladder-coverings of sixty pots of preserved fruits, but had also eaten a considerable portion of the contents; but on further inquiry it turned out the larvæ had not in this case eaten any of the fruit, but merely damaged the surface, which was covered with larva-skins and “what appeared to be powder or small eggs.” Mr. Newman, however, had informed Mr. Bond that a city house had recently sustained great loss from the same insect: in this instance the pots of jam were covered with paper only, not with skin, and the larvæ had actually consumed part of the contents, and rendered the whole worthless.

Mr. M’Lachlan had found quantities of a *Dermestes* larva in the timbers of a ship, upon which they had fed. Mr. F. Smith had reared *Dermestes* from timber; and Mr. Janson had often noticed that the larvæ would forsake hides and take refuge in the wooden flooring of a building, but this was probably for pupation, not for sustenance.

Mr. Daniel Hanbury communicated a letter from Dr. Bidie, of the Madras Army, respecting the “coffee-borer” of Southern India (see Proc. Ent. Soc. 1867, p. cix); and Mr. F. Smith mentioned that in Chevrolat’s collection in the British Museum there was a single specimen, labelled *Xylotrechus quadripes*, which seemed to be identical with the insect recently received from India.

With reference to Mr. Stainton’s larva of a *Tinea* found feeding in an antelope’s horn (Proc. Ent. Soc. 1867, p. cv.), Mr. Bond mentioned that a similar case was

recorded by Mr. Haliday in the Proc. Dublin Univ. Zool. Soc. 1855: see Dublin Nat. Hist. Review, vol. iii. p. 23, pl. i.

Mr. Bond also exhibited a specimen of *Bombyx Quercus*, in which the colours of the male and female were combined.

Dr. Wallace exhibited two British-born specimens of the Japanese oak-feeding *Bombyx Yamamai*, one reared by Mr. Gascoyne at Newark, the other by Mr. Shoolbred at Wolverhampton; and some eggs laid by Mr. Gascoyne's specimen. Also specimens of *Bombyx Pernyi*, a Chinese oak-feeding species, which he hoped would be naturalized in this country. Also, an imago and cocoon of *Pachypusa effusa* from Graham's Town, an acacia-feeder, from which an attempt was being made in South Africa to obtain silk, though the nature of the cocoon gave little promise of a favourable result. Dr. Wallace made some observations on the progress of sericulture, as well of mulberry silk as of *Ailanthus* silk, at the Cape of Good Hope and in Australia; and expressed his opinion that, although he found the air of the Eastern Counties of England too dry for *Bombyx Yamamai*, that species would probably succeed better in the cool and moist climates of Ireland or Scotland.

Dr. Gray communicated the following extract from a letter received by him from Dr. George Bennett, dated "Sydney, 21 October, 1867":—

"We have had, since the 14th of September, a wonderful flight of moths in Sydney and the vicinity, extending inland fourteen to twenty-five miles, and along the coast in clouds, from Newcastle seventy-five miles north, to Kiama eighty-eight miles south of Sydney: in those places they have swarmed in legions, proving a perfect pest. They are of the family Noctuidæ, and you may recollect that in my 'Wanderings in New South Wales' vol. i. p. 265, I mentioned a moth of the genus *Agrotis*, probably *A. spina*, which congregates in November, December and January, about masses of granite on the Bugong range of mountains. The moth of which this year we have such multitudes is, I consider, of the same genus as the Bugong, and is a large dark-coloured insect, very prettily marked; whether a new species I will leave you to determine: it is recognized by the colonists as a well-known visitor, but rarely in such multitudes and never to so wide an extent as during this time. Every house and public building is infested with them, clinging in swarms to the corners, behind shutters, or in any hollow space where they can congregate: this occurs to a greater extent in the suburbs than in the city. On the first morning following their arrival they occasioned great alarm and annoyance, for on opening the shutters the servants were saluted by a copious shower of these strong-winged insects, which had crowded on every part of the rooms and verandah, flying in legions in their faces with a whirring noise, and at the same time covering them with a quantity of dust or moth-feathers. During the first few days of the plague, some persons had to call in the assistance of their neighbours to help to clear away the hosts of these insects that had congregated in their dwellings. They filled the church at Kiama, and for a time prevented the performance of divine service; and how they behaved in the church at St. Leonards, on the north shore of Port Jackson, has been described by the Rev. W. B. Clarke. It is difficult to form an opinion whence the moths came: on the doors and windows being left open, the rooms were soon filled with multitudes, and what with the "dust-feathers" and a white fluid ejected by them, they stained and injured the curtains and coverings of the furniture. About dusk they might be observed flying

high and always with great rapidity, and then spreading about would alight on the flowers, always selecting the sweetest, and on these they might be seen in crowds sucking the blossoms, and so busily engaged as to be readily captured. Although generally seen about dusk, yet I observed a few days since a number of them crowding on the flowers of the orange and lemon trees early in the afternoon, and they rose in multitudes when disturbed. All I have examined are males, and although caught in various localities not a single fertile female has yet been discovered. It has been stated that a similar visitation took place in the vicinity of Sydney in 1855, but I do not recollect their swarming so generally, or to so great an extent or in such legions, as on the present occasion. In the 'Newcastle Chronicle' it is mentioned that Captain Twiss, of the brigantine 'Express,' which arrived in port on the 9th of October, reports that 'on the 7th of October, being 300 miles away from the coast of New South Wales, he observed a great number of moths in the sea; on the 8th, being in moderately calm, the sea was literally covered with moths.' Captain Twiss was of opinion that they had been blown from the shore, but from observations on land they appeared to come from the sea in the teeth of a westerly gale."

The following is the account given by the Rev. W. B. Clarke, dated "St. Leonards, 10th October, 1867," and referred to in Dr. Bennett's letter:—

"On the 22nd of December, 1851, I camped on a thick bed of snow, just under the summit of the Mount Kosciusco range in the Australian Alps, at a height of between six and seven thousand feet, or more than a mile and a quarter above the sea. The only fuel we could obtain was from the belt of old withered dwarf gum scrub, that appears just at the snow line; our fire, therefore, was very small. About sundown an immense flight of moths came down from the granite peaks and nearly extinguished the fire. My attention being attracted to them by this circumstance, and my memory supplying the fact, that Dr. Bennett had, years before, described the moths that he saw on the Bugong Mountain, on the Upper Tumut River, I secured a specimen, which I find by comparison to be identical in species with the *Agrotis* that is now infesting this vicinity. It is for the sake of identification that I allude to the year 1851. On the 7th of October, 1855, St. Thomas' Church (North Shore) was visited by a great flight, which much disturbed the congregation on that day and the following Sunday, 14th October. The invaders were got rid of with great difficulty, and at some cost to the parish, on account of the injury done to the church furniture. On the 7th and 14th of October, 1866 (just eleven years afterwards) a similar visitation took place, attended by similar results; though the moths were not quite so numerous as in 1855. The moths appeared in church this year on the 14th of September, and from that date to this have gone on increasing in numbers, until several bushels have been destroyed, though, apparently, without much diminishing the army. The state of the church was such on Sunday last (6th October) from the accumulated dust (moth-feathers), and the incessant swarms that were continually flying through the building, that divine service could not be held therein. More than seven days' hard labour in endeavouring to subdue them had been spent in vain; and since then, applications of the strongest ammonia, sulphur smoke, and other contrivances used for hours, have failed to drive them away, for as fast as one swarm is partly destroyed another succeeds. There are so many openings in the building that cannot be closed, and so many lodgments outside, that no smothering contrivance has succeeded; and as the trees and ground are

full of them, the moths, if driven away for a time, muster again and return. This morning I made an attempt to reckon up the numbers grouped together on the windows, and I counted more than 80,000. In the tower and below the floor, and hidden behind the skirting, there are probably many millions. An opinion has been published, that these moths came in from the sea. A flight fully a mile in length, very thick and broad, was certainly seen on the evening of the 20th of September, travelling from the direction of the Heads along the North Shore; and another similar flight was seen at Newcastle, probably both directed by a N.E. wind, which would in the latter case have, perhaps, blown them from the projecting land about Port Stephens, and so they might have crossed the water. The sands of the sea have been known in former years to be bordered by a thick band of dead moths, doubtless blown in from the land, drowned, and washed ashore. I am told that a vessel, yesterday, twenty miles from land, was covered by them. My own observations, specially on the 22nd of December, 1851, lead me to believe that if they have migrated from a distance they have come from the west and south-west, especially as their first appearance this year was with a west wind. And it must be remembered, that previous visitations have probably left eggs enough to account for the present multitudes within less distance than that from Sydney to Mount Kosciusco."

Mr. F. Smith exhibited the moths forwarded by Dr. Bennett to Dr. Gray. They did not appear to differ from the "Bugong moth," *Agrotis spina* of Guénée. With reference to Dr. Bennett's remark that males only had been found, it may be observed that the box forwarded by him contained about an equal number of male and female specimens. Both sexes also have been described, in a paper read before the Entomological Society of New South Wales, by Mr. A. W. Scott, who applies to the insect the name of *Agrotis vastator*. The following is an extract from Mr. Scott's paper:—

"The caterpillar of this moth is fleshy, little attenuated at each extremity, sub-verniform in appearance, and of a livid colour, varying much in shade, with the anterior segment furnished with a horny plate. It measures at maturity about two inches, and undergoes its transformation in the ground. The chrysalis is cylindrical, of a shining yellowish brown, and protected by a slight cocoon of a rough irregular ovoid form, composed of agglutinated earth. The caterpillars of several species of *Agrotis*, such as the one now under consideration, are very destructive on account of their numbers, feeding on the roots and leaves of low herbage, and hiding during the extreme heat of noon under clods of earth, stones, and other convenient places. The number of larvæ, in seasons which prove favourable for their development, almost surpasses belief. . . . A few years ago, on the Hunter River, I carefully examined a paddock of twenty-five acres, under oats for hay, which was much infested by the caterpillars of this species, and found that nearly every stalk had at least one caterpillar on it; numbers had two, many three. Taking the plants at twenty to the square foot, and each with only one caterpillar, the result would be 21,780,000 of these insects; and supposing that all these lived to become moths, each pair producing by the end of the season a progeny of 80,000, the total produce for the twenty-five acres would amount to 871,200,000,000. What, then, calculating under the same conditions, would be the number of the caterpillars which were at the time I allude to ravaging whole districts? A long line of figures almost unpronounceable.

“Allowing for every reasonable loss caused by weather not unusually severe, accident, or their numerous enemies, still there would remain quite sufficient to produce those vast numbers of moths, collected together from a wide range of country, and seen clustering in caves, under ledges of rocks, in churches, houses, barns, in every nook and cranny where their gregarious habits lead them, seeking shelter from the glare of day. I, therefore, think that this natural increase, aided by favourable weather, is quite sufficient to account for the swarms of moths recently seen in many localities, without having recourse to improbable theories. All moths are, in their primary stages, purely terrestrial, and cannot ‘come in from the sea.’ They cannot be born there, neither are their wings adapted for so long a flight as to cross the ocean from any point of land to the eastward of our coast, particularly ‘in the teeth of westerly winds.’ Indeed, many swarms of insects, besides the Lepidoptera, are known to be blown from the land, while a few others wilfully fly seaward under some unaccountable, almost insane, desire; but all these inevitably perish. I would suggest that the moths seen by vessels at sea were either endeavouring vainly to emigrate, or, what is *far more probable*, were driven away from the land by the prevalent westerly winds, and perished by thousands in the ocean; those seen returning to the shore were the fortunate few that had escaped before being carried too far to sea. I remember, some years ago, walking along the sands for about five miles between Newcastle and Redhead, and I observed an almost continuous undulating line of dead bodies, several deep, of these moths, marking the wash of high water along the whole of this length of beach, interrupted only by the rocky headlands; and probably this exhibition of the fate of these insects in such vast numbers was continued for a considerable distance on either hand.

“Were it not for the wholesale destruction of these vast assemblages of insect pests, caused by the violence of winds—by the fall of rain for several days successively—by sudden changes of temperature—and by the host of enemies, following in their wake, consisting of insectivorous birds and reptiles, and the numerous family of the Ichneumonidæ, I fear all the endeavours of man by artificial means to eradicate them would be baffled. The abundant food furnished by the roots and leaves of the various weeds and grasses growing over a vast extent of waste lands, will always ensure too ample a supply of such noxious creatures. We can, however, check in some degree the injury to our crops, and thus moderate the evil, by ploughing and harrowing the fallow lands, thus cutting off the immediate supply of food,—by passing the roller again and again over the growing crops when practicable,—and by encouraging, not molesting, the many species of birds that visit the fields in flocks on such occasions. I have seen crows, large brown hawks, magpies, cranes, spur-winged plovers, and a host of smaller birds, enjoying during the day ample meals furnished by these caterpillars, and had a great difficulty in preventing the overseer from driving them away, ‘because,’ he said ‘they eat the lucerne.’ The large family of ichneumons is also a great ally of man in the war of extermination, for they pierce the body of the living caterpillars, depositing their eggs within them, and thus cause a slow but certain death before the larvæ can attain to the perfect or winged state, and on this account they ought to be encouraged.

“In January and March of the year 1865, my friend Mr. Robert Vyner visited the Bougong Mountains, accompanied in the first instance by an aboriginal ‘Old Wellington,’ and in the other by Mr. Sharp, of Adelong, Old Wellington, and

another black fellow; both of these latter well acquainted with the habits of the moth, called by them 'Boogong' and 'Gnarliong' indiscriminately. The tops of these mountains are composed of granite, and present a series of lofty peaks, and it was up one of these, named by the natives 'Numoiadongo,' he and his companions toiled for nearly six hours before attaining the summit; so steep and rugged was the path that even the wild cattle never attempted to ascend to these heights. The moths were found in vast assemblages, sheltered within the deep fissures and between the huge masses of rocks which here form recesses, and might almost be considered as 'caves.' On both sides of the chasms the face of the stone was literally covered with these insects, packed closely side by side, overhead and under, presenting a dark surface of a scale-like pattern—each moth, however, was resting firmly by its feet on the rock, and not on the back of others, as in a swarm of bees. So numerous were these moths that six bushels of them could easily have been gathered by the party at this one peak; and so abundant were the remains of the former occupants that a stick was thrust into the *débris* on the floor to a depth of four feet. Mr. Vyner tells me that on this occasion he ate, properly cooked by Old Wellington, about a quart of the moths, and found them exceedingly nice and sweet, with a flavour of walnut—so much so that he desires to have 'another feed.' His clothes, by the moths dashing against them on being disturbed, were covered with honey, and smelt strongly of it for several days. At the time these multitudes assembled, the tea-tree and the small stunted-looking white gums were in full blossom, no doubt yielding up their honied treasures to these nocturnal depredators, whose flight, when issuing from their hiding-places to the feeding-grounds, was graphically described by Old Wellington, 'very much like wind, or flock of sheep.' The Tumut blacks report that the moths do not congregate on the high peaks in the spring time, but they first locate the lower mountains, feeding on the blossoms, which appear there earlier, and then work their way up to the higher peaks, where the plants are later in bloom.

"The Bougong moths are collected and prepared for food by the aborigines in this wise:—A blanket or sheet of bark is spread on the floor; the moths, on being disturbed with a stick, fall down, are gathered up before they have time to crawl or fly away, and thrust into a bag. To cook them, a hole is made on a sandy spot, and a smart fire lit on it until the sand is thoroughly heated, when all portions left of the glowing coal are carefully picked out for fear of scorching the bodies of the insects (as in such a case a violent storm would inevitably arise, according to their superstitious notions). The moths are now poured out of the bag, stirred about in the hot ashes for a short time, and then placed upon a sheet of bark until cold. The next process is to sift them carefully in a net, by which action the heads fall through, and thus, the wings and legs having been previously singed off, the bodies are obtained properly prepared. In this state they are generally eaten, but sometimes they are ground into a paste by the use of a smooth stone and hollow piece of bark, and made into cakes.

"In this locality were seen many of these holes, having been formed years ago for a similar purpose, by the then numerous blacks.

"Mr. Vyner also mentions that, at the period of his visit to this peak, he saw hundreds of crows and magpies feeding upon these moths, and the foot-marks and other tracks of native dogs and tiger cats were abundant, leading direct to the fissures of the rocks, and although he did not see these animals, he adds, 'I am certain from their traces that they must feed upon the moths.'"

(See also Proc. Ent. Soc. 1839, p. xxiv.; 1840, p. xvi.; 1865, p. cxxix.)

Mr. F. Smith exhibited specimens of the Australian form of *Pyrameis Cardui*, sent by Dr. Bennett to Dr. Gray, "taken in November, 1860, when off Cape Otway, on the Australian Coast; multitudes of them were about the P. and O. Company's steamer 'Jeddo,' alighting in numbers on board, and were captured."

Prof. Westwood remarked that the butterfly in question had been recently separated from *Pyrameis Cardui* by Prof. M'Coy, and described under a new name. (See Proc. Ent. Soc. 1867, p. lxxxvii.)

Mr. Trimen exhibited a specimen of *Apatura Ionia*, a rare species from Asia Minor, placed by some authors in the genus *Vanessa*, by others in *Pyrameis*.

The Hon. T. De Grey exhibited *Hypercallia Christierninana* (see Proc. Ent. Soc. 1867, p. xcii), captured between Shoreham and Sevenoaks, in the locality where the insect was a few years ago taken by Mr. W. Farren. Also *Acidalia rubricata* and *Opostega reliquella*, *Zell.*, both taken in Norfolk in 1867; see Ent. Ann. 1868, p. 131; with reference to Mr. Stainton's remarks there published, on the swarming of *Opostega salaciella*, Mr. De Grey added that he also had found that insect in such considerable numbers together, that the term "swarming" was not inappropriate.

Mr. Hewitson communicated a note on the date of publication of Dr. Felder's second volume of the 'Reise der Novara,' a question of some importance with reference to the priority of nomenclature of numerous species of butterflies (see Zool. Record, vol. iii. p. 433, and Trans. Ent. Soc. 3rd series, vol. v. p. 471). Mr. Hewitson made several applications for the volume, either with coloured or uncoloured plates, at the beginning of 1867, through Messrs. Williams and Norgate, who informed him that they were unable to procure it from the bookseller in Vienna. Nevertheless the work (*i. e.* the text, with uncoloured plates) was really published at the latter end of 1865. Dr. Felder had written to him to the effect that the 'Reise der Novara' was produced by and at the expense of the Imperial Academy of Science, and was issued by the Academy with uncoloured plates; coloured plates were not kept ready for sale, and copies were only coloured to order, which fact was stated on the cover of the volume: if any one had applied at the Academy, or to the bookseller of the Academy, at the latter end of 1865, for the second volume with uncoloured plates, he could have been supplied with 400 copies.

The President also read a letter to the same effect from Dr. Felder, who, in corroboration of the above statements, enclosed a letter from Herr Carl Gerold, the bookseller of the Imperial Academy, explaining that the reason why the work had not been supplied when ordered by Mr. Hewitson was, that the only order he had received was for a coloured copy; he had never received any order from England for an uncoloured copy.

Sir John Lubbock communicated a letter from Dr. Signoret, dated Paris, January 4, 1868, of which the following is a translation:—

"At the Meetings of the 5th and 19th of November, 1866 (Proc. Ent. Soc. 1866, pp. xxxii. xxxvi.), mention was made of the *Aphis* which lives in the galls of the elm, and it was spoken of as an object almost unknown at the present day, Geoffroy, Réaumur, De Geer and Et. Geoffroy (1764) being the only authors cited as having treated of this insect. It would be unfortunate for Hemipterology if that branch of Natural History had since that time fallen into oblivion, but it is not so, and to begin with I have only to cite Mr. Francis Walker, who speaks of it in his List of

Homopterous Insects, p. 1049, and who cites some fifteen authors, all of whom describe it more or less at length; to whom I may add Blot (Mem. Soc. Linn. de Caen, 1824), Hartig (Germer's Zeitsch. 1841), C. L. Koch (Die Pflanzenläuse, 1857), and more recently, Passerini (Aphididæ Italicæ, Archiv. Zool. de Modène, 1863).

"At the Meeting of the 5th of November (Proc. Ent. Soc. 1866, p. xxxii.) Mr. Pascoe exhibited two females of a Coccus living under the leaves of the Eucalyptus. Mr. Schrader has published an excellent paper with three plates in the first volume of the Transactions of the Entomological Society of New South Wales, 1863, where Mr. Pascoe will certainly find his species of Coccus.

"As I have occupied myself for several years with Cochineal insects in general, and am endeavouring to bring together all the existing material on that subject, I should receive with pleasure any papers, observations or insects which might be communicated to me. As regards the insects, I should especially like to have the males, which are extremely difficult to meet with, and I would ask those who find any to be kind enough to place them in tubes with some weak spirit of wine, for when they are dried it is impossible to make drawings of them. I should also be glad of information respecting the plants on which they live, which also may be inserted in the tubes."

Mr. F. Smith thought that Dr. Signoret had misunderstood his remarks about the galls of the elm; the fact was that the galls in question had never been noticed in this country before 1866. Mr. M'Lachlan added that he had referred to Geoffroy, Réaumur and De Geer, not as being the only authors who had described the gall, but merely to show that, though new to this country, it had in fact been well known on the Continent for more than a century.

Mr. F. Smith exhibited a new species of *Oryssus*, from the Gold Coast, the body of which was of a splendid metallic deep emerald-green, a somewhat uncommon occurrence among the Tenthredinidæ. Also specimens of Brazilian Hymenoptera and Diptera, whose economy was described in the paper mentioned below.

The Secretary exhibited a spider sent by Lord Cawdor, from Stackpole Court, Pembroke, which was pronounced by Mr. Blackwall to be a female of *Pholcus phalangioides* (see 'Spiders of Great Britain and Ireland,' part 2, p. 208), a species which frequents the interior of old buildings in the South of England: having been preserved in the dry state, the abdomen had shrunk greatly, and this circumstance had affected the colour. Mr. Blackwall added that in the spring of 1867 he received from India a species of *Pholcus*, described as *P. Lyoui* (Ann. and Mag. N. H. ser. 3, vol. xix. p. 392), one specimen of which "presented the extraordinary physiological fact of the union of the two sexes in the same individual." In this gynandromorphous spider, the left side exhibited male and the right side female characters.

Papers read.

Mr. F. Smith read "Observations on the Economy of Brazilian Insects, chiefly Hymenoptera, from the Notes of Mr. Peckolt, of Cantagallo."

Mr. M'Lachlan read "A Monograph of the British Neuroptera-Planipennia," enumerating forty-nine species as inhabitants of the British Isles.—*J. W. D.*

On the supposed strange Variation in the Eggs of the Cuckoo.
 Being a Translation from the German of a Paper by Herr
 Baldamus.* By the Rev. ALFRED CHARLES SMITH, M.A.

IN following up my story of the colouring of the eggs of the cuckoo, as given in the 'Zoologist' for March (S. S. 1105), with a literal translation of Herr Baldamus' paper, I have but one object in view; and that is, to place before the ornithologists of England as prominently as possible what I conceive to be an extremely interesting theory, and which, once started by so eminent a naturalist as Herr Baldamus, and supported by so many proofs, deserves at all events very careful examination, before it is discarded as improbable and rejected as worthless.

I would here take an early opportunity of mentioning that the subject has received attention at the hands of Mr. George Dawson Rowley, who published an able article on "Certain Facts in the Economy of the Cuckoo," in the 'Ibis' for 1865 (new series, vol. i. pp. 178—186), but which had not appeared when I wrote my paper and read it before the Wiltshire Archæological and Natural History Society, of which I have the honour to be Secretary. Mr. Rowley, indeed, does not incline to agree with Herr Baldamus' theory, though, on the other hand, I have several notes, from various correspondents, confirmatory of the German ornithologist's view; and Mr. Rowley candidly says, "I cannot refrain from expressing my admiration at his researches, which of themselves bear witness to his reputation as an ornithologist:" and he continues, "the theory is as beautiful as it is new, and I only wish that fresh evidence may be brought forward of a nature so strong as to make it an acknowledged fact." Mr. Rowley also adds, "It would be much more satisfactory if English readers had the opportunity of studying Dr. Baldamus' article in their own language."

Fully agreeing with the sentiments thus expressed, while feeling wholly incompetent as yet to pronounce any opinion of my own on the question before us, I am glad, with the hearty concurrence of Mr. Newman, to offer the readers of the 'Zoologist' (which will, I suppose, include every ornithologist in England) as accurate a translation of the whole of Herr Baldamus' article as I could make; and I am especially glad to do so at this season, since the subject will be

* 'Naumannia' for 1853, pp. 307—326.

fresh in the minds of my readers when the cuckoos arrive in April, and offer opportunities in May of testing the accuracy of Herr Baldamus' theory. Not, however, that such a question is to be settled in a day: it must, if it is to be fairly sifted, be tried by the concurrence of many investigators in various localities, and it can only be satisfactorily disposed of by the collection of a great many separate facts. For my own part, I am on the point of starting for the South, in order to avoid the cold winds of spring, as is my very frequent custom at this season; and before this paper is in the hands of my readers I hope to be in Portugal, whence I shall not return till the early part of June. I cannot therefore expect to be of much assistance personally in examining the eggs of the cuckoo this spring; but before I leave England I beg with all my heart to commend their very careful examination to my brother ornithologists at home, and I trust that when I return I shall find the pages of the 'Zoologist' well filled with information on the subject.

ALFRED CHARLES SMITH.

Yatesbury Rectory, Calne,
March 5, 1868.

Fresh Contributions to the History of the Propagation of the European Cuckoo (Cuculus canorus). By E. BALDAMUS.

THERE stands before me, in a small cabinet with many little compartments, a small collection of eggs. All around the work-table are lying almost as many similar eggs in small and large boxes. The half-instructed man would believe the whole to be a collection of a variety of songsters' eggs. I call up a lad who knows pretty well how to distinguish birds' eggs of the commoner sorts. "That is a lark's egg," he says; "that a garden warbler's (*Sylvia hortensis*), and this a wheatear's (*Saxicola œnanthe*)."

And if the matter had not been so positively ascertained; if Mr. Braune, the forester of Greiz, had not cut this large willow wren's (*S. hippolais*) egg (as it seems) out of the ovary of the cuckoo, which was killed as she was flying out of the willow wren's nest; if Count Rödern, of Breslau, was not a reliable authority, that this apparent redstart's egg was taken out of the nest of the redstart (*Ruticilla phœnicurus*); if Mr. Habicht had not taken this large tree pipit's egg out of the nest of a tree pipit (*Anthus arboreus*); if I myself had not taken out of the nests of the redbacked shrike (*Lanius collurio*) this reddish and this green grayish peculiarly marked cuckoo's egg;

one might indeed entertain doubts *whether this variously-coloured collection*—these green eggs, with and without markings; these on white, gray, green, greenish, brownish, yellowish, reddish and brown-reddish ground; these gray-green, olive-green, ash-gray, yellow-brown, olive-brown, yellow-red, wine-red, brown-red, dark brown and black; these spotted, streaked, speckled, grained and marbled eggs—*could one and all be the eggs of our cuckoo!*

And yet this is indeed the fact! Many of these eggs, evidently so widely differing, have long been known as cuckoo's eggs to our great ornithologists and oologists, such as Naumann, Thienemann, Brehm, Gloger, von Homeyer, Degland, &c. Every oologist knows that there are some, which, *both in colouring and marking, are extremely like the eggs of the pied wagtail (Motacilla alba), the blackcap (Sylvia atricapilla), the whitethroat (S. cinerea), the reed wren (Calamoherpe arundinacea), the sky lark (Alauda arvensis), &c.* "So much," says Thienemann, in his beautiful work on eggs above mentioned (p. 84), "*so much do many of these resemble the eggs of the wagtail, the tree pipit, the field lark and the great sedge warbler, that they can only be distinguished from them by the distinctive spots and the grain.*"

I shall return to these marks of distinction somewhat later; but now we are concerned, in the next place, to find authorities for the establishment of the fact, *that the cuckoo's eggs are in reality extremely similar to several other eggs—I mean the eggs of those birds in whose nests cuckoos' eggs are found;* however superfluous such references may seem to many an experienced oologist. Moreover, the Oology of our days has made much more extensive discoveries in these points.

A cuckoo, which instead of its ordinary more or less clear third tone, gave the second note of its cry in the fifth, with a shake on the fourth, appearing again in the following spring (1850) with the same remarkable cry, in the same isolated district, offered me an opportunity of investigating whether his species lived in monogamy, or in polygamy, or finally in polyandry. Accordingly I visited almost daily the district, which was very near me, but without attaining any positive result. I observed, however, only one female, which seemed to be paired with the above-mentioned male; while a male which inhabited a neighbouring district was driven away by the others as soon as it passed beyond its own limits. Still the above-mentioned male went frequently across a meadow to a little thicket, in which I never heard another male, but from which I obtained a cuckoo's

egg: this, however, might certainly have been laid by the female of the first-mentioned district. In short, on this point I have been unable hitherto to arrive at any positive result. But two eggs of the same female, which I myself found on one day in that district, and which were coloured and marked just alike, both lying in nests of the whitethroat (*Sylvia cinerea*), one quite fresh, the other a little set upon; these, coupled with a very differently coloured cuckoo's egg, which was found on the same day in another district, made me suppose *that at the root of this striking phenomenon there was a fixed law, perhaps a law which might be discovered.*

I now began to pay more attention to the cuckoo's eggs, and made it my special endeavour to make myself quite certain of every egg which passed through my hands, *with regard to the nests in which they were found*; and with that view and to that end I immediately wrote to my oological correspondents, to impart to them my opinions, and to invite them to a careful attention to these circumstances. In a short time I obtained the most astonishing results, part of which I communicated at Berlin and Altenburg,* and some of which have been already published in the 'Naumannia.' †

In the next place the list is now very much enlarged of those birds which are admitted to have acted as foster-parents of the cuckoo. Dr. Thienemann mentions the following:—

- | | | | |
|----|-------------------------|-----------|---------------------|
| 1. | <i>Sylvia hortensis</i> | | Garden Warbler. |
| 2. | „ <i>cinerea</i> | | Whitethroat. |
| 3. | „ <i>atricapilla?</i> | | Blackcap. |
| 4. | „ <i>curruca</i> | | Lesser Whitethroat. |
| 5. | „ <i>tithys</i> | | Black Redstart. |
| 6. | „ <i>phœnicurus</i> | | Common Redstart. |
| 7. | „ <i>rubecula</i> | | Robin Redbreast. |
| 8. | „ <i>arundinacea</i> | | Reed Wren. |

* When I communicated to a meeting at Altenburg my experience, further detailed in the text, the Royal Forester Braune, of Greiz, rose, very *à propos*, to support my previous assertions, by recording facts already touched upon above, and which will be more fully detailed further on—*viz.* that the cuckoo lays also reddish, dark-spotted eggs, very like the eggs of Hypolais. In Berlin the most distinguished anatomist and physiologist of our time, the Privy-Councillor Professor Johann Müller, challenged me to put together the cuckoo's eggs in the collection lying before me, and to mix them with the eggs of the foster-parents of the cuckoo which were lying near, and then to search again for the cuckoo's eggs, and to arrange them accurately, which I at once accomplished.

† 'Naumannia,' i. 2, p. 48, 51; ii. 1, p. 4; iii. 1, p. 105, 106; 2, p. 203, 228.

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|-----|-----------------------------|---------|----------------------|
| 9. | <i>Sylvia palustris</i> | | Marsh Warbler. |
| 10. | „ <i>cariceti</i> | | |
| 11. | „ <i>locustella</i> | | Grasshopper Warbler. |
| 12. | „ <i>trochilus</i> | | Willow Wren. |
| 13. | <i>Accentor modularis</i> | | Hedgesparrow. |
| 14. | <i>Troglodytes vulgaris</i> | | Wren. |
| 15. | <i>Saxicola rubetra</i> | | Whinchat. |
| 16. | <i>Motacilla alba</i> | | White Wagtail. |
| 17. | „ <i>flava</i> | | Gray Wagtail. |
| 18. | <i>Anthus campestris</i> | | Tawny Pipit. |
| 19. | „ <i>pratensis</i> | | Meadow Pipit. |
| 20. | <i>Alauda arvensis</i> | | Sky Lark. |
| 21. | <i>Emberiza citrinella</i> | | Yellowhammer. |

In addition to these, the following may now be added:—

- | | | | |
|-----|------------------------------|---------|----------------------|
| 1. | <i>Lanius collurio</i> | | Redbacked Shrike. |
| 2. | <i>Sylvia nisoria</i> | | Barred Warbler. |
| 3. | <i>Lusciola luscinia</i> | | Nightingale. |
| 4. | <i>Hypolais vulgaris</i> | | Chiffchaff. |
| 5. | <i>Phyllopneuste rufa</i> | | Rufous Warbler. |
| 6. | <i>Calamoherpe turdina</i> . | | |
| 7. | „ <i>phragmitis</i> | | Sedge Warbler. |
| 8. | <i>Regulus flavicapillus</i> | | Goldencrested Wren. |
| 9. | <i>Anthus arboreus</i> | | Tree Pipit. |
| 10. | <i>Alauda cristata</i> | | Crested Lark. |
| 11. | „ <i>arborea</i> | | Wood Lark. |
| 12. | <i>Emberiza miliaria</i> | | Common Bunting. |
| 13. | „ <i>schœniclus</i> | | Blackheaded Bunting. |
| 14. | <i>Loxia chloris</i> | | Greenfinch. |
| 15. | <i>Linota cannabina</i> | | Linnet. |
| 16. | <i>Saxicola stapazina</i> | | Russet Wheatear. |

Subsequently there was added even a third list, and in this were several grain-eating songsters (*Conirostres*). Indeed it is not only possible, but most probable, that the number of foster-parents of the cuckoo will be found very much larger, especially by means of the African, Asiatic and South and North European species. Indeed Levaillant, even in his day, knew *Lanius collaris* and *Backbakiri*, *Saxicola superciliaris* and *pastor*, as those birds in whose nests the cuckoo laid her eggs, at the Cape. Moreover, the number of those

kinds would have been found still greater, including nearly every species of the genera *Lanius*, *Saxicola*, *Pratincola*, *Ruticilla*, *Lusciola*, *Sylvia*, *Phyllopneustè*, *Hypolais*, *Calamoherpe*, *Calamodyta*, *Accentor*, *Regulus*, *Motacilla*, *Budytes*, *Anthus*, *Alauda*, *Emberiza*, and even *Fringilla*: all these would have been known as foster-parents of the cuckoo, if we had recognized *as such* all those *cuckoos' eggs* which had been found in their nests, especially those of *peculiar colouring*.*

When Dr. Thienemann wrote his description he had before him twenty-five specimens from different countries of Europe. Of these the colouring changes from simple white to a yellowish, grayish or greenish tinge. Those with a white ground are sparingly spotted: the under markings are ash-gray; then follow gray or greenish brown dots, little specks or compound points, upon these light or dark and generally circular spots, with the edges frequently shaded down.

Those single spots, which sharply contrast with the ground colour, are in the greater number of the eggs extremely characteristic, and only in very rare cases are they entirely wanting. Those with darker ground colour generally have the spots in three distinct shades of the ground colour. In many cases they are indistinct, but very thickly distributed over the whole space, sometimes thicker at the larger end, where they occasionally form an indistinct zone.

I have now lying before me more than sixty specimens of my own collection, and more than half as many more, which have been forwarded to me by the kindness of the Counts Rödern, Schallehne, Vogel and others. The collections of these and of the Messieurs Kunz, Passler, Habicht, Hoffmann and Pralle contain about a hundred specimens. Thus I have ample materials before me.

These eggs † are taken out of the nests of the following Insectores, and accord in colouring and marking with the eggs of the birds in whose nests they were found:—

* Certainly I can assert nothing positive of my own knowledge, although it is by no means improbable that *Muscicapa* also and *Sturnus* belong to the above list. The striking fact that even the corn-eating warblers bring up cuckoos is established beyond all question (*S. Naumannia*, a. d. a. O), and is thus explained—that the latter feed their young, at any rate at first, with insects.

† In addition to these there are about twenty specimens, chiefly of a gray-green and whitish colouring (Nos. 6, 11, 16 and 20) from unknown localities.

	No. of specimens.	Other colouring. (Exceptions.)
1. <i>Lanius collurio</i> (Redbacked Shrike) - 3		
2. <i>Ruticilla phœnicurus</i> (Redstart) - 4		
3. <i>Rubecula familiaris</i> (Redbreast) - 3	2 specimens with colouring of No. 6.	
4. <i>Lusciola luscinia</i> (Nightingale) -	1 specimen	
5. <i>Sylvia nisoria</i> (Barred Warbler) - 1		
6. „ <i>cinerea</i> (Whitethroat) - - 6	1	” 16.
7. „ <i>hortensis</i> (Garden Warbler) - 4		”
8. „ <i>atricapilla</i> (Blackcap) - - 1	1	” 6.
9. <i>Hypolais vulgaris</i> (Chiffchaff) - 1	1	” 16.
10. <i>Calamoherpe turdina</i> (Great Sedge Warbler) - - - - 2	1	” 11.
11. „ <i>arundinacea</i> (Reed Wren) - - - - 8	1	” 20.
12. „ <i>palustris</i> (Marsh Warbler) - - - - 2	1	” 8.
13. „ <i>phragmitis</i> (Sedge Warbler) - - - - 1		
14. „ <i>aquatica</i> (Aquatic Warbler) - - - - 1		
15. <i>Accentor modularis</i> (Hedgesparrow) 1		
16. <i>Motacilla alba</i> (Pied Wagtail) - 7	1	” 11.
17. <i>Budytes flava</i> (Yellow Wagtail) - 2		
18. <i>Anthus arboreus</i> (Tree Pipit) - - 4	1	” 6.
19. „ <i>pratensis</i> (Meadow Pipit) - 1		
20. <i>Alauda arvensis</i> (Sky Lark) - - 4		
21. „ <i>cristata</i> (Crested Lark) - 1		
22. „ <i>nemorosa</i> (Wood Lark) - 1		
23. <i>Emberiza citrinella</i> (Yellowhammer) 1		
24. <i>Linota cannabina</i> (Linnet) - - 1	1	” 16.
25. <i>Saxicola stapazina</i> (Russet Wheatear) 1	in the collection of M. Gerbe, of Paris.	
26. <i>Ruticilla tithys</i> (Black Redstart) - 1		Dr. Dehne.
27. <i>Emberiza miliaria</i> (Common Bunting) 1		Olph. Galliard.
28. <i>Loxia chloris</i> (Greenfinch) - - 1		Pralle.

No. 1 contains two specimens of a yellow-red ground colour, with reddish gray under spots and yellowish red upper spots. The eggs of the shrike, in whose nests I myself found both of these, belonged to the reddish variety: in all probability they were laid by an old hen. The third specimen was found in a nest of this bird, which contained eggs of a greenish ground colour, with olive-gray and olive-brown markings, which it resembled both in colouring and in markings.

2. These four specimens, which were found in the nests of *Ruticilla phœnicurus* are all of a light green ground colour: two of them have

at the larger end more or less brownish red spots,* which on one of them form a zone; the third has similar markings, but only sparingly scattered over the whole surface; whilst the fourth (which, together with many others of undoubted authenticity, was sent me by the obliging kindness of Count Rödern) is without any marking at all: herein it is identical with one in the possession of Dr. Dehne (Naum. iii. 2, p. 203), which is uniformly light greenish blue, without any markings whatsoever.†

3. Three which were found in the nests of *Rubecula* have exactly the same yellowish white ground and brownish cinnamon markings as the eggs of the redbreast, only that they are somewhat more distinct and more determined, while the spots are larger and extend over the whole surface, but are very sparingly distributed in comparison with the eggs of the redbreast; still there are varieties of these latter which very nearly resemble these cuckoo's eggs.

4. A cuckoo's egg, which I myself this year took out of the nest of *Lusciola luscinia*,‡ can only be distinguished by its size and grain ["das korn"] from the three eggs of the nightingale which were lying in the nest with it: I saw the hen cuckoo at different times near this nest, and I took her egg as soon as it was laid. To my regret two neighbouring nests of the nightingale, which this hen cuckoo also visited, were destroyed, perhaps by herself (might it not be because the clutch § brooded on was in too forward a state to suit her later eggs?), and so I found no other eggs in this district of Diebziger Thicket, although it had been especially rich in nightingales.

5. The six cuckoo's eggs which were found in the nests of *Sylvia cinerea*, and which resemble in some cases the lighter, in others the darker varieties of the eggs of that bird, are of a dirtyish light or darker greenish white colour, thinly or thickly marked with under spots of ash-gray and upper spots of a dirty olive-green.

7. The nest of *Sylvia hortensis* furnished me with four cuckoo's eggs, one of which I received through the courtesy of Count Rödern: they are of a dirty yellow-white ground colour, with under spots

* There occur also eggs of *Ruticilla phœnicurus* and *Saxicola œnanthe* with similar markings.

† M. Gerbe, in Paris, has a third plain cuckoo's egg, without spots, of an uniform verdigris-green colour, taken from a nest of *Saxicola stapazina*. It appears that all the chats should be added to swell the number of the rearers of the cuckoo.

‡ By mistake *Sylvia nisoria* is put in the text for this bird.

§ "Die Brüt." We have no word exactly answering to this.

of yellow-gray, and upper markings of a light and dark olive-brown.

8. One cuckoo's egg was, without doubt, found in a nest of *Sylvia atricapilla*, which resembled the eggs of that bird, even to the so-called "marks of branding" ["brandflecken"]. I myself found it close to the White Morass in the Banat, South Hungary.

9. As regards the egg mentioned above, which came from the nest of *Hypolais*, the following circumstance occurred:—Mr. Braune, the Royal Forester, for a long time observed a hen cuckoo flying to a nest of the chiffchaff, of which he knew the locality, and which already contained several eggs. Fearing lest the nest built by this superb songster, in his garden, might be destroyed by these visits, he on that account shot the cuckoo, in whose ovary ["legedarm"] he found a perfectly formed egg, which, to his great surprise, was coloured exactly like the eggs of *Hypolais*, and when he came to examine the nest closely he found a similar egg already laid in it.

10. Two eggs from the nests of *Calamoherpe turdina* (especially that one which belongs to Count Rödern) show, even in their faded condition, the peculiar olive-green ground colour of the eggs of the great sedge warbler, which for depth of colour are only surpassed by two cuckoo's eggs, taken the one from the nest of *Accentor modularis* and the other from the nest of *Calamoherpe palustris*. Less striking is the similarity in regard to the marking.

11. Eight eggs out of the nests of *Calamoherpe arundinacea*. [Perhaps these are the warblers which, next to *Sylvia cinerea* and *Motacilla alba*, bring up the greatest number of cuckoos.] These eggs remind one, both in colour and marking, of the eggs of this bird. Indeed by far the greatest number of cuckoo's eggs which I have seen resembled the eggs of *S. cinerea* and *C. arundinacea*, which are so like one another.

12. We have just mentioned one of the two cuckoo's eggs which were found in the nest of *Calamoherpe palustris*, which is of a tolerably deep blue-green or verdigris-green ["spahngrüner"] colour: it has the characteristic spots, as if of branding, and the deeper as well as the surface markings of the marsh warbler's ["sumpfrohrsängereier"] egg: I found it myself at the White Morass in Hungary. The other, which is in the collection of Count Rödern, is of a pale ground colour, and moreover has the characteristic markings, though more indistinct and thickly spread over the whole surface. One very

like the Hungarian specimen was found by the Pastor Passler in a marsh warbler's nest (Naum. i. 2, p. 49).

13 and 14. One found by myself in the nest of *Calamoherpe phragmitis*, and one found by Count Rödern in the nest of *C. aquatica*, show the extremely faint markings which almost hide the real ground colour of these sedge warbler's ["*rohrsängereier*"] eggs.

15. One of the most interesting of the cuckoo's eggs is a beautiful blue-green one, which was taken out of the nest of *Accentor modularis*, without any markings, and which, *even to the shell, the grain and the size* ["*bis auf schale, korn und grösse*"], is like a very dark egg of the hedgesparrow.

16. The nests of the pied wagtail furnished me with seven cuckoo's eggs, all of which (but especially the specimen belonging to Count Rödern*) more or less resemble the eggs of the wagtails, in their white or greenish ground colour, as well as in their gray and blackish streaked markings.

17. The same may be said of one found in the nest of *Budytes flava*.

18. Amongst the most interesting, both in regard to colouring and marking, are the three (or perhaps four, for the exact nest from which one was taken is uncertain) which were found in the nests of the tree pipit: one is even now, after the lapse of several years, of a dull wine-red colour, which is very deep ["*sehr intensiv*"], and shades off very unmistakably into violet. The violet and reddish brown markings show clearly the characteristic measles-like ["*gleichsam maser*"] speckles, blotches and burning marks, which belong to most of the tree pipit's ["*baumpiepereier*"] eggs. Two others bear the same character of markings in bluish gray and reddish gray upon a light blue-gray and light violet-gray ground.

19. One found in a meadow pipit's ["*wiesenieper*"] nest shows the faint streaky markings of this pipit's eggs in a gray, which in slight shades approaches to yellow.

20, 21 and 22. These have in several shades, both of the ground colour and of the markings, just the peculiarity of marking belonging to the lark's eggs ["*lerchen eier*"], *viz.* a dirty greenish or yellowish gray, with faint and indistinct marbled streaks and spots.

* I must here observe that the Count Rödern assured me that he had himself taken from the nests the whole of the cuckoo's eggs handed over for my use, except the plain green egg which a collector in Breslau took from a ["*rothschwanz*"] redstart's nest.

23. The eggs from the nest of *Emberiza citrinella* has just the same hair-streaks, or (as Dr. von Middendorf calls them) “vermiform lines” [“wurmlinien”] of the bunting’s [“ammereier”] eggs; whilst—

24. The egg which was found in the nest of *Linota cannabina* has a light-green ground colour, with a few reddish brown spots.

This is the description of the cuckoo’s eggs now lying before me, which resemble the eggs of the foster-parents. But there must be added to the list—

26. One which was described by Dr. Dehne (Naum. iii. 2, p. 203) which was laid in a cage by a cuckoo that was caught in a hay-loft, and which was very probably destined for a nest of *Ruticilla tithys*, though *R. phœnicurus* also sometimes builds its nest on and in buildings. The light-greenish blue egg, without any markings, might have passed for the egg of either species of the redstarts [“rothschwanzarten”]; for those also belonging to *R. tithys*—that is to say, of certain pairs—are sometimes of a greenish-white colour.

27. Herr Leon Olph. Galliard describes a cuckoo’s egg which he had taken out of a nest of *Emberiza miliaria*, as very similar to the eggs of that bird. I even conjecture that the supposed bunting’s egg [“ammerei”], which this ‘excellent observer found in the œsophagus of a cuckoo which he had killed, was the egg belonging to the bird killed by him, and which she had thus in her beak in order to carry it in this manner to a nest which otherwise would have been inaccessible to her.* (S. Naum. iii. 1, p. 106.)

28. The cuckoo’s egg which was found in the nest of *Loxia chloris*, together with other eggs of that bird, by Herr Pralle, Secretary at the

* It does not at all tell against this view that the dead bird had the egg in her œsophagus, for in her fright she had swallowed it. That the cuckoo avails itself of its beak to place its eggs in many nests is *a priori* established, for there are cases in which no other means are at all possible; besides many a hen cuckoo has been killed which had its own egg in its mouth. But in just such a case the whole proceeding has been lately and accurately watched. A charcoal-burner in the Forest of Thüringer had built his somewhat low forest-but in sloping ground, when a cuckoo (which he had long observed flying about in the neighbourhood) flew into the hut, perched upon a bench near the entrance, laid an egg, seized it in her beak, and placed it in a wren’s [“zaunkönig’s”] nest, which was built against the inner side of the hut. The man, who knew nothing of the history of the propagation of the cuckoo, gazed on in silence, and full of astonishment at what was happening before his very eyes, and afterwards related the “wonder” to Herr Mädell, an actuary in Gotha, to whom I am indebted for this very interesting communication.

Post Office, was not very observable from the others in regard to its ground colour, *even when it was faded* [“selbst wenn es verbleicht war”], so that one would point it out from its striking dissimilarity.

Moreover, we should lay the less stress upon such a dissimilarity, as the grain-eating warblers are only in very rare cases chosen as the foster-parents of the cuckoo, which is appointed to eat animal food. Herr Olph. Galliard indeed maintains that the cuckoo, at least in his locality (the environs of Lyon), has a preference for the nest of the common bunting [“grauammer”], and has himself taken several young cuckoos which had been brought up in the nests of these birds: and Herr Bethe (S. Naum. iii. 1, p. 105) found in the stomach of one taken out of a linnet's nest quite green unripe *seeds* (*Panicurus sanguinalis* and others). But even on the supposition that buntings and finches [“ammern und fincken”] do not feed their young ones *entirely* with vegetables, the fact last mentioned shows that the bringing up of a bird which is appointed exclusively for animal food, by those which *only*, or at any rate *partly*, feed on vegetables, must belong *to the exceptions*; and it is a question whether the cuckoo which had been taken out of the linnet's nest by Herr Bethe would not have died if the linnets had continued to feed it with the seeds.*

For that reason it would be quite extraordinary if the cuckoo's eggs should resemble the eggs of these exceptional foster-parents.

The *fact* is quite established, and beyond all doubt, *that there are cuckoo's eggs which, both in colour and in markings, are very like the eggs of those warblers in whose nests they are accustomed to be laid.*

What follows then from this?

If Nature has any motive in this, and she never trifles, there is, in unison with the high dignity of the laws of Nature and the Creator, a conclusion very apparent: *she has so planned her arrangements as to facilitate the continuance of the species under the conditions once appointed.* This seems more sound than the assumption that she had a desire to show that warblers (which generally recognise so easily all strange eggs, casting them out of the nest, or else deserting it), in regard to the cuckoo's eggs, are quite blind, and cannot recognise

* There certainly remains still the possibility that instinct may lead the foster-parents, out of the order of corn-eating warblers, to continue to bring insects again and again to the young foster-bird, which showed signs of hunger, and yet declined seeds of various kinds. It would indeed be extremely interesting if the stomach of a cuckoo like this of Herr Bethe should come into the hands of a Johann Müller.

the red eggs amongst their green layings (clutches),* and *vice versa*.

No other motive seems probable, and the choice between the two above mentioned does not seem to me to be difficult.

Therefore I do not hesitate to set forth, as a law of Nature, that *the eggs of the cuckoo are, in a very considerable degree, coloured and marked like the eggs of those birds in whose nests they are about to be laid, in order that they might the less easily be recognised † by the foster-parents as substituted ones. ‡*

* "Gelege." "Loiters," as we say in Wiltshire.

† It must, however, by no means be asserted that in carrying out this object Nature cannot and does not employ other means as well.

‡ It is not without great significance for us that this rule has reference (as it appears) to almost all the species of the true cuckoo.

1. *Cuculus flavus*, *Gm.*, according to Thienemann (l. c. p. 85) has reddish gray-white or reddish yellow-gray eggs, with some, scarcely visible, very fine ash-gray or reddish gray dots and specks, massed together at the larger end, in the form of a wreath, and comparatively scattered over the remaining surface. These were found by Boie and Macklot in the nests of *Enicurus coronatus*, *Tem.*, and *Megalurus palustris*, *Horsf.*, which have eggs partly similar.

2. *C. cineraceus*, *Vig.* and *Horsf.*, lays eggs of a dirty reddish white, more inclining to gray or yellow, almost without spots: they were found by Dr. Preiss in the nests of *Meliphaga fulvifrons*, and by Gould in those of *Rhipidura motacilloides*. Upon these Dr. Thienemann makes the observation, "It is worthy of remark that the eggs of many New Holland birds also, especially of the division of *Meliphaga*, have a reddish ground."

3. The eggs of *C. solitarius*, *Cuv.* (according to Levaillant), are reddish white, powdered with light brown specks, and consequently extremely like the eggs of *Saxicola superciliaris*, *Malurus macrourus*, *Sylvia coryphea* and *Turdus reclamator*.

4. *C. serratus*, *Sparrm.*, *edolius*, *Cuv.* (likewise according to Levaillant), lays its clear white eggs in the nests of *Motacilla capensis*, *Malurus subflavus*, and other small insectivorous birds.

5. *C. niger*, *L.* (according to the statement of General Hardwicke), lays its eggs, which are rather large and of a greenish gray-white, evenly covered with very fine grayish brown and yellow-brown specks, in crows' nests. They have, moreover, a great resemblance to the eggs of many of the crows.

6. *C. lucidus*, *Lath.* Inasmuch as *Acanthiza diensensis* and *chrysothœa*, *Glyciphila fulvifrons*, *Malurus cyaneus* and others of this genus, and *Petroica multicolor*, are known as foster-parents of this bird, so a fair number of its eggs varies as regards their colouring and marking, exactly in the same manner as with the eggs of our cuckoo. One finds the ground white and speckled with red and reddish brown in a variety of shades, mostly with numerous delicate spots, which collect near the larger end, and often form a distinct wreath; or with large confused specks, oftentimes heaped on one another, as is the case with many species of fowls. Then again there

That is the *rule*, which (like all other rules) will not be without *exceptions*.

But before we proceed to discuss and explain it, there is another inquiry, which, if not fully answered, should at any rate be stated.

The question then is, *does the same hen cuckoo lay eggs of the same colour and markings only?* and so *is she limited to the nests of but one species?*

Or else, *does the same individual lay eggs of different colour and marking, according to the character of the eggs amongst which her own will be intruded?* My friend H. Kunz (to whom I first communicated my observations on the difference of colour in the eggs of the cuckoo, and who also made similar observations) pronounced his opinion in favour of the latter view, and advanced the following hypotheses (Naum. i. 2, p. 51):—"The sight of the eggs lying in the nest has such an influence on the hen which is just about to lay, that the egg which is ready to be laid assumes the colour and markings of those before her." Such an event is in itself by no means improbable. There could be adduced for it reasons and analogies from Physiology. First, in one of the oldest records of history, *viz.* in the Pentateuch* there is a relation of ancient experience, that sudden, extraordinary and particularly strong or lasting impressions upon the senses (particularly on the sense of sight) of the mother during the conception

occur eggs entirely olive-green or olive-brown, which in colour resemble the eggs of the nightingale, where, however, the larger end is of a darker, the smaller of a somewhat lighter, colour, as is the case with many eggs of the birds of New Holland.

7. *C. auratus*, *Gm.*, lays eggs of a shining white. Levaillant affirms that it lays its eggs in the nests of the smallest insect-eaters; and since he shot a hen bird which had its own egg in its mouth, and thereupon he drew the conclusions that the bird introduces its eggs by means of its beak into nests which it cannot enter, it is right to accept this; and the clear shining white of the eggs supports this assumption, that it prefers to entrust its eggs to those species which breed in holes. Perhaps even the allied species (*Indicator major* and *minor*), which lay white eggs in holes of trees, belong to its foster-parents.

Whether therefore, finally (*Journal f. Ornithol.* i. 2, p. 144), *Cuculus glandarius*, since it does not personally incubate its own eggs, can no longer remain as a type of Swainson's order *Oxylophus*, is of no importance to this question; but it is of importance that the eggs of this parasite, too (whether it be a genuine cuckoo or not), are so wonderfully like the eggs of the foster-parents that one can scarcely distinguish them; in colouring and marking, from many small specimens of the crow's eggs at least that is the case with my own specimen, which I received from Herr A. Brehm.

* Genesis xxx. 37 and following verses.

and first stages of pregnancy, may under certain circumstances have a considerable influence on the formation of the embryo. So it would not be of itself improbable that Nature would follow out in this manner her design once advanced.

Nevertheless, several facts speak against this explanation. In the first place, experience, which proves that the eggs of the cuckoo are differently coloured and marked, according to the localities, or (as Temminck says) "they depend upon the locality."* This fact, even under the limitation pointed out in the note, would not be enough to explain if one would set out from the view put forth in the text, since

* It is evident that this assertion of Temminck's must be modified, in that it strictly appertains to certain, but by no means to all, localities; that is to say, in those spots where certain cuckoos' foster-parents live near one another in remarkable abundance, while there are not many other warblers in the neighbourhood, the cuckoo's eggs will assume entirely the type of the eggs of the predominating species. Such spots are, for instance, large reed-ponds, where *Calamoherpe arundinacea*, by far the most abundant breeder among the warblers, is wont to dwell: and in fact this assumption will be confirmed in a surprising manner by the knowledge, derived from experience, that almost all the cuckoo's eggs from the Badetzer pond near Zerbot, where the cuckoo is very abundant and the reed warbler ["*teichrohrsänger*"] is the most common bird, assume the type of the last-named bird's eggs. Moreover, in the vicinity of streams and brooks, in grass-flats, willow-beds and tracts of wood, where *Motacilla alba* finds its favourite haunts; in marshy meadows and moors, where *Anthus pratensis* breeds in the greatest abundance (as in all probability in the neighbourhood of Leyden, and in the immediate environs of Herr von Homeyer, who, in his 'Systematic Review of the Birds of Pomerania,' p. 10, alleges that the cuckoo lays its eggs principally in the nests of the ["*weissen bachstelge*"] pied wagtail and the ["*wiesenpieper*"] meadow pipit); lastly, in districts where *Emberiza miliaria* is particularly abundant (as is apparently the case in the neighbourhood of Lyons); throughout all these places will the cuckoo's eggs assume various predominant colours, according to the various localities. In opposition to this view of Temminck, M. Mogirin-Tandon (*Degland, Ornith. Europ. i. p. 170*) asserts "that the variation of the cuckoo's eggs depends upon age, state of health, vigour in laying ('abondance de la ponte'), and the kind of food." Of all the explanations of the fact that is the one which has the least to say for itself, so much influence one is inclined to allow to the arguments above mentioned for the origin of other varieties of eggs. Dr. Gloger (*Handb. d. N. G. der Vögel Europa's, i. p. 448*) supposes that generally, but certainly not invariably, nearly all the cuckoo's eggs laid in the course of one year, and by various hens, at least such as happen to be laid at the same time, are very similar to one another; and then adds, thereupon, this appearance may be readily explained by the general use of this or that sort of food in the course of one or another year, since in most summers just this or that sort of caterpillar appears in a neighbourhood in peculiar abundance, and for some time generally presents itself to the hen cuckoos in that place in great numbers.

always some nests of other birds, besides the predominating species, would by their eggs have a great influence over the colouring of the cuckoo's eggs.

But how then could it be explained *that two cuckoo's eggs of entirely different colour and marking can occur in one and the same nest?* and yet this fact also has been repeatedly established. I myself found in a nest of *Calamoherpe arundinacea*, which was placed in a ditch sparingly overgrown with weeds, two cuckoo's eggs, together with three eggs of the above-named bird. Of these cuckoo's eggs one had the type of *C. arundinacea*, and the other had the type of the eggs of *Sylvia hortensis*. Two other cuckoo's eggs are lying before me, taken from the nest of a warbler [“grasmücke”], very probably of *S. cinerea*, of which one has the character of the egg of that bird, the other of the eggs of *S. atricapilla*. That the two first could not have been laid by the same hen (which, moreover, if it was so would not have removed the difficulties before us) is proved by the precisely similar state of advancement towards hatching in both of them [“bewies das gleiche stadium der bebrütung beider”]. Thus they must have been laid by two hens;* but whichever of the two was laid first, and even if the one bearing the type of the whitethroat's egg was laid in the nest while it was yet empty, the difficulty of explaining the colouring of one or the other, according to the theory of Herr Kunz, still remains undiminished.

Moreover, *cuckoo's eggs are found, although rarely, in such nests as have not yet received any eggs of the owner*; in which case the cuckoo is without any pattern of a fixed form of colour for its egg.

Finally, a direct proof, and quite an independent one, against this theory, is furnished by experience, *that one and the same hen cuckoo lays similarly coloured eggs in the nests of different species*. However important, on one side, is the proof furnished to us by Herr Braune, the forester, that both eggs of the cuckoo he described had the colouring of the eggs of *Hypolais*, in whose nest the one was laid, it would have been more important if one could have observed in what nest the second egg (which was cut out of the bird) would have been laid. Meanwhile the following fact will support what has been said. As I observed already at the beginning of this paper, I found on the

* Naumann, Thienemann, Degland and others assert that sometimes two cuckoo's eggs have been found in one nest, and nearly all those authors add thereupon that they were in all probability laid by two different hen birds, and this without taking into account the colouring of these eggs.

same day two cuckoo's eggs, coloured exactly alike, of the type of the eggs of *Sylvia cinerea*, in two nests of that bird, in the district of that pair, the cock bird of which attracted my whole attention by his peculiar cry. Both eggs undoubtedly belonged to the same hen bird. After about eight or nine days, a boy, whom I had commissioned to search for nests in the district which I pointed out, brought me a third egg, exactly similar, together with the nest and eggs of *S. hortensis*: all three eggs are in my collection, and are not to be distinguished from one another. We may with confidence assert that this third egg also belongs to the same hen, or rather pair, in whose district the boy had found it.

Thus all experience *hitherto made* declares for the assertion *that every hen cuckoo lays only eggs of one colouring, and consequently (as a general rule) lays only in the nests of one species.*

“All experience hitherto made,” I say, including even the *exceptions* to the rule. Yes, indeed, for it is just here that these find the only satisfactory explanation. We repeat once more, so striking an appearance of the cuckoo's eggs, agreeing with the very various colouring of the warbler's eggs, cannot be accidental or without purpose. Moreover, it is easy enough to see the purpose which Nature has in view herein. Most certainly, too, does she attain that purpose, by securing and facilitating the continuance of the species, through the circumstances, once and for some good reasons firmly established, which forbid the cuckoo to hatch and rear her own young. She attains this purpose in the way above mentioned, perhaps also by some other means. In short, we think the case to be this: every pair, or rather each individual cuckoo, is endowed with the instinct to lay its eggs in the nests of some one species of birds which are fit to act the part of foster-parents; so in order that these latter may the less readily observe the strange egg it is found to be of similar colouring to their own; and perhaps for the same reasons it is also so disproportionately small. Then every pair of cuckoos seeks its old district, or that spot where it breeds, just as all other birds do. Here (as a general rule) it finds those species of warblers which it requires for its peculiar circumstances, but certainly not always in the necessary numbers, or perhaps breeding earlier or later than its six to eight weeks' time for laying [“*legezeit*”] lasts. It will therefore be unable to find for each of its eggs a fitting nest of that species to which it was prepared to entrust it, and to which it was used, and so it finds itself obliged to

introduce one and another egg into the nests of some other warblers, if haply by good chance it can do so.

Thus then it comes to pass that there are, and according to the nature of circumstances there must be, *proportionably many exceptions* of the rule.

Thus, too, it comes to pass that *by far the greatest number of cuckoo's eggs* bear the type of the eggs of *Calamoherpe arundinacea*, *Sylvia cinerea*, *Motacilla alba* (and perhaps, in certain other localities, of *Anthus pratensis*, *Emberiza miliaria*, and others), and that on that account *eggs of such colour form the most frequent exceptions*; that is to say, are the most frequently found in the nests of other species.

Since then, as has already been observed, just those species, even in all parts, but more especially in suitable localities, are rich in individuals, and live very near together, and thus, either occasionally or always, offer a favourable opportunity for the hatching of the cuckoo's eggs; so, on the one hand, the motive for the local prevailing colour is evident; on the other hand, the frequent occurrence of such colouring in other nests is accounted for; the latter, inasmuch as some birds (*Calamoherpe arundinacea*, for example), on account of their late period of breeding, can hardly ever receive the first eggs of the cuckoo, which are laid towards the beginning of May.* On the contrary, the *rarer colourings will appear as exceptions still more rarely*, although the birds for whose nests they are designed breed less abundantly, and so their nests are more difficult to be found by the cuckoo; but it appears that, on this account, so much the more determined is she in seeking for such nests, and she searches so as to find and to make use of them, as, for example, those of the redstart ["rothschwanz"] and the wren ["zaunkönig"], even on the hayrick and in the charcoal-burner's hut, quite renouncing her usual timidity. Does her instinct possibly tell her that eggs of such striking contrast are in especial jeopardy? Besides these very circumstances seem in general to require larger districts for those kinds of pairs, and at the same time to require and account for the frequent excursions of the hen bird in the neighbouring districts, in her search for those

* But how much the more true is this in regard to nearly all the others. I would investigate all, in order, if possible, to prove these views by means of more numerous facts. The Badetzer pond, already mentioned, offers abundant opportunities to this end. Many observers may have similar opportunities: let them, on all sides, be taken advantage of.

particular nests which in her own district do not exist in sufficient numbers.*

Thus, lastly, it comes to pass that *the two prevailing colours* of the cuckoo's eggs are spread over *most localities*, whilst at the same time they also appear *almost everywhere*, as exceptions, in other nests. They are those of *Sylvia cinerea* and *Motacilla alba*. The diffusion of these birds is very extensive, and their dwelling-places for the most part offer to the cuckoo also the requirements of its existence. It is therefore not without signification that one seldom finds in their nests cuckoo's eggs of other colours, but one does frequently find in the nests of other birds cuckoo's eggs of their type.†

It is asserted that numbers convince. Let any one then look once more at the catalogue of the cuckoo's eggs which are lying before me, and he will find that notwithstanding by far the greater part of them are only from this country, which certainly is a very rich locality, still they do not contradict the views explained above.

In conclusion, let us separate that which is matter of fact, and confirmed by experience, from the deductions derived therefrom: thus it is proved by facts, that—

- (1). The cuckoo entrusts its eggs to a great number of species of warblers to be hatched by them.
- (2). Cuckoo's eggs occur of a great variety of colours and markings, such as does not happen in the case of any bird (so far at least as is known up to this time).
- (3). All, including the most varied colourings of its eggs, find analogous eggs amongst those of its foster-parents, similarly coloured and marked, so that they might easily be mistaken for them.
- (4). Certain particular colourings appear to predominate in different localities.

* Perhaps they are such hens, of which Herr S. Prevost in general asserts, "As soon as they have paired, have laid an egg, and made themselves certain of its reception on the part of the chosen foster-parents, they desert their first mate to search for another, which they then likewise forsake as they have forsaken the first. According to his account only the males have a fixed station. It would be important to learn in what localities he had made these observations. (Degland, Orn. Europ. i. p. 169.)

† With regard to these circumstances I was able to assert at Halberstadt (Naum. iii. 2, p. 121) that so rash a conclusion from the exceptions produced by Herr J. Hoffman has no authority, and that even those exceptions are in support of my views. They were almost all of the colours above pointed out, and had been laid in the nests of *Rubecula*, *Hypolais*, *Phyllopneuste* and *Linota cannabina*! (Naum. i. c. p. 15.)

- (5). Each hen bird lays but one egg in each nest.
- (6). She lays, as a general rule, only in those nests in which she finds eggs of the foster-birds already laid.
- (7). The same hen bird lays eggs of similar colouring, as a general rule, in the nests of the same species only.
- (8). The exceptions to 4, 5, 6, 7 are comparatively rare.
- (9). Most of the warblers forsake their nests readily and at the smallest interruption.
- (10). They pursue and drive away the cuckoo whenever it comes into their neighbourhood.
- (11). The latter takes advantage of the absence of the parents to lay its egg in their nest.
- (12). She lays her egg on the ground, and carries it in her beak to nests not otherwise accessible, and she even does so when she has the opportunity of laying it in nests perfectly accessible.
- (13). With that end in view, she even lays aside her customary shyness of buildings.
- (14). One may occasionally find two cuckoo's eggs of different colours in the same nest.

We conclude from these facts, that—

- (1). Nature must have a special motive in these so many circumstances thus connected with one another, but so peculiar.
- (2). This motive is plainly to be seen. She will, by means of arrangements originally made by her, ensure and facilitate the preservation of a species otherwise much exposed to danger.
- (3). She attains this motive by a very simple method, in that she invests every hen bird with the faculty of laying eggs coloured exactly like the eggs of the bird of whose nest she prefers to make use, according to the locality;* or, in other words, every hen cuckoo lays eggs only of a fixed colour, corresponding (as a general rule) with the eggs of that warbler in whose nest she lays them, and she only lays in other nests when, at her time for laying [“legereife”], one

* One cannot here make the objection, that so nothing at all is attained: if the foster-mother has only accepted the first, and sat upon the strange egg, then the instinct of becoming foster-parents, so preeminently strong in birds, will provide for the further breeding up of the young.

of the species of her own peculiar type, as we may say, is not ready.

E. BALDAMUS.

After the above paper had been concluded, I received further information from that excellent observer, Mr. Inspector R. Tobias, of Leipzig. I hasten to add it as belonging to this place.

“Although I, too, have found continually that the eggs of our cuckoo are like the eggs of that bird into whose nest each intrudes its egg (for I found in the nests of the reed wrens [“*rohrsänger*”] greenish, in those of the tree pipits [“*baumpieper*”] reddish, and in those of the whitethroats [“*grasmücker*”] whitish and greenish eggs); still I am not of opinion that each hen lays eggs of always the same colour, but in the course of the summer lays eggs of very different colours, according to the eggs of the nest which she uses. The following fact will prove it:—In a small pond, sparingly overgrown with reeds (*Phragmitis communis*), I found a nest of *Calamoherpe turdina*, in which, close to the very vividly coloured eggs of the warbler, was a cuckoo’s egg of a ground colour of so deep a green that till then no other like it had ever occurred to me. But, within a circuit of half a mile, no other pond existed in which a reed wren (neither *C. turdina* nor yet *C. arundinacea*) was breeding, while the cuckoos, on the contrary, were more numerous, so that in the above-mentioned district at least three pairs had their abode: under these circumstances the hen cuckoo which laid the egg described was obliged to be content with the nest of some other species of warbler, and therefore in all probability to lay eggs of quite a different colour. The following fact seems to speak still more plainly in favour of this view:—In the year 1842, on a certain estate, there were made, out of some old fish-ponds, some meadows, which, on account of their former occupation, were obliged to be intersected with high banks, upon which stood many trees and a great deal of bush; consequently they were inhabited by many whitethroats: but a pair of cuckoos had also fixed their quarters there, and laid their eggs partly in the nests of *Sylvia cinerea*, partly in those of *S. hortensis*. All the cuckoo’s eggs were more or less like those of the warbler, by the side of which they lay, only that each cuckoo’s egg had upon it several dark spots. The fourth was laid in the nest of *S. hortensis*, which contained eggs of a peculiar colouring: three of them had a grayish white ground colour, with very few markings; two were uniformly grayish white. The cuckoo’s egg which was lying by them was

of a grayish white colour, and had only the little spots, like fly marks, observed in the eggs mentioned before. If it should be supposed that the contemplation of the eggs in the chosen nest has an influence on the cuckoo's egg just about to be coloured, it remains still to be investigated how the colouring exists in those eggs which are laid in nests which are covered in above, and are only provided with a little entrance-hole at the side, or those which are laid in the holes of trees, as for instance, of *Troglodytes*, *Phyllopneuste*, *Ruticilla*, &c."

In 'Naumannia' for 1854 is a plate (coloured) of sixteen specimens of cuckoo's eggs, taken from the following nests, and closely resembling the eggs of the nest from which they were respectively taken (p. 415):—

No. 1,	from the nest of	<i>Sylvia rubecula</i> .
„ 2,	„	<i>Calamoherpe arundinacea</i> .
„ 3,	„	<i>Sylvia hortensis</i> .
„ 4,	„	<i>Ruticilla phœnicurus</i> .
„ 5,	„	<i>Sylvia atricapilla</i> .
„ 6,	„	<i>Calamoherpe palustris</i> .
„ 7,	„	<i>Fringilla Hypolais</i> .
„ 8,	„	<i>Sylvia cinerea</i> .
„ 9,	„	<i>Pratincola rubetra</i> .
„ 10,	„	<i>Motacilla alba</i> .
„ 11,	„	<i>Lanius collurio</i> .
„ 12,	„	<i>Anthus arboreus</i> .
„ 13,	„	<i>Sylvia rubecula</i> .
„ 14,	„	„ <i>nisoria</i> .
„ 15,	„	<i>Alauda arvensis</i> .
„ 16,	„	<i>Budytes flava</i> .

E. BALDAMUS.

Birds on Blackheath. By MATTHEW HUTCHINSON, Esq.

May 21, 1867. First noticed the house martins [flying about the new houses in the Shooter's Hill Road, nearly one month later than usual.

May 22. Snow storms. May 23. Cold winds. Swallows and martins sweeping the ground, flying fast, evidently a hard matter to get food. During the last four months of 1866 and the first four months of 1867 we had scarcely a dry day, and, if it did not rain daily, the atmosphere was so saturated with moisture that there must have

been a great destruction of insect life. In easterly winds no food to be had but about the ponds.

May 31. Swifts, swallows and martins all hawking together over a large, long wheat field on the sunny side of the cemetery hill, the head of the valley from Croydon to Shooter's Hill: possibly the southerly winds sweep up the smaller flies hither, for the Eltham swifts have been hawking there all the summer.

June 1. Saw a butcher bird at the west foot of Shooter's Hill near the cemetery. A quiet, steady bird, he remained motionless a long time; he had but just moulted, and looked bright, clean and smart. Having got a good front view of him I never saw a more delicate beautifully pencilled breast,—a hawk in miniature. From the hedge his flight was straight and heavy. Winding my way up the hill, through the rough tangled bushes, I looked with the glass at a pair of willow wrens near their nest, both darker than on their arrival, less yellow and more olive. Saw a richly coloured male whinchat in his old quarters towards the top of the furzes and brakes. Seeing a lark basking in the sun, and dusting himself in the farm road by Wellhall, I turned the glass on him and saw for the first time the crested lark. The feathers rose perpendicularly from the base of the bill and formed an arch over the top of the head; it gave the bird the appearance of having a top-heavy, cumbersome cock's comb: a cab coming by off it flew, something like a wood lark, and dissimilar to our sky lark. I tried often, but could not meet with it again.

June 2. A pair of swifts located about the many empty new houses in Vanbro' fields, and hawking on the east side of the heath.

June 11. In the fields on the N.W. of Eltham I saw a splendid yellow wagtail perched on an isolated small bush: it was so tame and fearless that I got within six yards of it, and examined it carefully for twenty minutes. It was long, level and slender, like the tree pipit; a white line above the eye, a strong yellow on the breast, with a long brown tail, the outer feathers white: as it flew off to the ploughing it was joined by its mate from a tree. A few weeks later, while following the plough too closely, it was cut down by the whip of a cruel plough-boy, and went to the cat.

June 13. Watched six house martins digging mud from the gravel-pit on the heath. They were busy building in Vanbro' fields, coming and returning incessantly. Never saw so many whinchats, old and young, as during the haymaking the last fortnight in June. The cold wet winds of the early spring had driven them from their accustomed

quarters on the hill to seek food and shelter about the close hedges in the neighbourhood.

June 19. Swifts, swallows and martins following the mowers, and catching the insects as they left the cut grass. They skimmed the standing grass next the mowers, and were all flying and hawking alike. I never saw the swifts keep such close company with the swallows and martins.

June 27. Saw a splendid redbacked shrike at a distance through the glass; very light and mealy about the head, black through the eye, a fine red back; a gay beautiful bird, probably the same I saw on the 1st of June, now in mature nuptial plumage. It was hawking after some prey in the long herbs and grass of the ditches. It is in these level fields on the north of the road from Lee to Eltham that I have always met with the redbacked shrike.

June 29. Resting in the outskirts of Eltham and studying the chief characteristics of the flight of the Hirundinidæ, all hawking before me; the better to assist me in distinguishing one from the other I fancied—the swift darts; the swallow swims; the house martin dives; the sand martin flutters. Thus musing I was suddenly assailed by an overpowering, sickening odour I could not account for: on looking around I discovered I was about three hundred yards to the leeward of a bastard spire, “the monument” of draining science, at the east end of Eltham: and as the old Kent spire at the west end points to the regions above, this is connected with the regions below, and brings up through miles of pipes from the very depths of Deptford to pour into the soft delicate air, which so sweetly recommends itself unto Eltham, a foul and pestilent congregation of vapours. Having once been poisoned by this concentrated sulphuretted hydrogen I lost no time in getting to the windward of the abominable essence of drains, and hastened to get a deep draught of the delicious water of Eltham pump, where I hoped I had at last found the cup of Hebe, but, alas! she proves, like the other goddesses, fickle, false, frail. It must be ozone, high above the impurities close to the surface of the earth, that supports the endurance of the birds ever on the wing; they breathe it in its purity, hence their thoroughly oxydized rich blood. I sadly fear this horrid ventilator may again drive my favourite swallows and martins out of Eltham.

July 16. The swift in Vanbro' fields was out hawking over the N.E. corner of the heath. He could scarcely face the strong gale, which so twisted his wings I thought they would have been broken. At last

he succeeded in contracting his wings and pointing them downward, like a hay-fork; he then rose higher, spread them out, and sailed right into the wind's eye, as powerful as an old gray gull. The gale was too strong for the swallow and martins.

July 23 and 24. Young swifts out hawking with the old, about Vaubro' fields. I saw no more of them; food was too scarce, so they left directly for a more hospitable clime.

July 25. Seven swifts, some of them young, about Eltham church-yard. The swifts at the east of Eltham had all left. Young swifts could still be heard chirping in the roof of the house in the church-yard.

July 28. Young swallows and martins out in force.

July 31. Six swifts at Eltham.

August 5. Three swifts at Eltham; did not expect to see any.

August 10. Sat in Eltham church-yard and counted nine swifts, old and young. I watched them a long time, thinking as I had seen the first of them I might now see the last. I thought once they had all started on their return, but they came back; it was too misty on the river to see their way.

August 12. But one swift left at Eltham, and it was hawking with the house martins round the church. The other swifts must have left on the previous day. The swifts have generally left by the last day of July, when I have for years seen them congregating on the Sussex coast preparatory to crossing the channel.

August 13. Saw a whole family of whinchats near the top of the hill, each perched on a tall twig. It was an excellent opportunity of noticing the variation in the plumage of old and young, male and female. In passing through the dark shady castle wood a nightjar flew across the path. I saw no other bird of any kind. The single swift was hawking with two house martins about Eltham church. One house martin never left the swift; wherever the swift went there went the house martin: a friendly couple.

August 17. Not a swift to be seen. The Eltham swallows and martins in reduced numbers. I bid farewell to the swifts, the fastest friends I have; and with watching their rapid, graceful, joyous flight, I am so delighted I never tire. Much of the excellent wheat was left standing so long after it was dead ripe that the sparrows attacked it in great numbers. All the sparrows from Deptford, Greenwich and Woolwich appeared to have migrated to the corn-fields: they gave a decided preference to the white wheat: for some yards next the

hedges there was scarcely a perfect ear, and they made sad inroads into the whole abundant crop. All the other birds helped them, especially the *Conirostres*. Whether the starlings lent their aid I could not ascertain. An advocate for a cheap loaf, as the basis of national prosperity, I felt irritated at the lack of zeal in securing the golden crown of the year, the goodness given by God. Much of the mischief done by the birds this summer may fairly be attributed to the farmers. In the debtor and creditor account of the sparrow there is a good balance in its favour. Working my way home in the August evenings, across the fields away from the public paths, I frequently met with small family parties of swallows making straight for the river. This was unusually early, but the young having been reared with difficulty in the scarcity of food, the sooner they left the better.

September 21. Swallows and martins congregating on the rooftops. Numbers of swallows about King John's Eltham palace; most of the old had lost their forks, and the young had not yet got them: thus at a distance they are easily mistaken for martins; the glass shows what they are.

September 30. A large flock of swallows with a few martins resting in the large cow pasture of Kidbrooke farm: a few began to hawk, then up rose the whole lot and disappeared. Crossing a field near Eltham about a dozen swallows shot right over my head in a straight line due south. I never saw swallows fly so swiftly; they were out of sight in a moment. For the last ten days great numbers of the north country swallows have been going south. They linger about the farm-yards for food, and then off again on their long journey. My old friend Dr. Hodgkin, the great anatomist, and the friend of the human race of every colour in every clime, once observed to me that for their preservation God had given the birds a faculty we do not possess. Reflecting on these evidences of unerring wisdom I exclaim "All thy works praise thee."

October 21. Admiring the gorgeous masses of foliage in Eltham Park beautifully variegated with all the rich tints of autumn, I observed a dozen house martins hawking to the southward: these were the last I saw.

Let me recommend the readers of the 'Zoologist' to lay aside their cruel fatal guns, and take to the pocket telescope: they will see more birds, become better acquainted with their forms and flight, and all the detail of their varying plumage; will note with pleasure their peculiar manners and customs as they flit about their happy homes;

and will avoid those obvious mistakes in the birds and their arrival I so frequently meet with. But for these vile guns would not the hoopoe breed commonly with us? It is to be lamented that the beauty and rarity of a bird should be but the premium for its destruction. A dead bird in the hand bears but little resemblance to the pretty, lively, blooming bird in the bush. For stuffed birds I would not give a shilling a dozen.

In the spring of 1867 I saw, within a diameter of two miles, not more than eight miles from London Bridge, above fifty different kinds of birds.

MATTHEW HUTCHINSON.

Blackheath, December, 1867.

Notes on the Folk-lore of Zoology. By EDWARD R. ALSTON, Esq.
(Concluded from Zool. S. S. 1096).

Red Grouse.—There is a tradition in Selkirkshire that before the black grouse became common in that district the red species never ate corn, for

“The muirhen had sworn by her tough skin
She sall never eat of the carle’s wiu.”

But they have been sadly corrupted by their sable relatives. (See the ‘Magazine of Natural History’ for 1837, p. 120).

Quail.—Ancient writers relate that ships were sometimes sunk by the vast migratory flocks of quails which settled on them. Yarrell derives the French proverb of “hot as a quail” rather from their heating quality as food than from their animal temperature, but their warm and amorous disposition is perhaps a more natural derivation than either. A local Scotch name for this bird is “weet-my-feet,” evidently a paraphrase of its note.

Dotterell.—As is well known this species was credited in old days with great stupidity (hence, says Yarrell, its specific name of *morinellus*, “a little fool”). It is thus alluded to by Drayton in the ‘Polyolbion’ :—

“The dotterell which we think a very dainty dish,
Whose taking makes such sport as no man more can wish,
For as you creep, or cower, or lie, or stoop, or go,
So, marking you with care, the apeish bird doth so,
And, acting everything, doth never mark the net
Till he be in the snare which men for him have set.”

Peewit.—The “pease-weep” is sometimes regarded as a bird of evil omen in Scotland, the origin of which is said to be that it frequently betrayed the persecuted Covenanters by its habit of wheeling round and round over an intruder on its haunts. Its nest is constantly “harried,” in spite of the poor bird’s mournful plaint

“Pease-weet! pease-weet!
Harry my nest and you’ll gar me greet!”

That is, make me weep (*Chambers*). “In consequence of the inveteracy excited by the ambitious pretensions of Edward I. to the Scottish crown, an old Scottish Parliament passed an Act ordering all the pease-weep’s nests to be demolished, and the eggs broken, assigning as a reason that these birds might not go south and become a delicious repast to our unnatural enemies the English.” (*Agricultural Survey of Forfarshire*,’ quoted by Jamieson).

Heron.—“In Angus it is vulgarly believed that this bird waxes and wanes with the moon, that it is plump when the moon is at the full, and so lean at the change that it can scarcely raise itself, so that it can almost be taken with the hand.” (*Jamieson, Scot. Dic.*) It was believed that the legs of the heron contained a perfume which attracted fish within reach of its bill; Isaak Walton says, “And some affirm that any bait anointed with the *marrow* of the thigh-bone of a hern is a great temptation to any fish: these have not been tried by me, but told me by a friend of note that pretended to do me a courtesy;” the receipt would be a difficult one to follow, birds having no marrow in their bones.

Bittern.—The “mire-bumper” or “bog-bummer” was formerly supposed to produce its booming noise by sticking its beak either in a hollow reed or in the mud. Chancer says

“—— A bittore bumbleth *in the mire.*”

which Dryden changes into

“—— A bittern bumps *within a reed.*”

Wife of Bath.

Stork.—The stork is a bird of good omen, and has no voice unless a loud clattering of its mandibles can be so called; so Spencer proves himself no good naturalist when he says in his ‘*Epithalamion.*’

“Let not the screech-owl nor the storke be heard.”

Dante is more accurate when he compares the gnashing of teeth in

the frozen region of hell to this clattering noise of the stork ('Inferno,' xxxii):—

“These wretched spirits, fixed within the ice
Tremble, with sound of chattering teeth that seems
Like the stork's note.”

Among the ancients the stork was the emblem of chastity and gratitude, and it is a protected favourite in most lands to this day. I remember once hearing a German clergyman roundly abused by a party of his brethren for having driven the storks from his house; they were the only pair in the neighbourhood, and all agreed that he was “no good Christian” thus to molest them. Many strange stories are told by old writers of this bird; Ælian relates how one which had broken its leg was succoured by a poor widow of Tarentum, and how next season it brought her a huge diamond from foreign lands. Oppian tells us of a pair of storks that were persecuted by a serpent, until they brought a strange bird with them from abroad, who slew the reptile with its sword-like beak, but was poisoned in the conflict and lost all its feathers, when the grateful storks fed and tended their ally till it was recovered. The old birds were said to be carefully fed by their young, whence the *Lex Pelargica* (from “pelargos,” a stork) which inculcated similiar piety in another species. Aldrovandus says that storks will not live in Thuringia because no tithes are paid there, and they were affirmed to confine themselves to free states and republics, which, however, is said by Sir Thomas Browne to be merely, “a pretty conceit to advance the opinion of popular policies.”

Curlew.—This bird, with its weird and melancholy note and haunts, has naturally excited superstitious feeling; hence in Scotland its name of “whaup” is also applied to a long-nosed goblin, peculiar, I believe, to that country, and it is to this that Sir Walter Scott alludes, as Yarrell has noted, when he speaks in the ‘Black Dwarf’ of “woricows and *lang-nebbit things* about the land.” The note of the curlew heard by night is also dreaded by the Channel fishermen, who term the sound “the Seven Whistlers.” Mr. F. T. Buckland, in his ‘Curiosities of Natural History’ (Second Series, p. 286), quotes an old man at Folkestone who said to him:—“I never thinks any good of them, there's always an accident when they comes. I heard 'em once one dark night last winter. They come over our heads all of a sudden, singing ‘ewe, ewe,’ and the men in the boat wanted to go back. It came on to rain and blow soon afterwards, and was an awful night, sir; and sure enough before morning a boat was upset and seven poor

fellows drowned. I knows what makes the noise, sir; it's them long-billed curlews, *but I never likes to hear 'em.*"

Snipe.—Simrock says that the snipe was sacred to Thor, because its flight was believed to forbode a storm. One of its German names is "donner-ziege" (thunder-goat), and in some parts of France it is called "chevre-volant," because the humming sound which it makes in spring is supposed to resemble the bleating of a goat; hence also one of its Scotch names "heather-bleat."

Bernicle Goose.—The ancient fancy of mediæval naturalists, from which this bird takes its English name, has been already noticed by Mr. Harting (Zool. S. S. 661). There appears, however, to have been some doubt as to the species thus produced; generally it was said to be the "barnicle" or "brant-goose," but Butler says that it was the gannet:—

" — From the most refined of saints
As naturally grow miscreants,
As barnicles turn *soland geese*
In th' islands of the Orcades."

Hudibras.

Swan.—On the subject of the death-song of the swan, I must again refer the reader to Mr. Harting's notes (Zool. S. S. 663): in Pope's 'Rape of the Lock' also we read

" Thus on Meander's flowery margin lies
The expiring swan, and as he sings, he dies."

Great Northern Diver.—Of this bird the Rev. Lucas J. Debes writes, in his 'Description of Foeroe' (Englished by John Storpin, Doctor of Physick, 1671), that it has "two holes, one under each of its wings, capable to hold an egg, wherein they (the natives) suppose it hatcheth its eggs, till the young ones come out, neither is it ever seen with more or less than two young ones, which conceit seems not unreasonable."

Pelican.—The old story of the pelican feeding her young with blood from her own breast has been alluded to by Shakspeare in two or three passages (Hamlet, Act iv., Scene 5: Richard II., Act ii., Scene 1; King Lear, Act iii., Scene 1) which appear to have escaped Mr. Harting's researches. In heraldry the blazon sometimes occurs of "a pelican in her piety."

When these notes were written I was not aware that many of the Scotch rhymes quoted had already been published in the 'Zoologist' by Mr. R. Dick Duncan (Zool. 556). I had originally intended to include also the superstitions regarding reptiles and fishes, but these I must now postpone to some future time. I will therefore conclude with a few additional notes, which were either accidentally omitted or which have since come to my knowledge. In so doing I must return thanks to my kind friends Messrs. Gray, Harting and Norman, for their assistance.

Cat (Zool. S. S. 921).—In many parts of Scotland it was formerly believed that if a cat leaped over a corpse it boded misfortune; some said that the next person it leaped over would be stricken with blindness. Hence cats were carefully excluded from the room where a corpse lay (Jamieson, Scot. Dic.). Every old woman will tell you that cats will "suck a child's breath" and thus kill it, and I would hardly call this an idle superstition, for cats are proverbially fond of warmth, and if they nestled over a young baby's face in its cradle might easily suffocate it.

Wolf (Zool. S. S. 921)—Mr. Harting sends me the following charm, repeated by shepherds to protect their flocks from the wolf:—Come, beast of wool, thou art the lamb of humility! I will protect thee! Go to the right about, grim, gray and greedy beasts, wolves, she-wolves, and young wolves; ye are not to touch the flesh which is here! Get thee behind me, Satan!" Uttering this somewhat incoherent spell was, however, regarded as sorcery, and punished with death.

Black Rat (Zool. S. S. 976).—Mr. Harting has reminded me of a superstition which I accidentally omitted in noticing this species. It was formerly believed that not only could no rats live in the parish of Roseneath, Argyleshire, but that the earth of that district was fatal to the species, and it is said that a West India proprietor actually sent several barrels of earth from Roseneath to Jamaica, in the hope of extirpating the rats there! I am also indebted to Mr. Harting for the following note:—"It was a prevalent notion in past ages that you might extirpate rats by a persevering course of anathematizing in rhyme. Reginald Scott says that the Irish thought they could rhyme any beast to death, but the notion was in general restricted to the rat. It is with reference to this belief or practice, that Rosalind, in 'As You Like It,' says:—"I never was so berhymed since Pythagoras' time, that I was an *Irish rat*, which I can hardly remember.' (Act iii. Scene 2)."

Hare (Zool. S. S. 977).—Mr. Norman writes me:—"In noticing the hare, you omit the curious superstition the Swedes entertain respecting that animal. In Sweden every sportsman cuts off pussy's head immediately after shooting her; there is a fine of so many rigsdalers for taking one home with her head on. The benighted people imagine that should a pregnant woman see the head of a hare her child is sure when born to have a 'hare lip'; hence this fine." I have since learned that another form of this superstition still lingers in some parts of Scotland, where it is believed that if the mother step over a hare's "form" the same effect will be produced.

Boar (Zool. S. S. 979).—In the inside of the fore-leg of a pig, are four small pores; these, say old women in Scotland, are the holes through which the legion of devils entered into the herd of swine which "ran violently down a steep place into the sea and perished in the waters." (Matthew viii. 28—34.)

EDWARD R. ALSTON.

205, Bath Street, Glasgow,
March 4, 1868.

Badger near Wisbech.—On the evening of the 10th of February a fine badger was captured on the farm of Mr. Crow, at Gorefield, near Wisbech: it was first observed on the 6th by Mr. Crow's shepherd. The animal had a burrow in a plantation four feet deep and six feet long: three men dug it out and despatched it. It has been purchased for the Wisbech Museum.—*T. E. Gunn; 21, Regent Street, Norwich.*

Mice and Periwinkles.—A few days since, whilst on a visit to a neighbour who is famous for his choice collection of old-fashioned herbaceous plants, he directed my attention to a piece of rock-work, which was covered with the different varieties, double and single, of the lesser periwinkle (*Vinca minor*). The shoots of these plants were almost all gnawed through close to the ground, whilst in all directions stalks, bitten up into small pieces and chewed all over, bore testimony to wholesale destruction on the part of some small animal. My friend informed me that the rock-work in which the periwinkles grew was the abode of numbers of shrew mice (*Sorex araneus*) and the common short-tailed field mouse or vole (*Arvicola pratensis*). Upon setting a number of traps he caught many of each species, but still the destruction went on, and he was fearful that his plants would be quite destroyed. The quantity of débris at the mouth of each hole left no doubt as to the cause of the mischief. The odd part of it is that the mice and the periwinkles have been there for years, but my friend has never had any damage done till the present season.—*H. Harpur Crewe; The Rectory, Drayton-Beauchamp, Tring, March 6, 1868.*

Osprey in Norfolk.—I have lately received information that a pair of ospreys were observed on Rockland Broad, about the middle of February. My informant was out

shooting wild fowl, and had just emptied both barrels at some ducks that passed overhead, when an osprey came swooping over him, within easy shooting distance. The bird had been seen several times with its mate around the neighbourhood, but at present, so far as I can ascertain, has fortunately evaded capture.—*T. E. Gunn; March 3, 1868.*

Kestrel feeding on a Slow-worm.—I have just read Mr. Gunn's interesting note on a kestrel eating a frog (S. S. 1131). As he asks if any of the readers of the 'Zoologist' have met with a similar instance, although I must reply in the negative with regard to the frog, the following extract from my 'Birds of Berkshire and Buckinghamshire,' which will very shortly be published, may not be uninteresting:—"Some time since a male kestrel was shot in the act of grasping a slow-worm, which it held so tightly that when it arrived at Cookham, from Reading, its feet still retained their hold, notwithstanding that the victim was alive." The following note touches on the food of the kestrel:—"Mr. Sharpe thinks that this hawk feeds chiefly on small birds: I think mice constitute its principal food, although it has occasionally been seen to carry off live sparrows, redpoles, siskins and goldfinches; and, as a proof of its voracity, a London bird-fancier once exhibited a young kestrel which had been killed and partly devoured by others of its own species." ('Birds of Berkshire and Buckinghamshire,' p. 2.) Perhaps some gentlemen may wonder why this species appears so early as in the second page of my work, so I may as well now state that my arrangements, although following Yarrell's classification, is based on the admirable plan proposed by Mr. Newman, in his Appendix to the 'Letters of Rusticus on Natural History,' and the kestrel is the first bird noticed in my work. My arrangement is as follows:—1. Residents; 2. Summer visitors; 3. Winter visitors; 4. Spring and autumn visitors; and 5. Rare and accidental visitors. No less than 230 species will be included in my list,—a fair number for an inland county,—although doubtless many rare stragglers have escaped my notice.—*Alexander Clark-Kennedy; Eton, Bucks, February 29, 1868.*

An Early Thrush's Nest.—On the 12th of March I discovered a song thrush's nest containing two eggs, in a holly tree in Windsor Home Park. It has been a very mild winter, but still it must be admitted that it is an early date for eggs. Nor was this the only nest I found, for, at the distance of about two hundred yards from the first-mentioned tree, I lighted upon another nest containing three eggs, upon which the female bird was sitting; and as I suppose the eggs were laid at the rate of one a day, I take the date of oviposition of the song thrush for 1868, in Berkshire, to be the 10th of March.—*Id.; March 13, 1868.*

Scarcity of the Redwing.—In the 'Zoologist' for March (S. S. 1131) I perceive a communication from a Devonshire correspondent noticing an unusual scarcity of redwings this winter in the neighbourhood of Barnstaple. I have observed the same scarcity in this district, having only once during the season, and that early in November, seen these birds where they have never, within my recollection, been so few. We generally have, in the park here, several flocks all through the winter and early spring. I am disposed to account for their absence by the fact of severe frost and deep snow having last year caused numbers of redwings to perish.—*Clermont; Ravensdale Park, Newry, March 17, 1868.*

Scarcity of the Redwing.—I can fully corroborate the remarks of Mr. G. F. Mathew on the scarcity of the redwing during the past winter, at least in Bucks and

Herts. It generally swarms, but this season I have scarcely seen one. The fieldfare has also been unusually scarce.—*H. Harpur Crewe.*

Scarcity of the Redwing.—In the last number of the 'Zoologist' Mr. G. F. Mathew remarks on the scarcity of the redwing in Devon this season. I beg to inform him that redwings have been tolerably abundant at Cobham (Kent). Fieldfares, however, have been very scarce, and I never saw more than two or three at a time. Last year fieldfares were very abundant, large numbers appearing on the 3rd of January, the day on which so many wood larks occurred at Cobham and in Sussex.—*Clifton; Eton College, March 3, 1868.*

Wildness of the Hawfinch.—Mr. Doubleday remarks on the extreme wildness of the hawfinch in Epping Forest. As far as I have observed, it is not always very wild. Last winter I observed one hopping about on the grass, within ten paces of the house (Cobham). When seen so near, the white bill of the winter plumage had a very odd appearance, giving one the idea of a bird with a piece of bread in its mouth. I imagine that some hawfinches leave us in the winter and return to breed.—*Id.*

Bittern at Steyning, Sussex.—A fine adult male bittern was shot by Mr. William Stanford on his farm last January: it was shot in the back, and on his going to pick it up it set up its neck-feathers and came at him as well as it could: however, a blow from a hedge-stake soon settled its pugnacity. It has been well set up by Mr. Potter, of the neighbouring village of Bramber.—*H. J. White; Steyning, Sussex, March 13, 1868.*

Blacktailed Godwit in Somersetshire.—On Saturday, the 15th of February, I rescued a very fair specimen of the blacktailed godwit from the cook of a gentleman at Taunton, who had bought it of one of the poulterers with some peewits, and was going to have them all cooked for his dinner. It is an adult bird, in winter plumage. On inquiry at the poulterer's, he said that it had been shot in the marsh, and that the man who shot it told him there was another bird of the same kind in company with it, but that it was too wild for him to get a shot at it.—*Cecil Smith; Lydeard House, Taunton, February 20, 1868.*

Plumage of the Oystercatcher.—In the 'Zoologist' for 1867 (S. S. 607), Mr. Clark-Kennedy describes a specimen of an oystercatcher, which he shot along with another at Hunstanton, in Norfolk. He says that, of the two specimens, "the smaller bird had its neck, to the breast, of a pure glossy black, and its bill was more black at the end than that of the other bird." Does not the first part of this description agree very closely with that given by Sir W. Jardine, in his 'Illustrations of Ornithology,' as being characteristic of the closely-allied species in America, *viz.* *Hæmotopus arcticus*? I think, however, the bill is yellow both in the American and British birds, not black. It might be worth Mr. Clark-Kennedy's while to compare his specimen with *H. arcticus* and *H. palliatus*, both figured by Sir W. Jardine.—*John A. Harvie Brown; 130, George Street, Edinburgh, March 19, 1868.*

Storm Petrel in Buckinghamshire.—During a gale of wind on the night of the 21st of January, at about half-past eleven o'clock, a storm petrel was knocked down by a man as it was flying over the London road, near High Wycombe. It appeared very exhausted, and was taken by its captor to my friend Mr. James Britten, Secretary to the Natural History Society, High Wycombe, who put it into a basket, in which he had placed some flannel, and consigned it to a warm room. The next day it seemed rather

better, and appeared to relish a dinner of bread-crumbs soaked in cod-liver oil; then it had a swim in a little tub of fresh water. On the following Friday it was perceptibly weaker, and sank almost directly on being placed in a bath prepared with "Tidman's Sea Salt." On the next day it was again fed with oil and crumbs of bread, and it flew up and down Mr. Britten's drawing-room. On Sunday it was very weak, and on Monday it died, having lived in confinement just a week.—A. Clark-Kennedy.

PROCEEDINGS OF SOCIETIES.

ZOOLOGICAL SOCIETY.

February 13, 1868.—JOHN GOULD, V.-P., F.R.S., in the chair.

The Secretary made some observations on a bear in the Society's Gardens, which had been lately received from South America, and which appeared to belong to a new species.

The Secretary exhibited, and made some remarks upon, an egg of the guácharo (*Steatornis caripensis*), which he had received from the Governor of Trinidad.

Mr. Gould exhibited two new species of birds from Australia, and offered some remarks on their affinities. He proposed to name them *Chrysococcyx russata* and *Pitta simillima*.

A communication from Surgeon Day was read by the Secretary, in which some new species of Indian fish were described.

A report by Messrs. Sclater and Salvin was read on a collection of birds from Conchitas, Argentine Republic. The collection was formed by Mr. Hudson, and forwarded by him to Prof. Baird, of Washington, who named the specimens.

The Secretary read a second paper from Dr. Hartlaub on the birds of the Pelew Islands, in which he gave some interesting observations and descriptions of two new species.

A new species of dolphin, sent by Mr. Layard from the Cape of Good Hope, was described by Dr. Gray, who proposed to name it *Clymene similis*.

Mr. Bartlett read an interesting report on the birds which had bred in the Society's Gardens during the past year.*

February 27, 1868.—Dr. J. E. GRAY, V.-P., F.R.S., in the chair.

The Secretary read a letter from Mr. Blandford, one of the scientific corps of the Abyssinian Expedition at Annesley Bay, in which he gave some particulars relating to the Zoology of that district.

Dr. Murie read a paper on the Anthropoid Apes, chiefly with reference to the young, of which he exhibited several specimens.

Dr. Murie also made some remarks upon a rat which had lately been presented to the Society's Gardens by Mr. Bond. It was captured on board a vessel lately arrived from Manilla, and differed so much in general appearance from the common species (*Mus rattus*) as to justify its being considered a new species.

* Some notes with reference to this report, and a list of the species referred to, will appear in a future number of the 'Zoologist.'

A beautiful specimen of the nocturnal ground parakeet of Australia (*Geopsittacus occidentalis*) was exhibited by Dr. Murie, who read an interesting paper on its structure.

A report by Messrs. Sclater and Salvin, on a collection of birds sent by Mr. Goering from Venezuela, was read by the Secretary. The collection contained 125 species, three of which were considered as new.

A second report by the same authors was also read, on a collection of birds from Peru. This collection was formed by Mr. Whitely, in the Tambo Valley, south of Arequipa, and contained several species of great interest. Amongst others were specimens of *Calidris arenaria*, a species which had not previously been observed in South America, and whose geographical range was thus proved to be much more extensive than had been supposed.

Mr. E. T. Higgins exhibited six new species of shells belonging to different genera, and gave descriptions of each.

Dr. Gray gave a description of a new species of monkey, belonging to the genus *Colobus*, which had been lately forwarded to the British Museum from Zanzibar, where it was discovered by Dr. Kirk. Dr. Gray, in consequence, proposed to name it *Colobus Kirki*.—*J. E. H.*

ENTOMOLOGICAL SOCIETY.

February 17, 1868.—H. W. BATES, Esq., President, in the chair.

Donations to the Library.

The following donations were announced, and thanks voted to the donors:—
‘*Tijdschrift voor Entomologie*,’ 2nd series, vol. ii. parts 2—6, vol. iii. part 1; presented by the Entomological Society of the Netherlands. ‘Remarks on the Names applied to the British Hemiptera-Heteroptera,’ by F. P. Pascoe; by the Author.

Election of Members.

Linnæus Cumming, Esq., B.A., and E. P. R. Curzon, Esq., both of Trinity College, Cambridge, were severally ballotted for, and elected Members.

Exhibitions, &c.

Mr. M'Lachlan exhibited a living specimen of *Lucanus Cervus*, found under ground in an earthen or clayey cocoon: Mr. Backhouse, of Teddington, digging in his garden, had turned up half a dozen of these cocoons, each containing a beetle and the remains of the skin of the larva and pupa. It thus appeared that the beetle had not gone under ground to hibernate, but the larva had descended into the earth and had there undergone the changes to pupa and imago.

Mr. A. E. Eaton remembered one or two such cocoons being dug up in the autumn, about October, in a potato-field, and these contained living stag-beetles.

Mr. Janson also had dug stag-beetles out of earth, not wood; and thought that the specimens appearing in the spring were in fact hatched in the autumn, and remained in their cocoons throughout the winter.

Mr. Stainton compared the case to that of *Cossus ligniperda*, the larva and pupa of which were specially adapted for their ordinary habitat in wood, but the larva sometimes, he believed in a state of nature, and certainly in confinement, went under

ground to change, and formed for itself an earthen cocoon. There was no evidence that the larvæ of the goat-moth, which were not unfrequently found crawling about on the surface of the ground, ever re-entered a tree, and he expected that these underwent their transformations in the earth.

Mr. Janson, on behalf of Mr. A. G. Latham, exhibited two specimens of the nest or cocoon of a sociable larva from Port Natal: a large outer cocoon, three or four inches in diameter, was made up of numerous coats of brown silky matter, the whole forming a covering of considerable toughness, attached to and transpierced by a small branch of a tree; on cutting this open it was found to contain a number of smaller cocoons, each of which was tenanted by a pupa. It seemed as if a score larvæ associated themselves together to construct and build themselves into the outer family cocoon, upon the completion of which each larva proceeded to spin its own individual cocoon.

Mr. Trimen had found the same kind of cocoon in Natal: it was that of *Anaphe reticulata* (Walker, Brit. Mus. Cat. Lep. Het. part iv. p. 856), one of the family Liparidæ.

Mr. Janson, on behalf of Mr. Latham, also exhibited half-a-dozen larva-cases or cocoons of another Lepidopterous insect, probably a Psyche, or allied thereto. These, too, were from Natal, and were attached to and hung pendulous from the branch of a tree, resembling a cluster of large beech-nuts.

Mr. Trimen said that these cases were common in Natal on the Mimosæ, or thorny acacia; he had collected many of them, but had never been able to breed a single moth of either sex.

Mr. Pascoe exhibited a beetle from New Zealand (probably from Otago), which he regarded as the type of a new genus of Cucujidæ, and which he proposed to describe under the name of *Dryocora Howittii*. He remarked that members of some of the clavicorn families were well known to have tarsi with varying numbers of joints; or, when the normal number were present, the basal joint was very small or almost obsolete, as in many Cucujidæ, or the penultimate was very small or almost obsolete, as in the Nitidulidæ. In *Cucujus* the tarsi were heteromerous in the male and pentamerous in the female; but in *Dryocora*, which in other respects was allied to *Cucujus*, the tarsi were tetramerous in both sexes, the basal joint being suppressed. Organic modifications of this kind, and the exaggerations of form of some one organ which in certain groups was found to be subject to unusual modification,—as the antennæ in Paussidæ, the eyes of Hippopsinæ, the pronota of Membracidæ, &c.,—seemed to Mr. Pascoe “to point to a law of aberration only to be explained on the hypothesis of the derivative origin of species.”

The President mentioned that Mr. Darwin was engaged in elaborating the subject of secondary sexual differences and sexual selection, and would be obliged by the communication of detailed observations on the numerical proportion of the sexes of insects in nature. He had numerous cases of well-authenticated numerical excess of the male over the female, and was desirous to ascertain whether in other cases a corresponding excess of the female over the male had been noticed.

Mr. M'Lachlan mentioned *Apatania muliebris*, of which he had captured hundreds, but the male had never been seen; and *Boreus hiemalis*, of which only three or four males had been known to occur in this country. Mr. Janson mentioned *Tomicus villosus*, the female of which was almost a plague, whilst the male was hardly known.

Mr. S. Stevens referred to *Drilus flavescens*, the second known British female of which was exhibited at the previous Meeting (Zool. S. S. 1137). Mr. F. Smith cited *Tenthredo cingulatus*, the male of which was rare, whilst the female abounded, and *Hemichroa Alni*, of which the male was quite unknown. Of the latter Mr. Smith had a large number of cocoons, and if there were such a thing as a male of that species he hoped soon to breed it.

The President remarked that the different habits of the sexes must be taken into account. Among the South-American butterflies, the males of many were more handsome than the females, and exceeded them in number in the proportion of a hundred to one; the male sported in the sunshine, whilst the female was slow in flight, never appeared in the open sun, but remained in the shade of the forest: under such circumstances it might be that a superabundance of males was necessary in order to ensure the impregnation of the females and to prevent the extinction of the species; but he was unable to suggest any explanation of an excess of females over males.

Mr. Stainton thought that, by reason of the difference of habit of the sexes, little reliance could be placed upon records of a supposed disproportion of the number of the sexes of any insect when in a state of nature: it was only by breeding the insect that the relative numbers of the sexes could be ascertained with any certainty. In *Micro-Lepidoptera* he had often found the result of observations in the field at variance with the result of breeding the same species in confinement; species the females of which, from their retiring and secluded habits, were seldom caught, whilst the males were common, had, when eggs or larvæ were obtained, produced twice as many females as males.

Mr. M'Lachlan said that Mr. Darwin had recently put two queries to him, Do male dragon-flies fight with one another? and, Do many or several males follow one female? He confessed his inability to answer with certainty either of these apparently simple questions.

Papers read.

The following papers were read:—

“A few Observations on the Synonymy of *Tinea* (?) *alpicella* and *Zelleria Saxi-fragæ*, n. sp.,” by Mr. H. T. Stainton.

“On the Homologies of the Ovipositor,” by Mr. A. E. Eaton.

“Contributions to a Knowledge of the *Colcoptera*,” Part 1 (continued); by Mr. F. P. Pascoe.

March 2, 1868.—H. W. BATES, Esq., President, in the chair.

Donations to the Library.

The following donations were announced, and thanks voted to the donors:—
 ‘The Journal of the Linnean Society,’ Zoology, No. 39; presented by the Society.
 Newman’s ‘British Moths,’ No. 15, and ‘The Insect-Hunter’s Year-Book for 1867;’
 by the Author. ‘The Zoologist’ for March; by the Editor. ‘The Entomologist’s
 Monthly Magazine’ for March; by the Editors.

Election of Members.

G. A. Lebour, Esq., of the Geological Survey Office, and Captain A. F. Lendy, of Sunbury, were severally balloted for, and elected Members.

Exhibitions, &c.

Mr. Edward Saunders exhibited various species of Buprestidæ which he had compared with the Fabrician type-specimens in the collection of Sir Joseph Banks, with a view to the correction of several errors of nomenclature. Thus the insects known as *Psiloptera morbillosa*, *Dicerca lurida* and *Belionota canaliculata* were not the true *morbillosa*, *lurida* and *canaliculata* of Fabricius: the species commonly called *Ancyllocheira flavomaculata*, *Fabr.*, was in fact the *maculata* of Fabricius, whilst the *maculata* of authors other than Fabricius was identical with the *strigosa* of Gebler. Mr. E. Saunders also exhibited *Pasiphæ modesta* and *Ethon cruciatum*, which, though described by Fabricius, and figured by Olivier and Herbst, had not been noticed by recent authors, except that Gory had described, under the name of *Buprestis superba*, an insect which was not specifically distinct from *P. modesta*.

Mr. Pascoe exhibited the type of a new genus of Prionidæ, captured by Mr. Swanzy; and read the following description:—

“*EUDIANODES* (*Colpodero* aff.).—Clypeus distinctus. Prothorax marginibus angustatis, serratis. Mesosternum latum. Tibiæ simplices, compressæ; tarsi breves, articulo ultimo cæteris fere æquali. Corpus haud validum.

Eudianodes Swanzii.—Niger nitidus; capite prothoraceque subtiliter punctatis, hoc macula magna fere tripartita fulva ornato; elytris subtilissime punctatis. Long. 11 lin. Hab. Cape Coast Castle.”

Mr. Pascoe also read the following description of a new species of Curculionidæ:—

“*Oxycorynus Hydnoræ*.—Rufo-fuscus; rostro attenuato; fronte prothoraceque creberrime punctatis; elytris 6-carinatis, interstitiis granulatis. Long. 6 lin. (rostrum incl.). Hab. Catamarca.”

This *Oxycorynus* formed part of the contents of a small box sent from South America by Mr. F. Schickendantz, of Pilciao (Zool. S. S. 1102). The other insects in the box were a *Xylopertha*, resembling *X. sinuata*, but smaller; two species of *Nitidulidæ*, apparently near *Carpophilus*; and a *Saprinus*, with a large yellow spot on each elytron. The whole of these were stated by Mr. Schickendantz to have been found by him “in the flowers of a new species of *Hydnora*” (a genus of *Cytinaceæ*, root-parasites, some of which exhale a peculiar animal odour).

Mr. T. W. Wood (who was present as a visitor) exhibited pupæ of several *Lepidoptera* from Sierra Leone, one of which, apparently an *Antheræa*, was remarkable from having two very deep impressions near the hinder extremity. Mr. Wood mentioned that he had once opened a pupa of *Sphinx Ligustri*, and found that the haustellum was $2\frac{1}{2}$ times as long as its case, within which it lay double throughout the entire length of the case and in a triple fold for half its length.

With reference to the numerical disproportion of the sexes of insects (S. S. 1181), Mr. Stainton mentioned that since the previous Meeting he had inquired the results of the experience of Mr. Doubleday and Mr. Hellins in breeding *Micro-Lepidoptera*. Mr. Doubleday thought that males were generally more numerous than females, and did not remember a single instance in which he had met with an excess of females. Mr. Hellins, on the other hand, reported that he had usually found females more numerous than males.

Mr. Stainton added that Mr. Darwin would be glad to receive replies to the following further inquiries:—(1), whether sexual attraction or fascination was exercised in the same manner by butterflies which have the wings gaily ornamented on the under side and by those which have dark under sides, as *e.g.* by *Argynnis* and *Vanessa*; (2), whether any and what moths were more brightly coloured in the male than in the female sex; and (3), whether any and what moths were more conspicuously coloured on the under side than on the upper side of the wings. (In reply to the third query, Mr. Wormald mentioned the genus *Hypopyra*). Mr. Darwin was also desirous of acquiring facts bearing on the distinction between sexual and protective colouring in insects; and of ascertaining the causes which decided the success of one out of several males which were in pursuit of the same female.

March 16, 1868.—H. W. BATES, Esq., President, in the chair.

Donations to the Library.

The following donations were announced, and thanks voted to the donors:—‘*Stettiner Entomologische Zeitung*,’ 1868, Nos. 1—3; presented by the Entom. Verein zu Stettin. ‘*Coleopterologische Hefte*,’ II.; by the Editor, Baron Edgar von Harold. ‘*Monographie der Scydmaniden Central- und Süd-Amerika’s*,’ by the Author, Dr. L. W. Schaufuss.

Election of Member.

Charles Carrington, Esq., of Westwood Park, Forest Hill, was balloted for, and elected a Member.

Exhibitions, &c.

Mr. F. Smith exhibited a specimen of the larva of a Lepidopterous insect from Brazil, which was described by Mr. Peckolt, of Cantagallo, as being of a social habit, and forming a common cocoon as large as a man’s head, within which each individual formed its own proper cocoon. The larva was covered with spines, like a *Vanessa* or *Acræa*; and appeared to belong to one of the *Diurni* rather than to one of the *Bombyces*.

Mr. Stainton directed attention to the account given by Herr Hartmann, in *Stett. Ent. Zeit.* 1868, p. 109, of the breeding of *Sesia cephaliformis*, *Grapholitha duplicana*, *Zett.* (interruptana, *H.-S.*), and *Gelechia electella*, from gall-like swellings on the twigs of juniper bushes: an examination of the juniper during the spring would probably lead to the discovery in this country of the larvæ of the two last-mentioned species.

The President announced the proximate publication, by Dr. Gemminger and Baron E. von Harold, of the first part of a General Catalogue of Coleoptera, intended to include all the hitherto-described species of the whole world: the classification would be based on that of Lacordaire, the species of each genus being arranged in alphabetical order.

Mr. F. Smith read a paper on ants, extracted from ‘*The Guardian*’ of 1713, and, as the result of an elaborate and amusing criticism thereof, contended that the history of the habits of those insects therein contained, detailed and circumstantial though it were, could not be a record of actual observations, but was chiefly, if not entirely, the offspring of the imagination of the writer.—*J. W. D.*

Quadrupeds in Lincolnshire. By JOHN CORDEAUX, Esq.

Stoat or Ermine.—This graceful and agile but destructive little animal is abundant in this district, and is of much more frequent occurrence than the weasel. In the winter they are sometimes seen mottled white and brown, the latter colour generally predominating; much the larger proportion, however, do not undergo any seasonal change. I have occasionally seen one in our marsh district in the perfect winter or ermine dress. On the 9th of March last I was fortunate in seeing a beautiful ermine, almost perfect in colour. It was hunting over some pasture land, quartering the ground in a systematic manner, after the manner of an experienced pointer, and looking not unlike an animated snow-ball. By keeping well out of sight below the bank, and imitating the squeal of a rabbit, I called this little poacher within a short distance, and had then a favourable opportunity of examining him. He was altogether, excepting the black tip to the tail and a few brown hairs on the thighs, pure white, without any apparent tinge of yellow, and was a remarkably large and handsome specimen of his race. The next day I shot a stoat, in the usual brown summer dress, differing in no respect from what we see in the summer. Can any reader of the 'Zoologist' explain this apparent anomaly in the stoat's dress? Here were two animals in the same parish, at the same level above the sea, showing at the same time the extremes of colour. I am inclined to think that this change to the ermine dress is not altogether consequent on cold weather. I have as frequently met with the white ermine in mild as in severe weather, and the present season has been exceptionally mild. Not long since I saw a stoat in pursuit of a rabbit: how long the chase had lasted I cannot say, probably some time, as the rabbit was then nearly exhausted, slowly cantering a few feet in advance of its deadly foe. Whenever the rabbit stopped, which was every few yards, the stoat also stopped. Although I was at this time standing in full view, both pursuer and pursued passed within half-a-dozen yards; fear on the one side, expectation on the other, completely overruling their natural instincts. In watching this chase what most surprised me was that the stoat all this time made no attempt to seize the rabbit. Did he wish to completely exhaust his victim before closing with him? It reminded me very much of a well-trained dog driving a sheep. An incautious movement on my part now made the little brute fear for his own safety, and he in turn became the pursued, but having then neither gun nor stick I had but little chance

of bringing him to account. He made rapidly off at the usual long bounding gallop, disappearing through a fence, the boundary of a thick gorse fox-cover. The rabbit I found squatted in the spot where the chase had terminated, and might easily have taken it, but thought it only fair after so desperate a struggle that the poor creature should save its life: it too retreated towards the fox-cover, but in a very different manner and pace from the stoat's, entering the gorse at the same run through which its enemy had preceded it. It proved an unfortunate line of retreat, for almost immediately after this there was a shrill squeal of distress; evidently the stoat had turned again, and was now completing his work: this proved the case, and on my entering the plantation I found the little brute dragging the now motionless rabbit across the ride into the gorse, exhibiting an extraordinary amount of strength, resolution and ferocity, not relinquishing his fatal death-grasp till his own life was in danger; and even after I had robbed him of his prey, and was walking off with it, he kept advancing from the gorse, running wildly about in the most excited manner, evidently very reluctant to abandon the hard-won prize. A few minutes after its death the rabbit became quite rigid, like a hare killed after a severe course.

Weasel.—A white weasel, probably an albino, has taken up his quarters in an oat-stack in my yard. It appears to be yet an open question whether the weasel, like the stoat, becomes white in winter. The late Mr. Wheelwright was decidedly of opinion that it does change colour, and states he has seen pure white specimens killed during the winter in Wermland. He goes on to say "I can prove by specimens kept in confinement that the change of colour from the red summer dress to the white of winter takes place by an actual change or shedding of the old coat, and not by the old hair changing colour."

White or Cream-coloured Moles.—There is a beautiful variety of mole occasionally trapped in Lord Yarborough's plantations near "Pelham Pillar," the highest point of the Lincolnshire North Wolds. An old mole-catcher informs me that he has taken them in this locality for many years, and considers them a distinct race. They are not white, but a beautiful rich cream-colour. This man has also taken moles in this same plantation cream-coloured, mottled with black.

JOHN CORDEAUX.

Great Cotes, Ulceby, Lincolnshire,
March 21, 1868.

Effects of Frost and Snow upon the Common Birds of the County Dublin during the Month of January, 1867. By HARRY BLAKE-KNOX, Esq.

BEFORE entering on the subject a slight description of the localities so much frequented by our birds during snow will be necessary. Latterly journal-writing has become so very fashionable, indeed regal, that I shall make no excuse for the following short extract from my journal as descriptive of these localities.

The soil along many parts of our coast, particularly where it is rocky, is either too poor or too shallow to repay the labour of the husbandman; besides the easterly gales of winter and spring drench it with salt water, burning up even the natural wild grasses and sea-shore plants that luxuriate in summer, in all the freedom of Nature and in defiance of man. * * * These fields or wilds teem with minute snails of various kinds; the ghost and allied-feeding moths have their strongholds in the soil, in the evening gladdening the eye, as the gaudy burnet moth and lovely cinnabar (*Euchelia Jacobææ*) did in the day. * * * Most abundant the tall yellow ragwort, the food of the cinnabar, now in all its beauty, oppressing the air with its heavy perfume, but soon to be covered with its crop of yellow and black caterpillars. Soon, like some skeleton form dry and withered, will come the winter breezes to sigh and chafe against its sapless stem, while in the ground and various crevices sleep the spoilers of its life. The old "bum" or dor beetle assiduously buries the droppings of the few poor sheep and bullocks that feed upon the scanty herbage around, adding nourishment but hidden death to their roots, for in each ball of dung so assiduously buried she has laid the germs of a dreadful grub. * * * Tipulæ in ceaseless clouds rise as you go along; they, too, are impregnating the soil with horrid pests. Worms and insects seem to reign here undisturbed, the plough and the spade never being known to have broken into their places of abode. But they have natural enemies quite as relentless, and far more effective than man—in the winter the scalding salt from the sea, the searching frost, and many hungry birds. When snow falls, the frost must be very hard indeed that permits it to lie on these fields, for obvious reasons—their proximity to the sea and the consequent humidity of the air, and their being so impregnated with salt. So when the country is snow and ice-bound, the birds have some chance here. The first night of frost and snow literally paves these fields with dead and frozen insects, worms,

snails and grubs. I have counted about forty worms to a square yard, and it would take hours to clear a few yards of the snails, and this for miles.

January 1, 1867. The new year has set in with great severity. Wind E.N.E. Heavy fall of snow during night, occasional showers of same throughout the day. Freezing.

January 1—5. Till the evening of the 5th the snow and frost continued. Following are the effects produced by five days frost on our common birds.

Redwing.—Although arriving in great numbers in the end of October, 1866, about three weeks later than usual, was not to be seen in my district till to-day, the 1st of January. The redwing can be seen arriving from the east and north-east every year along the coast. In all the fields I passed through to-day along the coast they were in thousands, their harsh bark "e-wack" and their soft whistle "phee, e, e" have been ringing in my ears all day. Whole flocks could be seen arriving, crossing the Channel evidently from the English shore. Can it be that they have the instinct, when England is frost and snow-bound, to know that Ireland lies to the west, and that its climate is less severe on account of its humidity? After a few days, that is when the supply of food from these fields fail, they all disappear, with the exception perhaps of a straggler or so found under the bottom of some sunny hedge in company with blackbirds. Considering the whole country to be equally snow-bound, as it is this year, where do they migrate to again? Great indeed must be their sufferings when compelled to travel such long distances, on such precarious food, and the flocks must be decimated.

Fieldfare.—Appeared with the snow, I might say simultaneously. This bird is quite a mystery to me, its abundance in England, and its scarcity in seemingly most favoured spots in Ireland. In my district, rather, indeed, a barren one, but one in which "chance" has thrown me, and even too much for a close investigator of various branches of Nature, a six mile radius from the little historic and ancient town of Dalkey, I consider it little better than an occasional visitant appearing with snow to the day, and remaining only long enough to help to clear away the snails, &c., off the sea-coast fields. It is true an odd one may be met with in barren pastures in fine weather, but on the whole it is essentially a hard-weather visitant. During snow and frost it may be seen arriving from the east in countless numbers, so that the birds which we see along the sea-coast fields in hard weather are not driven

from inland. It is rare to see it migrating, except in snow, although its harsh chattering note, and the white under surface of the wings, with the dark breast, make it a conspicuous bird at a long distance: the missel thrush, a permanent resident, is often mistaken for it. They seem to suffer intensely from the cold and from hunger: one shot and examined on the 3rd of the month had the crop packed with small stones and a few blades of grass only. On the 1st they were fat and in very good condition; on the 3rd very poor; on the 1st, 2nd and 3rd I saw numbers arriving from the east across the Channel: after the fourth day they had quite disappeared, and could not, I think, have weathered another four days of such hardship.

Thrush.—Thrushes have increased enormously at Dalkey since the snow. They are feeding in company with the fieldfare and redwing in open meadows (unusual situation), but still showing a decided partiality for the bottoms of walls and hedges and the edges of pathways, in search of snails and “lob-worms.” Now in earnest, though always doing so, the poor thrush benefits the gardener by picking the large snails from their cosy holes, carrying them to a convenient spot, and, poor fellows, how feebly they often carry their burden, tired from their labours in unearthing, or perhaps from breaking the tough glue, that bound it in its lair, to a company of its fellows, to break them—another weary job, and one at which I have taken them up exhausted. What a brutal return for all this is the robbery of their nests in the spring, and the fatal gin in the fruit season. Shame on you, gardeners! I have been greatly struck with the large number of worms frozen and dead to be seen on every pathway and field, any of which that escape the first attack of the thrushes, and snow often falls so rapidly that many are buried under it, give great relief to the poor starving birds when the thaw comes: instead of having to seek it, when most in want Nature spreads a bountiful repast. So great is the bounty and goodness of God. I do not think thrushes arrive from the east in hard weather: I have never seen them migrating, but fancy that they come from inland. Fortunately a thaw came on the 5th, but they were quite exhausted and worn out, allowing themselves to be taken with the hand. Four days and a half had reduced them to this. What must be their destruction in protracted hard weather? The thrush never leaves us, like the redwing and fieldfare, but, on the contrary, increases in numbers with the severity of the weather,—rides out the storm or is shipwrecked. Sunny spots and aspects are their chief haunts in frost and snow,—pleasant in the day

but bitter as all around at night, as many a poor frozen skeleton with feathers has proved.

Starling.—The starling seeks the same places as the redwing and fieldfare, in countless numbers, till all the food has been devoured; they then scatter about in small flocks, seeking sunny spots, where they bask and feed (alas!). Their merry chatterings and easy graceful flight make them a very welcome relief to the monotony of snow, if one could but forget their famishing state. Incessantly during snow millions arrive from the east across the Channel. Next to the lark they are our most abundant snow bird, weathering the storm or dying with us. Ireland seems their last resort. They are always a regular autumn and winter visitant to this country, but in hard winters arrive in thousands for the one in fine.

Sky Lark.—During snow these birds arrive in countless thousands, from the north and north-east, across the Channel. Day after day, week after week, the incessant tide of birds flows into Ireland in flocks of tens, hundreds and thousands. Where they come from, where they go to, I cannot tell. I could scarcely believe, I was going to say, a continent, a country, to contain such multitudes as I have seen flying from the east into Ireland, the first three weeks of 1867. These remarks apply to about a quarter of a mile of coast, but the same tide of birds was pouring in from north to south of our eastern shores. Their numbers must be astounding. They do not appear fatigued, but fly westward, making no stop. Although in thousands in this county, but a moiety of them alight in it. Where do they go to? what instinct informed them of Irish land? as it is evident they are not our natural migrants, coming as they do so late and in such numbers. It is at these times that we hear of quantities found dead on our eastern coast.

Meadow Pipit.—Always a most abundant bird in the County Dublin, but becomes much more so for a time in snowy weather. It then seeks the sea-coast and beach, also warm dung-hills, water meadows, and, in fact, any place where the frost has little effect. After little more than four days frost and snow, I found many dead birds and others much exhausted. In inland districts I consider it the most likely to suffer of any of our small birds, its feeding-grounds being so open and exposed that the first snow covers them.

Rock Pipit.—Being a hardy bird and feeding amongst the sea-weed covered rocks of the coast, and the rotten *débris* of the strand, does

not suffer so much from hunger as from the cold at night, to which it often succumbs.

Lapwing.—Seems to have been driven entirely from inland to the coast. The beach of Killiney, which is generally very barren in its Ornithology, was strewed with large flights of these birds. They seemed to have forgotten all their lapwing habits, and fed, like the common sand-birds, at the margin of the water. They were very tame, but in such bad condition that I did not shoot them.

Curlew.—On the commencement of hard frost and snow the curlew seeks the sea-coast fields, and often travels great distances inland, frequenting wild and barren districts, feeding on small snails and worms. It is equally partial at all times to barren sand-hills, feeding in their valleys and on the edges of the little lakes scattered generally amongst them: even in these situations, so admirably adapted for the stalker, it is next to impossible to get a shot at them, as they place a sentry on a commanding sand-hill near. Many consider it quite a marine bird, like the whimbrel, which I think rarely leaves the sea-coast.

Heron.—Hérons seem very disquieted since the frost: I am sure I cannot tell what they live upon; they, like the other sand-birds, have left the oozy parts of the coast, showing that their food there has left the shallows to avoid the frost. They cannot get much in the rivers, as the trout and eels conceal themselves in the deepest pools, and seldom wander about in frost. Perhaps the following paragraph, from the 'Tyrawley Herald,' may explain it a little: friends have corroborated it:—

"*The Moors in the West of Ireland*.—Such was the severity of the frost and snow that several hares were found dead on the moors, and grouse became so tame that they were seen in numbers picking on the manure heaps at the cabin doors on the mountains. They afterwards passed in flocks towards the south, and fears are entertained that they have not all returned. Woodcocks, ducks and wild geese went in hundreds to the sea side, where many of them have been shot. The hooded crows were seen to fight each other to death, and the victors to regale themselves on the dead bodies of their foes; and, more strange still, herons were found devouring the snipe which were unable to fly. It was well at this time for the feathered tribes that the Habeas Corpus Suspension and Peace Preservation Acts were in force, as otherwise the destruction of game would have been immense."
—*Tyrawley Herald*.

Snipe.—January 3. Till to-day I never had the pleasure of seeing a snipe crossing the sea. One passed over my head, flying from east to west, of course migrating: its flight did not differ from the erratic course generally pursued, though conducted more in the one direction: it was about two hundred yards high. The frost-bound state of the country has filled the drains and springs with these birds, some in very good, others in very indifferent, condition: I killed to-day, with a muzzle-loading gun, thirty-five brace, five and a half couple of cocks, three mallards and five teal, in suitable localities for frosty weather. Were it not that I wanted the cocks and ducks I have no doubt I could have procured half as many more, and with a breech-loading gun in all probability double the number: I missed one snipe. Being passionately fond of snipe-shooting, and knowing that two or three others were following me and would have got what I left, is the only excuse I can offer for the unnaturalist-like destruction. Where all these snipe came from I cannot say, this county only being a tolerable one for them. I was informed they were in great numbers in such localities throughout Ireland. In parts of May a good shot can bag from thirty to sixty brace a day, at times even in open weather.

Woodcock.—Large flights have visited this county; they are very abundant and to be found in unheard-of places. In the direction of Swords the country people killed them with sticks as they alighted exhausted. Any I shot were fine active birds; fat and muscular. There is an idea prevalent in Ireland that the woodcock can pick up condition in twenty-four hours. Be this as it may, I know a day or two makes a vast difference in their condition.

Sparrow.—The best off of the feathered race in snowy weather, feeding in yards and on the charitable crumbs outside houses. During this weather they show a decided partiality for warm chimneys to roost in. The smoke seemingly only has the effect of blackening their plumage. The dirty little scoundrels come out, thus begrimed, in fine relief against the white snow.

Blackbird.—January 4. Seem strong on the wing, cheery of note, and not tamer than usual. They never feed in the fields with the thrush or redwing, but seem to prefer the sunny bottoms of hedges and ditches. There are a great number of haws not yet consumed, so they will not suffer yet awhile. Some watched feeding on these berries seemed very dainty in those they took. Haws are always most abundant before a hard winter, and seem to stick designedly to the trees.

Linnet, Greenfinch and Yellow Bunting.—These birds flock to weedy ground and farmsteads. They consume the leaves of herbage now as well as the seeds, and seem very restless, and to suffer much. They are easily trapped in the farm-yards, shot in scores, and caught at night in the ricks; but were it not for the shelter of the haggard and the grain they can pilfer, notwithstanding all that are killed in such places, we would have a bad account of them. They can hold out a considerable time, but still die in numbers of the cold.

Lesser Redpole.—Great numbers of these birds visit us, scattering themselves over weedy districts, farmsteads and the marshy lands of the sea-shore. Countless flocks seek the brackish land about the "Bull," Dollymount, to feed on the wart-worth and other barren-land plants, whose seeds are here at all events only eaten by themselves and the snow bunting, thousands of which assemble with the redpole in such localities.

Chaffinch.—Well scattered about; I think I see as many males as females. I notice none of those large flocks of females one sees in ordinary winters. They seem to suffer greatly. Beneath my window some males are so weak as to be unable to crack hemp-seed, half a stone of which I have scattered about—I fear greatly, though, only to fatten the old sparrows, who make short work of eating it.

Blackheaded Gull.—Since the snow the county has been inundated by the blackheaded gull: they seem starving. Three shot from a flock of some hundreds whilst feeding were found to contain the maggots, chrysalids and imagos of the common sea-shore fly, together with pieces of the decayed sea-weed, amongst which they were found. In easterly gales the rotten sea-weed driven up on the beach by some former storm is again carried out to sea, together with the numerous broods of flies propagated in it. Thousands of gulls take advantage of this Godsend, alighting on the water and feeding in a similar manner to the phalarope. At such times when a large breaking wave advances, it is a striking sight to see thousands rise as one upon the wing, only to alight again when the breaker has rolled past.

After a few days of thaw the frost set in again, with more snow, out of the north and east, and lasted about two weeks. By the middle of the second week sky larks were quite exhausted, dying, and to be caught with the hand: if it was not for the cold at night they might hold out well, as, like the partridge, they feed greatly on the leaves of grasses and herbs. At no time have I found the partridge better

or fatter than when feeding on grasses during severe frost and snow. I have found partridges frozen dead in very fine condition: this was in a country where they had not the shelter of thick furze-bushes to covey and nestle under. Thrushes even more exhausted, and found dead. Redwings—what remain of them—more exhausted, than the thrushes; any picked up dead were mere bunches of feathers. Meadow pipits have suffered severely: I believe the body of them have succumbed to the frost. Starlings suffering intensely, dying in numbers, and to be caught with the hand. On the sunny banks of railways hundreds of dead birds are to be found, particularly starlings, redwings and thrushes.

Rook.—The rooks do not seem to be very badly off, but have quite lost their rookish habits; they have deserted the snow-clad fields, feed in stable-yards with sparrows on the oats found amongst horse-dung, frequent public roads for the same purpose, “scavenge” the back yards of houses, becoming petty vultures in their way, frequent the sea-shore in whole rookeries, and last, but by far the most important, hawk incessantly after the poor dying birds, which they kill in numbers. Though this is a regular habit of the rook, I never saw so many birds struck and killed by rooks as I did this year. A fellow shot in the act of killing an old comrade, a starling, was in prime condition: on putting him into a loft he ejected, during the night, several bone-pellets, like those from the crop of a bird of prey.

Missel Thrush.—No increase of numbers. They seem very tame and to suffer much, feeding principally on what haws and berries they can find. They are usually unapproachable here, except in the breeding season. As long as berries hold out they should do well in the food line, as they are their chief support.

Waterhen.—Have come down the streams very emaciated. Their large foot-marks are to be met with everywhere, and the birds stalking about in all kind of places.

Redbreast.—Notwithstanding all that is said about the redbreast being a very delicate and tender bird to cold, I find that the severe frost of the past three weeks does not appear to have affected it in any decidedly detrimental manner. I find him at the window and in the garden, eating the crumbs of charity. I find him in the farm- and straw-yards, by the warm dung-hills; I find him by the wild sea-coast, and I find him in the lone country hedge, the snipe feeding in the drain beneath. They perhaps do not look so sprightly as usual, are a little more “puffy” in plumage, and their look one *might* in-

terpret as imploring help, but then should you kill and examine one you will not find it much the worse in muscle. Why should they be? Being a hole-seeking bird, have they not many a place we know not of, where frost and snow do not reach, and where their food lies in abundance, and where they can shelter well at night? It is idle to say that they suffer most of the feathered tribe; but pity them if you will, kind heart, as I do, the hardships they endure, when you think of their engaging ways, their fearlessness of man, their mellow eye, their fairy shape, the exquisite soul-subduing melody of their song, calling up old recollections by its melancholy plaintiveness, singing as it does in the old yew-tree, for—

“The bird of all birds that I love the best
Is the robin which in the church-yard builds its nest;
For he sings o'er my Kathleen,
Hops lightly o'er Kathleen,
My Kathleen O'Moore!”

And last, not least, the redbreast—first cousin of pity from childhood's days. But sorrow, kind heart, each night of protracted frost and snow, for the poor lark, the thrush and the starling, whose food lies on the open fields, now covered deep with frost and snow.

Wren and Hedgesparrow.—Seem not to suffer more than the robin, their habits being somewhat similar. The hedgesparrow comes nearer to man's habitation and frequents faggots in abundance, feeds in sewers and among the pigs' food, eating indeed anything that is soft and edible. They are most endearing little creatures at this time. I have not found wrens here sleeping in packs in the holes of corn- and hay-ricks, as writers assert, and cannot fancy that a number of these birds in a hole could die of cold—more probably of suffocation and want of ventilation—a death in such cases is one of great ease, a gradual faint from which they never awaken.

Ringed Plover.—To be met with along all our rocky coast, feeding amongst the sea-weed (very unusual). They greatly frequent the mouths of rivers at such seasons, and all kinds of unheard-of little shingly spots along the sea-coast. It is rarely seen on our rocky coast. Sometimes, at high water, and when driven from the strand by the tide, a flock or two may be met with on the West Pier, Kings-town. They are essentially a strand bird, though, unlike many of the true sand larks, are very fond of barren shingly beaches.

Blackheaded and Common Gulls.—Swarming everywhere in unheard-of numbers, inland and coastwise. The first-named bird has

grown very tame and feeds in strange places; for instance, I saw three feeding on fish-guts by the side of a public road, and heard of others feeding in back-yards in the city. They feed on what worms and other food they find inland, as the strands seem quite deserted by them, showing that their prey there must be influenced by the frost. In fact, the strands are quite deserted by all their usual denizens. Some of both species shot were in a fearfully emaciated state—a striking comparison to a robin killed the same day.

Cormorant and Shag.—Are very wild and constantly on the wing. Must suffer much on account of the torpidity of the fish, particularly the cormorant, whose chief prey, the flat-fish, lie torpid in the sand.

Northern Diver.—Has the bill very much worn by rooting up the sand-dabs. It is well known that flat-fish bury themselves under the sand in severe frosts. Crabs, lobsters and whelks become torpid, and will not go into the pots set to take them, but creep to deep water, where the frost does not reach.

HARRY BLAKE-KNOX.

Dalkey, County Dublin,
February 14, 1868.

*In Memoriam Wilson Armistead, of Virginia House, Leeds.**

By ALBERT MULLER, Esq.

WHEN, some years ago, I began to converse by pen with the esteemed friend whose decease so many are now deploring with me, I did so from a conviction that, in his own words, "A somewhat neglected portion of Nature's wonderful and infinitely varied productions," *viz.* galls, wanted elucidation. Besides it occurred to me then that ever since the death of my countryman, J. J. Bremi-Wolf, of Zueric, the study of Swiss galls and of their insects had been lying dormant; whilst in the hands of Dufour, Giraud, Laboulbene, Fairmaire, Perris and Vallot, in France; of Von Frauentfeld, Hartig, Kaltenbach and Kollar, in Germany; of Von der Osten Sacken and B. I. Walsh, in the United States; and of Westwood, Smith and others in England, the study of these curious productions, of their rightful inhabitants and numerous inquilines and parasites, had elsewhere made many and rapid strides forward, not to forget the very recent investigations on

* Born 1818; died February 18, 1868. A short sketch of his life and social labours appeared in the 'Entomologist' for March, and in the 'Leeds Mercury' of the 20th of February, 1868.

the reproduction in the unisexual (?) Cynipidæ, and on the viviparous larvæ of Cecidomyia. Seeing, then, that scarcely any one paid attention to the galls of my native land, I resolved to do the little in my power to cultivate their knowledge again. I have ever since been accumulating materials, and shall continue to do so.

Mr. Armistead's lamented demise having, as it were, severed the intellectual thread connecting the observations of different individuals in various parts of this country and abroad, the present seems to me to be the proper moment for bringing forward a few notes and queries on British and foreign galls and other excrescences, which have accumulated in the course of my reading and rambles for the last few years. It will be seen in the sequel that Mr. Armistead's numerous communications have afforded to me some most important information: this stands quoted throughout, identified by his initials and the dates of his letters. The kind contributions of other gentlemen I have also everywhere acknowledged, and thank them here publicly for their various good offices.

In a compilation of fragments like the following the absence of any order, either entomological or botanical, may be excused, my purpose being simply to interest out-door observers and to invite their co-operation in the investigation of what we may in this instance truly call "knotty points."

Convinced as I am that our understanding of the present productions of our globe will be largely benefited by knowing what the past has produced, I begin, by way of a kind of desultory introduction, with the little as yet ascertained concerning—

Fossil Galls.—The late Senator Carl von Heyden, in Frankfort-on-the-Maine, was, I believe, the first to describe and figure fossil galls on *Salix abbreviata*, *Göppert*, and as their position on the leaf, their size and shape were unlike those of a Cynips or a Cecidomyia, and as recent Acaridæ are known to produce similar excrescences on limes and willows, he came to the conclusion that these galls were caused by an Acarus, which he named *Phytoptus antiquus*.* The same author subsequently described and gave a figure of the galls of *Cecidomyia* (?) *dubia*.† Both these galls are from the "Braunkohle" of the Nether Rhine (Salzhausen). The next explorer in the field was Professor Oswald Heer, of Zueric, who received from Oeningen about

* 'Achter Bericht der Oberhess, G. f. Nat. & Heilkunde,' 1860, p. 63, and Von Meyer's 'Palæontographica,' t. 10, p. 64, tab. 1.

† Von Meyer's 'Palæontographica,' t. 10, p. 80, tab. 1.

a dozen fossil poplar-leaves (*Populus latior*), the stalks of which were distorted by *Aphis* galls, similar to those produced now-a-days by *Pemphigus* on several poplars. The name given to this fossil plant-louse is *Pemphigus bursifex*.* Professor Heer has also found small semi-globular galls on a fossil poplar (not willow) leaf from Oeningen. These are ascribed to a dipteran, named *Cecidomyia Bremii*, † as he finds that the galls agree with those of the recent *Cecidomyia Salicis*. ‡

Leaving the faithful but (in this instance) scanty records of the book of Nature, we come to annals of a more spurious kind, the quaint and fanciful notions which originated in the human mind. Handed down from generation to generation, these are now considered, not as always affording trustworthy knowledge, but as curious heir-looms of the brain-work of bygone times, when the light of Science was mostly confined to the lanthorns of the cloister and the solitary flickering lamp of the alchemist. No doubt the readers of the 'Zoologist' are acquainted with the opinion entertained in the fourteenth and following centuries on the leaf-roses of the willow,§ so I may be allowed to pass over this subject here, likewise the often-ventilated question of the identity of the so-called "Dead-Sea apples" with galls, which latter point has at various times been commented upon by writers eager to substantiate the testimony of ancient writ. || But the following early signs of gall-study in this country may not be generally known to the entomological reader. On the 6th of February, 1658, Sir Thomas Browne, of Norwich, wrote, in a letter to Mr. Dugdale, the following:—
"I made enumeration of the excretions of the oak, which might be

* Heer, 'Insectenfauna, &c., von Oeningen, &c.,' t. iii. 1853, and 'Urwelt der Schweiz, 1865, p. 389 (Rhynchota).

† Heer, 'Urwelt,' pp. 394, 395, fig.

‡ I am indebted to the late Senator von Heyden for a copy of his first notice on fossil galls; to Prof. Heer for kindly pointing out to me what fossil galls came under his notice; and to Dr. H. Hagen, formerly of Koenigsberg, now of Cambridge, Mass., for a complete index to the fossil genera of gall-makers as far as known; and I much regret that, on account of Mr. Armistead's death, these valuable materials will have to be laid by for the present.

§ See, for instance, Ed. Peacock's interesting letter in the 'Athenæum' of March 18, 1865; reprinted in the 'Zoologist' (Zool. 9554).

|| Book of Wisdom, chap. x. 7. — Lambert, A. B., "Some Account of the Galls found on a Species of Oak from the Shores of the Dead Sea" (Trans. Linn. Soc. 1837, t. 17, pp. 445—448, pl. 1). Elliot, W., "Account of the Poma Sodomitica," &c. (Trans. Ent. Soc. Lond. 1837, t. ii. pp. 14—18).

observed in England, because I conceived they would be most observable if you set them down together, not minding whether there were any addition by *excrementum fungosum vermiculis soatens*, I only meant an usual excretion, soft and fungous at first and pale and sometimes covered in part with a fresh red, growing close unto the sprouts; it is full of maggots in little wooden cells, which afterwards turn into little reddish brown or bay flies. Of the *Tubera indica vermiculis scatentia* I send you a piece; they are as big as good tennis-balls and ligneous.* The first of the productions referred to in this letter is perhaps the common oak-apple (*Cynips terminalis*, Fab.); the modern name for the "*Tubera indica*" I should be glad to learn.

"Bitter as gall" has long been a standing saying; † to listen to truth is sometimes more bitter still, but this is no valid reason for keeping it in the back-ground, when the opportunity occurs of speaking it, and so I hope that the following quaint logic will be borne in mind by those literary craftsmen who stand in want of such a warning:—In a story of the tenth century by Scheffel (vol. iii. p. 4), intituled 'Ekkehard,' this person asks, "How does it happen that so much that has flown from ink cannot deny its origin?" Answer: "Because all ink comes from the gall-apple, and all gall-apples from evil wasps' sting."

A biographical notice of William Hall, *alias* "Antiquarian Hall," &c. (who was born June 1, o. s. 1748, at Willow Booth, a small island in the fens of Lincolnshire, near Heckington Ease, in the parish of South Kyme, and who died at Lynn, in Norfolk, January 24, 1825), contains the following interesting observation—I say interesting, because full allowance must be made for the state of knowledge extant at the time it was written:—"No animation without generation' seems a standing axiom in philosophy, but upon tasting the berry of a plant greatly resembling brooklime, but with a narrower leaf, I found it attended with a loose fulsomeness, very different from anything I had ever tasted; and on splitting one of them with my nail, out sprang a fluttering maggot, which put me upon minute examination: the result of which was that every berry, according to its degree of maturity, contained a proportionate maggot up to the full-ripe shell, where a door was plainly discerned, and the insect had taken its flight. I have ever since carefully inspected the herb, and the result is always

* 'Posthumous Works of the learned Sir Thomas Browne, Kt., M.D., late of Norwich, &c.' London, 1712. 8vo.

† I am, of course, aware that no vegetable "gall" is implied here.

the same, *viz.* if you split ten thousand of the berries, you discover nothing but an animated germ. It grows in shallow water, and is frequently accompanied by the water plantain: its berry is about the size of a red currant, and comes on progressively, after the manner of juniper in the berry: the germ is first discoverable about the middle of June, and continues till the frost subdues it: and my conjectures lead me to say that one luxurious plant shall be the mother of many scores of flies. I call it the fly-berry plant." *

"The extract from William Hone's 'Table Book' I am much obliged for, as I wish to trace the history of the knowledge of galls by naturalists, who for long appear to have had very erroneous opinions respecting them: this is strongly shown by this extract from Hone's book, which is on a par with the odd ideas formerly entertained of the barnacle goose. The plant known as 'brooklime' is *Veronica beccabunga*, found in slow shallow streams in June and July. There is a plant 'brook-weed' (*Samolus Valerandi*), growing in marshes and moist meadows, but I never saw or heard of galls on either, and it is almost too late to search for them, I was going to say, but I think not, as they will be to be found long after the flowering time."—W. A. *in litt.* October 2, 1865.

This gall on "brooklime" is still unknown to me. Can anyone find it?

I must now bring this disconnected chapter to a close, and begin to point out a few cases of galls as yet imperfectly known. I add a few words of reference, relating to galls fully described by authors, but for which I can give new localities. If it should seem almost useless to anyone that I have endeavoured to be particular in giving exact localities even for common galls, I would remind him that it is by no means proved in all instances that the geographical distribution of the food-plants accords everywhere with the horizontal or vertical spread of the insects, and that, however slender our present knowledge of the habitats may be, a time may reasonably be anticipated when gaps will be filled up and when even fragmentary lists of localities will meet with approval at the hands of a generalizing mind.

The galls my memoranda refer to are on—

Aspen (*Populus tremula*).—Pea-sized gall, produced by *Cecidomyia polymorpha*, *Bremi* (Beitraege zu einer Monographie der Gallmücken, 1847, p. 15, and tab. 1, fig. 14). Locality: Radolfszell, on the Lake of Constance, August, 1867.

* William Hone's 'Table Book,' 1831, p. 145.

Small woody cones, standing mostly along the midrib of the leaf, one line high, on upper surface; whilst the under side of the leaf shows only raised tubercles in the same spots, which latter are pierced, when the larva leaves the gall. *Cecidomyia bifrons*, *Bremi*? Locality: Radolfszell, August, 1867.

Specimens of both the preceding galls were sent to me by Mr. C. Schaffner.

Beech (*Fagus sylvatica*).—The woody conical gall with a pointed apex, produced by the *Cecidomyia Fagi* of Hartig, has reached me from so many localities in Switzerland and Germany that I am inclined to think with *Bremi*, that it is well nigh as widely distributed as the tree itself. Besides it is so well known that any comments would be superfluous, so I only just mention that the specimens exhibited by Mr. Saunders before the Entomological Society of London on the 7th of November, 1864, belong to it, and that Mr. Armistead has met with the thin vermiform summer gall pertaining to this species near Harrogate, in September, 1866.

Tubular galls, height from one to two lines, covered with a reddish pubescence on the upper side of the leaf, standing almost all along the midrib. These I found near West Wickham on the 1st of October, 1865, commonly, mostly on sheltered branches of the beech. Insect unknown to me.

On the trunks of beech I find woody, hard, knob-like rounded excrescences of about the size of a marble. On being detached their under side shows concentric rings of growth. Shirley, May, 1866. Rennie ('*Insect Architecture*,' p. 339) supposes them to be produced by one of the *Curculionidæ*, but I have never been able to detect any trace of insects in or near them. Is this production allied to the "black-knot" of American authors?

Box (*Buxus sempervirens*).—Small, flat, round dark brown excrescences, of half a line in diameter, both on the upper and under side of box-leaves. "Were sent to me by a friend in Hampshire."—W. A. *in litt.* April 7, 1866. I am inclined to refer these excrescences to an *Acarus*, possibly a *Cephaloneum*.

Common Bracken (*Pteris aquilina*).—Leaflets discoloured, either reddish or black, rolled up or otherwise distorted. "Are very common here, Allonby, Cumberland."—W. A. *in litt.* August 9, 1867.

Celtis australis.—Flat, rounded, mine-like blisters, one to two lines in diameter, slightly raised on both sides of the leaf, as many as from fifty to sixty blisters on the same leaf, which is attacked in all stages

of growth. When dried these blisters look like flattened oak-spangles, or like the fungus so commonly met with on bramble-leaves: this resemblance is evidently a powerful means of protection against predatory insects or birds. All these galls present an orifice on the under side of the leaf. One I found tenanted by a living Thrips, and this is the only insect I have seen in these galls as yet. Prof. Westwood ('Introduction to Modern Classification,' vol. ii. p. 4) mentions of Thrips that "The leaves upon which they reside [are] marked all over with small decayed patches." This is exactly what these blisters on *Celtis* look like, but they are undoubtedly mines. Mr. Stainton has favoured me with the following opinion on the same production:—"The mines, or rather minute galls, are probably the work of a minute hymenopteron." To me their originator is still a puzzle; the leaves containing them were gathered by my friend Mr. Charles Schaffner, in August, 1867, near Radolfszell, on the Lake of Constance. The plant grows throughout the South of Europe.

Cranberry (*Vaccinium oxycoccos*).—"A correspondent mentions finding a gall-like formation on the cranberry, but I have not yet been able to get a specimen."—W. A. *in litt.* April 9, 1867. This would be a novelty: can any observer send it to me? Possibly the dwarf-willow gall, mentioned further on, has been mistaken for this production.

Elder (*Sambucus nigra*).—Woody excrescences on the root, sometimes of the shape of a cauliflower, brown, individual sprouts more or less regularly digitate or palmate. Size varying from that of a grain of wheat to that of a walnut. "In some places they are pretty abundant, though, from being just under ground, except where the upper soil gets washed off by rains or the side when near streams, they are seldom observed. They do not appear to have any insect-life connected with them, and may after all prove to be something cryptogamous, but they want observing at different seasons."—W. A. *in litt.* Through Mr. Armistead's kindness I have been enabled to examine recent specimens in all stages of growth, and I concur in his opinion that this production has no connexion with any insect whatever. I introduce the subject here in hopes that some observer may succeed in tracing the true origin of this excrescence.

Elm (*Ulmus*).—The large purse-like gall produced by *Schizoneura* (?) *Gallarum* (*Ulmi* of De Geer), mostly on stunted elms, and formed of the leaf itself, as is in some specimens plainly shown by the midrib of the leaf still retaining its original position round the gall, has reached

me from Basle, where Mr. Stehelin-Im Hof collected it in June, 1867, on an elm with smooth twigs. Mr. Armistead found it near Nancy and Mannheim in the same month, and it occurred to me near Penge, in July of the same year, rather abundantly on an elm-bush, the bark of which is dilated in lamina, disposed lengthwise along the twigs. Can any botanist give me the scientific name of this variety of elm.* A discussion on this gall took place before the Entomological Society of London on the 5th of November, 1866, and to Mr. M'Lachlan we are indebted for a handy *resumé* of the observations of previous authors who wrote on these and allied galls ('Entomologist's Monthly Magazine,' vol. iii. pp. 157—159), to which Mr. H. C. Cooke has added some interesting facts at p. 190 of the same periodical. My friend Mr. H. Knecht, of Basle, sent to me, in September, 1866, specimens of broad elm-leaves collected near Basle, on the upper side of which there stand numerous pedunculated, fig-like, hollow excrescences, of the size of a small bean, green, tinted with purple-red. These galls were filled with winged individuals of an *Aphis*, which I refer with doubt to *Tetraneura Ulmi* of Kaltenbach. A translation of Kaltenbach's extracts from Von Gleichen's work, referring to the preceding or an allied species, has been given by Mr. M'Lachlan in the paper quoted above. I am inclined to say that though Kaltenbach, as quoted by Mr. M'Lachlan, could find no differences between the tenants of his large and small galls, that the two species of *Aphidæ* to which I refer the two kinds of galls mentioned by me above are as distinct from each other as two insects belonging to the same family can possibly be: the entomological proof for this assertion remains to be given, but in the mean time I would simply ask the question, has any one ever bred the same insect from galls of a different shape and of a different location—say, for instance, from a large purse-shaped gall formed by the transformed leaf and fig-like small pedunculated galls, standing in numbers and independent of each other on one and the same leaf? I think not,† and it is not going too far to assert that the size and shape, texture and covering of most galls, their location on the bud, leaf, twig, trunk or root, are regulated within certain limits by laws as inviolable as those governing other organisms; that we meet here and there with exceptions need not disturb

* Is it *Ulmus suberosus*?

† I am quite aware of the Rev. T. A. Marshall's valuable observation on the two galls of *Spathogaster baccarum*, *Linn.* (*Ent. Monthly Mag.* vol. iv. p. 225), but the form and structure of these is identical, and only their location differs.

our belief in the existence of this law, for there is no rule without an exception.

Spurge (*Euphorbia cyparissias*).—The leaflets of terminal shoots, stopped by larvæ of *Cecidomyia capitigena* of Bremi, in their ordained development, produce a bud-like head, beautifully tinged with red (Bremi, *loc. cit.*, tab. 2, fig. 24, p. 25). “Forbach, June, 1867.”—W. A. *in litt.* July 3, 1867. *Cecidomyia subpatula*, Bremi, produces a different head of leaflets on the same *Euphorbia* (Bremi, *loc. cit.*, p. 23, and tab. 2, fig. 25).

Dyer's Weed (*Genista spinosa*).—A pod-like gall, about two lines in length, gathered by Mr. Stainton near Cannes, in March, 1867: insect unknown to me. Rennie ('*Insect Architecture*,' p. 331) describes and figures a similar gall on *Genista tinctoria*, which he refers, with a query, to *Cynips Genistæ*. This latter gall I have never met with.

Wild Geranium (*Geranium sanguineum*).—A green leaf-rose, the individual leaflets tinged with red, produced by a *Cecidomyia*? “Allonby, Cumberland.”—W. A. *in litt.* August 9, 1867.

Grass.—On a short-jointed, narrow-leaved, low, creeping grass, along a road near Woodside, Croydon, I met (in September, 1865) with pink, smooth, polished galls, of the size and shape of a caraway-seed. Dipterous?

Hawthorn (*Cratægus Oxyacantha*).—The bedeguar of the hawthorn was very abundant near Penge in June, 1867. “Was very frequent near Leeds in 1866.”—W. A. *in litt.* August 9, 1867. Described and figured by Rennie ('*Insect Architecture*,' pp. 346, 347), who thinks that this excrescence may originate in the natural growth of a shoot being checked by the punctures of Aphides, &c. I should like to see this statement superseded by actual observation. Specimens in my collection show regular rows of bundles of very short brown bristles, set so thickly in some spots as to resemble the fur of some caterpillar.

Juniper (*Juniperus communis*).—A woody hard gall of a little less than walnut size, on the basis of a stem, was sent by Mr. Newman to Mr. Armistead: locality unknown to me. At the Meeting of the Entomological Society of London on the 16th of March last, Mr. Stainton called attention to the fact that Herr Hartmann, of Munich, had bred a *Trochilium*, a *Grapholitha* and a *Gelechia*, from twigs of juniper, upon which he had observed some gall-like swellings: * an

* Full particulars of Mr. Hartmann's observations are published in the '*Stettiner Ent. Zeitung*,' 1868, part 1.

examination of juniper-bushes during the spring would probably lead to the discovery in this country of the two last-mentioned insects" (Zool. S. S. 1184). I never yet met with these swellings, and should feel obliged for a specimen to any observer who would kindly send me one.

Yellow Toad-flax (*Linaria vulgaris*).—Pea-sized, pale yellow or white gall, produced by *Gymnetron Linariæ* of Panzer. "Are not uncommon here, Allonby, Cumberland, but one has to pull up a great many roots to find them. I am trying to get at the insect by planting the roots in small pots."—W. A. *in litt.* August 16, 1867.

Oak (*Quercus Robur*).*—I possess a long series of galls, mostly hymenopterous, collected both in England and abroad, on various species of oak, but space forbids me to enter into the subject here. I could not yet obtain possession of specimens of the so-called "woolly gall," the root-gall of *Cynips aptera*, and the currant-gall of the catkin, and I mention these gaps in my collection to bring them to the knowledge of entomologists who may feel disposed to help me in filling them up.

Black Poplar (*Populus nigra*).—Leaf-stalks distorted by one or more fruity-looking swellings, occasioned by the *Aphis Pemphigus cursarius* of Linneus, found near Basle, in September, 1862. I have mentioned a fossil species of this genus in my introductory remarks. The observation of these contortions on the leaf-stalk of the black poplar has led me long ago to the idea that there must be some analogy between the growth of pulpy fruits and that of fleshy galls, and indeed if we cut any of the softer galls transversely we meet with a similar grain as in many fruits: the knife discolours and spoils not only the apple, but also the oak-apple; and, as to exterior changes, I have watched these poplar leaf-stalks, first in a green, hard state, gradually assuming the red cheeks of ripe fruit, then the rich yellow of a very ripe pear, and afterwards the sober tints of decay, brown and black. I have also noticed that the tree sheds these distorted leaves much earlier than sound ones. The Rev. H. J. Berkeley has years ago commented on various striking resemblances between cryptogamic plants and galls.† Resemblances between fruits and galls

* The Rev. T. A. Marshall is at present publishing, in the pages of the 'Entomologist's Monthly Magazine,' a series of exhaustive articles on the Cynipidæ of Great Britain, which will be quite indispensable to future inquirers in this field.

† In his paper, "On a Gall gathered in Cuba," &c. (Trans. Linn. Soc. 1841, t. 18, p. 575.

are so commonly met with that in describing the latter we are constantly compelled to use designations usually applied to the former.

Alpine Rose (*Rhododendron ferrugineum*).—Fleshy, fruit-like galls on the leaf, of about the size of a raspberry, smooth; one gall grown right on the edge of a leaf. For an inspection of these to me novel galls on the far-famed "alpine rose" I am indebted to Mr. Stainton, who kindly allowed me to send them to Leeds, and who, at my request, has furnished the following precise particulars, which will enable any tourist to investigate the subject further, if they are not already described somewhere. Mr. Stainton writes, "They were common enough at Andermatt, from one hundred to two hundred feet above the chapel, which is itself just above Andermatt: the colour was green, with a slight rosy tinge in places: the date was July 30 (1866)." Insect unknown to me.

Rose (*Rosa canina*).—Of the common bedeguar of the wild rose I possess a specimen, showing on the same stem, on a length of not more than three inches, six bedeguars placed round the stem, each about the size of a walnut: it was found near Box Hill, where this bedeguar was exceedingly numerous in 1865. A leaf of this rose in my collection displays several small tufts of red bedeguar bristles: a similar case is mentioned by Réaumur, as reported by Rennie ('*Insect Architecture*,' p. 329). *Rhodites Rosæ* of Linneus. "I find the farmers here (Harrogate) gather the mossy galls of the rose to make an infusion for diarrhœa in cows, which they say is very efficacious."—W. A. *in litt.* September 24, 1866.

Burnet Rose (*Rosa spinosissima*).—Polythalamous, woody galls, of the size and shape of a small rounded bean, mostly beautifully tinged with red, sometimes provided with short obtuse spines; a few specimens cushion-shaped with leafy fringe all round. (*Rhodites* ——?) "Allonby, Cumberland, very abundant in August, 1865 and 1867."—W. A. *in litt.* August 18, 1865, and August 9, 1867. One of the specimens obtained in 1865, which I have kept ever since in a dry box, opened to-day (March 9, 1868), shows one larva alive, though much shrivelled and lean.

Meadow Sweet (*Spiræa Ulmaria*).—The well-known gall produced by *Cecidomyia Ulmaria*, first described and figured by Bremi (*loc. cit.* gall, p. 16, and insect described, p. 52; gall figured, tab. 1, fig. 15), needs only a passing notice here, as Mr. H. W. Kidd has given an excellent account of it in the March number of the '*Entomologist's*

Monthly Magazine' (p. 233), which saves me the trouble of recapitulating its history: I can, however, add my mite to Mr. Kidd's dates of breeding, as in 1867 I bred this gnat as early as the 7th of July, from specimens obtained near Penge. I introduce *S. Ulmaria* principally to call attention to *Spiræa filipendula*, "which has also a gall on its leaf, but I have not been able to preserve it, either by drying or in brine. It is rather red and pretty when recent."—W. A. *in litt.* July 10, 1867. If this gall has not yet been noticed abroad, and if the *Cecidomyia*, which undoubtedly occasions it, should turn out to be a novelty, I hope whoever describes it will name it "*Cecidomyia Armisteadii*," in remembrance of one whose heart was in the study of galls for years, and whose exertions in the cause of suffering humanity will not be soon forgotten.

Sumach (*Rhus integerrima*, Wall.).—"Kakra-Singhee. Curious horn-shaped galls produced on a species of sumach are employed in India as an astringent in medicine, and to a limited extent in dyeing" ('Science Gossip,' December 1, 1865; fig.). I believe the 'Zoologist' wends its way to India once a month, and if this should meet the eye of any person there who could enlighten people at home about the insect which produces this gall, he would benefit Science by doing so. Galls from all parts, even from Japan, are largely imported to Europe for technical purposes: the little we know about "Kakra-Singhee" is just enough to excite our curiosity, and be it plainly stated we also want to know its value in a commercial and technical point of view.

Willows (*Salix*).—My collection contains at the present moment, on different species of British and European willows, Dipterous galls, including willow roses, nine; Hymenopterous galls, thirteen; Acari-deous galls, three; but I would caution any one not to take this statement as representing the true proportions of the willow gall-makers in Europe, as only three countries have as yet contributed their quota, *viz.* England, Germany and Switzerland, and even these three are but inadequately represented. From the numerous, to my knowledge (as far as Great Britain is concerned), undescribed willow-galls, I select for mention in this paper only one, as its occurrence demonstrates a striking case of protective resemblance. The gall I refer to is found on the dwarf willow (*Salix herbacea*). It is of the shape of a berry, reddish, and Mr. Armistead informed me that he found it abundantly at Allonby, Cumberland, growing among the cranberry plants, bearing fruit at the time: he met with

it twice in August, 1865, and again in the same month in 1867. (Nematus ——— ?)*

It will be evident to every naturalist who will condescend to peruse these hasty notes, that doubtful points innumerable will have to be cleared up ere the life-history of the insects inhabiting these galls can be written: happily we are not everywhere so far behind, as complete biographies of many a little denizen of these "fairy palaces" are already penned; but even the numerous queries here advanced are only a small part of the number still in store, so it is to be hoped that as within the last few years the snow-ball of truth-seeking in this field has again been set in motion in this country, it will roll on, increasing in strength and power, and that plenty of shoulders will be found anxious to push it on, when it will have grown, as it almost has, too cumbersome for the few hands it has hitherto occupied.

ALBERT MULLER.

Peuge, S.E., March, 1868.

Something about the Cuckoo (Cuculus canorus).

By T. R. ARCHER BRIGGS, Esq.

WE live in a world of change truly, and it is wondrous to mark how in this nineteenth century all the opinions of our grandsires, whether on Theology, Natural History or any science whatsoever, are doomed to be turned topsy-turvy by the theories of this enlightened age.

The Rev. Alfred Charles Smith, in his paper on the cuckoo in the 'Zoologist' for March, combats an established opinion, by telling us that the famous Dr. Jenner has led many into error by having stated that it is the *young* cuckoo that removes its foster-brethren from the nest in which it is hatched, and affirms that it is the *parent* cuckoo that does this. As regards this opinion I would observe that Mr. Smith is at issue with Colonel Montagu, as well as with Dr. Jenner, since that distinguished ornithologist tells us, in his 'Ornithological Dictionary' that he agrees with that gentleman in respect to the phenomenon of the infant bird throwing the eggs or young out of the nest, and adds that he had ocular proof of the fact, for he saw a young bird of this species repeatedly throw out a young swallow when this was put in for the purpose of experiment. What I witnessed on the

* Since writing the above, I have been informed by Mr. M'Lachlan that Mr. Inchbald has bred this insect, but I cannot yet give more particulars.

9th of July last on Crownhill Downs, recorded in last year's 'Zoologist' (S. S. 914), makes me assert most positively that these ornithologists of the past were correct when they stated that it was the little cuckoo that expelled from the nest the eggs or young of the bird that had hatched it. It is useless for even a Waterton to talk of a thing as impossible when facts show the contrary to be the case.

The habits of the cuckoo are so remarkable and mysterious that everything that tends to throw light on them seems worthy of record; consequently I append to the above remarks some particulars respecting a tame bird of this species that I kept for more than twelve months. It was procured from a labourer at Lipson, near Plymouth, on the 26th of June, 1858, and on the same day I undertook the charge of it. Although not sufficiently fledged to be able to fly, it was, even then, fierce and pugnacious. I fed it on meat, both raw and cooked, and on a paste composed of soaked bread and yelk of egg, on which it throve so well as to be able to fly and hop by the end of the first week in July, when it showed impatience at being confined, and a desire to escape from its cage, but no fear of anyone that it was accustomed to. When let out into the room it often endeavoured to get out through the glass of the window, and its restlessness, especially in the evening, was quite tiresome. In one of my note-books, under date August 16th, I find the following entry, "Cuckoo will now peck at a caterpillar." It was extremely fond of the larva of the "buff-tip moth" (*Pygæra bucephela*), and when one of these was given it, it would generally pass it through its bill, take it by one of the extremities, violently shake it to empty the stomach of its contents, and then eat the dead insect.

A part of the time I had the bird it was allowed the range of a lumber-room. Among the records of my pet appears the following particulars:—

September 21. Cuckoo very restless, sometimes when it is moonlight endeavouring to get out at the window. No doubt the migratory instinct affects it.

October 22. Still alive and well, has a peculiar way of snapping its bill together, apparently in anger, or as a sort of menace: generally when I give it water reluctant to drink it.

October 29. Anxious to have its bill clean, frequently wiping it against its perch, or anything that may be near. Still restless at times and fed by hand.

About the middle of November it was very restless by candle-light, and frequently would flap its wings and fall or flutter off its perch.

November 20. Pecks sometimes at its meat when on the stick.

November 25. Much quieter than it was last week, and very voracious; seems in good health, not unfrequently pluming its feathers, which in colour much resemble those of the woodcock.

November 28. Again restless between nine and ten o'clock in the evening.

January 25, 1859. Cuckoo beginning to moult, still restless during the early part of some nights.

February 8. Some of the new feathers expose their fibrous ends.

February 12. Astonishes us by making a loud shrill noise in the evening by candle-light, something like the laughing note of the green woodpecker.

February 18. Much less restless to-night, as also for one or two previous ones. New feathers out on the back, of a nearly uniform slaty blue colour. Now generally feeds itself by taking meat with egg, or meat alone, from my hands or the bars of its cage; but sometimes descends to the bottom to pick up pieces of food. Very fond of the black beetle, which before eating it generally softens by passing through the beak.

February 24. Rather restless this evening; frequently picks meat with egg, and Blattæ up from the bottom of the cage. I never put any water in it, but generally add this to the meat and egg, when I mix up the food.

March 14. Although it eats black beetles, I have never seen it cast up any portion of them in the manner of hawks and owls. Much of the new plumage out on the back and breast, but many of the old feathers still in the wings, some at the back of the head, and on the higher part of the breast. A large new quill-feather in one of the wings. Still fond of Blattæ, descending to the bottom of the cage to feed on them; they and raw meat now constitute its principal food. Still restless some evenings.

April 28. A mouse having been caught last night I gave it to my cuckoo, which took it in its bill, shook it several times, and appeared to regard it quite as an edible article. On its being divided it ate portions of skin, fur, bones and flesh, and from its manner I think it likely that it would swallow a small mouse if it had the opportunity.

Has not yet changed all its wing-feathers. Is pugnacious towards some, snapping at their fingers, elevating its wings, and saying "cuc, cuc;" manifests fear of others, and when it sees a cat on the garden-wall, or any unusual object at a distance, depresses its feathers, and with its bright eyes anxiously watches the thing that has engaged its attention. I have never seen it cast up any of the more indigestible portions of its food in the manner of predatory birds, although, before it was accustomed to feed itself, it would sometimes eject from its throat a pellet of food given it from the stick with considerable force, by shaking its head and neck. It has never drank of its own accord, but it sometimes has its food moistened with water, and when it was fed by hand I occasionally gave it water from a finger, but certainly with it water does not appear a necessary of life.

May 15. Called "cuckoo" in the evening.

July 15. Cuckoo called as it has done on a few previous occasions.

When not at large in a lumber-room this pet was kept in an osier-cage, in a parlour, or some other warm room, and frequently on winter nights a cloth was placed around its cage to keep off the cold, and as a further precaution one of its perches was bound round with flannel. It frequently plumed its feathers, and on being placed in the sun would droop its wings, and appear to much enjoy the heat. It sometimes hopped from perch to perch, but frequently remained for a long time on one at the top of the cage. Sometimes it would spring up and cling on with its tenacious claws and feet to the higher parts of the cage, and then fall quite to the bottom, often, whilst it was moulting, in this way breaking its new quill-feathers, and making them bleed, if not fully developed. This was a constant source of annoyance to us, and doubtless of pain to our restless, dissatisfied and impatient pet—such, in truth it was. Its restlessness was probably indirectly the cause of its death, for one day I found it in its cage, with the skin of its head so fearfully torn that I thought it best to kill it by pulling off its head—such was the ignominious end of my poor cuckoo. I cannot say it was very much regretted, as, although it had never known liberty, it always seemed to feel itself a captive, notwithstanding the pains we took to make it comfortable, and the regard we showed for it.

J. R. ARCHER BRIGGS.

4, Portland Villas, Plymouth,
March 26, 1868.

Birds occurring in Leicestershire in 1868.

By THEODORE C. WALKER, Esq.

Goldeneye Duck and Pochard.—In January a fine specimen of the goldeneye duck was shot on the fish-pond at Ulverscroft Priory, on the estate of the Earl of Stamford and Warrington; a pochard was also shot at the same place, where specimens occur nearly every winter: this place is in the very centre of England.

Green Sandpiper.—A specimen of this winter visitor was shot in a ditch by Martinshaw Wood, near Ratby.

Gray Phalarope.—A specimen in winter plumage was killed by striking against the telegraph-wires near Leicester.

Bohemian Waxwing.—A very fine adult male was shot at Arnsby, by a farmer, while feeding on a hawthorn-bush during severe weather.

Great Spotted Woodpecker.—An adult male was shot at Bosworth, near the battle-field, on the estate of Sir A. B. C. Dixie, Bart.: this bird is of not unfrequent occurrence in some of our largest woods, as Buddon, Martinshaw, Steward-Hay, &c., but being very shy is seldom seen.

Hawfinch.—A specimen was shot, in the beginning of April, at Belvoir Castle. Birds of this species occur annually about the woodlands of Anstey and Bradgate Park.

Little Bittern.—A specimen of this rare winter visitor* was shot at Billesdon Coplow in January.

Bittern.—A splendid specimen was shot in the snipe-ground of Groby Pool in March. I am told that it is twenty-five years since the last was shot in the county, at Bradgate Park.

Merlin.—A specimen, in immature plumage, was killed a few days since, by dashing at the window of a house in Leicester, causing great consternation to the occupants. An adult bird was shot on the farm of Messrs. Spencer, in this county.

Peregrine Falcon.—I have just seen a splendid adult female at our taxidermists, Messrs. G. Stuart & Co., killed at Weston-super-Mare: an egg ready for extrusion was found in the ovary: the egg is very beautifully coloured.

* [I have a great aversion to making any criticisms on the communications I receive, but I think the term "winter visitor," as applied to the little bittern, is rather assuming a fact before it is established. My own opinion does not coincide with Mr. Walker's, in considering this rare bird a winter visitor.—E. N.]

Kittiwake.—Several specimens have been found dead from starvation in the fields about Earl-Shilton, which is about the very centre of England. A specimen was shot at the West Bridge, in Leicester, during March.

Water-fowl at Groby Pool.—Having ridden over to Groby Pool, a sheet of water of about forty acres, with a marsh adjacent (about five miles from Leicester), I had a good opportunity of watching the habits of some of the water-fowl. I observed a pair of hooded crows flying over Steward-Hay Wood: this is the latest I have observed this species in the county, as they have mostly all departed for the North by this time. As I cautiously approached the boat-house, several mallards and ducks rose from the sedge, and a heron got up and flew slowly farther up the marsh: herons are uncommon in this county, owing to the absence of water. Five or six pairs of teal got up from the rushes and flew overhead with a curious whistling note, not very unlike the cry of the plover. Having carefully hidden behind the reeds, I peeped out over the pool, and was surprised and delighted to see two pairs of beautiful great crested grebes tranquilly floating twenty or thirty yards from me: a pair have visited Groby Pool for the last two or three seasons, as they are strictly preserved. With my glass I could see distinctly the colours of their feathers, and even the twinkling of their bright eyes. The male is considerably larger than the female. The bill, sharp as a spear, is seemingly of a greenish horn-colour; the crest or occipital feathers black, and lying backwards on each side of the head, as in Yarrell's figure; the gular feathers of a rich rufous colour, and the breast of a satin whiteness; the back and wings of a brownish wash. The female has the red on the neck scarcely perceptible. Inquisitive at my approach, they swam backward and forward quite close, the male and female swimming side by side, the female occasionally nodding her head, after the manner of the gallinule: swimming off a little way, the male chased his mate, on which she rose on wing for a few yards, close to the water, and came down tail foremost, and falling forward ploughed up the water with the impetus; then coming close to one another they erected their crests at right angles straight out, and emitted sounds like a low cough uttered very quickly. After watching them a little longer, they separated and commenced diving, gently gliding under without a ripple, and remaining under a considerable time, and on emerging came up head first as gently as they went under: these birds leave us in the winter. The coots were very clamorous, clanking and calling and chasing one

another on the water and among the reeds, ruffling up their feathers, and putting their heads down and tails up: I observed a pair of birds, either coots or gallinules, flying high up over the water in wide circles. The courtship of the gallinule was going on, the male chasing his mate on the island among the reeds and on the water, with head drawn close up and on a level with the water, the female moving her head backward and forward, and jerking her tail and expanding it. But the sun having set, as the evening shades gathered round the pool, quantities of pied wagtails came flitting to the trees above me, and as their companions arrived they joyously flitted out a few yards to meet them, welcoming them with a pretty little song, not unlike a portion of the pipit's song: I had never heard them utter any other than their ordinary chirping notes: gradually they settled down to roost on the bushes of elder and on reeds, twittering the while, but whenever a rook made his appearance, on his way home to the rookery close by, the whole flock rose and chased it till some distance off, twittering the while in great anger.

Rookery at Great Stretton.—Being anxious to procure some rooks' eggs for my collection, I rose before five on the morning of the 1st of April, and after a walk of five miles reached the rookery at Great Stretton, before the sun had dispelled the thick mist which hung over the valleys. The rookery is a small plantation of ash-poles of about three or four acres, with a few larger trees in it. To my astonishment the nests are built on the ash-poles, not more than fifteen or twenty feet from the ground. On my approach the whole cloud of rooks rose from their nests and flew high overhead, uttering dolorous cawings. The nests were composed of the usual materials—sticks and twigs, interwoven and lined with fine hay, &c. The eggs in each nest were mostly five or six, and they varied a good deal both in size and colouring; one is like a jackdaw's, only lighter, while another is very darkly speckled with olive at the thick end. In the beginning of spring last year a colony of rooks built in an ash-pole plantation half-a-mile from Leicester, and when the eggs were all laid, the gamekeeper pulled down all the nests, since which they have deserted the place.

Arrival of Summer Migrants.—April 18. During the past week a cold east wind has prevailed, and the many summer migrants which have arrived have kept mostly concealed, and have sung very little. I first heard the chiffchaff on the 3rd of April singing in a sheltered corner of Shethedges Wood, and the garden warbler and the wheatear on the 7th.

Widgeon.—In passing Groby Pool, on the 18th of April, I saw three pairs of widgeon rise from the sedge, and each pair flying by itself, sailed round me overhead, uttering a succession of whistling notes, as they do in the breeding season: they have most likely a nest near, although they have not been known to breed in the county that I am aware of.

Snipe.—I flushed several snipes from the swamps, on the 18th of April, which is rather late for them to remain here.

Swallow.—On the 18th of April I saw three or four swallows flying low over Groby Pool and the marshes: they were first noticed on the 13th: they are always seen about the pool before visiting the town. I see by my note-book that I did not observe them till the 13th of May last season.

Yellow Wagtail.—April 18. The yellow wagtail has arrived here in the damp meadows.

THEODORE C. WALKER.

Woodside, Leicester.

A Season's Collecting of Land and Freshwater Shells in West Sussex.
By W. JEFFERY, jun., Esq.

IN the 'Zoologist' for July last (S. S. 873), Mr. William Thomson expressed a wish for a list of Sussex shells, and as this has not yet appeared, it may not perhaps be out of place on my part to offer a list of shells found by myself in this neighbourhood last season, together with a few remarks on the same. Mr. Thomson writes, "Beech woods and their vicinity are not generally regarded as prolific collecting-grounds by conchologists," but I have found as many as nine species on beech trees, in addition to those mentioned by Mr. Harting (S. S. 760), *viz.* *Helix hortensis*, *lapidica*, *capitata*, *virgata* and *rotundata*, *Bulimus obscurus*, *Pupa cylindracea*, and *Clausilia bidens* and *nigricans*. Were I in want of specimens of *H. lapidica*, *B. obscurus*, *C. bidens* or *nigricans*, I know of no place near here where I should be so likely to find them as in a certain beech wood. Indeed it has always appeared to me that the *Clausiliæ* were intended by Nature to live in the vicinity of beeches, such a resemblance have these shells in shape and colour to the long leaf-buds of the beech. I am not stating this as an attack on Mr. Thomson's remarks, but merely to show that beech woods on a chalk soil are not altogether to be despised by the shell-collector. But to my list.

1. *Cyclostoma elegans*. Occurs plentifully on dry banks in a chalky soil.

2. *Bithinia tentaculata*. Common in our running streams.

3. *Valvata piscinalis*. As the last-named.

4. *Vitrina pellucida*.

5. *Zonites cellarius*.

6. *Z. nitidulus*.

7. *Z. lucidus*.

8. *Helix aspersa*. Far too numerous in our gardens.

9. *H. hortensis*. Generally distributed. Numerous in most of our hedge-rows in the lowlands, and several varieties occur, including a clear yellow and a pink, both destitute of markings.

10. *H. nemoralis*. Found on the downs amongst juniper-bushes and furze. A pink-coloured banded variety is sometimes found in woods, but is not numerous.

11. *H. obvoluta*. Have not yet met with this species in a living state, but have found untenanted shells on a chalky bank near the downs.

12. *H. lapicida*. Found in tolerable plenty on the stems of beech trees. We have no rocks.

13. *H. caperata*. Generally distributed, but not numerous.

14. *H. virgata*. Plentiful on the chalk downs, but there it attains no great size, seldom exceeding three-eighths of an inch, while in the lower and cultivated ground it reaches three-fourths of an inch in diameter. The only variety is a dull creamy-coloured shell, with the purple lip distinct.

15. *H. ericetorum*. Also pretty numerous on the downs; as a rule, of small size, but in certain parts growing to nearly an inch in diameter.

16. *H. cantiana*. In this district our most common shell; every hedge abounds with it. Clear white examples have occurred to me, though rarely. With *Helix carthusiana* I am unacquainted, and do not think it is to be found in this immediate locality, although it is given as a Sussex species.

17. *H. rufescens*. Common in gardens and hedge-rows.

18. *H. hispida*. Is found sparingly on dry banks. I am in doubt about a species which I find in plenty in some marshy meadows: it appears to me a higher shell (more raised) than *H. hispida*, rather thicker in substance and more glossy in appearance, is generally depilous, but the young would seem to be hairy: whether it will

answer to *H. depilata* I am undecided, but hope to pay more attention to the *animals* during the coming summer.

19. *H. rotundata*.

20. *Succinea putris*.

21. *Bulimus obscurus*.

22. *Zua lubrica*.

23. *Pupa cylindracea*.

24. *Clausilia bidens*.

25. *C. nigricans*. These two *Clausiliæ*, together with *Bulimus obscurus*, are commonly found, as I have said before, on beech trees, seldom in other places. *C. bidens* is very numerous in a plantation of beech on the downs; I could collect almost any number after a summer shower.

26. *Limneus auricularius*. I am uncertain about the identification of this species.

27. *L. pereger*.

28. *L. palustris*.

29. *L. trunculatus*. Scarce.

30. *Planorbis carinatus*.

31. *P. contortus*.

Of the bivalves I cannot say much, having noticed two species only, *Cyclas cornea* and *Anodon cygneus*.

After another season I hope to have many additions to make to this list.

W. JEFFERY, JUN.

Ratham, Chichester, March 20, 1868.

Superstitions concerning the Liver of the Otter and Bear.—Many years ago I was told by a gamekeeper, a native of a parish in Norfolk, where otters were at that time frequently met with, that it was universally believed in that locality that the liver of an otter was divided into a number of lobes, equal to the number of years during which the animal had lived. In recently reading Dr. A. L. Adams's very interesting volume, intitled 'Wanderings of a Naturalist in India,' I was surprised to find, at page 184, that a similar opinion was held by the doctor's "shickaree" respecting the liver of the "isabella or brown bear of the Himalaya." So singular a coincidence is, I think, worthy of record, and I therefore communicate it for the pages of the 'Zoologist.'—*J. H. Gurney; March 31, 1868.*

Peregrine Falcon at Hareland: Parasitical Worms.—Towards the end of December last an adult male peregrine falcon was obtained at Hareland, and sent to me for

preservation: it was a very small bird, the smallest I had ever seen. The principal measurements were—

Bill (including cere), on the curve of upper mandible	-	1½	inch.
Total length, beak to tail, inclusive	- - -	16	inches.
Tip to tip of fully extended wings	- - -	37	„
Wing, from carpal joint	- - -	12½	„
Tail, tip to root	- - -	6½	„

The bird was in a very poor and apparently starved condition: the plumage, however, was good. Excepting a little blackish matter, its stomach proved empty, and on the outside surface I found a mass of thread-worms, about eight or nine in number; they were coiled up together and lying loosely upon the surface: the longest worms measured as much as five inches and a quarter in length.—*T. E. Gunn*; 21, *Regent Street, Norwich*.

Thrush singing while Flying.—One evening last spring a thrush pitched upon the top of a tree close to me, and, for several yards of its flight before it settled, it sang quite loudly, continuing its strains without interruption for some time afterwards. I never before noticed nor heard of this habit.—*Henry P. Hensman*; *Northampton, March 27, 1868*.

The Nightingale.—I heard the nightingale for the first time on the 4th of April and again on the 6th, which I imagine to be very early, as the usual time with us is the 15th.—*Augustus H. Smith*; *Flexford House, Guildford, April 11, 1868*.

Robins nesting in Letter-boxes.—This season a pair of robins have built a nest and hatched their young in the letter-box of Mr. Hill, nurseryman, of Newmarket Road, Norwich. The nest has been built just below the aperture for receiving the letters, but the little birds do not at all seem to mind the daily disturbances necessarily made by the intrusion of letters or the emptying of the box: this is the third season this pair of robins have successively occupied their strange habitation. I remember a similar instance, about five years since, when I saw the nest with the female sitting on her eggs in an old letter-box belonging to a gentleman in the parish of Lakenham, in this city, and, notwithstanding our inspection, the bird still remained faithful to her charge, apparently quite fearless. The gentleman had taken particular pains to preserve his little favourites, and kept the box exclusively for their use: he informed me that the same birds had occupied their strange nesting-place for several successive seasons.—*T. E. Gunn*; *April 10, 1868*.

Brambling breeding in Confinement.—During the course of last summer a pair of bramblings bred in the aviary of a gentleman in Norwich. Materials being supplied, in the shape of dried moss, &c., the birds constructed a nest in a small box that hung at one corner of the aviary: in the course of time the female laid four eggs and sat upon them several days, but leaving them they were taken away, when they proved to be rotten: I have one of the eggs now in my possession. Instances of this kind have been before observed, but I think their occurrence rather unusual.—*Id.*; *February, 1868*.

Pied House Sparrow in Worcestershire.—The following is extracted from a letter received lately from Mr. J. S. Gibbons:—"I shot a male house sparrow during the summer of 1866, which was almost entirely white on the wings and had several white feathers in its tail: I killed it while it was sitting, in company with two common

sparrows, on some railings by the railway, near the Stourport Station, Worcester-shire." Another friend tells me that he killed an albino blackbird near Richmond, Yorkshire, during the winter of 1866-7.—*Alexander Clark-Kennedy; Eton, Bucks, March 13, 1868.*

Arrival of the Wryneck.—On the 5th and again on the 9th of March the wryneck was heard in Great Bealings: it was not heard here last year earlier than the 17th of April.—*E. C. Moor; Great Bealings, Woodbridge, Suffolk, March 23, 1868.*

Wryneck heard.—I was rather surprised, this morning early, to hear and see a wryneck: I watched the pretty little bird for a considerable time. Is it not unusually early for them to make their appearance?—*Edward Sweetapple; Cone Mill, Lydney, Gloucestershire, March 27, 1868.*

Chough in Somersetshire.—Two of these birds made their appearance at Bagborough, a village at the foot of the Quantock Hills, not far from Taunton. My informant gave me the following account:—"They were shot on the 1st of April; they were at that time on the grass in front of the stable-yard, apparently feeding; but I hear they had been seen for a few days previously about the church porch and tower, as if going to build there, and seemed very tame for wild birds. I confess I was very sorry to hear of the poor birds being shot." With this latter sentence I quite agree, as I think there can be very little doubt but they would have bred there, more especially as there are no jackdaws there to molest them, those birds having all been destroyed by the predecessor of the gamekeeper who shot the choughs. I obtained the body of one of them from the birdstuffer, as I wanted the breast-bone: on examining the gizzard I found seven or eight oats, which the bird had no doubt picked up near the stable, some grubs, and some half-digested hard brown skins, which I think were those of earwigs, but I could not be quite certain.—*Cecil Smith; Lydeard House, Taunton, April 13, 1868.*

[Since the sad event recorded above, the following note has appeared in the Taunton papers. St. Audries is about eight miles from Bagborough, where the choughs were killed.—*E. Newman.*]

A Word for Choughs.—I see, under the head of "rare birds," in your impression of the 11th inst., that two choughs were killed a few days ago in the neighbourhood of Taunton. I should feel much obliged to you if you would state in your next journal that these birds had paired and strayed away from St. Audries, where I have for years kept a few, hoping that they would breed, and that thus this interesting and rare bird would again become naturalized on our coast. My neighbours for miles around have kindly assisted my endeavours by sparing my choughs, and I am sure I have only to mention that any choughs which may be seen about the county are pet birds which have taken a long flight from their home, to induce all gentlemen to preserve them. The chough may be easily distinguished from the commoner species of the pie kind by its purple-black plumage, its bright red legs and beak, and its peculiarly wild cry.—*Alexander Acland Hood; St. Audries, Bridgwater, April 13, 1868.*

Colour of Cuckoo's Eggs.—I have eight cuckoo's eggs in my collection, some of which were laid in the nests of reed and sedge warblers, and they exactly agree in colour with the eggs of the foster-parents.—*John A. Harvie Brown; April 2, 1868.*

Swallows.—In Sweden the swallows, as soon as the winter begins to approach, plunge themselves into the lakes, where they remain asleep and hide under the ice till

the return of the summer, when, revived by the new warmth, they come out and fly away as formerly. While the lakes are frozen, if somebody will break the ice in those parts where it appears darker than the rest, he will find masses of swallows,—cold, asleep and half dead,—which, by taking out of their retreat and warming, either with his hands or before a fire, he will see gradually to vivify again and fly. In other countries they retire very often to the caverns under the rocks: as many of these exist between the city of Caen and the sea, on the banks of the Orne, there are found sometimes during the winter piles of swallows suspended in these vaults, like bundles of grapes. We have witnessed the same thing in Italy, where, as well as in France, it is considered very lucky by the inhabitants when swallows build nests on their habitations.—*Morning Advertiser, February 4, 1868.* [When will this fable be forgotten?]

Woodcock killed by Telegraph-wires.—On the 12th of March a woodcock was found under the telegraph-wires about a hundred yards from the Bealings Station of the Great Eastern Railway: its head was nearly severed from its body.—*E. C. Moor.*

White Woodcock in the North of Yorkshire.—On the 15th of December, 1867, I received for preservation a beautiful variety of the woodcock, which I was informed had been shot, two or three days previously, somewhere in the North of Yorkshire, by one of a party of gentlemen engaged in grouse shooting. The whole of the upper parts of its plumage are white, suffused with a pale ash-gray tinge, the bars and markings being of a very pale rufous hue, and the broad transverse bars on the crown of its head of a pale brownish gray; the under surface of plumage white, the usual transverse bars being of the faintest water-markings, indeed scarcely distinguishable; iris same colour as the ordinary examples; bill and legs somewhat paler. On dissection it proved to be an adult female.—*T. E. Gunn.*

Spring Moulting of the Jack Snipe.—Jack snipes still appear on our Moors, and they were observed in considerable numbers last week, or rather this week, commencing March 30, on the marshes in the Moors around Kilmar. It may not be generally known that this snipe moults all its tail-feathers simultaneously at this season of the year. I received a specimen this day from my nephew, who first called my attention to the fact. On examining this specimen the entire new tail was "sprouting," and had grown about three-quarters of an inch, the bases of the feathers being, of course, in a succulent state. I am not aware whether this character is confined to this species, but I mention the fact as new to me.—*Edward Hearle Rodd; Penzance, April 4, 1868.*

Bittern breeding in Norfolk.—The bittern was formerly a rather common resident in Norfolk, and in the time of Sir Thomas Browne bred in some numbers in our Fens and Broads, but of later years the species has become more scarce, its visits being almost exclusively confined to the winter season. Very few are the instances of its occurrence in the summer; in fact, so rare has the nesting of the bittern become of recent years that standard authors, such as Yarrell and others, cannot give more than three well-authenticated instances of its breeding in Great Britain, and in two of these cases the young had been hatched; in the third instance a single egg was obtained at Ranworth, in Norfolk, and it is this latter specimen that the Rev. F. O. Morris, in his work on the 'Eggs of British Birds,' has figured in his plate (vol. ii. p. 147). Seeing, then, that the nesting of the bittern is of such rare occurrence in Britain, it may prove somewhat interesting to the readers of the 'Zoologist' to learn that a nest containing two beautiful fresh-laid eggs was taken, on the 30th of March last, in the neighbour-

hood of one of our Broads. I have fortunately succeeded in purchasing both the eggs for my own collection, and while still in the yelk I exhibited them at the Meeting of the Norwich Naturalists' Society, held on the 6th of April. The old birds had frequently been observed for some time past in the vicinity of the Broad by a labouring man residing near the spot, and who, from their appearance and manners, imagined they had nested, or were preparing to nest, in that locality: his surmises proved to be correct, for on the day stated above he found the nest containing the two eggs only. This date I think unusually early for the breeding of the bittern: on this point, however, I am not certain, neither Yarrell nor Morris giving the slightest information as to the time of their nesting. The nest, as is usually stated by authors, was composed of reeds and sticks. The eggs are of a uniform pale brownish colour, a shade or two darker than the usual hue of the common pheasant's egg, but the shell is not of that glossy surface, the texture being somewhat coarser. One egg is a trifle larger than the other, and presents a beautiful oval form; the other tapers more at the ends, particularly at one end. Their respective measurements are as follows:—*first*, 2 inches 3 lines in length by 1 inch $7\frac{1}{2}$ lines in diameter; *second*, 2 inches 3 lines in length by 1 inch $6\frac{1}{2}$ lines in diameter.—*T. E. Gunn; April 10, 1868.*

Eider Duck on the Essex Coast.—A fine specimen of the male eider (*Anas mollissima*), in immature plumage, was shot in the last week of December, 1867, at Mersea, and has been added to my collection. This bird, so common in the North of Scotland, is rare in the South. I have never before met with it, or heard of its being captured, on the Essex coast. The bird in its first winter's dress is very different from that in the summer adult livery, and the naturalist is sometimes puzzled to distinguish it from its near ally, the king duck (*Anas spectabilis*). Temminck tells us that the females of the two species are alike; but Degland has pointed out that the female king duck is of a redder brown, the beak shorter, and the feet yellow instead of greenish black. In my bird dissection, displaying the bony labyrinth, told me that my specimen was a male, and I had no difficulty in referring it to the eider, although the measurements were the same as those of the female king duck in my collection, allowing for the difference in a dried and fresh skin; but the feet and legs were blackish green, the web nearly black, and the plumage altogether of a darker brown, quite distinct from the rich red-brown of the female and young male king duck.—*Dr. Bree, in the 'Field' Newspaper.*

Great Northern Diver near Birkenhead.—On the 9th of April, while on a visit to General the Hon. Sir Edward Cust, at Leasowe Castle, near Birkenhead, I sallied forth along the shore towards Hoylake, and after I had passed the town and arrived opposite Hilbre Island I was surprised to see a great northern diver swimming leisurely in the shallow water about a couple of hundred yards distant from the shore. Although I had a gun with me, I was armed with a far better weapon—a pair of opera-glasses, which have seen service in Africa; and by their means I was enabled to observe the bird to great advantage. The second week in April is a late date to see a northern diver so far South.—*A. Clark-Kennedy.*

Blackthroated Diver at Lowestoft.—A male of the blackthroated diver was shot on the 14th of January last, on the coast in the vicinity of Lowestoft, and on the following day was forwarded to me to preserve for a gentleman residing in that town. The bird was apparently assuming the adult plumage, numerous square white spots appearing on the feathers of its back, wings and upper wing-coverts. Some of the black feathers

of the throat, and the black and white striped feathers of each side of the neck, were also making their appearance. The following are the dimensions:—

Total length, beak to tail, both inclusive	-	-	-	30 inches.
Tip to tip of fully extended wings	-	-	-	50 "
Wing, from carpal joint to tip	-	-	-	13 "
Bill: tip to base	-	-	-	$2\frac{3}{8}$ "
„ tip to gap	-	-	-	$3\frac{7}{8}$ "

Neither Yarrell nor Morris gives the weight of specimens of the blackthroated diver: the one here recorded weighed just five pounds. The stomach contained some fish-bones, scales, and part of a small roach.—*T. E. Gunn.*

Iceland Gull off Brixham.—I have just seen a nearly adult specimen of the Iceland gull at the shop of Mr. Jacobs, birdstuffer, Newton Abbot. Mr. Jacobs informs me that he shot the bird from a boat off Brixham, on the 23rd of March, and that it was in company with a flock of herring gulls.—*J. H. Gurney; March 26, 1868.*

Picked Dog-fish with Coralline attached.—On the 18th of March a picked dog-fish was brought to me: it was a female, heavy with young, of full age, and apparently healthy: its peculiarity was that with its root or base under, and clinging all round the spine of the second dorsal, there was a healthy growing specimen of the sea-hair coralline (*Sertularia operculata*). The coralline had several branches, and was about four inches long: it was growing so firmly on the spine that I could not remove it without destroying the root.—*Thomas Cornish; Penzance, March 21, 1868.*

Salmon Peel at Penzance.—Salmon peel have this week been taken in drift-nets, several leagues south of the Runnel-stone—that is, in the open sea in deep water: I have not seen the fish myself, but I can rely on my information.—*Id.; March 28, 1868.*

Boar-fish near Penzance.—A small but very perfect specimen of the boar-fish (*Zeus aper*) was brought to me on the 11th of March. It was picked up dead on the beach at Sennen Cove, near the Land's End. This cove is near the Runnel-stone, at which place a large number of these little fish were taken by a trawler some years ago.—*Id.; March 22, 1868.*

Boar-fish at Whitsand Bay, Land's End.—Through the kindness of Mr. J. Symons, of Mayon, I have received another specimen of the boar-fish, found washed ashore this week at Whitsand Bay, Land's End. It is of importance, because its diminutive size authorizes the belief that it was hatched in our seas. It measures over all one inch and five-eighths; eye to fork one inch and one-eighth; in depth, without fins, six-eighths of an inch, and including fins one inch and one-eighth; head, from the extremity of the snout to the posterior edge of the operculum, four-eighths of an inch, of which the nearly circular orbit of the eye occupied a space of no less than seven thirty-seconds of an inch. In this extraordinary size of the eye and in a well-defined black spot at the upper base of the caudal-fin it differs from *Zeus aper*, as described by Yarrell and Couch; but as in all other respects, including colour, it agrees with their description, I am inclined, considering its size, to treat it as an immature specimen of the genus with which we are already acquainted. *Corystes Cassevelaunus* has already been brought to me: its appearance is early.—*Id.; March 28.*

Food of the Cod.—In the stomach of a cod-fish caught near Hoylake, in Cheshire, on the 4th of November, 1864, were the following:—one small ray, six small whiting, four soldier-crabs in whelk-shells, one small crab, thirty-nine flounders, one periwinkle, one whelk *minus* the shell, one doris (or sea-mouse), making a total of fifty-four fish. Does the food of this fish usually vary so much as this? Perhaps some other readers of the 'Zoologist' can supply further particulars as to the "bill of fare" of the cod.—*A. Clark-Kennedy.*

Scyllarus arctus off *Penzance.*—On the 7th of January last I had brought to me no less than three specimens of *Scyllarus arctus*: they were taken from the stomach of a common cod, which was caught about two miles off shore in the bay here: all three were in good condition, and I have preserved them. In the same cod-fish were three specimens of *Galathea strigosa*, two in good condition, the third having its shell softened by digestion. I judge from this that the sound specimens had been captured by the cod very shortly before it was itself taken.—*Thomas Cornish; March 21, 1868.*

Extracting Molluscous Animals from the Shell.—I shall be very glad to be informed by some of the correspondents of the 'Zoologist' of the best mode of extracting the animal from small shells, without injuring the colour of the shell.—*James Murton; Silverdale, Lancaster, April 22, 1868.*

PROCEEDINGS OF SOCIETIES.

ZOOLOGICAL SOCIETY.

March 12, 1868.—GEORGE BUSK, F.R.S., V.-P., in the chair.

The Secretary exhibited a monkey which had been brought by Mr. Monteiro from Cabinda, West Africa, and which had been named, by Dr. Gray, *Presbytes albigena*.

A letter from Dr. Peters was read with reference to the new rodent, *Lophiomys imhausii*, from Upper Nubia, lately described by M. Milne-Edwards.

An interesting communication was read from Professor Baird on the nestling plumage of the Californian vulture.

The Secretary read a letter from Dr. Cunningham, naturalist to the Magellan Straits Survey Expedition, relating to the Zoology of Fuegia and Patagonia.

Mr. Flower read a paper on the cetaceans *Balænoptera Carolinæ* and *Physeter Sibbaldi*, and came to the conclusion that these two species, which had been described as distinct, were probably identical.

The Secretary read a report from Surgeon Day, in which he described some new fishes from Madras.

A paper was also read from Captain Abbott on the seals of the Falkland Isles. It appeared that four species were found there, and the Secretary made some remarks on the determination of these species.

Dr. Gray read a synopsis of the species of pouched mice (*Sacomysinae*) in the collection of the British Museum.

Dr. Gray also made some remarks on a supposed new species of badger from China, which he proposed to call *Meles chinensis*.—*J. E. H.*

ENTOMOLOGICAL SOCIETY.

April 6, 1868.—H. W. BATES, Esq., President, in the chair.

Donations to the Library.

The following donations were announced, and thanks voted to the donors:—Hewitson's 'Exotic Butterflies,' part 66; presented by W. W. Saunders, Esq. Newman's 'British Moths,' No. 16; by the Author. 'The Zoologist' for April; by the Editor. 'The Entomologist's Monthly Magazine' for April; by the Editors. 'Proceedings of the Holmesdale Natural History Club, for 1866-67,' and 'Natural History of Reigate and its Vicinity: List of Coleoptera, Part 2;' by the Holmesdale Natural History Club.

Exhibitions, &c.

Mr. Stainton exhibited larvæ of a new species of *Nepticula*, sent from Mentone by Mr. Moggridge, where they were found in the leaves of *Euphorbia dendroides*. The perfect insect had been obtained from larvæ of the previous season, and would be described as *Nepticula euphorbiella*.

Mr. Stainton also exhibited the specimen which in 1854 he had described ('*Insecta Britannica*,' iii. 47) under the name of *Nemophora Carteri*; it was formerly in the collection of the late Mr. S. Carter, of Manchester (who, however, was unable to give any account of the insect or its place of capture), and had now passed into the possession of Mr. S. Stevens. Recent examination had convinced Mr. Stainton, and the exhibition of the specimen satisfied the other Lepidopterists present, that the supposed *Nemophora Carteri* was a fabrication, made by attaching the hind wings of a *Cerostoma* to the fore wings of a *Nemophora*.

Mr. W. C. Boyd exhibited a strongly marked variety of *Stenopteryx hybridalis*, captured in Hertfordshire.

Mr. J. Jenner Weir exhibited a *Polyommatus* captured at Lewes, which he regarded as a hybrid between *P. Adonis* and *Alexis*; also varieties of *P. Corydon* and *Alexis*, with confluent spots on the under side, and a male-like female of *P. Alexis*.

Mr. Druce exhibited a collection of butterflies collected by Mr. Pearson in Bolivia.

Mr. F. Smith mentioned that about September, 1866, Mr. Waring Kidd had sent to the British Museum a pollard oak, which was placed in a closed case in one of the galleries, for the purpose of showing the *modus operandi* of *Cynips Kollari*. In the spring of 1866 a numerous brood of *Clytus arietis* appeared in the case; they were observed running about the oak-stump for about three weeks, when, unable to escape, they died, and their remains were afterwards swept away. The same thing occurred in 1867, and in 1868, on the morning of the Meeting, the *Clytus* had made its third appearance. The large quantities of camphor placed in the Museum cases did not seem to affect them, or to prevent the development of the beetle.

Mr. Janson said that camphor, though useful in preventing the entry of insects, was powerless to destroy them: at the same time he doubted whether the *Clytus* had been reproduced in the Museum; the insect probably remained in the larva state for two or three years, and it was quite possible that all the larvæ from which the successive broods of 1866, 1867 and 1868 had appeared were present in the wood on its admission into the Museum in 1865.—*J. W. D.*

The American Silk-worm. By L. TROUVELOT.*

THE insect fauna of North America contains several gigantic species of moths belonging to the Lepidopterous family Bombycidae. This family has long been known to spin, when in the larval or caterpillar state, a cocoon which produces a large amount of silk, with a fibre of the most delicate texture, of great strength and of the most beautiful lustre. Every one is familiar with the beautiful and delicate fabric made from the fibres spun by that crawling repulsive creature, the silk-worm. Our country alone has eight or ten species of silk-worms: two of these, *Callosamia Promethea* and *C. angulifera*, feed on the lilac and wild cherry: they spin a small elongate cocoon of so very dense texture and so strongly gummed, that I have failed in all my attempts to reel the silk from the cocoon. These cocoons resemble very much those of *Samia Cynthia*, or the *Ailanthus* silk-worm, recently introduced into Europe from China, but the cocoon is of a looser texture. *Platysamia Euryale*, *P. Columbia* and *P. Cecropia* feed upon many different species of plants: they make a large cocoon, within which is another cocoon, or inner layer, of an oval form; but as the larva in spinning the cocoon leaves one end open for the exit of the moth, this prevents the reeling of a continuous thread: the silk, though quite strong, has not much brilliancy, and the worm is too delicate to be raised in large numbers. The caterpillar of *Tropæa Luna*, the magnificent green moth with the long tail-like expansion of the hind wings, feeds upon the oak, sycamore and other trees, and spins an oval cocoon, which, however, is so frail and thin, and the fibre so weak, that it is impossible to reel it.

Practically, however, the larva of *Telea Polyphemus* is the only species that deserves attention. The cocoons of *Platysamia Cecropia* may be rendered of some commercial value, as the silk can be carded, but the chief objection, as stated above, is the difficulty of raising the larva. The *Polyphemus* worm spins a strong, dense, oval cocoon, which is closed at each end, while the silk has a very strong and glossy fibre. For over six years I have been engaged in raising the *Polyphemus* worm, and here present the following imperfect sketch of the progress made from year to year in propagating and domesticating these insects from the wild stock.

* Reprinted from the 'American Naturalist,' published by the Essex Institute, Salem.

In 1860, after having tested the qualities of the cocoons of the different species of American silk-worms, I endeavoured to accumulate a large number of the cocoons of the Polyphemus moth, for the future propagation of the species. At first the undertaking seemed very simple; but who will ever know the difficulties, the hardships and discouragements which I encountered! This worm having never been cultivated, of course its habits were entirely unknown, though all success in my undertaking depended very much upon that knowledge: however, I was not discouraged by the difficulties of the task. The first year I found only two caterpillars: the chance of their being each a male and female was very small, and it was another question whether the two sexes would come out of the cocoon at about the same time for the fecundation of the eggs. So success was very doubtful. Spring came, and with it one of the perfect insects: it was a male; one, two, three days elapsed, my poor male was half dead, the wings half broken, the other cocoon was not giving any signs of an early appearance: imagine my anxiety; it was a year lost. The male died on the sixth day. The other moth came out more than a fortnight after: it was a male also. During the summer of 1861 I found a dozen worms, knowing then a little about their habits. In the spring of 1862 I was fortunate enough to have a pair of these insects that came out of the cocoon at the proper time, and I obtained from their union three hundred fecundated eggs. The pair which gave me these eggs were the originators of the large number which I have cultivated since. Of these three hundred worms I lost a great many, not knowing their wants, but I succeeded in obtaining twenty cocoons in the autumn. It was only in 1865 that I became expert in cultivating them, and in that year not less than a million could be seen feeding in the open air upon bushes covered with a net: five acres of woodland were swarming with caterpillar life.

Natural History of Telega Polyphemus.—Early in summer the chrysalis of Polyphemus, which has been for eight or nine months imprisoned in its cocoon, begins to awaken from its long torpor, and signs of life are manifested by the rapid motion of its abdomen. In the latitude of Boston the earliest date at which I have seen a perfect insect is the 20th of May: from this time until the middle of July the moths continue to come out of the cocoons. The cocoon being perfectly closed, and a hard gummy, resinous substance uniting its silken fibres firmly together, it is quite hard for the insect to open it, as it has no teeth nor instrument of any kind to cut through it, and the

hooked feet are far too feeble to tear such a dense structure. But the moth must have some means of exit from the cocoon: in fact, they are provided with two glands opening into the mouth, which secrete, during the last few days of the pupa state, a fluid which is a dissolvent for the gum so firmly uniting the fibres of the cocoon: this liquid is composed in great part of bombycic acid. When the insect has accomplished the work of transformation which is going on under the pupa-skin, it manifests a great activity, and soon the chrysalis-covering bursts open longitudinally upon the thorax; the head and legs are soon disengaged, and the acid fluid flows from its mouth, wetting the inside of the cocoon. The process of exclusion from the cocoon lasts for as much as half an hour. The insect seems to be instinctively aware that some time is required to dissolve the gum, as it does not make any attempt to open the fibres, and seems to wait with patience this event. When the liquid has fully penetrated the cocoon the pupa contracts its body, and pressing the hinder end, which is furnished with little hooks, against the inside of the cocoon, forcibly extends its body; at the same time the head pushes hard upon the fibres, and a little swelling is observed on the outside. These contractions and extensions of the body are repeated many times, and more fluid is added to soften the gum, until under these efforts the cocoon swells, and finally the fibres separate, and out comes the head of the moth. In an instant the legs are thrust out, and then the whole body appears; not a fibre has been broken, they have only been separated. To observe these phenomena I had cut open with a razor a small portion of a cocoon in which was a living chrysalis nearly ready to transform. The opening made was covered with a piece of mica, of the same shape as the aperture, and fixed to the cocoon with mastic so as to make it solid and air-tight: through the transparent mica I could see the movements of the chrysalis perfectly well.

When the insect is out of the cocoon it immediately seeks for a suitable place to attach its claws, so that the wings may hang down, and by their own weight aid the action of the fluids in developing and unfolding the very short and small pad-like wings. Every part of the insect on leaving the cocoon is perfect, and with the form and size of maturity, except the pad-like wings and swollen and elongated abdomen, which still gives the insect a worm-like appearance: the abdomen contains the fluids which flow to the wings. When the still immature moth has found a suitable place it remains quiet for a few minutes, and then the wings are seen to grow very rapidly by the afflux of the

fluids from the abdomen. In about twenty minutes the wings attain their full size, but they are still like a piece of wet cloth, without consistency and firmness, and as yet entirely unfit for flight, but after one or two hours they become sufficiently stiff, assuming the beautiful form characteristic of the species. If, while the wings are growing, they are prevented from spreading by some agency they will be deformed for ever. Sometimes when the wings are developing the afflux of liquid is so great that some parts of the wing swell up considerably, and if one of these swellings be opened with a pin and the sac emptied a singular phenomenon will result; the wing which has lost so much of its fluids will be smaller than the others, and sometimes it will retain the normal form of the wing, only being smaller, while the wound can be detected only on very close observation. I have in my cabinet a perfect specimen of such an insect: naturalists would regard it as a monstrosity. The moth remains quiet all day, and sometimes all night and the following day, if the night be cold; but if it be warm and pleasant, at dusk or about eight o'clock, a trembling of the wings is observed for a few minutes, and then it takes its flight, making three or four circles in the air. The male flies only a few minutes, and then rests for two or three hours in the same place, not making any motion. It is worthy of notice that the place of rest is always the extremity of an oak-leaf. Why he remains there so long I could not ascertain. The female continues to fly about the bushes, and though a virgin she lays eggs, which are, however, of no use for the propagation of the species: she continues so doing for two or three hours, and then rests all night attached to some plant, probably waiting for her mate, who during this time has either remained motionless or has been feeding on the sweet exudation of the oak-leaf. Soon after the female moth has laid these useless eggs the males become very active, and fly in search of their partners, whom they soon discover, especially if there be a slight breeze and the air loaded with vapours.

The moth lays her eggs on the under side of the leaves, sometimes on a twig: generally but a single egg is deposited at one place, rarely are two or three found together. I have observed that eggs are sometimes laid upon plants which the young larvæ refuse to eat, and in several instances where there was no other plant within a long distance, and consequently the young worms died: thus it seems that instinct, like reason, sometimes commits blunders, and is not so infallible a guide as has been supposed. The incubation of the eggs lasts ten or twelve days, according to the temperature. The young

worm eats its way through the shell of the egg; sometimes the young larva comes out of the egg tail foremost, as the hole in the shell is large enough to allow of the exit of the tail, but is not large enough for the head to pass through, so the worm is condemned to die in the egg. As soon as it is fairly hatched out the larva continues for some time eating the egg-shell, and then crawls upon a leaf, going to the end of it, where it rests for two or three hours, after which it begins to eat. The hatching out takes place early in the morning, from five till ten o'clock; rarely after that time.

The *Polyphemus* worm, like all other silk-worms, changes its skin five times during its larval life. The moulting takes place at regular periods, which come round about every ten days for the first four moultings, while about twenty days elapse between the fourth and fifth moulting. The worm ceases to eat for a day before moulting, and spins some silk on the vein of the under surface of a leaf; it then secures the hooks of its hind legs in the texture it has thus spun, and there remains motionless; soon after, through the transparency of the skin of the neck, can be seen a second head, larger than the first, belonging to the larva within. The moulting generally takes place after four o'clock in the afternoon; a little before this time the worm holds its body erect, grasping the leaf with the two pairs of hind legs only; the skin is wrinkled and detached from the body by a fluid which circulates between it and the worm; two longitudinal white bands are seen on each side, produced by a portion of the lining of the spiracles, which at this moment have been partly detached; meanwhile the contractions of the worm are very energetic, and by it the skin is pulled off and pushed towards the posterior part; the skin thus becomes so extended that it soon tears, first under the neck, and then from the head. When this is accomplished the most difficult operation is over, and now the process of moulting goes on very rapidly. By repeated contractions the skin is folded towards the tail, like a glove when taken off, and the lining of the spiracles comes out in long white filaments. When about one half of the body appears, the shell still remains like a cap, enclosing the jaws; then the worm, as if reminded of this loose skull-cap, removes it by rubbing it on a leaf; this done, the worm finally crawls out of its skin, which is attached to the fastening made for the purpose. Once out of its old skin the worm makes a careful review of the operation, with its head feeling the aperture of every spiracle, as well as the tail, probably for the purpose of removing any broken fragment of skin which might have remained

in these delicate organs. Not only is the outer skin cast off, but also the lining of the air-tubes and intestines, together with all the chewing organs and other appendages of the head. After the moulting the size of the larva is considerably increased; the head is large, compared with the body, but eight or ten days later it will look small, as the body will have increased very much in size. This is a certain indication that the worm is about to moult. Every ten days the same operation is repeated; from the fourth moulting to the time of beginning the cocoon the period is about sixteen days. The worms seem entirely unable to discern objects with their simple eyes, but they can distinguish light from darkness, as a very simple experiment will show. If a worm be put in a box with two holes in it, one of them turned to the light, the other to the dark, the caterpillar will very soon come out through the hole turned to the light.

It is astonishing how rapidly the larva grows, and one who has no experience in the matter could hardly believe what an amount of food is devoured by these little creatures. One experiment which I made can give some idea of it: when the young silk-worm hatches out it weighs one-twentieth of a grain; when

10 days old it weighs	$\frac{1}{2}$ a grain, or	10 times the original weight.
20	3 grains,	60
30	31	620
40	90	1800
56	207	4140

When a worm is thirty days old it will have consumed about ninety grains of food; but when fifty-six days old it is fully grown and has consumed not less than one hundred and twenty oak-leaves, weighing three-fourths of a pound; besides this it has drank not less than one-half an ounce of water. So the food taken by a single silk-worm in fifty-six days equals in weight eighty-six thousand times the primitive weight of the worm. Of this about one-fourth of a pound becomes excrementitious matter; two hundred and seven grains are assimilated and over five ounces have evaporated. What a destruction of leaves this single species of insect could make if only a one-hundredth part of the eggs laid came to maturity! A few years would be sufficient for the propagation of a number large enough to devour all the leaves of our forests. When fully grown the worm, which has been devouring the leaves so voraciously, becomes restless and crawls about the branches in search of a suitable place to build up its cocoon; before this it is motionless for some time, holding on to the twig with its

front legs, while the two hind pair are detached; in this position it remains for some time, evacuating the contents of the alimentary canal, until finally a gelatinous, transparent, very caustic fluid, looking like albumen, or the white of an egg, is ejected: this is a preparation for the long catalepsy that the worm is about to fall into. It now feels with its head in all directions to discover any leaves to which to attach the fibres that are to give form to the cocoon. If it finds the place suitable it begins to wind a layer of silk around a twig; then a fibre is attached to a leaf near by, and by many times doubling this fibre, and making it shorter every time, the leaf is made to approach the twig at the distance necessary to build the cocoon: two or three leaves are disposed like this one, and then fibres are spread between them in all directions, and soon the ovoid form of the cocoon distinctly appears. This seems to be the most difficult feat for the worm to accomplish, as after this the work is simply mechanical, the cocoon being made of regular layers of silk united by a gummy substance. The silk is distributed in zigzag lines of about one-eighth of an inch long. When the cocoon is made the worm will have moved his head to and fro, in order to distribute the silk, about two hundred and fifty-four thousand times.

After about half a day's work the cocoon is so far completed that the worm can hardly be distinguished through the fine texture of the wall: then a gummy resinous substance, sometimes of a light brown colour, is spread over all the inside of the cocoon. The larva continues to work for four or five days, hardly taking a few minutes of rest, and finally another coating is spun in the interior, when the cocoon is all finished and completely air-tight. The fibre diminishes in thickness as the completion of the cocoon advances, so that the last internal coating is not half so thick and so strong as the outside ones. During the process of spinning, the worm contracts and diminishes in size as the silk reservoirs empty. Six or eight days after the beginning of the cocoon the worm casts its last larva-skin, and then appears under a very different form—a transitory one, which is neither worm nor moth: it is the chrysalis or pupa. When the chrysalis comes out of the larva-skin, if observed closely, it will be seen that its resemblance to the perfect insect is striking; the antennæ, the head, the legs and abdomen resemble very much those of the moth. The wings only are very small, but in a few minutes they grow to about half the size of the abdomen. The legs of the chrysalis, at least the tarsi, are enclosed in the articulated leg of the larva, the wings are folded under

the skin of the second and third segments, and the antennæ are rolled up in the lobes of the cranium. When the chrysalis comes out every part is detached and free, and if then put in alcohol they will remain so; but when left to its natural course it will soon be observed that a general envelope covers the whole chrysalis, and that any motion of the legs, wings and antennæ is impossible, since the insect is contained in the hard brownish envelope secreted by its tegument, and now resembles an Egyptian mummy. If before the shell of the pupa has become hard an antenna, a leg or a wing be changed from the position that the insect has given to it, that part of the body which would otherwise have been covered by the part removed out of place will remain of a different colour and of a thinner consistence, and an insect thus treated will not generally live to arrive at the imago state.

Before the last transformation is accomplished the insect takes a long rest, and this period is the longest of its life—if it can be called an existence to live without eating, breathing, or even, probably, without having any distinct sensation. The pupa spends about nine months in this torpor, and braves the hardships of winter, notwithstanding all the changes of temperature, being frozen as hard as a stone. It is only when the warm spring days come that life awakens, and the pupa is transformed into a perfect insect. If a worm be opened longitudinally, even when half-grown, there will be found in the female a vast number of little globular white bodies attached to a fine tube on each side of the stomach. These little bodies are the eggs of the future female moth, as yet in a rudimentary state. This is the only method of distinguishing the female from the male while in the larva-state. I have never been able to find any other character by which to distinguish the sexes. Again, on making the same dissection of the larva, there will be found on each side of the stomach, and running from head to tail, two long secretory reservoirs, making a great many convolutions: these are the silk-reservoirs: the transparent liquid they contain is the silk, as yet in a liquid state. If one of these vessels be taken out carefully and stretched, it will measure twenty-five inches in length: these two reservoirs become very narrow as they approach the mouth, and unite together, terminating in a special contractile organ attached beneath the mouth. When spinning, the silk is thrown out from the two reservoirs at the same time, and the thread is in reality composed of two distinct fibres which can be easily separated. The silk in the reservoirs is sometimes used in commerce, being sold under the name of "gut." The process of obtaining the

gut is very simple: it consists in preparing worms ready to spin by putting them in strong vinegar for eighteen hours; a transverse opening is then carefully made on the under side and about the middle of the body, taking care not to injure the silk-reservoirs, which are very distinct. The glands, or reservoirs, are then taken out and stretched parallel to each other on a board, and dried in the shade for several days.

The Enemies of the Silk-worm.—Birds are the most formidable foes to the silk-worm, especially the thrushes, cat-birds and orioles. It is probable that ninety-five out of a hundred worms become the prey of these feathered insect-hunters. Toads and snakes also destroy some, and mice, rats, moles and squirrels eat the chrysalis enclosed within the cocoon. Among insects they have many enemies, such as various spiders, ants, bugs and wasps; but their most dangerous foe is the Ichneumon fly. A Tachina-like fly also deposits its eggs in the body of the larva. The Ichneumon flies can be seen in summer flying about bushes in search of caterpillars in which to deposit their eggs; and I have observed them often flying for an hour among shrubs where no worms were feeding, for which they searched carefully, peering under almost every leaf. When an Ichneumon detects the presence of a worm she flies around it for a few seconds, and then rests upon the leaf near her victim: moving her antennæ very rapidly above the body of the worm, but not touching it, and bending her abdomen under the breast, she seizes her ovipositor with the front legs, and waits for a favourable moment, when she quickly deposits a little oval white egg upon the skin of the larva: she remains quiet for some time and then deposits another egg upon the larva, which only helplessly jerks its body every time an egg is laid on it: she thus lays some eight or ten eggs, which adhere so firmly to the skin that it is very difficult to take them off. After several days these eggs hatch out, and the small white larvæ may be seen at work as soon as they are out of the eggs, digging their way under the skin of the worm, on whose fatty portions they feed. The caterpillar, however, continues to eat and grow, and lives long enough to make its cocoon; but when once enclosed in it the parasites which prey upon it have already eaten the fatty portions, and now attack the vital parts of the larva, which they speedily consume, and finally the one that outlives the others makes a cocoon within that of the Polyphemus larva; but it is a remarkable fact that here the maternal instinct of the Ichneumon fly makes a terrible mistake: several of the Ichneumon larvæ have entered the worm, but

only one of them can find food enough to enable it to arrive at maturity; so probably the strongest one devours its weaker brethren when food becomes scarce, or else they die from hunger.

Description of the Larva of Polyphemus.—When fully grown this larva measures over three inches in length, and the body is very thick. The head is of a light chestnut-brown colour; the body of a handsome transparent light yellowish green, with seven oblique lines, of a pale yellowish colour, on each side of the body; the segments are each adorned with six tubercles, giving rise to a few hairs, which are tinted sometimes with orange, with a silvery spot on the middle: there are six rows of protuberances, two on the back and two on each side, and the oblique lines run between the two rows of lateral tubercles uniting the lower one to the upper one by a yellowish line. The under side of the body is longitudinally striped with a faint yellowish band; the spiracles are of a pale orange colour, and the feet are brown. The posterior part is bordered by a purplish brown angular line similar to the letter V.

Description of the Pupa.—The pupa is much of the form and size of a robin's egg; the colour is dark chestnut-brown, with a pale greenish spot at the base of the antennæ. The form of the legs, wings and antennæ are distinctly marked, while the posterior part is furnished with a brush of minute hooks.

For a description of the moth see the 'Synopsis of Lepidoptera,' by Dr. J. G. Morris (published by the Smithsonian Institution, Washington), only observing that there are at least six varieties—the yellow, the ferruginous, the brown, the greenish, the pale cream-colour, and another variety with the black lunule on the secondaries replaced by a ferruginous spot. The male can be easily distinguished from the female by its lighter form and by its smaller abdomen, which is not so highly coloured as that of the female; but the most striking difference is in the antennæ; those of the male are pectinated, broad, and like two feathers adorning the head, while those of the female are narrow and very much smaller.

Description of the Egg.—The egg is about one-tenth of an inch in diameter, almost cylindrical, with the two ends convex. The cylindrical surface is brown, with a narrow white spot about one-half the width of the egg; the two convex parts are white. One hundred of them weigh, on the day they are laid, eight grains; but an evaporation of the fluid contents of the body takes place, and on the day the young hatch out the same number weigh only six and two-third grains:

one hundred and ten empty shells weigh one grain : about six thousand worms are equivalent in weight to one ounce.

I will now proceed to give some instructions as to the rearing of the worm : they will be easily understood, if I have been clear enough in explaining the natural history of the *Polyphemus* silk-worm.

Selection and Preservation of Cocoons intended for Stock.—The cocoons intended for the propagation of the species for the following year should be carefully selected. As a general rule, the female larva is larger than the male ; so the cocoon of a female is also larger than the male cocoon. I estimate a cocoon to be a very good one, and the pupa within healthy, when it is heavy for its size, and resists well the pressure between the fingers, not being deformed by it. About one half of the number intended for propagation should be selected from among the largest ; very probably the majority will be females : the other half should be selected, not among the largest nor the smallest, but among the intermediate ones. When properly selected they should be placed beyond the reach of rats or mice, in boxes, baskets or bags : the boxes should be stored in a cold dry room or cellar, where the temperature does not get above forty-five degrees, for if the temperature be higher they will be liable to hatch before winter. While the temperature should not go above forty-five degrees, it can descend indefinitely without injury to the pupa.

Hatching out of the Moth.—Towards the end of May, in the latitude of Boston, the temperature sometimes reaches seventy degrees. I have said above that a heat of fifty or fifty-five degrees, continued for some time, is sufficient to put in activity the causes which transform the pupa to perfect insects. So, about the middle of May, the cocoons should be taken out of the cellar and put into the hatching-room, as the time approaches when the perfect insect will appear out of its prison. Tables or shelves should be placed in the hatching-room to lay the cocoons upon : they should be spread out, and not piled one upon the other, as the insect in coming out would get to the surface with difficulty : over the tables or shelves where the cocoons are placed should be hung pieces of cloth, or net, to which the insect can easily attach its hooks for the purpose of allowing its wings to develop. The perfect insect rarely comes out before noon, and very few after five o'clock in the afternoon. One should watch the process of exclusion, in order to help the insects when they do not readily find the net, or cloth, to cling to, and also to remove those which disturb others whose wings are already expanding. The rays of the sun

should not fall directly upon the cocoons, as the heat would cause a rapid evaporation, which would certainly kill the chrysalis. Towards the evening of the day on which the moths leave their cocoon, an equal number of both sexes should be placed in the same cage, and after pairing the females should be kept until they die, which will occur in four or five days after their union. The eggs, which are stuck to the cage with gum, should be scraped off with a wooden or whalebone knife, and then spread in a large pasteboard-box to dry thoroughly. A ticket, with the date stating when the eggs have been laid, should be put upon the box, so as to indicate the day the worm will probably hatch. The length of the period of incubation depends entirely on the temperature, but in June the incubation generally lasts twelve or thirteen days, while in August the period is two days shorter. Eight or ten days after the eggs have been laid they should be placed in the hatching-box, which should be made of tin, and about three inches long, two inches broad, and one and a half inch deep. In the middle a narrow longitudinal band of tin should be soldered, and bent so as to form a hook by which the box may be hung to some twig or branch. The box should be painted, and before it is dry sand should be sprinkled over it so as to make a rough surface upon which the worm can crawl with ease. The larvæ hatch out from five to ten o'clock in the morning, and the attendant should be ready at that time to place the box upon a branch which has its extremity in the water. A thousand of the little worms can feed upon a branch of moderate size for four or five days, and when it is well covered with them the box may be removed to another branch. The larvæ feed equally well upon the different species of oaks, maples, willows, poplars, elms, hazels, birches, blueberry and other plants, without affecting the quality of the silk.

Rearing of the Larva in the Open Air.—There are different ways of raising the wild silk-worms. I have for two years cultivated them in the open air. I had about five acres of woodland enclosed by a fence eight feet high: a net was stretched over the bushes, which were of six or eight years' growth: this net, supported upon posts, was intended to protect the worms from the depredations of the birds. The eggs were put upon the bushes in the little hatching-box, so that after this there seemed but very little to do; but it was not so: over so large a space it was impossible to keep the net in good order, and the birds managed to get under it; the small ones could go through the meshes, and the larger ones through some holes in the old net, so I was

obliged to chase them all the day long, as when pursuing them on one side they would fly to the other and quietly feed, until I again reappeared. Thus, besides the insect enemies enumerated above, many of the caterpillars fell a prey to the birds.

Rearing Larvæ under a Shade.—This year I made a shade open on all sides, protected by a roof to keep out the hot rays of the sun, and boards were arranged so that they could be raised up from the roof to give more light when the sun was behind the clouds, and also at morning, evening and at night: this shade had a very fine net around it, so that it was impossible for the birds to get through the meshes. In this way an oak branch can be kept fresh for four or five days: a branch is placed in every two holes, so as to leave a vacant one between any two branches. When the foliage of one branch is nearly eaten up a fresh one is put into the vacant hole, and small twigs, going from the old branch to the fresh one, are placed so that the worms can cross upon it without descending upon the table. When the worms are attached, for the purpose of moulting, they should not be disturbed or taken away from the place where they are, as they could not so easily change their skin. Three times a day the excrements should be swept from the table. In warm days some water should be sprinkled with a watering-pot upon the leaves, as the worms are fond of drinking water. The worms should be handled as little as possible, and only when it is absolutely necessary. The space that remains open between the branch and the table should be filled with paper or hay, so that the larvæ may not crawl under the table, as they would be drowned in the water contained in the bottle. For cultivating silkworms upon a large scale it would be very well to select a place with a brook running through it, as the water could be made to flow under the table, in reservoirs, where the branches could always dip in fresh water: as the water put in the bottles is soon corrupted, and the branches absorb much of it, they need to be filled up several times a day. When a cocoon is well begun, the best way will be to separate from the branch the twig and leaves between which it is built, so that other worms will not disturb the larvæ working inside: this cocoon should be placed upon lines stretched for that purpose in a special room, where the sun cannot reach it: ten or twelve days after they will be completed, and may be placed in baskets, and kept as I have indicated above. Some experiments made on our silk-worm show how hardy it is, being the easiest of all the silk-worms to take care of. Chrysalids were put into a tin box, which

was placed in another box containing ice and salt; the temperature soon descended to four degrees below zero. They were allowed to remain in this refrigerator for half an hour. When taken out, the chrysalids were as hard as a piece of ice; they were immediately put into a cold room. Several days after this, the temperature of the room being above the freezing point, the chrysalids gave signs of life by moving the abdomen. Some years ago, wanting to keep a cocoon in my collection, I thrust a pin through it, and it passed through the body of a living chrysalis inside of it; this was done in the month of October. Nine months after, in June of the following year, I was astonished to find a great commotion in one of the boxes of my collection; all the specimens were broken, and I found the cocoon which had been pinned in the box, detached and open at one end, and the antennæ, head and legs of the moth projecting out of it; the insect was still living and could not come out, as the pin passing through it had also transfixed the cocoon. Through this insect had been thrust, for nine months, a pin covered with verdigris, and yet had not been killed by it! Naturalists state that it is very important, when transporting cocoons in a box, to pierce the box with holes so that the air may penetrate it, as if air was needed for a chrysalis inside the cocoon. Having observed how close and air-tight the cocoon of the *Polyphemus* seems to be, I could not conceive that air was needed for it to breathe. Desirous of ascertaining whether my idea was correct, I took three cocoons, and at two different times I covered them carefully with a thick coating of starch, allowing the first coating to dry before putting on the second one. After this the cocoons were covered at three different times with a heavy coating of shellac varnish; thus the cocoons were made perfectly air-tight. They were kept in a cold dry room all winter. In July the moths came out perfectly healthy, the fluid they discharge through the mouth having perfectly dissolved the starch and varnish. So these insects had been nine months with no air, except the very small volume enclosed in the cocoon, and they had accomplished their transformation just as well as if the air had been allowed to come into the cocoon.

It seems to me that when once enclosed in the cocoon, the pupa is in a transitory state. The process of assimilation, at least during the cold days, seems to have ceased. In the stomach of chrysalids can be found an albuminous, greenish substance; probably it is a food which can be assimilated, or at least transformed into some of the liquids which are discharged by the perfect insect when coming out of

the cocoon. If there is any elaboration of the food in the chrysalis, the process must be very slow, and surely no air is needed to accomplish it, nor any food, except what little food is in the stomach. The most striking phenomena manifested by life is the assimilation and elimination of food; but to assimilate, the animal must take food, either in the solid or gaseous form. We know that the chrysalis cannot eat; breathing is very problematical. Before changing into a chrysalis, the worm evacuates all the contents of its stomach; so, in my opinion, the chrysalis does not breathe, or, if at all, it is so very slight as to be insignificant.

There is not much possibility of being able to obtain two broods of the silk-worm in the same year in this latitude. The earliest date at which I have obtained cocoons was the 1st of August, twenty-two days after the moth hatched from the cocoon. On the 5th of September I had young larvæ, but the heat being less in this month than in July and August, the larvæ did not grow so rapidly, and the moulting did not take place so regularly. The first moulting took place on the fourteenth day, the second the twenty-third day, the third the thirty-sixth day; on the 1st of November, or fifty-six days after their birth, they had not accomplished the fourth moulting. I could not continue the experiment, as I left for Europe the 2nd of November; but they had frozen several times, and the leaves were very hard; in fact, I do not believe that the second brood would have come to maturity. I do not see that it would be of any advantage to obtain two broods, as the moths do not all come out of the cocoon at the same time, but sometimes there are two months between the first and the last; so the process of rearing can go on permanently all summer, which is equal to having two broods.

Cocoons can be retarded in hatching out by being put in a very cold room—an ice-house, for instance; in this way they can be made to hatch another year, or nearly twenty-one months after they have been in the cocoon. In fact, the time of their appearance can be put back for an indefinite period, as life is nearly suspended. Réaumur states, that, at the time he was writing, he had in his cellar pupæ which had been there for five years, which were still living. I have myself kept pupæ of Sphingidæ, of hawk-moths, for three years in my cellar. At the time I went to Europe, they were still living, but on my return I found that the rats had eaten them.

Numerical Proportion of Sexes among Spiders.

By the Rev. OCTAVIUS PICKARD-CAMBRIDGE, M.A.

THE following facts relating to the numerical proportion of the sexes among spiders may be of interest to Mr. Darwin, who will no doubt see them if inserted in the 'Zoologist.'

In an extensive group of the family Epëiridæ, comprising several genera (*Gasteracantha*, *Acrosoma*, *Pycnacantha*, *Plectana*), I have never yet seen an example of the male sex. During a continental tour in 1864-5, I inspected collections of Arachnida in the Natural History Museums of Vienna, Milan, Berlin, Frankfort and Leyden: in all of these, if I remember rightly, there were females of this group, but certainly *no males*. The British Museum, as well as the Oxford University Museum, contain large collections of this group, but I could not detect in either an example of the male sex; nor do I believe that any one of this sex has ever yet been described by arachnologists; Walckenaer alone describes seventy-nine species, but all are evidently females. Koch (*die Arachniden*) describes many more, but no males. Morell indeed, in a paper entitled "*Ureja exotiska Epëirider*" (*Ofversigt. af Kongl. Vetenskaps-Akademicus Förhandlingar*, 1859, p. 299), describes two males, which he includes in this group: I have not this work by me, but on a hasty perusal of the paper, last October, there seemed to me reason to doubt whether the two spiders described really belonged to the group in question: supposing, however, that they do, it is still a remarkable fact that out of a group numbering upwards of one hundred described species, males of *two* only should have been observed; and this singularity is increased when we consider that the group comprises some of the most curious of spider-forms—forms which invariably attract the attention of even the most unscientific collector. I have seldom seen a collection of tropical insects, whether sent home dry or in spirits of wine, that did not contain specimens of these anomalous-looking spiders:

In all probability the males of this group are exceedingly small compared to the females, and for this reason perhaps they have been overlooked by collectors: if I were to hazard a conjecture as to their probable appearance I should say they would look like little horny and more or less spiny *ticks*. The idea that their minuteness has caused them hitherto to escape notice is borne out by the known

minuteness of the male sex in another large group of the same family. In the genus *Nephila*, which contains some of the giants of the spider race, the males are almost unknown, and where known they are ridiculously disproportionate in size to the females. In *Nephila* (*Epëira*) *opuntiaë*, one of the most numerous spiders in Egypt, and in parts of Syria and Palestine, the female measures from a half to three-quarters of an inch in length, while the male does not exceed one-tenth of an inch. This species is gregarious and very abundant, young trees of the date palm, the prickly pear and gum acacia being often in a perfect maze of web, in which thousands of the spiders live in apparent amity: with the closest search, however, I only succeeded in obtaining three adult male specimens, so difficult was it to detect them among the multitudes of young individuals of the other sex.

Two species of this group, figured and described by M. Vinson ('*Araneides des îles de la Reunion, Maurice et Madagascar*, pp. 183—191, plates v. and vi.), *Epëira inaurata* and *E. nigra*, present an equally striking difference in the relative size of the sexes. In his observations on the latter species he says, "Rien de plus disparate que de voir la petitesse du mâle de l'Épëire noire, auprès du volume énorme de la femelle; il se promène sur elle, marche sur ses côtés, fait rapidement en se laissant glisser le long de ses longues pattes comme le long d'un cable, lorsqu'il redoute sa colère. Il se réfugie sur le milieu de son dos pour échapper à son atteinte. : . ."

In this passage we are reminded of the well-known voracity of the female spider in our common species, of the same family, *Epëira diadema*, in which there is also a great disproportion in the relative size of the sexes, though nothing so great as in the species to which M. Vinson refers. The remarks of this author also lead me to suppose that this extreme disproportion may be accounted for by an application of Mr. Darwin's principle of "sexual selection." Thus the smaller the male individuals the more chance they would have of escaping the ferocity of the female, by playing at hide and seek among her limbs and over her body in the mode M. Vinson describes. This "selection" would go on exercising its inevitable influence upon the size of the males until at length they became what in M. Vinson's instances they appear to be—mere parasites upon the female: the indefinite diminution of the male would only be checked by the natural requirement of a certain size for the fulfilment of the offices of impregnation.

I have observed that the sexual disproportion in *Epëira diadema* is not so great as in *E. nigra*, *Vins.*: we may account for this by the fact of the male of the former having a formidable armature of spines on its fore legs, with which it has been seen to repel the attacks of the female; but the male of *E. nigra* seems to be utterly defenceless, and to have nothing but its own agility to depend upon for escape.

Some species of other families of spiders also present a very striking disproportion in the relative size of the sexes, but their habits being unknown to me it is impossible to say whether or no it may be accounted for in a similar manner.

With regard to the general question of the numerical proportion of the sexes in spiders, the case seems to be about parallel with the same question as to insects: in some species there seems to be about an equal proportion; in some the males, in others females, preponderate, but until spiders are collected and studied more, by *arachnologists*, it is impossible to say how far the apparent disproportion is due to mere want of search and ignorance of forms and habits.

No doubt there is in every species of spider and insect an absolute natural numerical proportion between the sexes, and this proportion, if we could arrive at it, would perhaps form a good specific character; but it will be long before the state of entomological science will permit of any certain conclusions on the point. In other branches of Natural History, where the facts occur more under our eyes, a natural and peculiar proportion of sexes seems certainly to exist. I have observed this in respect to pheasants reared from eggs laid in the woods, but taken and placed under the common hen; the proportion of males here is invariably larger than that of females: it varies in different seasons, but on an average my own observations lead me to state it as three-fifths of the former to two-fifths of the latter.

O. P.-CAMBRIDGE.

Bloxworth, Dorset, May 4, 1868.

A large Sturgeon.—While a fisherman, named Henry Mellish, was engaged fishing in Limehouse Reach, in the Medway, at Rochester, on the 17th of April, he succeeded in capturing a very large sturgeon. On being landed it was found to measure seven feet six inches in length, and to weigh 130 lbs. Under the ancient charters of the city of Rochester sturgeons and other "royal" fish belong to the Mayor, to whom it was immediately presented, and by whom it was in turn sent to Windsor Castle by the principal water-bailiff, as a present to her Majesty. This fish is believed to be the largest sturgeon ever caught in an English river.—*Newspaper paragraph.*

NOTICES OF NEW BOOKS.

'The Birds of Berkshire and Buckinghamshire: a Contribution to the Natural History of the two Counties.' By ALEXANDER W. M. CLARK-KENNEDY, an Eton Boy. Post 8vo. 232 pp. text; four coloured photographic plates. Eton: Ingalton and Drake. London: Simpkin, Marshall and Co. 1868.

COUNTIES are arbitrary divisions of the kingdom for political, ecclesiastical or other purposes, and are made without any reference to physical or natural conditions: when, therefore, we enumerate and classify the living inhabitants of a county, we know that we are on very artificial, and therefore treacherous ground. Nevertheless, the thorough and exhaustive examination of each county may eventually supply us with valuable materials for a fauna of the little island on which we live. Taking certain of the larger sucklers, as the wild cattle of Chillingham, the red deer and the roebuck, we find their range defined with the same clearness, accuracy and constancy as a river is marked on our maps. It is somewhat different with birds, because they are volatile; the eagle that may soar over London once in his life is no more a bird of Middlesex, on that ground, than I am a Frenchman because I have performed the linen-draper's tour to Paris and back. Still a very considerable interest attaches to the clear definition of the boundaries within which birds, whether resident or migratory, confine themselves, and of the periods at which they appear: thus the wheatear, one of our earliest arrivals, makes its appearance simultaneously all over the kingdom; after the most minute inquiry I fail to establish any marked discrepancy of time between its advent in Cornwall, Cork, the Giant's Causeway, the Welch mountains, Midlothian and the Shetland Islands: then, again, in one locality it appears to be a bird of the sea-beach, in another an alpine climber, in a third a bird of the fallows. How different it is with a later arrival, the nightingale; it is never heard in Cornwall, Wales, Ireland or Scotland; rarely in Devonshire, a county apparently particularly adapted to its habits; nor yet in Ireland, whence it was perhaps banished by St. Patrick simultaneously with the snakes: it swarms in Kent, Sussex and Surrey, is common in the eastern counties, and permeates sparingly the midland, north-eastern and northern counties. How different, again, the cuckoo, which is a still later arrival, but is diffused at once over the kingdom, loving woods where

woods are to be found, but contenting itself with mountain-wastes where the shelter of trees is not to be attained.

Other species, again, are littoral or marine, and can only be found in their natural habitats in the vicinity of the sea; and when such species occur in inland situations we know at once that their presence is accidental, and entirely independent of geographical conditions.

Still, again, there are what may be called irruptions of species from foreign parts, as that of the sand grouse and waxwing—irruptions for which neither the scarcity of food, nor the ordinary migratory impulse, nor the cares of the breeding season will offer any explanation.

Though we may advantageously study these phenomena with the utmost care, we shall find that the comital division of a little island like Britain affords few natural areas of attraction for birds. Nevertheless it has ever been a favourite occupation with our ornithologists, not only to compile county lists, but to make them the vehicles by which to convey their own personal observations on species into the studies of their fellow-labourers; and they thus become of present use, and haply, in the lapse of time, of permanent value, but this utility and value must ever depend rather on the observations which have a general significance than on their association with particular districts: an original observation in any branch of Natural History is always worthy of preservation, while the incessant repetition of familiar facts becomes as wearisome to the instructed as it is useless to the ignorant reader.

A few of the lists which I recollect at this moment may be enumerated as containing information worthy of preservation.

1519 to 1578. Household and Privy Purse Accounts of the Le-stranges, of Hunstanton, published by Mr. D. Gurney, in the 'Transactions of the Royal Society of Antiquaries' for 1833, affords very positive evidence as to species of Birds inhabiting Norfolk at that early period, and has been availed of by subsequent writers on the Ornithology of Norfolk, a county peculiarly fortunate in the number and attainments of its ornithologists.

1682. An Account of Birds found in Norfolk. By Sir Thomas Browne. A work of which Mr. Stevenson observes that it affords the means of comparing, with singular accuracy, the present state of the county with its ornithological conditions about two hundred years ago.

1826. A Catalogue of the Norfolk and Suffolk Birds, with Remarks. By the Rev. R. Sheppard and the Rev. W. Whitear. This was pub-

lished in the Linnean 'Transactions,' and is a most complete and laborious account of the birds observed in both counties: of the value of this list Mr. Stevenson observes that its ample details supply many interesting particulars at a time when certain species, now no longer resident, were gradually becoming scarce.

1831. Catalogue of the Birds hitherto met in the Counties of Northumberland and Durham, published in the 'Transactions of the Natural History Society of Northumberland, Durham and Newcastle-upon-Tyne,' by Prideaux John Selby. Of this Catalogue it is almost impossible to speak too highly, and the accessory remarks are those of a scholar and philosopher: it is a fact worthy of record that the number of birds observed in these two northern counties exactly corresponds with that observed by Messrs. Sheppard and Whitear in the eastern counties of Norfolk and Suffolk, namely, two hundred and seventeen, or exactly two-thirds of the entire number then ascertained to inhabit or visit Britain.

1845. A Catalogue of Birds observed in South-Eastern Durham and North-Western Cleveland, by John Hogg, published in the 'Zoologist' for 1845: this paper, relating to a much less extensive district than Mr. Selby's, contains only seven species less in number: the district, as regards physical conditions, latitude, &c., is almost identical.

1845. In this year also appeared the Rev. Richard Lubbock's Fauna of Norfolk, a work which combines scrupulous accuracy with an elegant and pleasing style: it has ever been regarded as emphatically *the* authority on the birds inhabiting the Broad District of Norfolk.

1845. Notes on the Birds of the Isle of Wight, by the Rev. Charles A. Bury. This is a paper of great value, and not obnoxious to any objection on the score of vagueness and geographical circumscription: nothing can be more satisfactory than the limits of an island,—they are open to no question,—and Mr. Bury has evidently given the subject his earnest attention, resulting in one of the best local lists ever published.

1846. In this year, too, M. Julian Deby published, in the 'Zoologist,' his Birds of Belgium, a paper which, with three exceptions, relates to birds of Britain, and therefore becomes exceedingly valuable to British ornithologists, as showing the peculiar habits and characters of our birds when on a foreign soil.

1846. An Account of the Birds found in Norfolk, with Notices of

some of the Rarer Species which have occurred in some of the adjoining Counties. By John Henry Gurney and William R. Fisher. This is in all respects a first-class production: if I might venture on a criticism of a paper which, immediately on its appearance, took its place at the head of our local lists of birds, I should say that it is too brief; the instructive notes which accompany the name of almost every bird lead one to regret that they are so curt: as specimens of the richness of the mine of knowledge possessed by these two ornithologists, it is impossible to avoid feeling regret that they have given us no more of the true metal. Here for the first time we have a notice of the *coucou roux* of continental writers, a bird concerning which doubts still exist, some maintaining that it is merely the ordinary cuckoo in its first dress, others maintaining that if so it should not return to us in April and May clothed in the infantile plumage of the previous year. The concluding observations at p. 1385 of the 'Zoologist' are most excellent, judiciously arranged, and highly instructive.

1848. Birds of Sutherlandshire and Ross-shire, and Birds of St. Kilda and the outer Hebrides, by Sir William M. E. Milner, Bart., published in the 'Zoologist' for 1848. It is a matter of course that a list of the birds observed in a summer tour may be very incomplete, it being an almost imperative necessity that the compiler of such a list should be resident. I therefore do not mention these as county lists, as the winter season would undoubtedly make many additions to both of them.

1849. The Birds of Oxfordshire and its Neighbourhood, by the Reverends Andrew and Henry Matthews, published in the 'Zoologist' for 1849. In this highly instructive paper the species are classified as Residents, Summer Visitors, Winter Visitors, Passing Visitors and Occasional Visitors. This paper is written with great care, and is deserving the attention of every ornithologist.

1849. An Outline of the Ornithology of Godalming, in the County of Surrey; with brief Records of the Occurrence of some of the rarer Birds. By Edward Newman. In this list, published in the same year as the one previously described, the birds are very similarly divided, namely, into Resident Natives, Migrant Natives, Winter Visitors, Passing Visitors and Occasional Visitors: the two arrangements seem to correspond very precisely. In other respects this has no merit, except as combining the observations of those very able ornithologists, Mr. Salmon, Mr. Kidd and Mr. Stafford.

The Resident Natives are	57
The Migrant Natives	32
The Winter Visitors	29
The Passing Visitors	3
The Occasional Visitors	75
	<hr/>
Making a total of	196

By extending this local list to the boundary of the county a very slight addition might be made to the total number of species.

1849. This year also produced a Systematic Catalogue of the Birds of Sussex, by A. E. Knox, in which the birds are divided into orders and families in accordance with the quinary system: this Catalogue forms a kind of Appendix to the same author's 'Ornithological Rambles in Sussex,' a work written in a genial spirit, and one which has passed through three editions.

1856. A List of Birds of Banffshire, accompanied by Anecdotes, by Thomas Edward, collector and dealer in Natural-History specimens at Banff. An interesting list, but the writer indulges rather too freely in the romantic: this propensity has thrown some discredit on a story of the breeding of the snowy owl in Banffshire, which is given on the authority of fishermen who captured but did not preserve the old birds, and whose names and abodes are not mentioned.

1866. The Birds of Norfolk, by Henry Stevenson, stands deservedly at the head of all county lists, and has already been abundantly noticed in these pages.

1866. In the same year we had the 'Birds of Middlesex; a Contribution to the Natural History of the County,' by James Edmund Harting, a work with the merits of which all my readers are familiar.

These various and interesting works are so many models for future compilers of local lists of birds.

Mr. Clark-Kennedy's extremely pretty volume is a continuation of this series of local lists, and does the author infinite credit. It enumerates among occasional visitors several birds which, I think, had better have been omitted; but I will not enforce my own opinion on this subject without giving the author's own account of them.

Great Black Woodpecker.—"In April, 1844, a great black woodpecker was seen on several consecutive days in the Home Park, Windsor. The observer in this case was a Mr. Walter, whose word I have no reason to doubt, and moreover he gave so accurate a description of the bird as to leave no room for doubt that it was a

veritable *Picus martius*. Improbable as it may appear to sceptical ornithologists, I feel further justified in including this species in the present Catalogue from my own personal observation. In March, 1867, while walking under some elms in Ditton Park, I saw a great black woodpecker busily engaged on one of the tallest trees within a short distance of me. I was sufficiently near to identify the bird with certainty, and had an opportunity of observing its movements for the space of half a minute, when it flew off with an undulating flight to a considerable distance, and was seen no more.”—p. 178.

Black Swan.—“A few centuries ago the black swan was not supposed to exist, and doubtless many remember the old line—

‘Rara avis in terris; nigroque similima cygno.’

Of late years, however, some half-dozen of these birds have been procured on our coasts, and I saw, a short while ago, a young one which had been killed in Suffolk. About the year 1852 a man who lives out in the woods all day, and usually sleeps under a barn or hay-stack at night, saw a large dark-coloured bird, which he supposed was a swan, flying high up in the air over some trees near the little village of Burnham. He told Mr. Gerding’s gamekeeper this piece of news, and the two went together to try to get a shot at this curious bird, which they eventually did, and the bird—a veritable black swan—fell to the gun of the keeper. What became of this rare bird I was unable to ascertain, but I believe the skin was never preserved, and that, after being admired as a ‘curiosity,’ it was recklessly thrown away.”—p. 204.

Mandarin Duck.—“This rare duck has never occurred in a wild state, so far as I am aware, in this country, but I am here enabled to include it as a rare and occasional straggler. Mr. Sharpe tells me that a very fine adult male mandarin duck, in splendid plumage, was shot by Mr. Briggs, near Cookham, in the month of May, 1866. It might have been, and doubtless was, an escaped specimen, but it was exceeding wild, and gave Briggs a chase which lasted nearly a whole day before he managed to shoot it. It is now preserved in Mrs. de Vitré’s collection, at Formosa.”—p. 208.

Great Auk.—“The following extract referring to the appearance of the great auk in Buckinghamshire must be accepted *cum grano salis*. It is copied *verbatim* from the third volume of Yarrell’s ‘British Birds,’ but it is solely in deference to the high authority of that naturalist that it is reprinted in the present work:—‘Mr. Bullock told

Dr. Fleming some years ago that a specimen was taken in a pond of fresh water two miles from the Thames, on the estate of Sir William Clayton, near Marlow, in Buckinghamshire! That a bird of such thoroughly oceanic habits, and with wings so rudimentary as to be useless for flight, should be found so far inland as stated, seems, if not physically impossible, at all events highly improbable. I have no doubt that the species was misnamed, and that the bird really captured was, in all probability, one of the divers—either the great northern or the blackthroated diver. I need hardly add that all endeavours to trace a ‘great auk,’ or to gain any further particulars respecting it, have proved utterly unsuccessful.”—p. 213.

Such is the evidence on which four of the species rest their claim to be considered birds of Berkshire: there are other names I should like to see expunged, but I have not space to urge my objections. I ought to observe that in the numerous existing local lists of British birds, the disposition to swell the number of species at the expense of probability is only too apparent.

Without a little bit of criticism all notices of books are essentially vapid; so I will mention a feature in the work that strikes me as objectionable—I mean the inaccuracy of the index. I had occasion to refer to Savi’s warbler and at once consulted the index, not doubting it would be a sure guide: there is a double reference to the species, “Warbler, Savi’s,” and “Savi’s warbler,” but neither refers to any page in which the bird is mentioned. To use the mildest term, this may be called *inconvenient*:

EDWARD NEWMAN.

‘*On the Distribution of Lepidoptera in Great Britain and Ireland.*
By HERBERT JENNER-FUST, M.A.

SEVERAL conditions seem required to make such a work as this really useful to the truth-seeker. In the *first* place, the laborious task thus voluntarily undertaken should be carefully performed; *secondly*, the work should be so arranged as to be readily accessible, and, *thirdly*, it should give an exact idea of the matter whereon it professes to treat. Now the first of these conditions is fulfilled; the author’s task has been carefully and conscientiously performed; no praise of the author’s industry and zeal can possibly be too great: the second condition is not so completely fulfilled; there is no index, and no work without an alphabetical index can be readily accessible: witness Westwood’s

'Introduction to the Modern Classification of Insects,' and Stainton's 'Manual of British Butterflies and Moths.' Then, as to the exactness of the idea given of the 'Distribution of Lepidoptera in Great Britain,' this exactness is entirely wanting; for instance, the six species of *Satyrus* are denied to South Wales, simply, I presume, on the ground of there being no printed records of their capture, although to my certain knowledge, all of them are abundant, and two or three swarm to an excess scarcely known elsewhere in the United Kingdom. The three subprovinces, 17, including the counties of Cardigan, Carmarthen and Pembroke; 18, including the counties of Merioneth, Montgomery, Caernarvon, Denbigh, Flint and Anglesea, and 19, containing Lincoln only, are perhaps the richest of all in Lepidopterous insects, whereas from the absence of recorded observations, they appear the poorest: on the other hand the Metropolitan counties, in all probability the poorest, appear in these tables to be the richest—a result, of course, of the greater number of observers; thus these laborious tables give us practical evidence of the number, care and energy of the entomologists who reside in them or visit them, but have no direct bearing on their entomological productions.

It is impossible not to feel the warmest admiration for the industry and tenacity of purpose which has carried the author through his self-imposed task, but it is equally impossible to overlook the points, in which these great qualities have failed to accomplish their object. Mr. Watson's 'Cybele Britanica' has served as the author's model, but then Mr. Watson visited, either in person or by proxy, the localities he enumerates; and plants, moreover, are stationary, they remain rooted in the earth throughout the year; while Lepidoptera are notoriously evanescent: they appear for a week, or perhaps a fortnight, and then remain hidden for the rest of the year, so that, in the absence of resident observers, like Mr. Doubleday at Epping, or constant visitors, such as frequent Darenth and West Wickham, there is no mode of attaining even a superficial knowledge of the insect fauna of a county.

EDWARD NEWMAN.

Ornithological Notes from North Lincolnshire.

By JOHN CORDEAUX, Esq.

(Continued from Zool. S. S. 1125).

March 13. Pied wagtails arrived in gradually increasing numbers, both on the marshes and on the higher sands, from the 13th to the 25th of March.

March 18. Have observed a very decided increase in the number of our meadow pipits, particularly in the marshes, where they are in the summer months very plentifully distributed. The greater portion of these summer residents leave the district in the autumn.

April 2. Golden plover last seen and heard.

April 3. Wheatear (female) first seen.

April 3 and 5. On the 3rd of this month I saw several hundred fieldfares on the trees in Riby Park; and on the 5th flocks of these birds in the low grounds bordering our small stream. They are evidently drawing towards the coast preparatory to the spring migration.

Hooded Crow catching and eating Frogs.—April 6. Hooded crow last seen. There is a circumstance connected with the habits of these birds which I am not aware has been remarked upon, namely, their partiality for catching and eating frogs. When the first warm flush of spring draws these Amphibians from their snug winter retreats—the hollow banks and soft muddy bottoms of our shallow drains,—and their soft purring croak is heard, as they bask and sprawl in the shallows, then is the time for the “hoodie”: even the strong inducement of early-sprouting beans tempts him not to quit his favourite haunt, where he and his mate now feast right sumptuously, acting the part of the stork in the fable, as he sedately wades in the shallows. Woe to the slowly-swimming croaker that now comes within reach of his trenchant beak; sudden as thought he is grasped on the terrible shears, borne aloft to the nearest bank-top to be quickly pulled limb from limb and devoured. So engrossed are these birds in frog-catching that their usual cautious habits are abated. Many is the gray-backed forager that has fallen to my gun as he rose bewildered and surprised from the drain, and I rejoiced that there would be one plunderer less to harry the moorcock’s nest on a Scottish hill side. Judging from the many crows thus employed in frog-fishing in the early spring, the havoc made in these frog-colonies must be great. The only portion that is not eaten is the spawn of the female frog. Before I was aware of this habit of the hooded crows I have often wondered where the lumps of spawn came from we so constantly at this season find on the drain-banks.

April 11. Young rooks hatched.

April 11. Chaffinches have not yet paired. I saw a large flock to-day perched on the larch in one of the plantations. This flock was entirely composed of females: I did not observe a single male bird, although I looked carefully amongst them.

April 9. Nest of blackbirds hatched.

April 9. Nest of thrushes hatched.

April 14. Snipe last seen.

April 14. Tree pipit seen and heard.

April 14. A flight of buzzards, five in number, passed over this village to-day: time 12.30 P. M. They came from the direction of the sea, east, and were travelling westward. When first observed by me were flying at no great height, but, being "baited" by the rooks from my trees, rose in their beautiful spiral flight, till far beyond the reach of the clamorous rooks, and then still circling as long as I could see them, but at the same time moving westward, were soon lost to sight. I did not get sufficiently near to these birds to determine the species. They seemed too dark, however, for the roughlegged buzzard, and from their manner of soaring, &c., I am inclined to think were the so-called "common" species.

April 20. Chimney swallow first seen.

April 20. Willow wren seen and heard.

April 23. Common sandpiper seen.

April 25. Yellow wagtail's first appearance.

April 27. Sand martin first seen; we invariably see the chimney swallow in this neighbourhood before the sand martin.

April 28. Whitethroat and lesser whitethroat seen and heard.

April 30. Cuckoo heard.

May 1. Whinchat first seen.

May 1. Linnets and greenfinches, still in flocks, feeding on the groundsel growing in the clover-fields in the marshes.

May 3. House martin first seen. Is generally a very late arrival in this north-eastern corner of Lincolnshire.

May 3. Sedge warbler heard.

May 5. Swift's first appearance, five seen.

May 9. Garden warbler seen and heard.

May 12. Spotted flycatcher seen.

JOHN CORDEAUX.

Great Cotes, Ulceby, Lincolnshire,

May 13, 1868.

Du Chaillu's new Troglodytes.—Some of my readers will be pleased, others disappointed, to learn that M. Du Chaillu's new ape, the Tschego bouvé of his 'Equatorial Africa,' is accepted by Dr. Slack as a genuine species distinct from *Troglodytes niger*. Dr. Slack has communicated the following account of it to the Academy of Natural Sciences at Philadelphia:—"Size about equal to that of the

Anthropopithecus niger. General colour black, sometimes gray in old age. Head bald, black and shining; chin of adult bearded. Ears large, much larger than those of *A. Gorilla*, though smaller than those of the chimpanzee. Habitat, the deep forests, and the table lands of equatorial Africa. Figure of skeleton, Duvérnoy, Arch. du Mus, vol. ix. Figure of entire animal, Du Chaillu, 'Equatorial Africa,' p. 406. A fine adult skeleton of this rare anthropoidal ape, first noticed as a distinct species by the late lamented Duvérnoy, has been for some time in the collection of the Academy, and has been regarded until lately as that of the *A. niger*. For a full account of the osteological difference between the two species, I must refer to Duvérnoy's most valuable and interesting paper; though, on placing the skulls of the two animals side by side, their specific differences must be apparent to the most superficial observer. A careful study of the species appears to me to clearly prove the fallacy of regarding the *A. Gorilla* as the type of a distinct genus, as has been done by St. Hilaire, the tschego combining in a remarkable degree the characteristics of both genera. The cranial crests, so much insisted on as generic characters of the gorilla, are to be seen, though in a less degree of development, in the tschego, while with the black face of the gorilla are associated the large ears of the chimpanzee, and, in fact, all the characteristics of the animal are intermediate between those of the two genera. The names tschego, nschego and nchéko appear, from the accounts of travellers, to have been applied indiscriminately by the natives to all species of anthropoidal apes. To this species has been ascribed the faculty of constructing a nest or shelter among the higher branches of trees, as a protection from the inclemency of the weather during the rainy season. This, according to Du Chaillu ('Equatorial Africa,' p. 407) is covered with leaves, compactly laid together, at such an angle as to readily shed the rain. The branches are fastened to the trunk of the tree with vines; the roof is generally from six to eight feet in diameter. Surely this roof-constructing power must place its builder the highest in the scale of the quadrumana. The only figure of this animal in the flesh that I have met with is to be found in Du Chaillu's work. The so-called young in the same plate, however, resembles in a most remarkable degree a daguerreotype from life of a young *A. niger*, which died some years ago in the Jardin des Plantes at Paris. It must therefore be received *cum grano salis*.—*Edward Newman*.

Note on the Liver of the Wild Boar.—Referring to my note of the 31st of March, respecting the idea that the age of the bear and otter can be ascertained by counting the lobes of the liver, I desire to call attention to the statement of a correspondent at Bucharest of the 'Field' newspaper, published in that paper on the 2nd instant, from which it would appear that a similar opinion is entertained respecting the liver of the wild boar by the peasants of Wallachia: this additional coincidence appears to me to be very remarkable.—*J. H. Gurney; May 4, 1868*.

Food of the Otter.—Is the otter known to feed on fresh-water mussels? Possibly Mr. Alston, who has given the readers of the 'Zoologist' so many interesting letters on British Quadrupeds, can tell us. Last February I was at Burton, near Petworth, in Sussex, and there, on the banks of a stream frequented by the otter, I found quantities of shells of fresh-water mussels (*Anodon cygneus* and *Unio pictorum*), the first-named being the most numerous. These shells were mostly in pairs still united, but in every case either one shell or both were chipped at one end, and not broken in the way in which a crow would do it. Moreover, the crow is a scarce bird in the

locality, and the part of the stream where the shells were found in the greatest profusion was quite covered in with brambles and tall willows, a willow-covert bounding it on one side. Two otters were trapped on the stream last year, and fresh traces, unmistakable, were not wanting at the time I was there; further than this an otter has been trapped there since. With all this evidence I think the otter must be found "Guilty."
—*W. Jeffery, jun; Ratham, Chichester, May 9th, 1868.*

Food of the Water Shrew.—I have a similar charge to make against the shrew, and on equally circumstantial evidence. I have been endeavouring to cultivate the *Planorbis corneus* in some ponds in the garden, and have recently found several hoards of the remains of these shells (altogether upwards of 100 in number) amongst some rock-work at the edge of the water. The thin circumference of the shell was invariably broken away, leaving the thick spiral centre. What can have done this but the water shrew? I have several times seen these little animals near the ponds. While on this subject I will mention a circumstance which occurred to me one day last winter (December 24th, 1867). My attention was called to a struggle between a water shrew and a frog. Both were in a ditch in which there was scarcely mud enough to cover the frog, and a little water over that. The shrew was of course the attacking party, and resolute he was, biting at the frog's nose and shaking him, "as a dog would a rat," only that it had a proportionately larger antagonist to deal with. Froggy was of course in rather a sleepy state at that time of the year, and the only mode of defence which he appeared capable of was that of burying himself in the mud; but this was of little avail. The shrew showed himself in no way afraid of sand or water, diving into both after his prey. He had succeeded in dragging the frog to the edge of the ditch, but it was a slow process, and time would not permit me to stop and see it out. There is little doubt, I think, that the shrew was victorious, and probably made a hearty meal off froggy.—*Id.*

Longevity of a Caged Lark.—A highly respectable tradesman in this town, whom I know quite well, kept until lately a lark, which, to use his own phrase, "sang at my shop-door for twenty-one summers." He had it as a young bird from the nest. "H——'s lark" was a splendid songster, and was well known to almost every one in the town: it was kept in an ordinary lark's cage, looking on to a crowded thoroughfare, was fed on hemp-seed and bread, and a hard-boiled egg cut up, with sometimes a piece of meat, and had a fresh turf in the summer twice a-week. It was very tame, but pugnacious, and would fight its owner's finger, and hang on to it with its beak when he was cleaning out the cage. Whenever he entered the shop it would welcome him, fluttering its wings and twittering or singing, even in the middle of the night. This remarkable bird was found dead one morning in its cage, and the owner tells me that when skinned for stuffing there was a quantity of blood at the top of its skull, leading him to suppose that it had been frightened, and had dashed up against the top of the cage, and so killed itself.—*Henry P. Hensman; Northampton, April 20, 1868.*

Vinous-breasted Pipit near Plymouth.—On the 21st of March I killed the *Anthus spinoletta* (vinous-breasted pipit of Gould) on the rocks near Plymouth, which is, I believe the second recorded Devonshire specimen, the first being obtained at Torquay.—*John Gatcombe; Plymouth.*

[I suppose this to be the water pipit (*Anthus aquaticus*) of my edition of Montagu,

the *Anthus aquaticus* of Bechstein, and the *A. rupestris* of Nilsson. Blasius believes it a variety of our rock pipit (*Anthus petrosus*).—*E. Newman.*]

Nesting of the Crossbill.—Before leaving Yorkshire for Scotland I wrote to the keepers at Altyre to be on the look out for the early breeding of crossbills, particularly calling attention to the fact, as I supposed, of the birds breeding as early as the end of February and the beginning of March. On my arrival here, early in March, the keepers were most positive in stating that the birds had not paired, and soon I had many opportunities of convincing myself they were correct. During March and April I had occasion to visit the forest almost daily, after *Endromis versicolor* and *Brephos Notha* and *B. Parthenias*, and still the birds were in flocks, uttering, while flying, their musical “chink, chink, chink!” When settled on the pine-tree tops, busily shelling the pine cones, they were mostly mute and exceedingly tame. Towards the middle of April they began separating into pairs, and at this period were much quieter in their habits. On the 21st of April the keeper sent me word he had found two nests building, having carefully watched the old birds collecting the materials: both nests were then finished. On the 27th I went over, and soon came on the first nest, which was on a tall pine, about twenty feet from the ground, and, being quite at the extremity of the branch, very difficult to take. With my binocular I saw the female bird was sitting. Having with me a gun I wished to procure the old birds, if possible, but all attempts to get the bird to leave the nest were in vain. We pelted her with sticks, and hammered the pine-trunk with heavy stones, but all to no purpose. The head keeper fetched a long rope and saw, and sent the other keeper up the tree. The branch upon which the nest was built was now violently shaken, but the poor bird still stuck to her eggs. The man was now above the nest, and within a few feet of the bird, before he could drive her off, when, I am almost ashamed to say, she fell to my gun. The nest contained four fresh eggs, scarcely distinguishable from those of the greenfinch. The nest was a loose structure, externally composed of the dead twigs of pine, inner pine-bark, with a little moss and sheep’s wool; internally it was lined with fine inner pine-bark and a long hair-like lichen, which I believe is called “old man’s beard.” The male bird was absent for a time, but soon arrived on the scene—alas! soon to be laid alongside his mate, on a prostrate pine-log, to cool. The other nest was thirty feet or more up a pine tree, also on the extremity of a branch, but much more easily reached: it was ready for eggs. I have little doubt but that these birds are breeding in great numbers in this forest: having, however, procured a nest and the old birds for identification, I shall molest them no more.—*George Norman; Cluny Hill, Forres, N.B., May 4, 1868.*

The Cuckoo.—There is an error in Mr. Smith’s translation of Dr. Baldamus’s interesting paper on this bird (*Zool. S. S. 1149*), which I see is not corrected in the May number. Mr. Smith calls *Hypolais vulgaris* the chiffchaff, *Phyllopneuste rufa* the rufous warbler; whereas the former is the melodious willow warbler so rare in Britain, and the latter is our chiffchaff. With regard to the general subject of the paper, I trust that Mr. Dawson Rowley will give us his views on it, for the benefit of those who may not have seen his admirable article in the ‘Ibis.’—*Edward R. Alston; Paris, May 6, 1868.*

Note on the Breeding of the Bittern in Buckinghamshire.—Having just read the interesting communication of Mr. T. E. Gunn in the May number of the ‘Zoologist’ on the breeding of the common bittern in Norfolk, I am induced to send you the

following note. As there are so very few authenticated instances of this bird remaining here to breed, it may not be uninteresting to record that a few years ago (I cannot ascertain the exact date) a pair of bitterns stayed throughout the summer at one of the large reservoirs in the vicinity of Drayton-Beauchamp, in Buckinghamshire. Among the extensive reed-beds which line the shores of this piece of water, the bitterns constructed their nest, which was composed of dry reeds; and, I believe, stalks of various water-plants. In it the female bird deposited several eggs, which were taken; together with the nest itself, by Mr. Williams, of Tring Park; and the female bird was, I regret to say, shot off the nest, and her mate forthwith left the neighbourhood for a more secluded retreat. For these particulars I am indebted to the Rev. H. Harpur Crewe; so here is another authenticated instance to be added to the small list of records of the bittern breeding in Great Britain.—*Alexander Clark-Kennedy; 4, Prince's Gardens, W., May 5, 1868.*

Early Breeding of the Common Snipe in Sussex in 1868.—Wanting a specimen of the common snipe to settle a question on the breeding plumage, I requested a friend to procure me a bird, if possible, from the nest: to my surprise he brought me a fine female bird, shot from the nest on Saturday, April 4th, in which were four eggs: on dissection the bare state of the breast showed that the bird had been sitting some days. I have the eggs now in my collection, and they are the most beautiful set I ever saw:—*Frederick Bond; 203, Adelaide Road, N.W. May 8, 1868.*

Occurrence of the Greenshank and Reeve at the Land's End—The greenshank may be regarded as a scarce bird at all times of the year on our estuaries and marshes: they mostly appear with us in the spring months, where they show a transition state of plumage from the winter to the summer garb: the specimen I saw which was killed the last week in April near the Land's End, showed this change of plumage in some of the dorsal feathers having assumed the black centre, whilst the rest of the plumage retained the hair-brown tone peculiar to winter. The interest which the elegance of form of all the Totani affords, is in this species enhanced by the intermediate link it exhibits between the sandpipers and the godwits, in the upturned tendency of the shape of the bill, which in all the true sandpipers is cylindrical, passing through this species to the godwits and from thence in the fully-developed form of the avocet (*A. recurvirostra*). I have never observed the ruff and reeve in our western district, except in the autumnal migration, or perhaps occasionally when the winter months have begun: these have been apparently birds of the year. The two small reeves sent in at the same time as the greenshank appear to be adult females: one of the characters of this species, viz., in the female being remarkably less than the male, is a good point (*inter alia*) for the forming of a new genus for this bird and removing it from the Tringæ, where we see the opposite character prevail, viz. the larger size of the female than the male.—*Edward Hearle Rodd; Penzance, May 14, 1868.*

Blue Shark (Carcharias glaucus).—An example of the blue shark, measuring six feet in length, was found dead in Chichester Harbour, on the 3rd of November, 1867: It had been left in only a few inches of water by the receding tide. I saw the skin a few days after.—*W. Jeffery, jun; Ratham, Chichester, May 9, 1868.*

Angler or Fishing Froy (Lophius piscatorius).—A specimen of this extraordinary fish was exhibited in Chichester on the 7th of March last; its length was said to be

more than four feet: it was captured at the entrance of Pegham Harbour that morning. The principal spine on the back, the "fishing rod," was short, having been broken, but the enormous mouth appeared to be the principal feature of attraction. Mr. Couch mentions an example which measured four feet and a half in length, in which this organ measured fourteen inches across? The angler has been known to swallow a herring gull and attempt the same with a great northern diver; in both cases fish as well as bird perished.—*W. Jeffery, jun.*

PROCEEDINGS OF SOCIETIES.

ZOOLOGICAL SOCIETY.

March 26, 1868.—JOHN GOULD, F.R.S., V.-P., in the chair.

The minutes of the last Meeting having been read and confirmed,

The Secretary read letters received from Sir R. Alcock and M. le Père David, with reference to a new species of stag (*Elaphurus Davidianus*), which those gentlemen had been endeavouring to procure from China for the Society's Gardens.

A letter was read from the Rev. W. Hincks, of Toronto, on the subject of *Cygnus Passmori*, which he considered to be a species distinct from *Cygnus Buccinator*. A discussion followed, in which the Chairman, Prof. Newton, Mr. Blyth and Mr. Harting took part, when it appeared that the claim of *Cygnus Passmori* to rank as a distinct species was not sufficiently established. Mr. Hincks had pointed out as a distinguishing character the rusty colour of the head and upper portion of the neck. Mr. Harting doubted whether this would be found constant, and thought that, at all events, it could not be considered as a distinctive character, inasmuch as he had observed the same peculiarity in other species of the genus *Cygnus*. He attempted to account for it by supposing that it was either a vegetable or a mineral dye, acquired either by contact with roots under water or by the birds feeding in water which was impregnated by iron.

Mr. A. G. Butler read some descriptions of little-known species of Lepidoptera.

A report was read by Dr. Günther on a collection of marine fishes which he had received from St. Helena, and out of the thirty-five species which this collection contained it appeared that six were new to Science. An interesting discussion followed on the affinities of the fish, insect and bird fauna of St. Helena, in which the Secretary, Mr. Murray and Prof. Newton took part.

Dr. Günther read a second report on a collection of fresh-water fishes from Brazil and Surinam, and communicated descriptions of some new or little-known species.

The Secretary communicated some remarks on Baker's antelope, from observation of a living animal at Turin, and read a note on the subject, which had been received, together with an original sketch of the antelope, from Sir S. Baker, its discoverer. A pair of horns belonging to this species were exhibited, and compared with the horns of another allied species, when an interesting discussion followed, in which the Chairman, Mr. Blyth and others took part.

Dr. Murie read a paper on the arrest of growth in the salmon when detained in fresh water, and exhibited an example which had been hatched in the Society's

Gardens. Dr. Günther doubted whether this was really a salmon, and was inclined to refer it either to some species of lake trout, or to a hybrid between two different species of *Salmo*. It appeared that this fish had been hatched from Rhine ova, obtained and deposited in the Society's Gardens by Mr. Buckland, in January, 1863; nevertheless, it did not seem clearly established that the ova were really the ova of *Salmo salar*. Mr. Buckland made some interesting remarks on the subject, giving a history of the ova, and exhibiting a number of fish which he had reared. A lively discussion followed, in which Dr. Günther, Dr. Murie and Mr. Buckland were the principal speakers.

The Chairman exhibited four new species of birds from different parts of the world, and communicated descriptions of them. One of the most interesting was a grebe from Lake Titicaca, in Bolivia: the wings were remarkably small, so much so as to induce the belief that the bird must be incapable of flight: on this account Mr. Gould proposed to name it *Podiceps micropterus*.

April 23, 1868.—W. H. FLOWER, F.R.S., in the chair.

The minutes of the last Meeting having been read and confirmed,

The Secretary read a letter from Mr. Layard, of Cape Town, in which he described a new species of ribbon fish (*Gymnetrus*) lately captured by him.

Dr. Murie, who had carefully dissected the sea bear (*Otaria*), which died a short time since in the Society's Gardens, read an elaborate report on its anatomy, and made some interesting remarks on its habits as compared with the habits of other seals.

The Secretary read a letter from Mr. Geoffrey Nevill, with reference to some new species of Mollusca from the Seychelles and Mauritius.

The Secretary also read a communication from Mr. Spence Bate, F.R.S., illustrated by water-colour drawings, on a new genus of fresh-water prawns. It appeared that four closely allied species are known from widely separated localities: three of them had been found respectively at Formosa, Patna, and Guatemala; the locality whence the fourth had been obtained was uncertain. Mr. O. Salvin exhibited a specimen which he had procured in Guatemala, where he stated this crustacean was well known as an article of food. An interesting discussion followed on the singular distribution of this genus.

Mr. St. George Mivart read an extract from a letter which he had received from Professor Lessona, of Turin, touching the habits and affinities of *Salamandrina perspicillata*.

Dr. Gray made some remarks on a new species of marmoset monkey lately placed in the Society's Menagerie, and proposed to name it *Mico sericeus*.—*J. E. H.*

ENTOMOLOGICAL SOCIETY.

May 4, 1868.—H. T. STANTON, Esq., Vice-President, in the chair.

Donations to the Library.

The following donations were announced, and thanks voted to the donors:—
 * Catalogue of Scientific Papers (1800—1863), compiled and published by the Royal

Society of London,' vol. i.; presented by the Royal Society. 'Proceedings of the Royal Society,' Nos. 98—100; by the Society. 'The Journal of the Quekett Microscopical Club,' Nos. 1 and 2; by the Club. 'The Journal of the Linnean Society,' Zoology, No. 40; by the Society. 'The Journal of the Royal Agricultural Society of England,' 2nd series, vol. iv. part 1; by the Society. 'Bulletins de l'Académie Royale des Sciences, &c., de Belgique,' 2me ser., t. xxiv.; by the Academy. 'Bulletin de la Société Impériale des Naturalistes de Moscou,' 1867, No. II.; by the Society. 'Essai d'une Fanne Entomologique de l'Archipel Indo-néerlandais,' par S. C. Snellen van Vollenhoven. Troisième Monographie: Famille des Pentatomides, 1re Partie; by the Author. 'On Pauropus, a New Type of Centipede;' and 'Notes on the Thy-sanura,' Part iii.; by the Author, Sir John Lubbock, Bart. 'On the Lepidopterous Insects of Bengal,' by Frederic Moore; by the Author. 'Remarks on the Names applied to the British Hemiptera Heteroptera,' by J. W. Douglas and John Scott; by the Authors. Newman's 'British Moths,' No. 17; by the Author. 'The Zoologist,' for May; by the Editor. 'The Entomologist's Monthly Magazine,' for May; by the Editors.

Exhibitions, &c.

Mr. W. C. Boyd exhibited a number of skins of larvæ of Lepidoptera, admirably prepared by Mr. Davis, of Waltham Cross, so as to preserve both the form and colour of the caterpillars.

Mr. Trimen exhibited a crippled specimen of *Saturnia Pavonia-minor*, which, owing probably to the form and smallness of the box in which it was confined, had attempted to emerge from its cocoon tail-foremost, but failing in the attempt was found fixed with its head in contiguity with the head of the pupa-skin.

Dr. Wallace, of Colchester, offered to send eggs of the Japanese oak-feeding silkworm, *Bombyx Yamamai*, to any Member of the Society.

Mr. Stainton drew attention to the plate illustrating a paper entitled "Histoire d'une Chenille mineuse des feuilles de vigne, extraite d'une lettre écrite de Malte à M. de Reaumur," published in the 'Memoires de l'Académie Royale des Sciences de Paris,' in 1750. The habit of the footless larva which attacked the vine in Malta and produced a small moth was so carefully described and portrayed by M. Godeheu de Riville, that there was no difficulty in recognizing it as congeneric with the footless larvæ of *Antispila Treitschkeella* and *Pfeifferella*, and Mr. Stainton some time since proposed the name of *Antispila Rivillii*, in the hope that the species would be again detected in some of the vine-growing districts of Southern Europe. To the present day, however, the moth remains unknown, and the larva is known only by the record of M. de Riville.

Mr. Hewitson communicated the following note on *Tachyris Jacquinotii* (see Trans. Ent. Soc. 1868, p. 99):—

"I find, from a recent visit to the Jardin des Plantes, in Paris, that the *Pieris* described by Lucas under the name *Jacquinotii* is nothing more than a highly-coloured variety of *P. albina*, and when Mr. Wallace went over my collection I understood that he considered it as such. It does not come, as stated by Lucas, from New Guinea, but from New Caledonia, and has not, as I suggested, any relation with the South-American *P. Isandra*."

Mr. McLachlan mentioned that the *Anax mediterraneus* of de Selys Longchamps, which had on a solitary occasion been captured in the Island of Sardinia, but had been rejected from the list of European dragon-flies, was observed in swarms at Turin and in other parts of Italy by Dr. Ghiliani and others, on numerous occasions, from July to September, 1867.

Mr. F. Smith exhibited a larva which he believed to be a *Xantholinus*, found by Mr. O. Janson whilst digging in a sand-bank at Snaresbrook: attached by their hinder extremities to the under side of this larva, on the 5th, 7th, 9th and 11th segments respectively, were four pupæ of a Hymenopterous parasite, probably a *Proctotrupes*.

Mr. F. Smith also exhibited a Longicorn beetle, *Cerosterna gladiator*, and a large *Acheta*, which were very destructive to forest-trees in Madras.

Dr. Cleghorn, Conservator of Forests, Madras (who was present as a visitor), said that these insects had done great damage in the young *Casuarina* plantations along the Madras Railway. The attacks of the beetle were principally directed to the bark of the trees; but the cricket generally bit off the leading shoots or primary branches. It appeared suddenly in September, 1867, after some showers of rain at the end of the hot season: during the night the larvæ emerged from the sand, crawled up the young trees, and nibbled off the leading shoots (as a rabbit might have done), many of which, six inches long, were found lying on the ground; hundreds of trees had to be replaced on the railway-banks in consequence of their depredations. The best way to save the trees was to employ boys to dig out the larvæ from the tortuous galleries or passages which they made in the sand to a depth of ten to fifteen inches, and large enough to admit the little finger: he had had bushels of them dug out of their burrows and destroyed. In reply to inquiries, Dr. Cleghorn stated that he had himself frequently seen the larvæ crawling up the stems, and was convinced that they were the authors of the injury, but he had never seen them in the act of cutting off the shoots.

Mr. Trimen mentioned, as a parallel case, a tree-cricket at the Cape which eats the terminal shoots of the silver-tree (*Leucodendron argenteum*), by which, however, the shoots are not wantonly bitten off, but are consumed for food.

Mr. F. Smith exhibited eight kinds of larvæ from India, all of which were described as "borers," and as causing great damage to the coffee and other trees. Three of them appeared to be Lepidopterous; one, the "red borer" of Ceylon, which attacks a tree in the middle of the stem and works its way upwards through the pith, belonged to a species of *Zenzeria*; a second, which was a somewhat similar larva, was found in the pith of the charcoal tree (*Sponia Wightii*); the third, the "great white borer," also looked like a *Zenzeria*, and was usually found at the root of coffee and other trees. The remaining five larvæ were Coleopterous; one was probably a *Pyrochroa*, and was found in the coffee tree; another, a *Buprestis*, found in the root of a dead coffee tree; a third, an *Oryctes*, found in a dead forest tree in a coffee plantation; a fourth was a Longicorn; and the fifth was the "white borer," or "coffee borer" *par excellence*, *Xylotrechus quadripes* of Chevrolat. Of this insect numerous specimens in all its stages were exhibited, together with the stem of a coffee tree attacked by the larvæ.

With respect to the last-mentioned insect, Mr. F. Smith drew attention to a pamphlet (Madras, 1867) entitled 'Preliminary Remarks on the Ravages of the

Borer in the year 1867,' by Colonel C. P. Taylor, of the Madras Staff Corps. The following are extracts:—

“A very prevalent opinion exists, I believe, that the borer may come to nothing, or it may exterminate our plantations entirely. I confess that when I read of the successes and failures of various kinds of cultivation, and reflect upon the good and bad seasons all over the globe, when I consider how many luxuriant coffee estates have for so many years succeeded in India, and moreover when I admit the undoubted fact that the red borer has been known for years on our estates and in Ceylon, I cannot regard the extraordinary visitation of 1867 in any light but that of a plague which has come upon us, and with due care and precaution on our part will pass away. . . . The borer was very destructive in 1859. His ravages in 1867 are certainly more alarming, but I believe that although this insect may remain more or less on the estates, such fatal ravages are not likely to occur for many years. It is impossible to disguise the damage already done, and doubtless this becomes a most serious question, but I trust that many an estate may yet be saved to its owners. I understand that some proprietors contemplate no further outlay, but purpose taking the coming crop, whatever it may be, and then abandoning their properties. . . . It has been advanced by some persons who take a desponding view of this calamity that the coffee estates may die out in the same manner as the vines have perished in Madeira. I think we should dismiss any idea of this kind from our minds altogether, as the cases are not analogous. The vines, it is generally admitted, perished from a disease of the trees themselves, and not from any insect. The theory that the borer only attacks weakly trees (though supported by a most eminent entomologist with regard to ligniperdous insects) is, I believe, open to question in this case. Mr. Young, the Chairman of the Carnatic Coffee Company, in writing from personal inspection, declared that ‘the finest trees are its choice victims;’ and I believe every planter who has seen the borer in any numbers will bear me out in the assertion that the insect is indiscriminate in its ravages. It is quite possible that men who formed a different opinion on their own estates were mistaken, and that the sickly appearance they observed was in reality the borer who had entered the year before unnoticed. . . . The trees which on passing through an estate the planter can perceive are showing signs of something wrong should, in my opinion, be taken up, and nightly bonfires be lighted with a collection of them. . . . Some estates which have had the borer for some three or four years are nearly destroyed. If the affected trees had been burnt the first year, I believe that such estates might have been saved to a great extent. As it is, on some estates, as many as seventeen perfect beetles have been discovered in one tree, in addition to others in the pupa state. . . . My impression is that the white borer has been in many plantations for several years, and that he goes on, maturing or expiring, according to the weather. These dry seasons have enabled him to make a great stride in his work of destruction, and the trees have become loaded with larvæ. . . . I advise the burning of all affected trees; and as it has, I believe, been almost universally admitted in Coorg and Mysore that shade is beneficial, I should plant shade in the vacancies instead of young coffee, which rarely succeeds with old plants. . . . The handling of trees for the removal of any eggs might be useful. . . . Fish-oil and soot are spoken of, to stop the trees with, and chloride-of-lime water, or arsenic solution, or cyanide of potassium, to be

syringed, into them. Of all preventive and remedial measures as yet proposed, I consider the most valuable to be the plan of whitewashing the trees when good lime can be procured. Fires should invariably be lighted at this season, because it appears that the borer beetle escapes at night, and during this month (September). At the same time it is probable the beetle may escape during the daytime also. It has the power of boring its way out of the tree after it has changed from the pupa to the perfect beetle, notwithstanding that it may have to open a considerable aperture for the egress of its body. It is, in fact, furnished with a boring apparatus as effective in its purposes, though not of the same description, as that of the larva. This was exemplified in an experiment made by Captain Mitchell, of the Madras Museum, and myself. A portion of a coffee tree which we split up (brought from Coorg about ten days before) disclosed a beetle in a cleft of the tree, which proved afterwards to be a female. She appeared to have no inclination to escape, though she could easily have done so. She was comfortable and apparently torpid in her hole. We tied up the piece of the tree tightly, and Captain Mitchell placed it in a glass bottle with a stopper. In the morning he examined it, and found the beetle outside the wood, lively, and running up and down in a wonderfully active manner, feeling about with her antennæ as busily as possible. On examination of the piece of the tree, we found that during the night this insect had bored a large hole outwards, and had come out of the bark from the position in which we first discovered her. . . . It is doubtful whether the beetles will fly into the fire, though they will come round it in great numbers, in which case coolies with nets or branches of trees might kill a great many. . . . Can we introduce or encourage the breed of any animals inimical to insect life? Can the ornithologist be of any service here? Those birds which live chiefly in trees and hedges, if encouraged and protected on an estate, might prove formidable enemies to the borer. Flocks of guinea-fowls would kill a large number of insects; . . . they are mostly attached to white ants and grubs, but this borer is a very diminutive insect considering his powers of destruction, and I have no doubt the guinea-fowl would take to him amazingly. . . . Is it the case that, after two or more seasons of failure in the average amount of rain, the coffee trees become to a certain extent sapless, and offer an easy prey to ligniperdous insects of all kinds? I have stated before that this is open to question, but it has been asserted that such is the case, and that when the trees are luxuriant, and from constant showers in seasonable and heavy monsoons they have become in a high state of cultivation and are full of sap, the borer cannot make so much way in his depredations; he is, in fact, bothered (so to speak) by too much moisture in the wood. There are doubtless various kinds of borers, some of which have actually attacked this year the sandal-wood, whose scent it was supposed would scare the hungriest larvæ; some again have attacked dried-up and utterly sapless trunks, in whose fibrous elements not a particle of nourishment could be supposed to dwell. . . . It is important to discover if a juicy or a sapless coffee bush is selected by the borer, and if so, by what borer. . . . I believe that the white or red borer was originally indiscriminate in his attacks, either in shade or the open. I believe that the spread of insects has greatly increased by the absence of shelter for the birds of the forest. . . . I think that in many cases which have undoubtedly occurred, where the coffee in the open has been so fearfully injured by insects, the real cause has been that the warmth of such situations is peculiarly favourable to insect development. Millions of eggs might be hatched in

such situations, which would rot in a damp or shady position with the forest overhead. Once hatched the larvæ can only attack the tree in which they are placed. It will be asked, how do I account for the little injury done by the red borer in Ceylon, although the coffee is almost all in the open? I answer, the great and almost constant dampness of the climate is inimical to the borer, and prevents his being so prolific as in warm and dry situations. . . . This view of the case is also borne out by the fact that in cool situations in India, such as estates at high elevations, the destruction has hitherto been of little consequence; whereas the estates which have suffered most seriously are in every case, I believe, at low elevations with a high temperature. It is a question, however, if a coffee tree can be too full of sap, too moist, too juicy, or too succulent to present a favourable field for the attacks of the dreaded white borer. All I say is, I doubt it. On examination of numerous trees, I am led to believe that if the borer larvæ had the power of selecting their food, they would undoubtedly choose the tree in which there was the most nourishment. . . . If I am correct in my argument, we at once grasp at one of the causes of the great havoc of 1867. Man has transformed many a cool and shady forest into a hot and shadeless coffee garden, and has removed the chief enemies of the borer, cold and damp. Nature, for three years withholding her ordinary showers, has assisted certainly, but may not the result be attributable to man? May he not, by a too indiscriminate felling of forest in hot exposed situations, have caused the great increase in insect development, the results of which we now so bitterly deplore? . . . When I was clearing away jungle, four years ago, on my estate at Nemaur in the Nuggur Division of the Mysore country, the Brahmins warned me against removing the shade. 'If you cut the trees down,' they said, 'the sun will be very hot, and will bring poochies' (insects). I was under the impression that the climate of Nemaur was too damp and the rains too heavy for shade, or even partial shade, for the coffee, but I find I was mistaken, and we are now actually planting shade in parts of the estate. The elevation is about 2800 feet. It is also an interesting subject for inquiry, if the felling and dying out of any bamboos or jungle trees have driven the borer to the coffee. The theory that because in hot dry situations, unshaded from the scorching rays of the sun, the coffee tree becomes exhausted and sapless, and therefore the more liable to the attacks of the borer, who, in fact, proceeds to that portion of the estate in the first instance, and lays her eggs there in preference to the shady portions, may be the correct one, but it does not appear to me to be so. One thing is plain, *viz.* that throughout the coffee districts of South India, the trees in the open have suffered incalculably more than those in shade. At least I am satisfied that this is so as far as regards Coorg and Mysore. . . . In Coorg there is a legend that when bamboos die insects are created in myriads and attack all trees. Now in 1867 the bamboos in Coorg have died in enormous quantities. It is believed that they do so in a cycle of sixty years. . . . Some planters have noticed the beetles at night collect against the windows of their houses, attracted by the light inside. Now insect-traps might be so constructed with lights as to secure great numbers in different parts of an estate during the night. It has occurred to me that a simple contrivance would be a mud hut, lighted up and roofed in, with apertures all round, and the walls inside and out hung with cloth covered with some sticky tenacious substance, with which the floor also should be covered, which would disable the beetle on contact. The natives prepare a capital bird-lime, which would answer the purpose,

from the juice of the banyan tree (*Ficus indica*). . . . A still simpler contrivance would be a large basket like a common native bird-cage, or a round and more substantial trellis-work might be constructed, open at the top, in any case covered with a sticky substance and a lantern in the centre. Another plan which has occurred to me for a trap, is a square shallow trough, with a lantern in the centre, filled to about half-an-inch with liquid molasses. It is feared that pitch would not answer, as the smell would deter the beetles from approaching."

Captain Ralph Taylor, a resident and planter in Coorg (who was present as a visitor), gave his personal experiences of the "white borer," stating that he had known coffee trees of twelve years old destroyed by thousands; that the beetle emerged at all times of the year, or at any rate in August and from November to February; and that lime, and light, and other things had been tried, but no remedy had proved effectual. At the same time he was disposed to take a hopeful view, and believed that the evil was already on the decrease and would soon disappear; whilst he had last year obtained from 7 to 8 cwt. per acre from a plantation which was attacked by the "borer." He had himself known the white borer since 1863.

Dr. Cleghorn said that other trees beside the coffee were attacked by the *Xylotrechus*, and he thought that drought was a predisposing cause which rendered the trees either more liable to be attacked or less able to resist attack.

Mr. F. Smith remarked that Col. Taylor's opinion, that the borer larvæ would from choice select the trees in which there was most moisture or nourishment, was directly opposed to his own experience of the habits of the species of *Clytus* found in this country; he had never found either the larva or perfect insect in any other than dead wood, or in the decaying branches of living trees. The borer had no doubt existed in India long before the coffee-plant was cultivated, and as clearings of jungle were made it naturally resorted to the plantations so admirably suited to its requirements. If the planters abandoned their properties, the insect would have the opportunity of increasing without check and would spread over the neighbouring plantations. Mr. Smith had observed *Clytus arictis* in this country to be usually very abundant about the same stump or railings for four or five years in succession, when they appeared to move off to fresh quarters, the larvæ having, as he supposed, so riddled the posts that little or no wood remained to be fed upon.

Mr. Janson expressed his conviction that, as in this country, so also in India, it was decaying or unhealthy trees alone that were attacked by *Clytus*.

Papers read.

The following papers were read:—

"On the Duration of Life in the Honey Bee," by Mr. J. G. Desborough.

"Descriptions of Aculeate Hymenoptera from Australia," by Mr. F. Smith.

New Parts of 'Transactions.'

Trans. Ent. Soc., third series, vol. iii. part 5, containing a further instalment of Mr. Pascoe's "*Longicornia Malayana*," and the first part of 'The Transactions of the Entomological Society of London for the year 1868,' were on the table.—*J. W. D.*

*Extracts from the Report of the Council of the Zoological Society,
read April 29, 1868.*

THE following extracts are inserted in the 'Zoologist,' to the exclusion of some interesting and more original communications, with a twofold purpose; *first*, to serve the Society by inducing my readers to join so useful an institution, and *secondly*, to diffuse among my more distant subscribers valuable information which will scarcely be likely to reach them through any other channel.

The number of visitors to the Gardens during 1867 has been 556,214 against 339,217 in 1857 and 93,546 in 1847: this series comprises the highest and lowest numbers on record, excepting only the years of our international exhibitions, 1851 and 1862.

The loss sustained by the Society on the 6th of December, 1866, by the accidental fire which took place in the giraffe-house, was alluded to in last year's Report. The subsequent death of the old male giraffe reduced the Society's stock of this important animal to one adult female and a young male. Under these circumstances the Council thought it expedient to devote the special sum of £400 to the acquisition of a young female giraffe, which was imported last summer. The animal thus acquired makes an excellent match to the young male born on the 17th of March, 1867, in the Gardens, and both of them are now in excellent health and condition. The Council believe that this addition will enable them to keep up the breed of giraffes, of which no less than seventeen have been bred in the Society's Gardens.

The Society now possess three giraffes; a female born in the Gardens on the 25th of April, 1853, a male born in the Gardens on the 17th of March, 1867, and the female above mentioned as purchased on the 26th of July, 1867.

Another important addition to the Society's living collection during the past year was a young male walrus, purchased in November, 1867, at the cost of £204 10s. 6d.

This animal was captured in Davis's Straits by Captain Richard Wells, of the steam whaler 'Arctic,' belonging to Messrs. Alexander Stephen and Co., on the 28th of August last, under the following circumstances:—A herd of from two hundred to three hundred of these animals was met with on the ice by the 'Arctic' in lat. 69° N., long. 64° W. A boat's crew was landed on the ice, and the herd attacked

and several individuals killed, amongst which was a large female. The body of the latter being attached to the boat and rowed towards the vessel was followed by a young male, which swam and dived around and refused to quit his deceased parent. This being noted, he was captured by a noose swung over his head and one fore limb, from the ship, and hauled on board. For some days the captive was kept tied to a ring-bolt on deck, and refused food altogether. Subsequently he was induced to swallow thin slips of boiled pork, and was thus fed until the vessel reached the Shetlands, when a supply of fresh mussels was provided for his use. A large box with openings in the sides was fabricated; and the animal, secured therein, was brought safely into Dundee. From that port to London the walrus was conveyed in the steamer 'Anglia,' under the care of the Society's Superintendent. [The death of this rare animal has already been recorded in the 'Zoologist.'] The only specimen of the walrus previously acquired by the Society was a young individual received in 1853, which had been brought home, in a vessel engaged in the seal-fishery on the coast of Spitzbergen, by Captain Henry, of Peterhead. This animal, however, was in a moribund state on its arrival, and lived only a few days in the Gardens.

In their last Report, the Council announced that they had sent out to Calcutta Mr. C. Bartlett to take charge of, and bring home to England, some valuable animals offered to the Society by their Corresponding Members, the Babu Rajendra Mullick, Mr. A. Grote, Dr. J. Anderson, and other friends in the East. Mr. Bartlett returned to this country with his living freight in August last, having unfortunately met with some severe losses on the voyage, but bringing safely the following collection:—

Two black Tibetan wolves (*Canis laniger*): presented to the Society by Lieut. Alexander A. Kinloch, 2nd Battalion Rifle Brigade, and Lieut. J. Biddulph, 19th Hussars.

One female gayal (*Bos frontalis*), two pelicans (*Pelecanus mitratus*), four demoiselle cranes (*Grus Virgo*), two female polyplectrons (*Polyplectron chinquis*), one white fruit-pigeon (*Carpophaga luctuosa*), one bronze pigeon (*Carpophaga ænea*), one singing pigeon (*Treron sphenura*) and one Entellus monkey (*Semnopithecus Entellus*); presented by the Babu Rajendra Mullick.

One Panolia deer (*Cervus Eldi*), one slow loris (*Nycticebus tardigradus*) and one hemipode (*Turnix pugnax*); presented by A. Grote, Esq.

One Indian badger (*Arctonyx collaris*), one slow loris (*Nycticebus tardigradus*) and eight water tortoises (*Emys*. sp. var.); presented by Dr. J. Anderson.

The following notes relate to some of the other more remarkable additions made to the Menagerie during the year:—

An additional example of the mooruk or Bennett's cassowary; presented by Commodore Sir William Wiseman, Bart., R.N., along with other valuable birds, Feb. 14.

Two specimens of the very beautiful lory of the Solomon Islands (*Lorius chlorocercus*); purchased Feb. 5.

A male example of the wild swine of Formosa (*Sus taivanus*, Swinhoe); received by the ship "Island Queen," January 17, having been obtained for Mr. Swinhoe by Mr. Gregory, Her Majesty's Vice-Consul at Tamsuy, and forwarded to the Society by Mr. Swinhoe.

A pair of Saiga antelopes (*Saiga tatarica*, Pallas); received on deposit in November, 1866, and subsequently purchased, as being likely to do well in the Society's Menagerie.

A specimen of the carpet-snake of Australia (*Morelia variegata*, Gray), received from Queensland, purchased of a dealer.

A specimen of the Peruvian boa (*Boa Eques*.) from Guayaquil, presented to the Society by Prof. William Nation, of Lima.

A female Lyre-bird (*Menura superba*); brought to this country in the ship 'La Hogue' by its proprietor Mr. Ross, from whom it was acquired by the Society's Gardens.

An example of the parrot (*Coracopsis Barklyi*), described by Mr. Edward Newton as new at the Meeting of the Society held April 11; presented to the Society by Swinburne Ward, Esq., Her Majesty's Commissioner to the Seychelles, on the 8th of April.

A tortoise from Digué Island, Seychelles (*Sternotherus subniger*); presented by the same gentleman on the 23rd of March.

A pair of Ka-Ka parrots (*Nestor hypopolius*), from New Zealand; presented to the Society by the Acclimatation Society of Canterbury, New Zealand, on the 25th of April.

A boatbill (*Canceroma cochlearia*); obtained in exchange from the Zoological Gardens, Antwerp, on the 25th of April.

A male ground-hornbill, from West Africa (*Bucorvus abyssinicus*); presented May 6th by C. B. Mosse, Esq., Staff-Surgeon, and the more

acceptable as the Society's collection previously contained three females of this rare and interesting species.

Two Eyton's tree ducks (*Dendrocygna Eytoni*); presented by the Acclimatization Society of Sydney, New South Wales.

Two young night herons in immature plumage; purchased May 14th, being apparently the young of *Nycticorax cucullatus*, of Western Africa.

Two yellow-rumped parrakeets (*Platycercus flaveolus*, Gould), from Australia.

A young kite, supposed to be the young of the square-tailed kite (*Milvus isurus*, Gould), from Australia.

Three Maugé's ground doves (*Geopelia Maugéi*).

Two Brazilian tree-ducks *Dendrocygna fulva*, from Brazil.

A male rosy-billed duck (*Anas peposaca*), from South America.

An Arabian bustard (*Otis arabs*), from West Africa.

A Senegal bustard (*Otis senegalensis*), from West Africa.

A specimen of the golden tiger cat of Sumatra (*Felis aurata*), received in exchange July 17th.

A pair of Sæmmerring's antelopes (*Gazella Sæmmerringii*).

A fine example of the black variety of the leopard (*Felis leopardus*, var. *nigra*); presented to the Society by Major John Pearse, Madras Staff Corps. This animal is stated to have been formerly in the menagerie of the Rajah of Mysore.

A specimen of the rare Australian parrot lately described by Mr. Gould in the Society's 'Proceedings' under the name of *Geopsittacus occidentalis*; presented to the Society by Dr. Ferdinand Müller, of Melbourne, and received by the ship 'Essex,' under the special charge of Capt. Ridgers, the obliging commander of that vessel. Dr. Müller, who forwarded this bird to the Secretary under the impression that it was undescribed, supplied the following particulars concerning it:—
 "This peculiar parrot was presented to me by Mr. Ryan, on whose sheep-station, on the Gawler ranges west of Spencer Gulf, it was obtained. The most extraordinary circumstance connected with this bird is, that it is *nocturnal*! It lives in the rocky caves of the ranges, and comes out at night to feed."

But perhaps the following list of animals which have been bred in the Gardens of the Zoological Society between the 1st of January, 1867, and the 1st of January, 1868, is the most interesting portion of the document.

MAMMALS.

- Two Vulpine phalangers (*Phalangista vulpina*).
 Three short-headed phalangers (*Belideus breviceps*).
 Three yellow-footed rock-kangaroos (*Petrogale xanthopus*).
 One great kangaroo (*Macropus giganteus*).
 Three Gray's jerboa kangaroos (*Bettongia Grayi*).
 Two Bennett's kangaroos (*Halmaturus Bennettii*).
 Five Cashmere-shawl goats (*Capra Hircus*).
 One markhoor (*Capra megaceros*).
 Two hybrid goats, between *Capra megaceros* and *Capra beden*.
 One giraffe (*Camelopardalis Giraffa*).
 One yak (*Bos grunniens*).
 One zebu (*Bos indicus*).
 Three elands (*Oreas Canna*).
 One bless-bok antelope (*Damalis albifrons*).
 Two Wapiti deer (*Cervus canadensis*).
 One Sambur deer (*Cervus Aristotelis*).
 One Barbary deer (*C. barbarus*).
 One Formosan deer (*C. taivanus*).
 One Molucca deer (*C. moluccensis*).
 Two Japanese deer (*C. Sika*).
 One Persian deer (*C. Maral*).
 Three Andaman pigs (*Sus andamanensis*).
 One West African river-hog (*Patamochærus penicillatus*).
 Two Indian porcupines (*Hystrix leucura*).
 Two viscachas (*Lagostomus trichodactylus*).

BIRDS.

- Six Impeyan pheasants (*Lophophorus Impeyanus*).
 Ten Swinhoe's pheasants (*Euplocamus Swinhoii*).
 Sixteen Pallas's eared pheasants (*Crossoptilon auritum*).
 Eight lined pheasants (*Euplocamus lineatus*).
 Four barred-tailed pheasants (*Phasianus Reevesii*).
 One purple pheasant, or kaleege (*Euplocamus Horsfieldii*).
 Two cheer pheasants (*Phasianus Wallichii*).
 Seven black-backed kaleege (*Euplocamus melanotus*).
 Twelve Japanese pheasants (*Phasianus versicolor*).
 One Javan peafowl (*Pavo muticus*).
 One brush-turkey (*Tallegala Lathamii*).

- Twenty-six hybrid turkeys (*Meleagris Gallo-Pavo*).
 Twenty-one rufous tinamous (*Rhynchotus rufescens*).
 Two varied hemipodes (*Turnix varia*).
 One black-necked swan (*Cygnus nigricollis*).
 Seven ruddy-headed geese (*Chloëphaga rubidiceps*).
 Three ashy-headed geese (*Chloëphaga poliocephala*).
 Seven ruddy shieldrakes (*Tadorna rutila*).
 Three variegated shieldrakes (*Tadorna variegata*).
 Thirteen Bahama ducks (*Pœcilonetta bahamensis*).
 Five Australian wild ducks (*Anas superciliosa*).
 Five dusky ducks (*Anas obscura*).
 Three white-crowned pigeons (*Columba leucocephala*).
 Two vinaceous turtle-doves (*Turtur vinaceus*).
 One crested pigeon (*Ocyphaps lophotes*).
 One Bartlett's pigeon (*Phlogœnas crinigera*).
 Two stock-doves (*Columba œnas*).
 One turquoisine parrakeet (*Euphema pulchella*).
 Three crested ground-parrakeets (*Calopsitta Novæ-Hollandiæ*).
 One sun-bird (*Eurypyga Helias*).
 One common cassowary (*Casuarus galeatus*).
 One black-crested cardinal (*Gubernatrix cristella*).
 One rufous-necked weaver-bird (*Hyphantornis Textor*).

REPTILES.

- Six great lizards (*Cyclodus Gigas*).
 Two rattlesnakes (*Crotalus durissus*).

EDWARD NEWMAN.

The Cutting Ant of Texas (*Ecodoma Texana*, Buckley).

By GIDEON LINCECUM.*

IN many portions of Texas this species of ant is quite numerous and troublesome. It is capable of, and actually does, perpetrate more real perplexing injury to the horticulturist and farmer than all the other types of Texan ants put together. In form and colour the larger varieties of them do not differ in appearance very much from the agricultural ants. A great portion of our citizens speak of these two ants without distinction, as being the same species: there is, however,

* Reprinted from the 'Proceedings of the Academy of Natural Sciences of Philadelphia.' 1867.

a well-marked difference in their community regulations, in their manners and customs, in their mode of constructing their cities, in their peculiar food and manner of preparing it, and in their civil and military governments.

There are five varieties or castes in this species, all of which may be seen in the same community, or city as I prefer to call it. They vary in size from that of a drone honey-bee down to near that of the little black erratic ant; and their duties and vocations are as variant as their sizes. The largest size have wings and are the mother ants. They dwell in the ground in sandy lands, and one of their long-established cities will, on an average, occupy at least two square rods of surface. The area of the city is considerably elevated, often one to two feet, and sometimes even more. The earth which is thus thrown up, and which is universally sand, is thrown out from their numerous and capacious cells below, and from their extensive tunnels or subterranean passages. To their cells they have many holes or places of entrance, and some of them are tunnelled off several hundred yards.

It is known to many observant Texans that in all the larger cities the ants have penetrated the earth to water: this accords with my not very limited experience on the subject. I know of a number of wells which were intentionally sunk in the cutting-ant hills to procure water, and I have been informed by the owners of these wells that ant cells, tunnels and live ants were found all the way down to the water. I have myself seen and drank water out of eight of these wells, and have accounts of many others. I have not heard of a failure in any attempt to obtain water in a cutting ant hill. Mr. G. W. Brooks states that, in Chappel Hill, Washington County, Texas, Columbus Pearson dug a well in an ant hill, and obtained plenty of water at a depth of thirty feet. The facts in this case worthy of notice, and for which it is here recorded, is the manner in which the ants had also sunk two wells to the water. The walls of these wells were travel-worn and stained of a dirty brown colour, presenting the appearance of having been in use for years. Mr. Pearson states that, if these ant wells had been opened properly, a bucket could have been let down the largest one at the outset.

Dr. Fechtig, of Brenham, informed me that he had been making observations on the cutting ant for some months; and some of his discoveries, which he was kind enough to communicate to me, are valuable and of an interesting character, particularly as they afford additional testimony in favour of observations I have made in reference

to the disposition of the dirt which comes out of their tunnels, &c. These passages are always commenced within the compass of the city mound: the sand that is taken from the tunnels is always thrown back on the mound. These tunnels are made at the depth of eight to twelve inches, and in the direction of the object for which they are excavated. Sometimes, as I will show presently, on extraordinary occasions they are carried at a much greater depth. Dr. Fechtig's case, which I will now relate, was a tunnel from one of their cities to a neighbouring well, the tunnel entering the well ten or twelve feet below the surface of the ground. The well being walled with oak timbers, the ants had cut their way through to gain access to the water. In performing the boring through the thick oaken curbing, they threw down into the well so much saw-dust that the people were forced to strain the water previous to using it. On examination Dr. Fechtig found that a quantity of oak chips, similar to those which had been separated from the well-water, had also been thrown out on the ant mound.

Situated in a garden at Austin, Texas, there was a very large, very populous and seemingly prosperous cutting-ant city: the ants had for years, in spite of many patent traps and newly-discovered ant poisons, damaged the garden extensively. The proprietor of the garden at last conceived the idea that he would try to drown them, and for this purpose dug a large basin-formed pit in the ant mound, and led trenches into it right and left from the hill-side above the ant city, to convey the water into the basin when it should rain. Not long after this preparation was completed, there came a tremendous rain storm. Large quantities of water rushed along the ditches into the basin dug in the mound. To the gentleman's surprise the basin did not fill, but seemed to send forth hollow sounds. After the rain was over it was found that all the water which had been conveyed into the basin had been swallowed up. There is a creek with a flat rock bottom about seventy yards from the ant hill, and it was discovered that the water from the trenches had rushed down the wells of the ant city, washing out down to the rock (twenty-two feet) an immense hole, thence along a great tunnel on top of the rock, to the before-named creek, where the entire sluice, charged with millions of ants and sand and mud, made its escape into the creek.

Under a beautiful wide-spreading live-oak (*Quercus virens*) on the west border of the town of La Grange, Texas, there was an extensive and flourishing ant city. The city mound was large, occupying the entire area overshadowed by the live-oak. Nearly on a level, and not

exceeding eighty yards from the ant hill, there was a considerable pond of filthy water, which, being in the street, the town authorities ordered it to be drained. A ditch was opened along one side of the street, which intersected the ant mound near its centre, and for the purpose of inundating and drowning the ants, the workmen let the water into the ditch, and when it reached the mound (which had been ditched through to its further side) it found many open passages, down which it flowed quite freely: it was near night when the workmen left it, with the water passing into and seeming to be rapidly enlarging the hole it had already opened in the mound. The workmen and a number of the town people visited the place next morning: the pond was dry, and the ant mound had also disappeared; and what was more wonderful still, the large live-oak had settled down into the chasm that had been made by the disappearance of the ant mound, until the lower limbs of the tree were resting on the brink of it. (The lower limbs of a prairie live-oak are seldom more than six or seven feet above ground.) The outer ends of the very numerous live-oak roots were still clinging by their long ramifications in the walls of the great pit all around, and the large tree was swinging securely upon this net-work of roots as upon a hammock. But where did the water, mound and ants all go to? was the question among the La Grange folks. The Colorado river passes in its deep channel three hundred yards distant from the ant hill, and the popular supposition was, that the mound, ants and all, had passed through their great tunnel, which they had previously excavated, into the river. Several years have gone by, and still when it rains the pond vents itself through that ant chasm, and the live-oak, though still green and thrifty, has settled deeper in the ground. I know of many other wells and tunnels that were made by the cutting ants, but as I have recorded a sufficient number of them here to establish these great works as a characteristic trait in their natural action, it is deemed unnecessary to add any more.

All the sand and other material that is seen piled on the ant mound comes from the wells, tunnels and cells which are excavated for the accommodation of the ants. The work required to throw up these quite conspicuous mounds must have consumed many years, as well as an immense amount of labour. All the sand-carrying labour is performed by the smaller sized ants, principally by the very smallest: these are of a dingy brown colour, and when crowded have a woolly appearance. These little fellows are lazy and extremely slow in their

motion, seeming to perform their daily work with great reluctance: they are often found crowding in each other's way about the gates of the city, and do not seem to feel any interest in what they are doing, which is to carry sand day by day: for their size they carry large loads, but they lose the advantage of the big loads by their slow motions. The larger types of this species, which move with greater celerity, pay no attention to the sand-carriers, but pass out and in, walking over them and their big loads of sand as if they were the pavement. While I observe the slow, careless action of these lazy little mound builders, I cannot avoid the conclusion that they are slaves.

As the cutting ants perform their destructive works mostly during the night, I have not made sufficient observation on their nocturnal action to state certainly that they employ their slaves in the leaf-cutting business at all. They have large mandibles and sharp teeth, and I think it likely that they are capable and, perhaps, do participate in the labours and duties of all the departments in the national works. The cutting ants subsist entirely on the leaves of vegetables: they will eat the leaves of various trees, shrubs and some herbaceous plants. I have not observed them eating of any of the grasses. Sometimes during warm spells in winter, when, as I suppose, their provision stores have run short, I have seen them cutting and carrying home the buds of the long moss (*Tillandsia usneoides*). I think, however, that this alternative is resorted to only in periods of great scarcity, as I have never observed them collecting the moss during summer, or at any other time while the season of green foliage continues. They seem to have a regular and well-disciplined corps of foragers, and these, after a suitable tree has been selected by their scouts for them to work at, go forth about twilight, and, ascending the designated tree, frequently the tallest willow-oak (*Quercus phellos*), commence the work of destruction. They cut the green leaves into pieces not much less than a five-cent piece, and seizing it near one corner with their capacious mandibles elevate it, and tilting it backwards over the crown of the head, it falls edgewise between two strong spines of horns, which stand erect at the back part of the forehead: having their load thus adjusted, which, to the observer, seems to stand on its edge on top of the head and lengthwise with the body, they hasten away to the appointed place of deposit. It is quite an interesting sight to observe with what precision and celerity they can edge their piece of leaf along amongst hundreds of their fellow-labourers who are all carrying similar burthens,

while they are meeting on the path an equal number of workers who are hurrying back to the tree empty. They deposit the leaves on the ground at the place appointed for curing them, where they are left to dry in the sun through the succeeding day. Sometimes the new-cut leaves are deposited near the entrance to the city; at other times they are strewed thickly along the path from the tree to the city; and not unfrequently they are thrown down in a pile near the root of the tree from whence they were taken. In either case they are left exposed all day in the sunshine, and they are, during the succeeding night, carefully gathered up and taken into the city: this rule obtains in autumn: they do not cure their leaves until towards winter. All summer time they are carried directly from the tree into the city. Whilst the dried leaves are being stored away, the foragers are engaged in cutting and laying out a quantity of fresh leaves, which undergo the same processes of curing and storing as the previous lot; and so on through the season for storing up food for winter; but should a shower of rain fall upon and wet the laid-out leaves while they are out drying, it renders them unfit for food, and they are not stored. I have noticed many piles of these spoiled leaves rotting on the ground that had been damaged by being caught in the rain.

In my observations on the habits of the cutting ants, I have not discovered them eating anything besides the foliage of various plants; neither have I ever noticed them carrying anything else into their cities. Prof. S. B. Buckley, who is a very close and accurate observer, states that he saw them carrying hackberries (*Celtis occidentalis*), and that they eat insects, tumble-bugs, &c. The hackberry has a sweet pulpy covering, and I think it likely that if one of the leaf-eating ants was to find a hackberry, it would try to carry it home, but it being a perfect globe, a little too large for the span of its mandibles, I see not how it could effect it. As to their feeding on insects, I shall not pretend to deny it, for these wonderful, cunning and very sagacious ants doubtless perform many habitual actions that have passed unnoticed in my eighteen years observation. It is stated that this species of ant does not lay up stores of provisions for winter supplies. I have not opened one of their cities during winter, and therefore cannot assert that they do; but from the immense quantities of leaves collected by them during the autumnal months, which are carefully sundried and taken into the city, I should feel at a loss to say, if it is not intended for winter food, what other use they can put such quantities of leaves to, and furthermore, when it is known to be the kind of food

upon which they subsist. It is also known that they construct cells from fifteen to twenty-five feet below the surface,—below the line of change of temperature,—and in these deep subterranean apartments for their winter quarters, they would not become torpid, but would remain active. Now, if during the warm season it is necessary for them to consume the almost incredible amount of leaves which we see them daily carrying in, it becomes a matter of surprise—an unaccountable thing indeed—how they can make out through the winter months without anything to eat, when we know that they are not in a torpid state, but lively and active.

In this vicinity within the last two years (1861) the cutting ants have greatly diminished. Many large cities have dwindled away to a few thinly populated holes, whilst many others are entirely depopulated. This, I think, is mainly attributable to the protracted dry weather. With many other species, particularly the agricultural and little black ants, long droughts seem to favour their increase. Not so with the cutting ant: they evidently decline. A seven years' drought would cause their wells to dry up as it did many of the wells belonging to the genus *Homo*. I know of several very pretty homes that were evacuated the present year by human families, on account of the failure of their wells: their wells dried up, and as they could not deepen them sufficiently to obtain a supply of water they were obliged to leave their long-cherished and well-fixed homes. The ants have done the same thing, and as I think for the same reason: their wells also failed, and they have perished for want of water, or have emigrated to districts more congenial to their peculiar mode of life. Anyhow they have greatly diminished, and many large cities are actually depopulated and lying in ruins.

On the 1st of August, 1861, I discovered in a grove of thick timber and much undergrowth a great many cutting-ant holes: they were all around in the bushes, extending perhaps over an acre of ground: they were all alike of recent date: their newly thrown up little heaps of fresh sand was what first attracted my attention. Finding them there on the hill-side, and actually boring holes in the thick woods, was a performance so entirely contrary to their customary habits that I was led to the examination of the matter, and if possible to ascertain the cause of this strange unantlike proceeding. My first impression was, there being a large and very ancient city a few hundred yards distant from the new settlement, that it was the work of the recently thrown off queens from the old kingdom; that the young

queens had stopped short in the shady woods in consequence of the hot dry weather, and were setting up for themselves in a new style, it being on a declivity and in a densely shaded woodland. I, however, excused them for all these flagrant deviations from their long-established customs by laying it to the continuous drought and hot weather. I did not leave them until I had marked the place that I might visit them again, and find out how such a multiplicity of new settlements in so small a track of country would manage in the future. I then paid a visit to the large old ant city spoken of above: I had many times within the preceding twelve years, visited and made observations on its extraordinary public works. When I came there I was astonished to find that its inhabitants were all gone. I found only the large old mound of sand, now smoothed down by Time's sweeping winds and the passing cattle, but there were no inhabitants—all had disappeared: they had evidently emigrated to the new settlements I had encountered down the hill-side in the thick shady forest, and the inhabitants thereof were not, as I at first surmised, the newly-commenced communities of the young queens, but emigrating parties who had gone out from the old city in search of water; their wells having failed they could no longer remain in the city, and having left it had proceeded lower down the hill, and, hoping to find water, were sinking many new wells. Subsequent observations have confirmed me in this opinion. The new settlements in a short time were evacuated: having been unsuccessful in obtaining water at the new place, the ants had either died out or gone to some other district. In accordance with my observations on this subject, I am forced to the conclusion that the drought continued too long for them; that in districts where the wells are liable to dry up they often perish. I find that the kingdoms that are located near a constant stream, are in a flourishing state, and have continued so through all the time of the protracted dry season.

The cutting ants plant seeds of various trees, vines and other plants. When they locate a city in bald prairie, which is often the case, where they cannot procure the seeds of trees, they cultivate the prickly poppy (*Argemone Mexicana*), the most appropriate plant for their purpose that grows on the prairie. The seeds of this poppy are planted over the greater portion of the crown of the city mound; the plant springs up during the autumnal rains, forms strong roots in the course of the winter, and by the time the sun becomes oppressively hot the next spring it has grown up two or three feet high, with umbrageous green

foliage and many large white flowers, and affords ample shade to the city. When the ants locate a city on some sunny point near the timbered lands they do not plant the poppy, but appear to prefer certain trees and vines for shade: for this purpose they plant the seeds of the prairie dogwood (*Viburnum dentatum*), yopon (*Ilex vomitoria*), hackberry tree (*Celtis occidentalis*), gum elastic tree (*Bumelia lycioides*), the mustang grape (*Vitis Texana*), *Cocculus carolinus*, and occasionally the prickly ash (*Xanthoxylum fraxinium*). It is often seen in cases of long-established cities, that grape vines spread themselves over the tops of the grown-up shade-trees, and the large luxuriant foliage becomes so dense that it forms a shelter sufficient to turn a smart shower of rain: from the scorching rays of the sun these thrifty vines afford thorough protection. Notwithstanding the notable fact that all the plants these ants cultivate produce nuts, pulpy fruits and large seeds, I have not discovered that they make use of any of them for food: they appear to be a selection for shade, and so far I have not observed that they have any other use. If, however, after a more careful investigation, it shall be discovered that they cultivate the vines, trees and fruitful shrubs for the double purpose of both shade and food, we must accord to them a share of sagacity and far-reaching forethought almost incredible.

I have occasionally discovered colonies of small-sized red ants, which in form resemble the smallest type of the cutting ants: they dwell in the ground: I have not seen them cutting or carrying leaves: I have observed them thickly covering a greasy rag, places where syrup had been spilt, and where coffee-grounds had been thrown aside at my hunting camps: they are not often met with, and, as I now think, never will be, so long as the superior and very numerous race of cutting ants inhabit the land. The smallest type found in the cities of the cutting ants, which I have before alluded to as being slaves, are in shape, size, colour, and all their peculiar motions, precisely the same. How happens it that the same species of ant should occupy two very distinctly marked conditions? In one he dwells in small colonies, makes very little mark, is never wealthy, and does not remain long at the same station: in the other he is a slave!

How the cutting ant manages to make slaves of the smaller race is as yet an unsolved question. The cutting ant does, to be sure, perform all his thieving operations at night, or by the aid of an underground passage, if in the day time. Consequently our observations on the mode of carrying on the slave-trade must necessarily be tedious and

limited; but the cutting ants have what I take to be slaves in great numbers; and the same type that constitutes their slave population is found sometimes free, but very poor and in straggling communities. The fact that these little sand-carrying ants are a servile race, I think cannot well be denied. If they are produced from the eggs of the cutting ant by a peculiar process of feeding, as is the case in producing the various types found in a community or hive of honey bees, then the conclusion will follow, that there are no proper communities of the smaller type, and the little nests that I have occasionally seen of them were nothing more than companies of badly managing absconding slaves.

February 26, 1861. There was a heavy rain last night. To day it is very clear and pleasant: thermometer 70°. Everything that has life in it or can grow is in motion. I was out on the prairie botanizing, and while resting in the shade of a large live-oak, which was nearly in full bloom, I discovered great numbers of all sizes of the cutting ants ascending and descending the tree. On the ground beneath the tree were thousands of the ants, carrying pieces of the leaves of various plants. The greater portion were carrying the leaves of the live-oak: some of the leaves were faded and nearly dry, and all were the growth of the previous year. Seeing no ant-hill near I undertook to find out how far they carried their leaves through the thick grass. In a short time I discovered that they carried them above ground but a short distance to a little pile of leaves and trash, under which they went dragging their cut leaves with them. Turning up the little pile of leafy trash, which seemed to have been driven there by the winds, in a depression of the ground that was probably an old horse track, there was a hole a full inch in diameter. Not a particle of dirt had been thrown out around it, and yet the hole was large and slanted away to the north-west. There were thousands of the ants at work in the shade of the live-oak, gathering up the leaves that were being constantly cut down from above, and on closer scrutiny I found several other holes into which they were going with leaves: these holes also slanted off under the surface, but had no earth thrown out around them, and were all alike concealed with leaves and little sticks: all the holes were crowded with the ants going in with leaves, or coming out empty. With such a number of ants and so many holes, one would expect to find heaps of earth piled out around them; but such was not the case. The holes were the outer termini of the subterranean passages they had run out from their city, about fifty yards

distant, and piled on their city mound lay the sand that came from the passages: these passages, or tunnels, are constructed for the purpose of avoiding the almost insurmountable difficulty they would have to encounter in the effort to carry their leaves through the tangled grass, and also apparently to make it possible for them to obtain food in times of scarcity during the cold weather. The cutting ants are very easily stiffened with the cold air, and cannot succeed in scrambling through fifty yards of thick grass with a leaf on a cold day; but with the under-ground roads, in almost any kind of weather, they can go to the terminus, hastily run out, and snatching up a recently-fallen live-oak leaf, take it home through the tunnel without difficulty. I saw the ants carrying nothing but leaves during this day's observation, neither have I ever observed this species collect any other kind of food except small flowers and the petals of larger ones; but these are no more than tender leaves. At the ant city there appeared to be a great turn out of the ants this fine day: I noticed four sizes of them. Most of the slaves were engaged packing out sand upon the city mound: there were, however, a considerable sprinkling of them in company with the larger sizes packing leaves. I noticed also a greater number of their giants, walking to and fro with the labourers, but they performed no work that I saw. The giants are large, and have a large head with strong mandibles: they are well-formed for the execution of much of their kind of labour; but I did not discover that they did any work, though they were passing up and down the tree and along the road with the labourers all the time. All the small ones—the slaves, and the second-sized ones, which may also be slaves—were unremitting in their labours: the third size, or class, also carried leaves quite busily.

This species of ant often carry their subterranean roads to the distance of several hundred yards from the city in grassy districts, but where the grass has been destroyed they do not construct the under-ground passages, but travel over land in nicely cleared-out roads, which are seen radiating from the city mound and extending to various trees, or spots of herbage which produce suitable leaves for their subsistence. To see one of these well-cleared roads extending in a continuous line from the city to some tree or garden two or three hundred yards distant is indeed remarkable. This fact, in a district nude of grass, occurs so often that it cannot be attributed to chance or blind instinct. Some of the engineers, in their excursions in search of supplies, often wander to a distance of four or five hundred yards, or even further,

and finding a plentiful source of good food, would find no difficulty in conducting parties the best route to it, and soon a good smooth road is constructed, over which in crowds the workers are seen through the night; or in cool cloudy days, transporting the leaves to the city: this is their mode, invariably, in a country where the grass has been destroyed, and we can see and understand the method and the purpose for which they work; but in a country which is heavily coated with high grass it is not so easy to discover by what process they lay off a tunnel and successfully carry it in a direct line to the selected tree or garden spot a quarter of a mile distant, and sometimes beyond a considerable streamlet of running water. On one occasion, on a log that lay across the Ye-Gua Creek, the ants passed over to a gentleman's garden, and were rapidly cutting his vegetables to pieces. The owner, hoping to rid the garden of these troublesome insects, cut the log away, and it floated off down the creek: he was mistaken in his calculations, for it was but a few days after when the ants were ravaging the garden in as great numbers as they were previous to the removal of the log. After searching unsuccessfully for some interlocking tree that might afford them a passage, it was observed that the ants came out from several holes, situated on the creek side of the garden. Subsequently it was discovered that, on a large ant mound crowning a sandy point near the edge of some post-oak timber, two hundred yards from the creek, there were quantities of the black soil of the Ye Gua bottom thrown out, proving that the second visit of the ants to the gentleman's garden had been effected by a tunnel beneath the bed of the creek: the channel of the creek, at that place, is fifteen or twenty feet deep, and from bank to bank on top of the bluff about thirty feet. By what degree of the instinctive powers was all this engineering and truly great project accomplished!

I have never seen the cutting ants fighting among themselves, or with any of the other species. I look upon them as the most peaceable, the most sagacious, and at the same time the most destructive, of the ant kind.

On the Nesting of the Egyptian Vulture (*Neophron percnopterus*).

By Captain H. W. FEILDEN.

THIS bird, common to the three continents of Europe, Asia and Africa, is abundantly distributed throughout India, extending from

the Himalayas to the South, though Jerdon says it is unknown in Lower Bengal.

The habits of this bird are disgusting; its principal food is human ordure. Though it feeds off carrion, when obtainable, its bill is not able to compete with that of the true vultures, and the skin of a large animal would resist its attacks for a long time. Repulsive as are the habits of this bird it occupies an important place in the economy of Nature, supplying scavengers amongst races having no regard for sanitary arrangements.

The "Neophron" walks well and at a considerable pace, lifting its legs high and swaying the body from side to side. It may be seen at all hours of the day, circling over cantonments with never-tiring wing: its flight is strong and vigorous, soaring in great circles, like the true vultures. The difference in colour between the adult and young is very marked, the old birds being yellowish white with black ends to the wings, the young having a uniform plumage of dirty brown, and in an elder stage mottled brown and white. I have not seen any breeding in the immature plumage.

Jerdon says that they breed on rocky cliffs, on large buildings, and occasionally on trees: here (in the neighbourhood of Secunderabad) they nest entirely on rocky granite ledges. January, February and March are the usual months for breeding in. The nest is a large collection of sticks, lined with rags, hair and any soft material the birds can procure. The same breeding-places are annually returned to.

Not having arrived in India till the end of March, I consider myself fortunate in getting some eggs this season. On the 1st of April a friend procured an egg for me: there were two in the nest, one addled and the other ready to hatch. Again, on the 23rd of April my friend found another nest, with a young bird and an egg so nearly ready to hatch that on making a small incision in the shell the youngster inside poked his head through the aperture, breaking a hole the size of a sixpence. These eggs are not as highly coloured as Mr. Hewitson's beautiful illustration; their ground-work is white, scattered over with rusty brown spots, thickest at the larger end; in general appearance not unlike some eggs I have seen of *Milvus regalis*, but larger. I am told the eggs vary from white to deep red. The length of the egg is two inches and three-quarters and the height two inches.

I have found three nesting-places since I came here, but all three

had young in the nests. On the 20th of April, looking after a blue pigeon on the top of a lofty rock, I noticed, half way up, the head of a "Neophron" peering over a ledge: this was evidently a nesting-place, for the face of the rock was streaked white with the drainings from the nest, and at the bottom of the rock lay a pile of bones. I endeavoured to climb up to the nest, but failed. Clapping my hands and shouting made the bird fly off slowly: lazily circling two or three times round the rock, it returned to the ledge and looked inquiringly at me, putting its head first on one side and then on the other. I went in search of my horse-keeper, who can climb like an ape, and, returning with him to the rock, found both old birds sitting on the ledge: the horse-keeper with his bare feet scrambled up the face of the rock with great ease; when within three feet of the ledge one of the old birds flew off; the other would not budge, but put its head down, snapped its bill and bristled up its feathers: before it was dislodged I had to cut a stick and hand it to the man, and not until the bird was pushed with the stick would it leave the rock. There were two young birds in the nest, one apparently about a week old, the other just hatched: they were bare of feathers, and looked like large pigeon squabs.

H. W. FEILDEN.

Secunderabad, May 5, 1868.

Ornithological Notes from North Lincolnshire.

By JOHN CORDEAUX, Esq.

(Continued from Zool. S. S. 1252).

Whimbrel.—May 2. First appearance. Some large flocks of these birds have frequented the marshes during the month: on the 13th I counted up to sixty-one feeding in some low meadow land; and, on the same day, spent some time in attempting to stalk another lot, in the same neighbourhood, not less than double this number. These birds are far more a land bird than the curlew, feeding almost exclusively in our marshes, retiring occasionally to the flats to rest and bathe: they are very fond of washing themselves, and when thus employed it is an interesting sight to watch them through a glass: they splash about in the water like ducks, wading out breast deep, and striking the water with their wings, flinging it around in showers. After the bath they stand on the fore-shore preening their feathers, or

gently fanning their wings, as if to dry them. Others again will be seen standing perfectly motionless on one leg, the other foot dangling from the body, the head thrown back between the shoulders. The whimbrel remained with us to the 27th of May: on the 29th they had all left the district; on this day I saw a single pair on the "flats"—sole remnant of the large flocks seen on the 27th.

Dotterel.—An old gamekeeper, well acquainted with these birds, reports seeing a "trip" in the marshes on Sunday, the 26th of April, numbering about twenty birds. On the 4th, 5th and 6th of May Mr. J. H. Gurney and I walked for many miles over the Humber marshes in search of dotterel, without, however, seeing any. On the 19th a single bird alighted within ten yards of one of my labourers; and another, probably the same bird, was fired at by a brick-maker near the same place on the 23rd. Dotterel arrive in Lincolnshire about the last week in April, remaining for some days on the hills in the wold district before going down into the marshes, where we usually see them during the first week in May.

Gray Plover.—Like the dotterel these birds have been very scarce, the largest flock seen by me during the month numbering nine birds. First seen on the flats on the 4th of May; last observed on the 26th, when I examined through the telescope a small party of seven, two of them mature birds—splendid fellows in full summer dress.

Reeve.—May 20. To-day, when riding in the marshes, I noticed eight birds, like large sandpipers, feeding in a fifty-acre grass field adjoining the Humber. Two hours afterwards, on returning with my gun, found them still feeding within a short distance of the same place: while thus engaged they walked very close to the ground, not unlike knots, but when on the alert stood considerably higher than these birds do. My only chance of a shot was to walk up the drain: the noise made in doing so probably alarmed them, as they rose out of shot, going away in close order, at a great pace, and silently. I was afraid they would leave the field; fortunately, however, they turned, now coming directly towards me, but again changed their line of flight, going towards the Humber, giving me the chance of a long cross-shot: having a green cartridge in the left-hand barrel of my breech-loader, I fired well ahead of the flock, and with effect, one bird falling dead and another winged; the remainder, now reduced to six, going in a direction across the Humber. As they crossed the embankment I was sorry to see another bird leave the rest and pitch downwards towards the flats: this bird I did not find: a labourer who

works on the embankment picked it up and brought it to me on the 23rd. These birds were all reeves, and I believe the remainder of the flock were also reeves, as they appeared all of the same size: they are in summer plumage, but differ more or less in their colouring: they are now in the collection of Mr. J. H. Gurney, jun. I found the stomachs of two of these birds, forwarded by Mr. Gurney, contained the remains of some small bronze-winged beetles, common in our pastures, and earwigs, also several small sharp stones: these stones, felspar and quartz, must have been taken into the gizzard at a great distance from this place, and probably in a granite district.

Black Scoter.—Flocks of this species seen in the Humber during May. A flock examined by the telescope on the 4th was composed of birds in pairs, the male and female swimming together. About thirty of these birds inspected by the glass on the 16th were nearly all females; I could only make out three mature males. Last seen on the Humber May 18th.

Tree Sparrow.—May 27. Found two nests of this species to-day in the marshes, in a pollard hawthorn overhanging a drain: these nests were dome-shaped, constructed of dead grasses, and lined with fragments of wool: I only found a single feather. The eggs resemble those of the domestic bird, but are paler.

Cuckoo.—I never remember cuckoos so plentiful as they are this season: this is a subject of general remark. A friend lately found a cuckoo's egg in a hedgesparrow's nest in his garden: he never heard of Dr. Baldamus's theory, and described the egg to me as partly resembling that of the hedgesparrow. I got yesterday a cuckoo's egg from a hedgesparrow's nest in the orchard: this egg, however, in no way resembles that of the hedgesparrow.

Blackbird.—There is a blackbird's nest in the middle of a honeysuckle in the garden: this nest originally contained four birds, which, alarmed by the too close inspection of my household, prematurely flew from the nest, and, as I never saw them afterwards, probably became the prey of wandering cats. A day or two after the departure of the brood the hen bird began laying again in the old nest, and we have now a second brood of four birds in the nest nearly ready to leave it. The old birds are constantly feeding them, in spite of the frequent croquet playing close to the nest: they are now too large for the mother to cover them with her wings. I see her in the evening sitting on the edge of the nest, their heads resting against her wing.

Wood Pigeon.—May 18. The crop and gizzard of a wood pigeon shot this afternoon contained nothing but the berries of the spurge laurel (*Daphne Laureola*), a shrub which hitherto I have not found in the neighbourhood.

JOHN CORDEAUX.

Great Cotes, Ulceby, Lincolnshire,
June 5, 1868.

NOTICES OF NEW BOOKS.

'*Coleoptera Hesperidum; being an Enumeration of the Coleopterous Insects of the Cape Verde Archipelago.*' By T. VERNON WOLLASTON, M.A., F.L.S. London: Van Voorst. 1867. Demy 8vo, 285 pp. and an outline Map.

It has been my privilege to receive every one of Wollaston's volumes as it issued from the press, and I may truly add to derive pleasure and profit from its contents. I have read with the most scrupulous care every sentence he has penned bearing on principles, and if I cannot lay claim to having paid equal attention to his characters of genera and species, it is because they are not designed for one who, like myself, has little or no knowledge of the objects they are written to differentiate, and certainly, during the short remainder of my life, I shall never make their acquaintance.

Mr. Wollaston is one of the very few English naturalists who did not receive with open arms the very plausible—I may perhaps say the very beautiful—hypotheses of Mr. MacLeay and Mr. Darwin, on the ground of their becoming so fashionable. When I was beginning Natural History I found that not to be Quinarian was not to be received into scientific society—was, in fact, ostracising myself; and now, in the sere and yellow leaf of my career, I find myself equally unable to become Vestigian, or Lamarckian, or Darwinian, whichever may be the more appropriate and descriptive term, and for a second time I am ignored as a man of science. I have seen Quinarianism and its fiery advocates depart to their eternal rest; but Darwinism is still in the zenith of its fame, and has attained this fame quite as much through the instrumentality of a few injudicious opponents as through that of a multitude of unflinching advocates. It has always seemed to me that in order to oppose MacLeay or Colenso or Darwin, or any other great innovator successfully, it is necessary to think out the

matter as they have thought it out. A zealous divine may feel very irate with Colenso or with Darwin, but he cannot dash off such a sixpenny tract after dinner as the world will be content to receive as a satisfactory reply. Mr. Wollaston sees this, and without making Darwinism a prominent object, either to attack or defend, shows us how deeply he has been impressed with the magnitude of the question, and how exhaustive has been the research he has devoted to its consideration.

Mr. Wollaston, in his 'Coleoptera Atlantidum,' avows the opinion that if a once-continuous tract of land were broken up by some natural catastrophe, and the insect forms which once overrun the whole, were thus divided into separate assemblages, the inevitable consequence would be a certain amount of external modification consequent upon the change.

Suppose, for instance, some vast continent, as the favourite Atlanta of geologists, were submerged and became the Atlantic ocean, a few mountain peaks or desert flats only remaining visible, as now exemplified in the Madeiras, Canaries, Cape Verdes and Azores, Mr. Wollaston feels it would require no stretch of the imagination to conclude "that a very large majority of such minute insular departures from a central form as those which we now meet with, would have resulted as a matter of course; and would have been rapidly matured from their respective types."

That these modifications or departures do occur no entomologist who has studied Mr. Wollaston's works or the insects he has described will for a moment doubt, but the word "rapidly" will rivet their attention, especially where the Lamarckian proclivity has once taken root in the mind. Mr. Wollaston perceives this, and adds the following explanatory remarks:—

"I say *rapidly* matured, because I have no reason to think that the small insular modifications to which I refer are the product of that slowly accumulating infinitesimal divergence, in a given uniform direction, which certain modern theories would suppose to be unceasingly going on throughout indefinite time, but which seems to me, in nine cases out of every assumed ten, to have no existence in the feral world. Such a process may occasionally be kept up by the persevering intervention of a true controlling cause, such as that which is implied by the skill and intellect of man; but we have no evidence that 'nature' (whatever the term may mean) is able to accomplish a task thus difficult, and which requires not only sagacity and design,

but, in instances where το καλὸν is the special end to be attained, even imagination (in its highest sense). I need scarcely add that a denial of this Supreme power as inherent in 'nature' is perfectly compatible with a belief in those modifying external influences which all experience assures us are ever liable to act, within reasonable limits, and to leave their impress, upon organic structures, in accordance with the exact amount of pliability which has been allotted to each separate species; for this is totally distinct from that selective capability which we are accustomed to regard as an integral part of free agency and will. Mere variation we all know to be a fact; and, if its importance is by some exaggerated, no one has ever yet questioned its existence; but I believe it can seldom be said to 'accumulate' during more than a few generations, or ever to go on increasing in an undeviating course after the effect has been accomplished which is legitimately due to the combination of circumstances which occasioned it. Towards the close of my introductory observations in the 'Coleoptera Atlantidum,' I cited the Madeiran land-shells in support of this thesis, showing that, so far at least as they are concerned, we possess ocular demonstration that they have not altered during the enormous interval which must have elapsed since the commencement of their subfossil era, except that the *size* of a few of them appears to have been *suddenly* reduced (for there are no traces of the intermediate grades of stature, which must have been preserved under any process of a *gradual* dwindling down), as though consequent upon some physical catastrophe or depauperation, in the areas over which they had spread; and this, supported by other considerations, led me to infer that the many trifling insular departures which we meet with, from a central type, were *not*, in all probability, brought about by any slow and imperceptible method of long-continued, cumulative change, but in a comparatively short period (terminating when the natural conditions of the newly-acquired *habitats* had ceased to alter), and perhaps through the partial breaking up of this vast Atlantic province. At least some such inference seems borne out in many ways, and to accord with the two-fold fact that, while these trifling insular aberrations are everywhere conspicuous, we have at the same time most unmistakable evidence of what I may almost call the unchangeability of a large proportion of the present forms. And although it is true that my remarks arose out of Madeiran data, I am satisfied that they are equally applicable to the whole of these sub-African oceanic groups."—*Introduction*, p. xxxvi.

But why pursue a speculation that can lead to no satisfactory result? the evidence of actual metamorphosis is confined to the life-history of each individual; there is not, and cannot be, any evidence that it extends to species. On the other side, also, it must be admitted that the evidence is simply negative; no one can prove that metamorphosis *does not* take place; no one can show that the hippopotamus and the crocodile, the ostrich and the humming bird, the bird of paradise and the earth-worm, the sensitive plant and the spermaceti whale, *have not* descended from three or four, aye, even from one, primordial germ. Let me, therefore, leave these temptations to speculation, and devote the limited space at my command to statistics more relevant to Zoology as a science of facts.

Mr. Wollaston finds the Coleopterous fauna of the Cape Verdes to be comprised of two hundred and seventy-eight species: three of these are only indicated by fragments, the rest by perfect individuals; the whole are arranged by Mr. Wollaston under the following twelve primary divisions:—

Heteromera . . .	49	species.
Brachelytra . . .	42	„
Necrophaga . . .	39	„
Geodephaga . . .	39	„
Rhyncophora . . .	27	„
Priocerata . . .	18	„
Cordylocerata . . .	16	„
Phytophaga . . .	14	„
Pseudotrimera . . .	14	„
Philhydrida . . .	13	„
Hydradephaga . . .	7	„
Total . . .	278	species:

Six islands were “partially” examined. I quote the word “partially” because used by Mr. Wollaston, but I believe the examination has been very much more complete than Mr. Wollaston’s modesty would lead us to suppose. I give the names of these six islands, and append to each name the number of species that the island so called produced:—

S. Vicente . . .	132	species.
S. Jago . . .	130	„
S. Antonio . . .	114	„

Fogo	93 species.
Brava	61 „
S. Nicolai	27 „

A glance at the map will show that these numbers have no correspondence with the superficial area examined, since S. Nicolai, which has the fewest recorded species, has a larger superficies than S. Vicente, which has the largest number. I think it is scarcely necessary for me to add that the larger aggregate number in the second table arises from the fact that several species are common to two, three or more of the islands. The coleopterous genera which may be said to characterize this archipelago are *Oxycara* of the family Tentyriadæ, and *Trichosternum* of the family Opatridæ, both of them of course heteromerous, and both possessing slightly modified, although permanent, exponents in most of the islands—"exponents," says Mr. Wollaston, "which it is far from impossible may be in reality but insular phases of two aboriginal generic types." Then, as regards the entire absence from the Cape Verdes, of certain coleopterous families common to all continents, whatever their temperature, we have here an illustration of Man's power or influence in altering the original character of the fauna of any given tract. It would appear that all these islands, as well as the Canaries and Madeiras, were formerly inhabited by a race or species of man perfectly distinct from the European emigrants who now occupy the soil: whether the term Huanches properly applied to the whole or only to a portion of these aborigines, I will not pretend to say in the face of such authorities as Prichard and Latham; but whether the men who then "ran wild in woods," were of one or many races, it is quite certain they have expired, and with them those woods in which they ran. By the energetic white man the Huanche was converted, christianized, civilized, demoralized, diseased and destroyed: the first three terms are applied by the optimists; the last three are stern, truthful and incontrovertible—they are totally apart from sentiment or speculation. Now the invaders not only destroyed the natives, but the forests they inhabited, and with the forests perished the longicorns, the glory of all forest-clad countries. The euphorbian flora—strange, uncouth and distinct—still exists to some extent, and with it a euphorbian fauna; but both are rapidly disappearing, and it is by no means improbable that the naturalist visiting the Cape Verdes a century hence will prove to his own entire satisfaction that neither ever existed except in the

fertile and fervid imagination of Mr. Wollaston and his reviewer. Such is history: one generation erects a monument to commemorate an event; the next generation obliterates the inscription that recorded the event. We all recollect in how skilful a manner Dr. Whately enveloped the existence of the first Napoleon in such a dense fog of doubt, that we rose from the perusal of his labours in a state of perfect bewilderment; and yet the name of Napoleon then filled every publication that issued from the press: every adult in the civilized world regarded Napoleon as the greatest name, whether for good or for evil, that history has preserved, and Whateley's essay was a mere satire on the sceptic, yet penned with such excessive skill that many scarcely knew whether he was in jest or earnest. Thus may the sceptic hereafter dispute inch by inch the facts which Mr. Wollaston has recorded with so much precision, and may prove from isothermal lines, oceanic currents, latitude and longitude, that the Euphorbiaceæ could never have grown in the Cape Verdes, and that therefore the euphorbian fauna must have been a myth.

I cannot leave this volume without expressing a hope that I shall find time and space to return to it again. The divisions which Mr. Wollaston has used are scarcely sufficient, since before the entomologist can obtain any satisfactory view of the coleopterous fauna of any country, he must have the species arranged under those families and family names with which he is familiar. Mr. Wollaston's labours enable me to do this, and I hope hereafter to tabulate the comparative statistics I have already begun to extract.

EDWARD NEWMAN.

Ornithological Notes. By GEORGE ROBERTS, Esq.

Dates of Arrival of the Summer Migrants in 1868.—April 9th. Saw wheatear. 10th. Saw swallows about the River Aire. 20th. Saw yellow wagtail. 21st. Heard willow wren. 23rd. Cuckoo heard. 25th. Saw tree pipits in numbers: swallows more dispersed. 26th. Heard several cuckoos: heard whitethroat, whinchat and chiff-chaff. May 3rd. Heard sedge warbler: saw house martin and sand martin. 6th. Heard lesser whitethroat and corn crake: whinchats numerous. 10th. Heard wood warbler and garden warbler: redstart, blackcap and spotted flycatcher not seen. Mr. J. A. Harvie Brown says the flycatcher is the first of the migrants to arrive in Stirlingshire

(Zool. S. S. 68): this is either a mistake or a singular fact; I should very much like to know which, for it is one of the last to arrive in England.

Rook.—April 4th. Rooks had young. On this date I noticed the old rooks flying regularly backwards and forwards over this village, bringing food for the young. About the 23rd of May the young must have been out; the old birds ceased flying over.

Fieldfare and Redwing.—These birds, which had been assembled in a coppice several days, in a flock of about a hundred, left here about the 22nd of April.

Cuckoo.—Cuckoos were numerous here from the 30th of April to the 30th of May. Since the latter date they have either ceased singing or been very scarce. I have only heard of one cuckoo's egg this year.

House Martin.—Out of ten lists of spring migrants which I have looked over this season I found the house martin mentioned but twice. This bird is certainly becoming scarcer: I only found the martin recorded about three times in all the lists that I examined in the 'Zoologist' and 'Field' last year. I feel convinced that it is a decreasing species. During a four days' tour in Craven and Lancashire this spring I noticed martins but twice (both at one village), and not one swift.

Swallow.—Dates of arrival of the swallow at Lofthouse for six years:—1862, April 25th; 1863, April 16th; 1864, April 13th; 1866, April 14th; 1867, April 18th; 1868, April 10th. Although swallows arrived about here somewhat early this spring a pair did not come to a shed in which they have built for four years till the 1st of May. I noticed them haunting the shed very irregularly (sometimes they were a week away) till the 28th of May: on that date I saw them repairing a two-year-old nest. The female is now (June 16th) sitting. When they were away I think they were in the valleys in quest of food. The nest now contains eggs, and I frequently see *three* old birds about it. Swallows are scarce in this neighbourhood: two or three observers have reported this fact to me from different localities.

Lesser Whitethroat.—This little bird came into my garden on the 5th or 6th of May. The call-note to the female reminded me of the first notes of the yellowhammer's song: it also has a note like the squeak of the shrew-mouse, uttered sharply and loudly. Its song is a low warble: it does not sing as it flies, like the greater whitethroat,

but the feathers of the head are erected when it utters its call-note, and probably when it sings, but I have not noticed that point. It frequents huge trees like its congener. Its note of invitation to the female was uttered very vociferously from the date of its arrival till the 30th of May; about then it began to decline, and now it is heard very seldom and weaker in tone.

Sky Lark.—Larks had young on the 5th of May. A cute bird-fancier, at a neighbouring village, placed, for the sake of convenience, four eggs of a lark in the nest of a robin, and the robin hatched and fed the young larks.

Importation of Birds.—I should like to warn amateur naturalists against the imposition of unprincipled dealers in this matter. A short time since a friend, Mr. George Parkin, of Wakefield, showed to me a blue-bird, a redwinged starling, an American robin and a woodpecker, which had been sent in the flesh from America: they were simply drawn and packed in common salt: the flesh was not decomposed and the birds were in excellent order.

GEORGE ROBERTS.

Lofthouse, near Wakefield.

Rare Captures for May, 1868.—During the past month I have had the following, in the flesh, except Sabine's snipe, which reached me stuffed, and which, after all, is no true species:—

May 2. Little bittern (female), taken alive in a field at St. Leonards.

May 7. Black tern (male), shot at Flamborough Head. Sabine's snipe (female), shot at Wareham, in Dorsetshire, by Mr. C. Churchill.

May 9. Ring ouzel (male). Cromer.

May 12. Kentish plover (female), killed near Rye.

May 20. Three reeves, from North Lincolnshire; excellent specimens.

May 30. Turnstone (female), in summer plumage. Tees-mouth.

May 31. A wild turtle (female), from Sunderland (doves are rare so far North), and a pair of garganeys from the vicinity of Bridlington.—*J. H. Gurney, jun.*; *Bank, Darlington.*

First Arrivals of Spring Visitors observed at or near Minehead, Somersetshire, in 1868.—March 21st. Wheatear (male). 27th. Wheatear (female). April 10th. Yellow wagtail (male). 17th. Chimney swallow. 19th. Willow wren. 23rd. Redstart (male), 24th. Pied flycatcher (one pair seen together). 25th. Cuckoo and sand martin. 29th. House martin, greater whitethroat and whinchat (male). May 5th. Swift.—*J. H. Gurney; May 30, 1868.*

Montagu's Harrier near Falmouth.—Nearly all the specimens of this harrier which I have observed have been without the ash-coloured plumage; the two exceptions have been very far from being unsullied, but sufficiently so to show distinctly the

black bar in the wing, and light bay spots on the flanks and outer tail-feathers. A specimen of this description came under my notice to-day, killed near Carclew.—*Edward Hearle Rodd; Penzance, June 12, 1868.*

Thrush singing while flying.—With reference to Mr. Hensman's note (Zool. S. S. 1218) on a thrush singing while flying, it may be interesting to him to know that a similar circumstance has lately come under my own observation: as one day in April I noticed a blackbird fly some distance from one tree to another, in full song the whole time; and, on the same day, a chaffinch flew off the road in front of me to a neighbouring tree, and when about mid-way burst into its joyous little song.—*G. F. Mathew; Dartmouth, May 23, 1868.*

Nidification of the Bohemian Waxwing in England.—Does the Bohemian waxwing (*Ampelis garrulus*) ever breed in this country? The following facts would cause us to believe that it occasionally does so. A male bird was shot here in January last, and towards the end of April a pair of them were seen in a tree near this house. On Sunday, the 31st of May, a young one was caught by my butler while entangled in some rough grass near a fine specimen of *Pinus Douglasii* in my pleasure-ground: he perceived no red marks on the wing-feathers, but on the crown of the head the rudiments of the future crest were apparent. After having kept it in a small box for more than half an hour he placed it on the top of the iron railing, where the old birds immediately came to it, both the male and the female: the latter was more shy than the former, and would not permit his near approach; the former was much more brilliant in the plumage, and he distinctly saw the red marks at the tip of the wings: having watched them all for some time, he saw them take flight upon his return, and as they flew away to some trees near the spot he observed similar yellow bands on the tails of both the old birds. The whole family were noticed at intervals in the same locality for upwards of a week afterwards by my butler, gamekeeper and gardener, but they could not succeed in capturing any of them. What we took to be the nest was placed on the upper side of a branch of the Douglas's pine, about twenty yards above the ground, and consisted of wool, intermixed with fibres of grass and bits of the same fir: its shape was quite destroyed in our attempts to take it down.—*Oswald Mosley; Rolleston Hall, near Burton-on-Trent, June 13, 1868.*

Willow Wren's Nest in a Magpie's.—On the 31st of May I found a willow wren's nest and six eggs placed on the top of an old (wood pigeon's?) nest in a dead fir tree, about fifteen feet from the ground. To make sure that it was not a wren's nest I laid down on the ground, and soon saw the bird go into the nest: she had doubtless flown out as I ascended the tree. I have never before found the willow wren's nest more than a foot from the ground, and this, I think, only twice, though a gentleman showed me a nest, two or three years ago, which had been built in a yew tree two or three feet from the ground.—*John S. Thomasson; Moorfield, Bolton, June 1, 1868.*

Quails in Suffolk.—About the 20th of May several quails arrived in the neighbourhood of Scole, where they seem to be disposed to breed, and I need hardly add that the gentleman on whose estate they have made their appearance will not permit them to be molested.—*Alexander Clark-Kennedy; Little Glenham, Wickham Market, May 28, 1868.*

Quails nesting near Henley-on-Thames.—Last Monday, the 8th of June, I had eleven eggs of the quail brought me; they were mown out in an upland grass-field, at Remenham, in our neighbourhood. This is the first time I have met with the eggs of

the quail in our vicinity.—*Charles E. Stubbs; Henley-on-Thames, Oxon, June 14, 1868.*

Little Bittern at Braunton, North Devon.—I have been informed that, in the first week of May, a little bittern was killed at Braunton, near Barnstaple, by one of the keepers of Sir W. Williams, Bart.—*M. A. Mathew; Weston-super-Mare, May 19, 1868.*

Spoonbill on the Norfolk Coast.—Two immature male birds were shot on the 4th of May near Yarmouth. Both birds were apparently about the same age, but one was much larger, weighing four pounds, the other only three and a half pounds: they were both rather fat. A day or two afterwards, I was told, a beautiful old male was shot in the same locality.—*T. E. Gunn; Norwich.*

Rare Sea Birds.—Within the last few months I have skinned the following sea birds:—Little gull (2), Iceland gull, glaucous gull (5), greater shearwater, Fulmar petrel, spotted redshank, little auk (3), gray phalarope, pomarine skua (3), great skua, and ringed guillemot. I can furnish full particulars; several were given me by my friend Mr. J. Gatcombe.—*J. H. Gurney, jun.; Bank, Darlington.*

A strange Bird.—Copiapo, Chili, April, 1868. Yesterday, at about five o'clock in the afternoon, when the daily labours in this mine were over, and all the workmen were together awaiting their supper, we saw coming through the air, from the side of the ternera, a gigantic bird, which at first sight we took for one of the clouds then partially darkening the atmosphere, supposing it to have been separated from the rest by the wind. Its course was from north-west to south-east; its flight rapid and in a straight line. As it was passing a short distance above our heads we could mark the strange formation of its body. Its immense wings were clothed with a grayish plumage, its monstrous head was like that of a locust, its eyes were wide open and shone like burning coals; it seemed to be covered with something resembling the thick and stout bristles of a boar, while on its body, elongated like that of a serpent, we could only see brilliant scales, which clashed together with a metallic sound as the strange animal turned its body in its flight.—*Copiapo (Chili) paper.*

Large Sturgeon in the Severn.—It may be interesting to some of the readers of the 'Zoologist' to know that on Thursday, the 28th of May, a sturgeon was caught in the Severn, near Newnham, and kept alive by being anchored in the river till Saturday morning. The fish measured seven feet eight inches long: I have not yet been able to get at its weight.—*Edward Sweetapple.*

Homelyn Ray and Gemmeous Dragonet off Plymouth.—I have just received a specimen of the Homelyn ray (*R. maculata*), the smallest I ever saw: it was a male, 6 inches long over all, $2\frac{1}{2}$ inches long from the snout to the origin of the tail, which, as will be seen, was of the disproportionate length usual in young rays; across the wings from tip to tip the fish was $3\frac{1}{2}$ inches: the spots were developed, but disappeared soon after death: the spines were all developed in the precise order given by Yarrell. The same trawl which took this fish took the yellow skulpin or gemmeous dragonet (*Callionymus Lyra*) and the Asterias Placenta of Pennant.—*Thomas Cornish; Penzance, May 14, 1868.*

Notes on Aphides. By FRANCIS WALKER, Esq., F.L.S.
(Continued from S. S. 1123.)

Genus 7. APHIS, *Linn.*

Front flat or convex. Antennæ not seated on a frontal tubercle, smooth, generally shorter than the body; seventh joint longer than the sixth, or at least as long. Nectaries cylindrical or attenuated from the base, rarely very small, very rarely none. Tail more or less prominent, sometimes none. Cubital vein of the fore wings twice-forked.

Typical species, *A. Sambuci*, *Linn.*

A. Tail more or less conspicuous.

A. Nectaries longer than the tail.

a. Body green, or luteous-green, or olive, or ochraceous or lemon-colour, sometimes very pale.

a. Body powdered.

* Nectaries surrounded by rust-colour at the base.

† Nectaries cylindrical, lutescent, black at the tips. 1. *Padi.*

†† Nectaries black; tips paler, attenuated. 2. *Cratægi.*

** Nectaries not surrounded with rust-colour at the base.

† Abdomen green-gray, with dorsal transversely arranged and with marginal black points. 3. *Brassicæ.*

†† Abdomen green or greenish brown, with no dorsal points, at least in the apterous form.

‡ Antennæ half the length of the body. Nectaries black. 4. *Avenæ.*

‡‡ Antennæ as long as the body. Nectaries green in the apterous form, black in the winged form. 5. *Lactuæ.*

b. Body not powdered.

* Nectaries green or whitish, or lutescent; the extreme tips sometimes black or brown.

† Tail as long as half the length of the nectaries or longer.

‡ Abdomen green.

§ Dorsum dull, of one colour. 6. *Nasturtii.*

§§ Dorsum varied with brown. 7. *Clinopodii.*

†† Abdomen luteous-green, sometimes marked above with longitudinal green lines.

§ Body broadly oval, obtuse behind. Antennæ half the length of the body. 8. *Malvæ.*

§§ Body oblong oval, acute behind. Antennæ nearly as long as the body. 9. *Eupatorii.*

†† Tail shorter than half the length of the nectaries.

‡ Nectaries extending beyond the tip of the abdomen.

§ Nectaries long, very pale. Tail brownish green. 10. *Saliceti.*

§§ Nectaries moderately long, like the tail in colour. 11. *Urticæ.*

- ‡‡ Nectaries not extending to or beyond the tip of the abdomen.
 - § Nectaries thicker at the base. 12. *Prunina*.
 - §§ Nectaries quite cylindrical.
 - || Body bright green. Antennæ with all the joints cylindrical. 13. *Ballotæ*.
 - ||| Body luteous-green. Antennæ with the fifth and sixth joints distinctly clavate. 14. *Helichrysi*.
- ** Nectaries wholly black or brown.
 - † Tail very small, hardly visible.
 - ‡ Body ochraceous. Rostrum extending to the middle legs. 15. *Sambucaria*.
 - ‡‡ Body bright yellow. Rostrum extending to the hind legs. 16. *Verbasci*.
 - †† Tail more or less long.
 - ‡ Tail more than half the length of the nectaries. 17. *Chloris*.
 - ‡‡ Tail as long as half the length of the nectaries, or shorter.
 - § Abdomen of the viviparous winged female with black marginal points. 18. *Symphiti*.
 - §§ Abdomen of the viviparous winged female with no black marginal points.
 - || Antennæ of the viviparous winged female longer than the body. 19. *Scabiosæ*.
 - ||| Antennæ of the viviparous winged female as long as the body, or shorter.
 - ¶ Body intensely green. Antennæ brown.
 - ← Neck mucronate on each side. Rostrum extending to the hind legs. 20. *Plantaginis*.
 - ←← Neck unarmed. Rostrum not extending beyond the middle legs. 21. *Capsellæ*.
 - ¶¶ Body grass-green. Antennæ whitish.
 - ← Abdomen wholly green 22. *Mali*.
 - ←← Border and tip of the abdomen brown, the same black in the viviparous winged female. 23. *Solanina*.
 - AA. Body black, or brown, or blackish green.
 - a. Abdomen above brownish lutescent at the base. Antennæ as long as the body. 24. *Polianthis*.
 - aa. Abdomen nowhere lutescent above. Antennæ shorter than the body.
 - * Dorsum shining.
 - † Head green. Tail very small, hardly visible. 25. *Cardui*.
 - ‡‡ Head black. Tail quite apparent. 26. *Medicaginis*.
 - ** Dorsum dull.
 - † Body blackish green.
 - ‡ Tail black, a little shorter than the nectaries. 27. *Sedi*.
 - ‡‡ Tail green or white, much shorter than the nectaries.
 - § Antennæ as long as the body. 28. *Frangulæ*.
 - §§ Antennæ shorter than the body.

- || Body ovate-oblong. Nectaries hardly twice longer than the tail, which is whitish. 29. *Punica*.
- ||| Body oval. Nectaries more than twice longer than the tail, which is dingy green. 30. *Consolida*.
- †† Body black or brown.
- ‡ Nectaries pale at the tips. Tail luteous-brown at the base. 31. *Euonymi*.
- †† Nectaries and tail wholly black or brown.
- § Tail shorter than half the length of the nectaries.
- || Middle and hind femora whitish, brown only at the tips. 32. *Hederæ*.
- ||| Middle and hind femora black, paler only at the base.
- ¶ Third and fourth joints of the antennæ wholly white. Nectaries short, cylindrical. 33. *Intybi*.
- ¶¶ Third and fourth joints of the antennæ black, hardly whitish at the base. Nectaries long, attenuated at the tips. 34. *Sambuci*.
- §§ Tail as long as half the length of the nectaries, or longer.
- || Rostrum extending to the hind legs, or at least distinctly extending beyond the middle legs.
- ¶ Body olive-brown. Fourth and fifth joints of the antennæ equally long. Wings yellowish. 35. *Silybi*.
- ¶¶ Body black or brownish black. Fourth joint of the antennæ longer than the fifth. Wings not yellowish. 36. *Viburni*.
- || Rostrum not extending beyond the middle legs.
- ¶ Tail greenish brown. 37. *Nerii*.
- ¶¶ Tail black.
- Tail as long as half the length of the nectaries. Pupæ with no white points on the dorsum. 38. *Laburni*.
- Tail more than half the length of the nectaries. Pupæ with white points on the dorsum.
- ++ Antennæ white, hardly brown at the tips. Femora from the base to the middle and tibiæ white. 39. *Papaveris*.
- ++++ Antennæ brown, hardly paler at the base. Femora at the base and tibiæ lutescent. 40. *Rumicis*.
- AA.** Nectaries as long as the tail, or shorter.
- A.** Nectaries and tail at least twice longer than broad.
- a.** Body black, or blackish green.
- * Body bluish powdered. Nectaries as long as the tail. 41. *Cracca*.
- ** Body smooth, or if slightly powdered, then the nectaries distinctly longer than the tail.
- † Body greenish brown. Tail as long as the nectaries. 42. *Serpylli*.
- †† Body black. Tail longer than the nectaries.
- ‡ Nectaries cylindrical, distinctly shorter than the tail. 43. *Genista*.
- †† Nectaries thicker at the base, hardly shorter than the tail. 44. *Euphorbiæ*.

- aa. Body bright green, or luteous-green.
- * Body white-powdered.
 - † Antennæ as long as half the length of the body. Nectaries and tail brown; coxæ black. 45. *Cucubali*.
 - †† Antennæ as long as one-third of the body. Nectaries and tail pale green. Coxæ whitish or hardly brownish. 46. *Atriplicis*.
 - ** Body not white-powdered.
 - † Dorsum of one colour, or with deeper. Nectaries and tail pale, the former sometimes with brown tips. 47. *Origani*.
 - †† Dorsum with deeper longitudinal striæ. Nectaries and tail black. 48. *Beccabungæ*.
- AA. Nectaries and tail very short, about as long as broad.
- a. Body pale green. 49. *Carotæ*.
 - aa. Body brown.
 - * Rostrum reaching or extending beyond the hind legs. Dorsum wholly powdered. 50. *terricola*.
 - ** Rostrum not extending beyond the hind legs. Dorsum powdered excepting two spaces and a transverse line, rarely quite bare. 51. *Donacis*.
- AA. Tail none or not visible.
- A. Nectaries more or less long.
- A. Body shining.
- a. Dorsum green, with black shining and sometimes confluent black bands. 52. *Persicæ*.
 - aa. Dorsum of one colour.
 - * Colour bright green. 53. *Myosotidis*.
 - ** Colour black or brown.
 - † Nectaries slender, longer than the fore femora. 54. *Centaureæ*.
 - †† Nectaries rather thick, much shorter than the fore femora.
 - ‡ Abdomen of the viviparous winged female deep black and shining beneath. 55. *Prunicola*.
 - ‡‡ Abdomen of the viviparous winged female brownish black and dull beneath, only the anal folds shining. 56. *Tragopogonis*.
- AA. Body powdered.
- a. Viviparous winged female with a black dorsum. 57. *Ranunculi*.
 - aa. Viviparous winged female with an olive-green dorsum, with a black dorsal spot and with black marginal points. 58. *Lappæ*.
- AA. Nectaries wholly wanting. 59. *Gallarum*.

Genus 8. SIPHOCORYNE, *Passerini*.

Nectaries clavate, more or less long. In other characters like *Aphis*.

Typical species, *Aphis Xylostei*, Schrank.

- A. An oblong little horn above the tail. 1. *Cuprææ*.
- AA. No horn.

- A. Body dingy lutescent or greenish. Abdomen rust-colour or black about the nectaries. 2. *Feniculi*.
- AA. Body green, powdered. Abdomen not rust-colour nor black about the nectaries. 3. *Xylostei*.

Genus 9. MYZOCALLIS, *Passerini*.

Viviparous apterous female and pupa with a hairy or bristly dorsum. Nectaries very short, tubercle-shaped. In other characters like *Aphis*.

Typical species, *Aphis Coryli*, Goetze.

- A. Apterous form and pupa with a tuberculate setulose dorsum. 1. *Ononidis*.
- AA. Apterous form and pupa with the dorsum pilose or setulose, not tuberculate.
- A. Winged form with the dorsum tuberculate at the base.
- A. Abdomen bare, with four dorsal tubercles. 2. *Quercus*.
- AA. Abdomen with white down, with one dorsal tubercle. 3. *Quercea*.
- AA. Winged form with the dorsum not tuberculate. 4. *Coryli*.

Genus 10. CLADOBIUS, *Koch*.

Antennæ hairy; seventh joint at least as long as the sixth. Nectaries cylindrical, at least twice longer than thick.

Typical species, *Aphis populea*, Kaltentbach.

- A. Nectaries rather long, almost reaching the tip of the abdomen. 1. *Lantanae*.
- AA. Nectaries very short, remote from the tip of the abdomen. 2. *populea*.

Genus 11. CHARTOPHORUS, *Koch*.

Antennæ setaceous, distinctly pilose; seventh joint longer than the sixth. Nectaries obtuse, very short, shorter than their thickness. Tail wart-shaped.

Typical species, *Aphis Aceris*, Fabr.

- AA. Abdomen white, with black bands. 1. *leucomelas*.
- AA. Abdomen green or black.
- A. Abdomen grass-green, with darker spots or points in longitudinal series.
- A. Abdominal spots confluent, forming two curved stripes. 2. *Capreae*.
- AA. Dorsal and marginal points distinct, the former in two series. 3. *salicivora*.
- AA. Abdomen green with darker bands or black.
- A. Stigma dingy luteous-green, bordered with brown. 4. *Aceris*.
- AA. Stigma wholly brown or black.
- a. Abdomen green, with black bands and with black marginal points.
- * Veins of the fore wings clouded with brownish black. 5. *Vitellinae*.
- ** Veins of the fore wings not clouded. 6. *versicolor*.
- AA. Abdomen black above.

- a. Abdominal incisures luteous. 7. *Populi*.
 aa. Abdominal incisures of the ground hue. Abdomen bordered with
 green and brown at the tip. 8. *Salicti*.

Genus 12. PTEROCALLIS, *Passerini*.

Antennæ with the seventh joint shorter than the sixth. In other characters like *Myzocallis*.

Typical species, *Aphis Alni*, Fabr.

- A. Abdomen with black marginal points. Veins of the fore wings with
 triangular brown spots at the tips. 1. *Tiliae*.
 AA. Abdomen without marginal points. Veins of the fore wings not or
 hardly dilated at the tips. 2. *Alni*.

Genus 13. TRAMA, *Heyden*.

Antennæ with seven joints; third joint longest; seventh extremely small. Legs long; hind tarsi with one joint. Winged form unknown.

1. *Troglodytes*.

Genus 14. PARACLETUS, *Heyden*.

Antennæ short; third, fourth and fifth joints nearly equal in length; seventh very small. Abdomen depressed; no nectaries. Legs long; tarsi two-jointed. Winged form unknown.

1. *cimiciformis*.

(To be continued.)

How Spiders begin their Webs.—Early in the spring of 1866, while arrangements were making for photographing a live male of the *Nephila plumipes* (the so-called "silk spider of South Carolina"), the spider, after having several times traversed the circle of wire on which it was, suddenly stopped, took a firm position at the top of the frame and lifted the abdomen, pointing it towards a large skylight which occupied the middle of the ceiling: a slender shining thread was seen to shoot forth from the spinnerets which occupy the end of the abdomen; it seemed to have a blunt rounded extremity, which advanced through the air rather quickly for a few inches, but afterwards more slowly and steadily, and with an upward tendency, but always in the direction of the skylight. When it had reached the length of five or six feet, I allowed it to become attached to my coat; the issue ceased at once, and the spider, having attached the end of the line, turned about and began to pull upon it. I now broke it off near the wire, and, believing that there was a current of air toward the skylight, I blew gently upon the spider from various directions, and found that it always pointed its abdomen in the direction in which I blew, and that the thread was emitted in the same direction. So that while it seemed to have the power of projecting a thread for a short distance, yet it always availed itself of the prevailing current of air.—*B. G. Wilder, in the 'American Naturalist' for June, 1868.*

PROCEEDINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY.

June 1, 1868.—H. W. BATES, Esq., President, in the chair.

Additions to the Library.

The following donations were announced, and thanks voted to the donors:—
 ‘Verhandlungen der K. K. zoologisch-botanischen Gesellschaft in Wien,’ vol. xvii.; presented by the Society. ‘Stettiner Entomologische Zeitung,’ 1868, Nos. 4—6; by the Society. ‘On the Diurnal Lepidoptera of the Extra-tropical Northern Hemisphere,’ by W. F. Kirby; by the Author. ‘The Odonat-Fauna of the Island of Cuba,’ by Dr. H. Hagen; by the Author. Newman’s ‘British Moths,’ No. 18; by the Author. ‘The Zoologist’ for June; by the Editor. ‘The Entomologist’s Monthly Magazine,’ for June; by the Editors.

The following addition, by purchase, was also announced:—C. G. Thomson, ‘Skandinaviens Coleoptera,’ vols. viii. and ix.

Election of Members.

G. P. Shearwood, Esq., of Cedar Lodge, Stockwell, was elected a Member; Il Cavaliere Francfort, of Pallanza, Lago Maggiore, was elected a Foreign Member.

Exhibitions, &c.

The Secretary announced that an exhibition of useful and destructive insects would take place in the Palais de l’Industrie, at Paris, during the month of August. The Committee of Management includes Dr. Boisduval, M. Guérin-Méneville, and other entomologists and scientific agriculturists. The exhibition is to be made as comprehensive as possible, the scheme including the propagation of useful insects, methods of curing or preventing disease, and economical management; and the illustration of destructive insects, with means for opposing their ravages. As regards destructive insects, the Committee has determined on a practical instead of a scientific classification, the subdivisions being formed by the plants upon which the creatures feed. Foreigners are invited to take part in the coming exhibition; applications to be sent in before the 20th of July, to the Secretary of the Société d’Insectologie Agricole, No. 1, Rue Cadette, Paris, or at the Palais de l’Industrie. The insects or other objects of exhibition are to be sent in before the 25th of July, and the exhibition opens on the 1st and closes on the 31st of August. The following are the principal heads of classification:—First division—Useful insects:—1st class, Silk-producing insects; 2nd class, Insects producing honey and wax; 3rd class, Insects used in dyeing and for colour; 4th class, Edible Insects, crustacea and mollusks; 5th class, Insects employed for medical use; 6th class, Insects used as ornaments. Second division—Destructive insects:—Ten classes, viz. those which attack cereals, the vine, plants used in industry, forage, vegetables and ornamental plants, fruit trees, forest trees, timber used for building, truffles and fungi, dry organic matters, and, lastly, parasites of man and domestic animals. The third division includes three classes—carnivorous insects, parasitic insects; destructive of chrysalides; and insectivorous animals, birds

and reptiles. The fourth division includes—Insects and other creatures destructive of mollusks; and notices respecting edible snails and the benefit that cultivators may derive from them. Lastly, optical instruments for entomological purposes, and special apparatus connected with the rearing or destruction of insects. Printed or written memoirs are also to be admitted, even without specimens of the insects to which they refer; and it is further announced that conferences will take place in the exhibition on various subjects connected with “insectology” [? Entomology].

Mr. M'Lachlan exhibited the larva of a caddis-fly found by Mr. Fletcher, of Worcester, crawling about the bark of willow trees: the case was like a *Coleophora*, but the feet of the larva showed it to be Trichopterous, not Lepidopterous. *Enœcylla* [*Enoicyla*] *pusilla*, a species of which the female was apterous, had for some time been known on the Continent to have a non-aquatic larva, and M. Snellen van Vollenhoven found the larvæ in great numbers at the Hague: this species had not yet been found in Britain, but Mr. Fletcher's larvæ were probably to be referred to it. It would be interesting to ascertain how the larva breathed, whether or not by spiracles.

Mr. J. Jenner Weir called attention to the Report, in the ‘Journal of Horticulture’ for May 21, 1868, of the Proceedings of the Scientific Committee of the Royal Horticultural Society, in which it was stated that on the 19th of that month “Mr. Berkeley exhibited specimens of the larva of *Coleophora hemerobiella*, which attacks the leaves of the pear and cherry, not as is usually the case by eating away the whole substance, but by attaching themselves by their discoid suctorial mouth, and extracting the sap from the parenchyma for some distance round the point of attack; which when they have exhausted they leave, and commence an attack in another part of the leaf, leaving a small hole similar to a leech bite. Finally they enclose themselves in the leaf, which is rolled up into the form of a tiny cigarette.” Mr. Weir presumed that no one of the entomologists attached to the Scientific Committee could have been present at the promulgation of a statement so full of error.

Mr. Keays exhibited specimens of *Psyche crassiorella* from Hornsey Wood.

The Hon. T. De Grey exhibited pupæ of *Hypercallia Christiernana*; the larvæ were found on *Polygala vulgaris* between the 27th of April and the 22nd of May, near Shoreham, and one became a pupa during the Meeting. The pupæ were of a beautiful bright green colour, attached by their hind extremity only to the sides of the glass cylinder in which they were exhibited, and were not suspended loosely by the silken attachment, but rigidly fixed in an oblique position at an angle of about 60° to the side of the cylinder.

Mr. A. G. Butler (who was present as a visitor) exhibited a small and pale variety of *Nemeobius Lucina*, and a pair of *Anthocharis Cardamines*, all from Herne Bay. Both sexes of *A. Cardamines* were remarkable for the largeness of the black spot on the disk of the fore wings, and the male had a rudimentary tail to the hind wings.

Mr. Burmeister, jun. (who was present as a visitor), exhibited numerous drawings of larvæ of Brazilian butterflies, and pupa-skins of many of them. Amongst the latter was *Ageronia Amphinome*, remarkable for its pair of foliate appendages to the head, which, however, did not contain the antennæ of the butterfly: this pupa was not distinguishable from other Nymphalidæ, and showed that the old authors who described it as having a belt of silk round the middle were mistaken.

Mr. Burmeister also mentioned that he had found the larvæ of *Castnia* in the bulbs or swellings at the foot of the stem of Orchids.

Mr. Edward Sheppard read the following extract from a letter written by Mrs. Russell, of Kenilworth,—the beetle referred to being a *Meloe*:—

“An evening or two ago I watched a beetle for an hour in the garden excavating a hole in the earth of one of the beds, big enough to hold its own large long body. It was evidently a female, full of eggs. It bit off little pellets of earth from the rim of its hole and cast them away with its hind feet, turning itself about in every direction, and working without a moment's cessation. It had very large, thick antennæ, and was plainly a very powerful creature, rolling down pieces of the dry crumbling earth half as big as itself, and not minding them a bit. Next morning I went to see the state of affairs, and found, to my astonishment, the excavation completely filled up, and smoothed over, as if some one had passed their hand over the finely-powdered soil. Thinking it possible she might have buried herself, I searched the place well with a stick, but there was no trace of her, and I therefore conclude that she had been laying some eggs and covering them up.”

Prof. Westwood gave an account of his observations of *Ateuchus sacer* at Cannes, and mentioned that during flight the elytra were perfectly horizontal and very slightly open at the suture, so that the motion of the wings was confined within very narrow limits. The action of the beetles in rolling along the ground the ball or pellet of dung in which the female deposits her eggs was most curious: with head pressed down and hind feet raised aloft, with its back to the pellet and moving backwards, one beetle pushed and guided the ball with its hind legs, whilst another beetle clung to the ball, and remaining motionless thereon was rolled over and over with it, sometimes uppermost, sometimes undermost. [See the account of *Ateuchus variolosus* given by “*Ionicus*” in ‘*The Entomological Magazine*,’ vol. iii. p. 377.]

Mr. Keays exhibited oak-leaves from Hornsey Wood, which were cut straight across the middle, leaving only the midrib, and the outer halves then twisted and rolled up by *Attelabus Curculionoides*, with a view to oviposition.

The Hon. T. De Grey exhibited specimens of *Agapanthia Cardui*, bred from larvæ in stems of thistles.

Mr. A. G. Butler exhibited *Otiorhynchus picipes*, which had been found destructive to rose trees at Manchester, eating off the young shoots.

Paper read.

The following paper was read:—“*Descriptions of New Genera and Species of Heteromera*,” by Mr. Frederick Bates. Two new genera of Tenebrionidæ, from Australia, were characterized under the names of *Hypaulax* and *Chileone*.

New Part of ‘Transactions.’

Trans. Ent. Soc., third series, vol. iv., part 5, published in May, completing that volume, and containing Mr. A. R. Wallace's Catalogue of Malayan Cetoniidæ, with four coloured plates, was on the table.—*J. W. D.*

Ornithological Notes for the last Six Months, including Extracts from the Journal of a Nesting Tour in Sutherland. By JOHN A. HARVIE BROWN, Esq.

December 17, 1867. Snowy owl captured at Montrose (Zool. S. S. 1058).

January 4, 1868. To-day, when down at Grangemouth, I was informed by several trustworthy persons that during some misty weather in December, a flock, or part of a flock, of wild geese (bean) alighted in the streets of the town, and three or four were killed with sticks and stones, and one actually found its way into a butcher's shop, whence, as may be supposed, if the proprietor obeyed his instincts, it did not so easily make its exit.

January 7. Saw in a birdstuffer's premises (Mr. P. Allan's), in Stirling, a blackheaded gull, having a curious abnormal quill growing from the left pinion: it was a bare quill with only a few fibres of feather at the extremity. The bird was shot a few days previously on the banks of the Forth below Stirling.

January 9. Saw a little grebe on the river (Carron).

January 10. Two young goldeneyes, male and female, killed on the river. I have generally before obtained adult birds in the same locality.

February 4. Saw a kestrel distinctly, with a glass, hovering over the copse-wood. There are few seen inland at this season, though not unfrequently they are seen at the coast.

March 26. Small parties of blackheaded gulls have been frequenting the low lands near the river for the last few days.

March 30. At Grangemouth shell-bank I killed a fine specimen of the pinkfooted goose, and wounded the other of the pair with my left barrel: they were flying in the same direction as, but keeping separate from, a large flock of bean geese, and came over the ditch in which I lay concealed. Saw to-day a few curlews, redshanks and one dunlin, some blackheaded gulls and a few ducks out at sea.

April 3. Made a reconnoitering trip to a peregrine's eyrie: saw the birds. The man who was with me told me that he distinctly remembers the falcons breeding at the same spot thirty years ago, and of the young having been taken out by a person whom he knew and named. Ravens occasionally, in the absence of the falcons, occupy the same cliff.

April 9. Dipper's nest, but no eggs yet. Jackdaws have taken possession of the chimneys in the garden-wall, where starlings built before. Kingfishers going to breed at the same place where I took their eggs some years ago. Partridges seem tolerably plentiful as compared with former years.

April 20. Second visit to peregrines, with ropes, &c.; unsuccessful.

* * * * *

After returning from Sutherlandshire I received from a correspondent a very fine blackthroated diver, which will be a mother to the poor little young one which I procured last year (Zool. S. S. 857).

During my absence Mr. F., of Arngibbon, about ten miles west of Stirling, found an albino starling dead, and sent it to my birdstuffer in Edinburgh for me: it was quite warm when he picked it up, and I regret that I did not hear of it soon enough to give the birdstuffer directions as regarded examining the cause of death: it is of a pale ashy white, and the eyes were black, not red. I also obtained a white mole from the same place whence I procured one some years ago: this one was caught in the mole-catcher's traps.

On the 27th of June I received a nest of five lesser redpole's eggs, taken by a birdcatcher near here, who likewise caught the bird on the nest. The lesser redpole does not breed abundantly in this county that I am aware of, though large flocks arrive in winter.

Nesting Tour in Sutherland.—It is not my purpose here to give any very extended notes of my nesting tour in Sutherland, as I have already handed over to Mr. R. Gray, of Glasgow, most of my journal, but shall just give a few extracts, in a curtailed form, which may be of interest to the readers of the 'Zoologist.'

April 25, 1868. Arrived at my old station in West Sutherland to-day, after having spent a few days in Ross-shire. (Talking of Ross-shire, I am not the person mentioned in 'Land and Water' of the 27th of June, who it seems offers £10 for eagles' nests or eggs in the Gair Loch district: I sincerely trust that such a system will speedily be put a stop to.) Received one golden eagle's egg, which was taken from the same nest that the young bird was procured from last August: it had been in the nest since last season, and therefore is rather a faded specimen. The young bird is now, I believe, in the possession of the Duchess of Sutherland.

May 2. Saw no less than four greenshanks on the shores of one loch to-day.

May 5. Took two small but finely-marked buzzard's eggs, and fired at the female as she flew off the nest. Nest in a very simple place. Took the eggs out by means of a long stick, to the end of which my round hat was attached. Though there were only two eggs in the nest, nevertheless they had been sat upon for some time, and I had to leave them awhile unblown, in order the more easily to get out the contents. This year I knew of some six or seven buzzards' nests: some were inaccessible, others had young. There is no person in the district who is at all expert at rock climbing.

May 7. Saw both peregrines at the old place. I brought the best cragsman to be found in Assynt and Edderachyllis some twenty miles to try and take out the young falcons, some time after this, but he just looked at the rock and owned he was quite beaten by it: this man is a splendid cragsman, and on sea-cliffs, where the rock is firm, I never saw him surpassed; but this particular rock is exceedingly friable and dangerous, and besides there is no place above where a rope can be held. The inland cliffs here being for the great part formed of limestone are of a similar nature, and quite different from those at the coast or at Handa. Some of the above-mentioned buzzards' nests might have been got at with good ropes and an experienced cragsman, but of four peregrines' eyries which I knew of this year only one inland one could have been reached, and that only with great caution.

May 8. Shot a fine redthroated diver as a companion to the one I received last season (Zool. S. S. 856) on the 6th of June.

May 11. Found a blackthroated diver's nest ready for eggs; these, when laid about a week afterwards, were destroyed by those "dreadful vermin" the hooded crows; upon these, however, the same day summary vengeance was taken, they having a nest on another island of the same loch. I obtained a good series of hooded crows' eggs this season.

May 13. Amongst other things got to-day was a diminutive wild duck's egg, not so large as a partridge's: there were seven other eggs in the nest

May 18. Got a lot of eggs from collectors at Loch —, amongst which were two blackthroated diver's and some wild geese, snipe, teal, &c. I got a nice series of snipe's eggs this season: no two nests of eggs were alike; also a nice series of golden plover's, of which, however, from their having been kept too long unblown, I only succeeded insaving two complete nests.

May 19. Saw two pair of blackthroated divers to-day on one loch, which is rather uncommon. Gillie swam out to one green island, but did not find the eggs. Oh! what would I not have given for a light coracle or India-rubber boat or canoe. There were at least a dozen or eighteen islands on this loch, and herons, divers, ducks and geese breeding on them, and other birds, very likely, that I wot not of.

May 20. Keeper and I missed a buzzard to-day with all four barrels. We set a trap, however, baited with half a young kid which we had found dead on the hills, and a few days after got one of the pair, but the trap had spoiled the legs, and, in its struggles, the bird, as far as stuffing was concerned. I kept the wings "in memoriam."

May 21. Took four eggs of the ringed ouzel: its nest was built in the bottom of an old hooded crow's nest, which also last year was occupied by a pair of kestrels: the female flew off the nest.

May 23. Obtained a nest of four very fine greenshank's eggs: the person who took them yesterday, and brought them to me unblown, knew of the nest before the eggs were laid. This season I got another complete nest of greenshank's eggs collected along with the golden plover's, before referred to, redbreasted mergansers and other things, for me in another part of the county. The person who took the last nest got them by remaining out all night, and watching the bird go on to the nest in the morning.

May 26. To-day, during an excursion to the Badcall Islands, distinctly saw a purple sandpiper, in splendid plumage: it rose off the low rocks close to the sea at the report of my gun, flew out to sea for a long distance, in the teeth of a gale of wind, and then turned and flew back, and alighted this time on the top of the island amongst some bent grass: I failed, however, in seeing it again. Took to-day a good many eggs, amongst which were two nests of the great black-backed gull's, lesser blackbacked gull's, herring gull's (comparatively scarce here), common gull's, oystercatcher's, kestrel's, &c. Saw an eyrie of a peregrine: collector had tried to take the eggs, but could not; saw also a buzzard's nest with young, not removed more than a hundred and fifty yards from the falcon's. A squall struck our boat in Cairnbawn Loch and tore our sheet, when four miles and a half from the ferry, so we had to row that distance. Heard that a correspondent in the east of the county has for me the following eggs:—greenshank's, hen harrier's, merlin's, woodcock's, shieldrake's, and commoner things, such as redshank's and ringed dotterel's.

June 1. Having observed a pochard drake some days previously on a certain loch, I went up to it to-day, accompanied by an assistant, to endeavour to get him. Saw him whenever we arrived at the loch, and without much trouble secured him, by lying hidden and getting the gillie to drive him towards me. Two men searched with dogs nearly a whole day and part of a second for the female and the nest, both on the loch sides and along the burn, but were not successful. The eggs which Mr. Jesse and I obtained last year at Loch Skennaskink on the 5th of June (Zool. S. S. 856), and which we at first thought were widgeon's, I now believe to be pochard's, as they more closely resemble identified eggs of that bird than of any other duck's: the cream-colour has now faded and a greenish tinge is discernible. Mr. J. E. Harting, to whom I sent specimens of that nest, first drew my attention to the fact of their resembling pochard's eggs, he having compared them: I have since had opportunities of comparing with identified specimens of pochard's eggs, and certainly am of opinion that our eggs are identical with them.

June 2. Received merlin's eggs from the same locality whence the dark sepia-coloured egg was obtained last year on the 6th of June (Zool. S. S. 856): two of this nest were very light coloured. Also received one merlin's egg from the same pair of birds, probably, whose eggs I took last year on the 23rd of May (Zool. S. S. 853). The shepherd who took these this year broke three of the nest in bringing them to the inn. This pair of birds "shifted" twice before the eggs were discovered.

June 5. To-day discovered the great northern diver breeding on a wild lonely loch of Assynt: I quite satisfied myself as to their identity; I have already given Mr. R. Gray minute particulars, and shall only mention here the most striking peculiarities which I observed in the behaviour of the birds. *First*, the cry was only of two syllables, pitched in a high key, and could be heard a long way off, and seemed to be a cry of warning to the female which was on the nest: he was not heard to cry until we appeared at the side of the loch; I can imitate the cry very perfectly, though I cannot easily describe it: he also uttered, but not so frequently, the "gruck, gruck," which the blackthroated diver generally gives utterance to when alarmed. *Secondly*, the bird flew a long distance up the loch and returned to the same spot, I fancy, trying to decoy the female from the nest: he seemed when flying to be as large as a cormorant. *Thirdly*, no divers of any kind were ever known to breed at this loch before by either the keeper or by a gillie,

both of whom were with me to-day, and who know the loch well. The bird was distant about two hundred and fifty yards from shore, and kept always not more than fifty yards from the only *green* island on the loch, on which I feel certain the female was sitting on her eggs. A gentleman who was with me now attempted to swim out to the island, but the water was intensely cold, and he being out of practice could only accomplish about one-third of the distance, when he had to turn: the moment he entered the water, as I had expected, the female must have dived off the nest, as, for the first time, the two birds were seen together. The eggs must have been almost, I believe, on the point of hatching, she seemed, up to the time when danger most threatened, to be so unwilling to leave them, notwithstanding the repeated calling and uneasy movements of her mate. This loch is miles and miles from any habitation where a boat is kept, and the ground around it is so wild and rugged that it would be an immense labour to bring anything but a canoe or an India-rubber boat to it, if indeed it were not almost impossible to do it at all. I do not believe that they will be further disturbed this season, and think that they will have every chance to bring off their young in peace and safety.

June 9. Scowrie. Yesterday came here. Tremendous gale outside the bay, and all agreed it was dangerous, if not impossible, to go to Handa from Scowrie. Walked across four miles to Tarbat, and thence managed with four oars to row over to Handa, where we landed about ten o'clock. Got what eggs and birds I wanted. Received a lot of other eggs from collectors at Scowrie, and some information regarding the habits of the rock birds when feeding their young.

June 10 and 11. Returned to head quarters, bringing the Handa cragsman with me to try for the young falcons which Mr. MacIvor, the duke's factor, was anxious to procure. We went to the rock, but with what success I have already related.

June 14. Left Bonar by the mail at six o'clock this morning, and arrived at home about the same hour in the afternoon. Am to receive still a box of eggs from each of two correspondents whom I had no opportunity of meeting with during my tour.

Obtained thirty-five species of birds' eggs, not including some that are yet to come, a fine wild cat's skin, a pochard drake, and a red-throated diver. I also forgot to mention that I observed a specimen of the tree pipit, which bird I never before observed in the treeless, or almost treeless, district of Assynt: it sat on an ash-tree close to the

inn, and within a few yards of where I was at the time sitting. Cuckoos were heard first on the 5th of May: I do not think they were more plentiful here this year than last, though I see that such has been considered the case in some parts of England. Swallows and martins were much more abundant, but the latter had not yet laid eggs in the cliff behind the inn, when I left. Also saw a good many sand martins near Ledmore.

“Teochvingh” is a local Gaelic name here for the greenshank.

JOHN A. H. BROWN.

Dunipace House, Falkirk,
July 1, 1868.

Wayside Notes in France and Germany.

By EDWARD R. ALSTON, Esq.

THE following are a few miscellaneous notes collected during a short tour through part of France and Germany this May. A modern traveller sees but little of the animal life of the countries through which he is hurried in railway-carriages and steam-boats, while the fact of his resting-places being usually at towns is also a disadvantage. In addition to this, an almost tropical heat, such as we experienced even at that early season, is not favourable to energetic research, rendering a mid-day pipe in the shade (not to speak of a brief repose) more inviting than a breathless scramble over rocks and through steep and thorny thickets. Accordingly the following notes refer almost exclusively to the museums we visited, and to the Fauna of the Black Forest and the country near Freiburg-im-Breisgau, where we spent nearly a fortnight, and had thus some leisure for observation. It will be sufficient to state that our route led from Paris by Strasburg to Freiburg and Basle, and thence homewards by Baden-Baden, Heidelberg and the Rhine. Fear not, reader, you are not about to suffer under glowing but somewhat trite descriptions of the smiling Rheinebene and Breisgau, of the dark hills of the Schwartzwald, still flecked with snow, of the rugged Höllenthal, or of the lovely Murgthal, with its towering pines, nestling villages and quaint old schloss. Not even my old favourite, the castle at Heidelberg, with its beautiful contrasts of red stone and green ivy, nor “the castled Rhine,” nor the oft-sung Drachenfels itself, shall tempt me into legend or description. I have but little to say, but such as it is shall be an unadorned tale.

Museums.—I made a more careful examination of the great collections at the Jardin des Plantes than I had ever done before, and on

the whole I must confess to being disappointed with the quadrupeds and birds, which are mostly very well stuffed but too crowded, and many of them, like those in the British Museum, much faded in colour. Some of the birds, however, are models of the preserver's art: a magnificent ostrich, in particular, deserves attention, from the skill with which the naked pink skin of the head and neck is rendered. Some of the larger Cetacea are represented by painted casts and models, a good plan in the case of animals so difficult to preserve entire. I was also much pleased with the well-arranged series of birds' nests, much more advantageously displayed than those in the British Museum, and each accompanied by specimens of the architects. As to the Galleries of Comparative Anatomy and of Anthropology, they are beyond all praise.

Naturalists visiting Paris should not fail to seek out M. Duval's "Grand Aquarium," Boulevard Montmartre, No. 21. This being a private enterprise, and principally intended as a popular exhibition, the arrangements are in some cases somewhat theatrical, but the tanks, of great size and admirably designed, contain a large collection of marine and fresh-water animals, apparently in perfect health. Among others there are examples of the Japanese salamander (*Sieboldia maxima*) and the axolotl (*Axoloteles guttatus*), congers of from twenty-six to thirty inches in length, barbels, gray mullets, Hippocampi and pipe-fish in considerable numbers, and most of the commoner marine and fresh-water fish, including several torpedoes, native and foreign. Some of the common three-spined sticklebacks are exhibited in salt water, in which they appear to thrive perfectly. I observed one of the common river lampreys attached to the head of a dying bleak: Yarrell notes that this species feeds on the flesh of dead fish, but does not mention that it attacks live ones like its marine congener: in Loch Lomond Mr. R. Gray states that it preys on the powan (*Coregonus Lacepedei*), "which are often taken in a dying state with lamperns sticking fast on their sides."—(Keddie's Guide Book). On emerging from the winding galleries of rock-work which compose the "Grand Aquarium," one cannot help wondering why a private speculator should be allowed so completely to out-do our powerful and usually energetic Zoological Society in this matter of water-works.

The only other museum I had leisure to visit was a small but well-arranged one at Basle, containing interesting local collections, of which I had only time to study the Mammalia. Among the bats I noticed *V. noctula*, *V. murinus*, *V. pipistrellus*, *V. serotinus*, *V. dis-*

color, *V. Kuhli* and *P. auritus*. Among the shrews of the country are *S. araneus*, *S. leucodon*, *S. fodiens* and *S. alpinus* (the latter a large dark-coloured species, hitherto only found on some of the higher Alps); the specimens of *S. vulgaris* (our common shrew) are labelled as being from Sweden and the Volga. Among the voles there is a large species with a very short tail, named "*Hyp. terrestris*;" Dr. Gray gives "*M. terrestris*, *Erx.*," as a synonym of *Arvicola arvalis* (*List. Mam. Brit. Mus.* p. 118), but the present example is nearly as large as *A. amphibius*. Of the last-named species there is a specimen of the black variety and also an unusually large example of the bank vole.

The Black Forest.—I will now note a few facts as to the Zoology of the Schwartzwald or Black Forest and the adjoining country, combining with these a few observations made there six years ago.

Of the quadrupeds I cannot say much. The pine marten and beech marten occur, and the badger is common, as are also the smaller *Mustelidæ*. The otter is found in most of the rivers, and the wolf still lingers in the inner recesses of the great mountain mass of which the Schwartzwald forms part: only two winters ago a pair of them took up their abode not far from Heidelberg, and wrought not a little mischief among the flocks and herds before they were captured; they are, however, almost exterminated in this part of Germany, but are said to be more abundant in some of the forests near the Rhine. The fox is extremely plentiful in all the hilly forests, and appears to be more familiar than it is with us: one evening, when driving through one of the valleys near Freiburg, a fox emerged from the wood within thirty yards of us, and stood composedly watching us pass, switching his brush from side to side with the greatest unconcern. In Germany, where the fox is considered fair game for the gunner, the skin is always preserved for the market, and the jagers divide them into three varieties, the "*kohl-fuchs*" or black, the "*silber-fuchs*" or white, and the "*roth-fuchs*" or red fox, according to the predominant tint of the mixed hairs of the coat: of these the "*kohl-fuchs*" is the rarest and most valuable, while the "*roth-fuchs*" is the commonest. The roe-deer is even more plentiful in the sunny beech woods of the plains than in the sombre fir forests of the mountains: in the Mooswald, near Freiburg, about two hundred head were killed last season: I have already made some remarks on the habits and distribution of this species (*Zool. S. S.* 778). The red deer is still found in some parts of the Schwartzwald and Odenwald, but in many districts it is now

extinct, and the wild boar is now mostly confined to a few strictly preserved forests. Of the smaller Mammalia I can at present say nothing.

Birds struck me as being rare in the larger forests, and I was unfortunately too late for the egg season. Many species which are residents here are in Germany either total or partial migrants, owing doubtless to the greater severity of the winters: this greater cold also causes the field mice and voles to seek shelter in barns and outhouses, thus forcing many of the birds of prey to shift their quarters. I may here give the dates of arrival of some of the spring migrants near Heidelberg, as observed in 1861 by one of my brothers: of these the fieldfare and woodcock are merely passing visitors, only seen for a short time in spring and autumn.

Song Thrush	February 23.
Kite	„ „
Common Buzzard	„ 28.
Woodcock	March 2.
Starling	„ 4.
•Fieldfare	„ 12.
Black Redstart	„ 25.
Wryneck	April 7.
Chimney Swallow	„ 10.
Common Redstart	„ „
Cuckoo	„ 18.
Hoopoe	„ 20.

Of birds of prey I saw but little on this trip; all the species are now rather rare near Freiburg, a considerable “schutzgeld” or reward being paid for them. The kite and buzzard are, however, common in many parts, as is also the goshawk in the larger forests, and the kestrel and sparrowhawk are plentiful. The eagle owl is abundant in the fir woods; one man killed no less than seven head in the Sternwald (near Freiburg) last winter. The tawny owl sometimes takes up its abode along with the barn owl in the church steeples.

Both the redbacked and woodchat shrikes are frequently seen, often in company, especially in copse-wood near vineyards, where they find an ample supply of food in the large grasshoppers, whose chirping is so continually heard at this season all over the Continent: I very often noticed them perched on the telegraph-wires. The black redstart is one of the commonest garden birds, breeding in out-houses, barns, &c.,

and may often be observed climbing the rough walls of houses in a way that reminds one of the creeper. The robin is decidedly a rare bird in most parts of Germany (I only saw one this May), and the "hausrothschwänzchen" or black redstart takes his place, to some extent, as a popular pet and favourite. As in this country, the nightingale appears to be somewhat capricious in its local distribution in Germany, very abundant near Baden Baden and Achern; it is quite unknown at Freiburg, although the country and climate are much the same. The sky lark, however, is very plentiful among the rich level meadows. I was surprised to see and hear so very few titmice in the great pine forests; several species, however, occur there, including the crested titmouse. The golden oriole and the hoopoe are also regular visitors to the Black Forest, although I met with none on the present occasion. Carrion crows are often seen, but the rook appears to be scarce. Magpies and jays, on the other hand, abound, as in most parts of Germany and France, and are singularly bold and impudent.

The capercaillie is not uncommon in many of the forests, and the male is often shot with a rifle in spring while "playing," the stalking of the bird at that time being considered a masterpiece of woodcraft. The black grouse is also found, and in some districts the rarer hazel grouse (*Tetrao bonasia*), while the cultivated grouse is inhabited by the common partridge and the quail.

Of the waders the most conspicuous bird to the traveller is, of course, the stork: the birds are more abundant in Strasburg than in any other town I have visited, but the place in which I have seen them in most numbers is the Lüneburger Heide, a great heathy or moorland tract in Hanover, where I have counted twenty-five in one field. At Achern I saw a stork's nest built in a tall poplar tree: this, however, is considered a great rarity. The clattering of this bird's bill is a very singular sound, and is sometimes strangely mingled with the cries of the live frogs, which they carry to their nests. Often the stork sails round and round in wide circles, almost as motionless as the albatross: a German friend assures me that he has watched one for several minutes without being able to detect the slightest movement of the wing. As already observed, the woodcock passes over this part of Germany in spring and autumn, and doubtless many other waders occur in suitable places.

Of water-fowl, wild geese and ducks occur on the rivers, but of what species I cannot say. I observed a blackheaded gull circling over the innumerable islets of the Rhine between Freiburg and Basle, at a

distance of about four hundred miles from the Gulf of Genoa, the nearest sea-coast.

Reptiles are very abundant in this part of Germany. On the sunny banks of the vineyards and in the open forest glades you constantly hear a short sharp rustle among the withered leaves, and (if you are quick enough) you may capture either the very handsome sand lizard (*Lacerta agilis*), often beautifully tinted with green, or the more plainly-clad *L. vivipara*: the true green lizard (*L. viridis*) I have never met with. In a wood near Freiburg, where the slow-worm was very plentiful, I observed a fact worth recording: two of these reptiles were struggling together, and one of them had seized the head of the other so firmly in its jaws that it allowed me to lift it up and carry it for some distance by the tail without letting go its hold; the victim was about the same size as its captor, but in its writhings had broken off a considerable part of its tail: I had no idea that the slow-worm was of so combative a nature. We met with neither snakes nor vipers, although *Natrix torquata*, *Coronella lævis* and *Pelias berus* are all found in many parts of the Black Forest (Zool. 9559). The water-ditches which intersect the level meadows of the plains are literally alive with the edible frog (*Rana esculenta*), the "wasser-frosch," or water-frog, of the Germans—a capital name, for it is hardly ever found out of jumping range of its native element: indeed I found it not easy to procure specimens, for though they sometimes sit basking in the sun on the banks, they spring into the water the moment danger approaches, and bury themselves in the mud at the bottom: they often utter their peculiar croak even at mid-day, but at night the whole air re-echoes to the not unmusical sound. The common frog is not nearly so abundant. Besides the toad and rough and smooth newts the salamander (*Salamandra maculosa*) also occurs: this reptile is ovo-viviparous, and sometimes reaches a considerable size; a female in my collection is fully seven inches in length.

Fish.—The clear mountain-streams of the Black Forest abound with common trout, of small size but excellent flavour: they are generally taken with a net, and are often kept alive in tanks at the inns to be ready for the table. In many rivers the grayling is also found. Even the water-ditches mentioned above are full of coarser fish, such as barbels, tench, roach, minnows and miller's-thumbs, but of these I have not the materials for a complete list.

Insects.—Although not much of an entomologist, I may mention having observed the following species of butterflies either in Baden

or near the Rhine:—*Gonepteryx Rhamni*, *Anthocharis Cardamines*, *Vanessa Cardui*, *V. Atalanta*, *V. Io*, *V. Antiopa*, *V. Urticæ*, several species of *Argynnis*, *Polyommatus Phlæas* and *Lycæna Alexis*; many of these must, of course, have been hibernated specimens. The cock-chaffer was extremely plentiful throughout Germany this spring, and enormous numbers were destroyed, a reward being paid for them by the authorities.

EDWARD R. ALSTON.

Stockbriggs, Lesmahagow, N. B.,

July, 1868.

Notes on the Ornithology of Spurn Point.

By JOHN CORDEAUX, Esq.

THE position of Spurn Point, projecting two miles beyond the Yorkshire coast-line, bordered on the one side by the North Sea, on the other by the estuary of the Humber, here forming a deep and well-sheltered bay, offers many attractions to the wandering naturalist.

The Point itself is little more than an island of sand and shingle formed by the waste of the Yorkshire coast; for along all this coast-line of Holderness, from Spurn to Flamborough, the sea is ever encroaching on the land, slowly eating it up, at the computed average rate of two and a half yards in the year. To this waste the present Spurn Point owes its existence, as the *débris* of the boulder-clay and gravel cliffs is carried downward by the tidal current and deposited in banks and shoals of shingle at Spurn. The "island" of Spurn is connected with the main land by a narrow ridge of sand-hills, two miles in length—a great natural break-water and a guage by which we may estimate the waste of Holderness. Occasionally, with a high tide accompanied with a gale of wind, the wild North Sea makes a clean sweep across this sandy barrier into the estuary of the Humber, causing a breach to be repaired at a great expense by stone brought from the chalk cliffs beyond Hull. The light-house stands in the centre of the so-called "island," and is protected from any possible attack of the sea by a strong mass of masonry and concrete, like a circular fort: around this cluster the ever-shifting sand dunes, sloping away to the banks of shingle which seaward descend rapidly into deep water. Landing from a boat is at all times somewhat difficult,

for the tide at ebb and flow sweeps round the island like a mill-stream.

These sand dunes at Spurn are in the autumn a favourite halting-place for woodcocks, and a well-known locality for the little goldcrests; and doubtless many another rare ocean wanderer, "stooping weary to the welcome land," here finds a temporary refuge. I believe in the spring and autumn the Point would be an excellent station for an ornithologist, in some respects superior to Flamborough Head.

These sand-hills are green with the waving sea-rush (*marram*), and at the time of my visit were gay with the green succulent leaves and large delicate pink and white flowers of the sea bind-weed, clusters of the gray-blue sea holly and thickets of the prickly sallow-thorn.

I extract from my book the following notes on the birds seen during a visit to the Point, with two friends, on the 2nd of July.

Lesser Tern.—There is a breeding-place of the lesser tern about half-a-mile from the light-house, near a break in the sand-hills where the sea has at some time swept across into the Humber. In consequence of the lateness of the season we found no nests; but near this place saw eight or ten pairs of these small terns on the wing, also a few young birds which on our approach rose from the shingle. These young terns were wild and shy, and the old birds particularly so, hovering overhead, beyond reach even of a green cartridge. Nothing can exceed the exquisite beauty of the little tern on the wing: seen against a back-ground of blue sky, they look half-transparent, as if carved in ivory; their harsh cry, "chick, chick, chicker, chick," although somewhat monotonous, yet in harmony with the other voices of Nature, the whispering of the breeze over the "marram," and the screech of the fretful sea over its bed of pebbles. There were at this spot about the same number of a larger tern on the wing, and three or four young birds of this larger species: I believe them to have been the common tern, but do not feel certain about it. Mr. Wheelwright remarks of the lesser tern that "It appears to be confined to the very South of Sweden, and no where common." I have seen them on the west coast of Norway, as far north as the mouth of the Sogne fiörd; and some years since observed several of these little fellows hovering above the Leirdale stream, where it enters this fiörd.

Ringed Dotterel.—Breeds in some numbers at Spurn. In walking

along the beach these birds were constantly rising, flying backwards and forwards across the "dunes," and ever complaining of our intrusion on their domains. I found one nest of this species—a slight hollow in the sand, half full of small white stones, and containing a single egg, fresh laid. Several young seen on the wing.

Dunlin.—Numerous, flying in flocks along the beach: judged one flock would number three hundred birds. Specimens shot were in full summer plumage.

Lesser Blackbacked Gull.—Two old and four young birds seen on the beach.

Brownheaded Gull.—Old and some young birds seen both along the coast and in the bay of the Humber.

Linnet.—Numerous; breeds on the sand dunes. Found a beautiful nest of this bird in a bunch of sea-grass: this pretty nest was constructed of the fine wiry roots of the "marram" and lined with tern feathers.

Black Scoter.—On recrossing the Humber we ran past and put up a flock of about one hundred and fifty scoters. The boatmen say this large flock has been off the mouth of the Humber throughout the spring and summer: they appeared to be mature birds. There is no doubt that considerable flocks of scoters remain on our coast during the whole year, not going northwards to breed. On dissection they would probably prove to be barren birds: I shall try and test the accuracy of this theory.

JOHN CORDEAUX.

Great Cotes, Ulceby, Lincolnshire,
July 13, 1868.

A Cornish Moorland Walk.—July 8th. Young snipes full grown and generally scattered about the moors between Kilmar and Dosmare Pool. Sandpipers to be seen in suitable localities. Curlews and lapwing plovers have reared their broods, at least a fortnight earlier than usual, and have left the moors. Found two broods of teal, one much stronger fledged than the other, and in plumage not to be distinguished from the old birds. I found several nests of the dunlin (*Tringa variabilis*), which confirm my remarks some weeks since, when I found flocks about Dosmare Pool apparently not in a breeding mood, that these birds are late breeders in many localities. All the nests I found were on elevated tufts of coarse grass in the marshes, and each nest contained three eggs hard sat. I found no young. Those who are acquainted with the locality of the "Jamaica Inn," in the heart of Bodmin Moors, might have remarked some fir plantations in some of the gullies and ravines. Two herons built and reared their young this year in one of the pinasters.—Communicated by E. H. Rodd; Penzance, July 10, 1868.

“*Wild Parrots in London.*—The existence of wild parrots in London is more common than is usually supposed. A letter in a metropolitan contemporary states that a good many of them frequent Russell-square, where they may daily be seen feeding with the sparrows. The garden committee of the square, appreciating the presence of the gay little strangers, have appointed a commissionaire to look after and protect them.” [The species is the grass parrot (*Melopsittacus undulatus*). I was perfectly cognizant of the fact as regards the birds long ago, but the idea of protecting them is quite new to me. I should rather have expected to hear of the formation of parrot clubs and offers by churchwardens of a premium on their heads.—*Edward Newman.*]

Time of Arrival of Spotted Flycatcher in Stirlingshire.—I have to thank Mr. G. Roberts for directing my attention to a mistake which I made as regards the time of arrival of the spotted flycatcher in Stirlingshire. I fully intended to correct that mistake some time ago, but something occurred which caused me to forget to do so, and I have now to apologize, *first*, for the mistake, which must have emanated simply from my misjudgment at the time; and, *secondly*, for my having permitted such a mistake to remain so long uncorrected. The spotted flycatcher in this county, as in most other localities, arrives amongst the last of the migratory species. Therefore, at Zool. S. S. 68, fifth line from the top, for “much earlier,” read “much later.”—*John A. Harvie Brown; Dunipace House, Falkirk, July 3, 1868.*

Crossbills at Scilly.—A flight of these birds made their appearance in Trescoe Gardens last Friday. Whether they were broods with the old ones I am unable to say, as the variety of the tints and the mixtures of red, yellow and blue, baffles all speculation. They must have arrived in a flight, as none were observed before. Some had a considerable portion of red in their plumage, but none without a portion of dull brown mixed with the plumage, which took away anything like *brightness*. One I observed almost brown, with a slight tint of sulphur-yellow, and with the upper rump bright yellowish green or oil-colour: perhaps the ordinary adult plumage is bright scarlet, but the question is whether this in very old birds does not give way to yellow, or a mixture of that colour with slate-blue. Some of the specimens I received had blotches of all these colours intermixed, and apparently under the influence of moult.—*Edward Hearle Rodd; Penzance, July 8, 1868.*

[I have received several other communications on this subject, none I believe intended for publication. Crossbills have occurred all round London during the past month.—*E. Newman.*]

Note and Query regarding the Blackthroated Diver.—Having lately received from a correspondent in Sutherland a remarkably fine female blackthroated diver for my collection, I am very anxious to be certain about what is the most natural position in which it can be placed. I have seen during the last few years many pairs of these birds in their breeding haunts, and I have never yet seen one sitting in an upright position, but when on the ground always touching the surface with its breast and with its legs pushed out behind it. I have also questioned many of the natives of Sutherland, and, without a single exception, they have assured me that they never had seen the blackthroated diver in any position on land save in that last described. A young bird which I secured last year on the 8th of June (Zool. S. S. 857) lived a whole day and part of a second, and did not seem to be inconvenienced by the slight wound which it had received, as it willingly fed upon small pieces of raw fish, which we put

inside its mouth. During that time it was never seen to sit upright, but always maintained the above-described position, and moreover did not seem to use its legs at all in the act of progression. I mention these facts just as I have noticed them. The female when seen to leave the nest does not *walk* into the water, but scuttles off, and a regularly formed groove in the channel or grass between the nest and the water is always plainly discernible. But, on the other hand, a gentleman in Edinburgh, who has a good knowledge of the habits of our British birds, and to whom my birdstuffer applied for a drawing of the bird to assist him in setting it up, drew a portrait of it in an upright position (see Morris's 'British Birds,' vol. vi. p. 11), and assured him that that was the position most natural to it. If so, is it not strange that I, who have had abundant opportunities of watching these birds, and have availed myself of them over and over again, both with the naked eye and with a good glass, have never yet seen them assume a like position, and that moreover the natives who have lived amongst their haunts all their lives have, as I stated before, never seen them assume any other than that which I have attempted to describe? I shall be much obliged to any of the readers of the 'Zoologist' who may have seen the blackthroated diver in its breeding haunts, if they will say whether or not they have seen them sitting as figured in Morris's 'British Birds,' or as described and drawn by the gentleman above referred to.—*John A. Harvie Brown; July 6, 1868.*

A regular Visitor.—A land-turtle has been known to make thirty-seven annual visits to a particular locality on the farm of James A. Smith, near Mapleville, Burrillville, R. I. Whenever seen by Mr. Smith himself he has caught his turtleship and marked the year on the shell. The first one, still quite legible, is "J. A. S., 1831." The other years inscribed are 1834, 1840, 1844, 1845, 1852, 1855, 1861, 1862, 1863, 1864, 1865, 1868. So regular have been this tortoise's visits that Mr. Smith and family would suffer the loss of a real pleasure should they be intermitted.

Large Salmon in the Severn.—A large salmon was exhibited in the shop of Mr. Davis, fishmonger, of Gloucester, on Saturday, the 4th instant: it weighed when taken out of the water fifty pounds, and was caught on one of the fisheries near Berkeley: it was in fine condition, and is, I believe, the largest Severn salmon that has been caught this season.—*Edward Sweetapple; Cone Mill, Lydney, July 14, 1868.*

Is Whitebait the Young of the Herring?

[This vexed question seems to have undergone solution. Dr. Günther, than whom we have no higher authority, emphatically declares that he finds the specific characters to be the same in both: the following extracts from that admirable paper, the 'Field,' will I think be likely to be received as conclusive.—*Edward Newman.*]

The British Species of Herrings.—At the Meeting of the Zoological Society, on Thursday last, Dr. A. Günther gave a description of the

British species of herring (*Clupea*), and the distinctions between them. The fish constituting the genus *Clupea* are distinguished from other closely-allied groups by the following characters:—The abdomen is serrated, the serrations extending far forward towards the head. All the fins are present in every species; the lower jaw projects beyond the upper, whereas in the anchovy (*Engraulis*) and other allied forms the snout projects beyond the lower jaw. The teeth, if present, are rudimentary and deciduous, and the scales are very slightly attached.

The only British fishes of this genus recognized by Dr. Günther as being specifically distinct are:—1, the herring (*Clupea Harengus*); 2, the sprat (*C. Sprattus*); 3, the allice shad (*C. Alosa*); 4, the twaite shad (*C. Finta*); 5, the pilchard (*C. Pilchardus*).

These species are readily distinguished from each other. In the herring a vertical line, drawn down from the front of the dorsal or back fin, is in advance of the ventral fin; and there is a persistent patch of small rudimentary teeth on the vomer or central line of the upper jaw. The scales along the lateral line of the body are less than fifty in number, and, as a remarkably constant character, the number of the vertebræ is fifty-six.

In the sprat the vertical line drawn from the front of the dorsal falls on the ventral fin, both being placed equally forward. There are no teeth on the vomer, as in the herring; the scales are less than fifty along the lateral line, but the number of the vertebræ is reduced to forty-seven. These differences render the distinction between the sprat and the herring remarkably easy.

The two species known as shads were formerly confounded. They are easily distinguished from the herring and the sprat by the total absence of teeth, and by the smaller size of the scales, which are more numerous, there being from sixty to seventy along the lateral line. The allice shad is distinguished from the twaite shad by the large number of the gill-rakers, which are fine and long, and eighty to ninety in number on the outer branchial arch; whereas in the twaite shad they are short and thick, and from thirty to forty in number on the outer arch.

In the pilchard, which is also known as the sardine, there are no teeth at all. The scales are less than fifty in number, and the gill-covers are deeply furrowed. The exotic species of *Clupea* are very numerous, and, from their close resemblance, it is difficult to arrange them into subgenera or groups. The endeavour to classify them according to the nature and distribution of the teeth was made by

Valenciennes and others, but without success, as organs which only exist in a rudimentary condition cannot be regarded as affording a secure basis for the determination of species; hence great confusion has arisen, and numerous supposed species have been admitted into the British Fauna.

Thus the whitebait has been regarded as a distinct fish, and named *Clupea alba*; whereas it is in reality the young fry of the herring.

The facts on which Dr. Günther bases this conclusion are as follows:—The dorsal and ventral fins are situated as in the mature herring; the lateral scales are the same in number; there is the same arrangement of teeth on the vomer; the same number of vertebræ—namely, fifty-six, a number not found in any other clupeoid; and, finally, whatever may be the size of the whitebait, they are never taken in roe, and an adult or mature fish has never been seen.

These conclusions were generally acquiesced in by the Meeting. Henceforth, unless these opinions of Dr. Günther are proved to be based on insufficient evidence, we must regard the whitebait as herring fry.

Such being the case, the question arises whether or not it is desirable to continue their capture; for it does not follow that because they are young herrings, therefore it is a wilful waste of human food to capture them in an immature condition. Of the immense number of young produced by fish, it is obvious that only a minute fraction can arrive at maturity. Nature is prodigal of life, and the balance may possibly be so arranged that we are even increasing the number of adult fish by lessening the teeming myriads of fry, and so leaving more food and a larger scope for those that remain behind.—*From the 'Field' of June 13.*

The Whitebait and the Theories respecting it.—Since the time of Pennant, who, in the latter years of the last century, described “the lower order of epicures” as frequenting the long-shore taverns of Greenwich and Blackwall to feast upon whitebait fried with fine flour, there have been various theories propounded as to the true species of this small clupeoid fish. Pennant himself, writing when the structure of fish and the distinctions between their several families were not well known, stated that “it was impossible to class this fish with certainty;” and the editor of the edition published in 1812 described it as belonging to the *Cyprinus* group, or as allied to the carp family.

Shaw in his description followed the later edition of Pennant, and perpetuated this obvious mistake. Donovan, in his 'Natural History of British Fishes,' published at the beginning of the present century, treated the subject at greater length, and considered that he had obtained incontrovertible evidence that the whitebait were the young of the shad. This opinion of Donovan thus definitely announced carried the suffrages of those naturalists who did not take the trouble to investigate the question for themselves, and Turton, in his 'British Fauna,' and Dr. Fleming followed in the wake of Mr. Donovan; and this opinion was generally received until Mr. Yarrell investigated the subject, and conclusively proved that whitebait were not the fry of either species of shad. The first account of these investigations of Mr. Yarrell was published in the 'Zoological Journal' for October, 1828, and afterwards appeared in his well-known work, the 'History of British Fishes.' Since this time whitebait have been usually regarded as being specifically distinct from any other fish, and have been termed *Clupea alba*. Valenciennes, writing in 1846, went so far as to regard them as being more than specifically distinct, and placed them in a separate genus, which he termed *Rogenia*; but, as stated by Dr. Günther, the characters employed by this author in the distinction of clupeoid fish were not of definite value, and in consequence he fell into numerous errors.

Mr. Couch, the latest systematic writer on British fishes, follows Yarrell, and states:—"It was formerly supposed that the whitebait was the early stage of the growth of the Allis shad, which was then confounded with the Twait, and Donovan has represented the former for the latter. It was also supposed to be found only in the Thames, which last supposition could be regarded in no other light than as inconsistent with the former, since the shad was known to shed its spawn in several of the other rivers of England. But the belief of its being only met with in the Thames is now also known to be an error; and Dr. Parnell discovered it to be not rare in the Firth of Forth, while in the south and west it has been obtained in Devonshire and Cornwall. I have been favoured with examples from the Exe by Dr. Scott, of Exeter, and have obtained them from the Fowey, in Cornwall; and there is scarcely a doubt that if looked for they might be found in every important river in the British islands. Cuvier says they also exist in Germany; but we conclude they are limited to districts where the climate does not extend beyond the borders of moderate heat and cold. The time of spawning is supposed to be in

and throughout the summer, and the very young are mingled with the more fully grown, so long as they continue to be caught in the river—a circumstance which tends to show where the roe is deposited.”

Although the opinion that the whitebait is perfectly distinct from all other fish has been generally accepted by naturalists, fishermen and the public at large, there have never been wanting dissentients, and the columns of the ‘Field’ have from time to time contained letters from persons who have believed it to be only the fry of some well-known fish, as the common smelt, the shad or the herring. That whitebait are but herring fry has on various occasions been contended by Mr. Francis Francis. Thus, writing from Aldborough, Suffolk, in the ‘Field’ of January 10, 1863, he says:—“While going down the river (Alde) one day I picked up the head and shoulders of a diminutive silvery fish, which reminded me strongly of the whitebait. I showed it to the boatman: ‘We calls ’em smys, sir; that’s what we calls ’em. You’ll see hundreds and thousands on ’em just at the back of the wave on the beach in a week or two, soon as ever the herrin’ begins to show themselves, and sprats long with ’em, sir.’ And sure enough, about a fortnight after, when the herrings began to show themselves, there were myriads of these little fish, just as the boatman said, at the back of the wave, just outside the wave or surf on the beach. . . . I took one up and examined it; it was unmistakably a whitebait. The boys were picking them up by dozens, so I ordered as many as could be secured to be placed in the fish-basket separately. . . . The whitebait were of all sizes, from the most diminutive specimens seen on the table at Blackwall, up to six inches long. The largest were about six inches, the smallest barely an inch. . . . Yarrell speaks of the largest whitebait he has ever seen as six inches in length. That is about the length of the two largest specimens which I obtained. He further says that the sprat-fishers take the *adult* whitebait on the Kentish and Essex coasts frequently during the winter. As regards the adult fish, I opened the two largest I got and examined them very closely, but could detect no traces of either roe or milt. I confess that I should much like to *see* an adult whitebait; for Yarrell is so sound an authority, that it is not safe to doubt him, though he is certainly less clear upon the whitebait than he usually is. He certainly speaks of the largest fish he ever saw as six inches long; and mine are six inches long, but certainly not adult fish.”

And again, in the 'Field' of February 13, 1864, he says:—"As regards the distinctive species of the whitebait, I believe I had the honour of shaking my friend 'The Chronicler's' mind first upon this point. Yarrell makes a strong case of it, and although I would not be bold enough to question so high an authority, I should, I must confess, like to see a mature female whitebait in spawn. Indeed, I would gladly give a sovereign for one. I have the whitebait as sold in the London market, and I have a fish so much resembling the whitebait that to the eye no difference can be detected; and I have this fish of all sizes, from whitebait size, *i. e.*, one and a half or two inches long, to three and four inches long, and so on to five and six inches long, and so up to a full-grown herring, and the chain appears to me (at any rate to the eye) so complete that I confess I cannot detect the difference."

In the 'Field' of May 11, 1864, "The Chronicler" stated that the Fish and Oyster Breeding Company had secured several marine ponds at Southend, one of which, he said, "will be set aside for whitebait, and it is to be hoped that this will have the effect of solving the oft-mooted problem, of what fish is the whitebait the fry? Surely, after a year's confinement, the rival claims of the herring and the shad to the parentage of this piscatorial morsel will be decided upon." I am not aware, however, that anything was actually done in the matter; but, had the experiment been tried, it would most probably have resulted in failure. If the fish had been shut off from the sea they would have been starved, from the absence of their natural food; and had the communication been kept open other fish would have gained access to the pond, and the accuracy of the experiment would have been destroyed.

During the past year, as stated last week, Dr. A. Günther has been engaged in the distinctions between the different species of *Clupea*, and the result of his investigations has been published in the seventh volume of the 'Catalogue of Fishes' in the British Museum. Dr. Günther finds that in every detail of structure the herring and the so-called whitebait correspond; they have the same number of vertebræ, the same number of scales along the lateral line, the same arrangement of teeth on the vomer, and the same position of the fins and number of the fin-rays—conjoined characters which are found in no other fish. Dr. Günther writes:—"As regards the 'whitebait,' this is a purely nominal species introduced into Science by Yarrell and Valenciennes, in deference to the opinion of fishermen and gour-

mands. All the examples of whitebait I have examined are young herrings."

The positive determination of the identity of the whitebait and of the herring throws light upon many of the singularities of the smaller fish. Formerly the whitebait were regarded as peculiar to the Thames; it is now known that they are to be captured, in greater or smaller numbers, in all rivers whose estuaries are frequented by mature herrings. Dr. Parnell, in his 'History of the Fishes of the Forth,' published in the seventh volume of 'Memoirs of the Wernerian Society,' states:—"The whitebait is not, as it was formerly considered to be, peculiar to the Thames, as I have found it to inhabit the Frith of Forth in considerable numbers during the summer months. From the beginning of July to the end of September they are found in great abundance in the neighbourhood of Queensferry, and opposite Hoptown House, where I captured in one dip of a net, of about a foot and a half square, between two and three hundred fish, the greater part of which were whitebait of small size, not more than two inches in length. . . . In their habits they appear to be similar to the young of the herring, always keeping in shoals, and swimming occasionally near the surface of the water, where they often fall a prey to aquatic birds."

The question as to the effect of the capture of whitebait on the numbers of the mature animals is one which will suggest itself to most readers. It does not necessarily follow that because whitebait are young herrings, therefore it is injurious to our herring fisheries to capture them. The number of eggs deposited by a single herring is enormous. Of these only two or three can arrive at maturity—the rest must fall a prey to their numerous enemies; and the utmost destruction effected by man, with small nets a few feet square moored in the water of a broad river or estuary, can have but little influence as compared with the destruction by piscivorous fishes and fish-eating birds.

The present fashion of wearing bird-skins and plumes in hats has led to the wholesale slaughter of gulls and other water-fowl, so that at present scarcely one is visible in places where they formerly abounded. It is not improbable that this destruction of their enemies may have saved the lives of millions of young fry, and that the power of man has not equalled that of the birds he has destroyed. But be the bearing of the subject what it may, it is always desirable that the

truth should be known, and I am therefore well pleased to think that the matter may be regarded as definitely settled.

W. B. TEGETMEIER.

PS.—In order to render the distinctions between the British species of *Clupea* more evident, I append a table of the differences, compiled from Dr. Günther's catalogue.

Table of the Distinctions between the British Species of Clupea.

Herring (Whitebait).—Teeth on the vomer, or central line of upper jaw. Scales along lateral line less than 50. Dorsal fin in advance of ventral. Vertebræ 56.

Sprat.—No teeth on the vomer. Scales less than 50. Dorsal and ventral fins even. Vertebræ 47.

Alice Shad.—No teeth at all. Scales more than 50. 70 to 80 gillrakers on great branchial arch.

Twaite Shad.—No teeth at all. Scales more than 50. 30 to 40 gillrakers.

Pilchard (Sardine).—No teeth at all. Scales less than 50. Gill-cover deeply furrowed.—*From the 'Field' of June 20.*

Notes on Aphides. By FRANCIS WALKER, Esq., F.L.S.
(Continued from S. S. 1301.)

Tribe 2. LACHNINÆ, *Passerini*.

- | | | |
|-----|---|------------------|
| A. | Sixth joint of the antennæ setaceous. | 1. SIPHA. |
| AA. | Sixth joint of the antennæ filiform or clavate, often terminating in a spur like a rudimentary joint. | |
| A. | Fourth vein of the fore wings nearly straight; stigma linear. | 2. LACHNUS. |
| AA. | Fourth vein of the fore wings curved; stigma trapezoidal. | |
| a. | Abdomen bare. | |
| a. | Rostrum short, not extending to the middle legs. | 3. CALLIPTERUS. |
| aa. | Rostrum more or less long, extending at least to the hind legs. | 4. PTEROCHLORUS. |
| AA. | Abdomen woolly. | |

Genus 1. SIPHA, *Passerini*.

Antennæ short, six-jointed, slightly pilose-setose; third and setaceous sixth joint longer than the others. Nectaries tubercle-shaped.

Typical species, *Aphis Glyceriæ*, Kalténbach.

- | | | |
|-----|---|----------------------|
| A. | Abdomen green, with a paler dorsal longitudinal line. | 1. <i>Glyceriæ</i> . |
| AA. | Abdomen brown and shining above, rusty brown beneath. | 2. <i>Maydis</i> . |

Genus 2. LACHNUS, *Illiger*.

Antennæ six-jointed, smooth, much shorter than the body. Nectaries tubercle-shaped. Tail not visible. Fore wings with the cubital vein twice-forked; fourth vein almost straight.

Typical species, *L. Pinicola*, Kalténbach.

- A. Abdomen with a conical tubercle between the nectaries. 1. *Viminalis*.
- AA. Abdomen with no tubercle between the nectaries.
 - A. Rostrum shorter than the body.
 - A. Viviparous apterous female smooth, oblong-elliptical. 2. *Pinicola*.
 - AA. Viviparous apterous female pubescent, nearly globose. 3. *Juniperi*.
 - AA. Rostrum at least twice longer than the body.
 - A. Viviparous apterous female brown, shining. Fifth joint of the antennæ as long as the fourth and shorter than the sixth. 4. *Quercus*.
 - AA. Viviparous apterous female cinereous-powdered. Fifth joint of the antennæ longer than the fourth and than the sixth. 5. *longirostris*.

Genus 3. CALLIPTERUS, *Koch*.

Rostrum very short. Fore wings with the fourth vein curved; stigma trapezoidal. In other characters like *Lachnus*.

Typical species, *Aphis Juglandis*, Frisch.

- A. Abdomen with black dorsal spots. Veins of the fore wings broadly brown-bordered at the tips. 1. *Juglandis*.
- AA. Abdomen luteous, not spotted. Veins of the fore wings not bordered. 2. *Juglandicola*.

Genus 4. PTEROCHLORUS, *Rondani*.

Rostrum long, not extending beyond the body. Fore wings with the fourth vein curved; stigma trapezoidal. In other characters like *Lachnus*.

Typical species, *Aphis longipes*, Léon Dufour.

Genus 5. PHYLLAPHIS, *Koch*.

Body woolly. In other characters like *Callipterus*.

Aphis Fagi, Liun.

Tribe 3. PEMPHIGINÆ, *Passerini*.

- | | |
|---|-----------------|
| A. Cubital vein forked at the tip. | 1. SCHIZONEURA. |
| AA. Cubital vein simple. | |
| A. Hind wings with two oblique veins. | 2. PEMPHIGUS. |
| AA. Hind wings with one oblique vein. | |
| A. Wings deflexed. | 3. TETRANEURA. |
| AA. Wings horizontal. | 4. APLONEURA. |

Genus 1. SCHIZONEURA, *Hartig*.

Antennæ six-jointed. Nectaries none or rudimentary. Wings deflexed. Fore wings with four oblique veins; cubital vein once-forked. Hind wings with two oblique veins.

Typical species, *Aphis Corni*, Linn.

- | | |
|--|------------------------|
| A. Antennæ pilose; third joint shorter than the three following joints together. | |
| A. Abdomen with a black somewhat round dorsal spot, and with black marginal points. | 1. <i>venusta</i> . |
| AA. Abdomen black above, with a whitish line at the base and with a whitish tip. | 2. <i>Corni</i> . |
| AA. Antennæ scabrous, not pilose; third joint longer than the three following joints together. | |
| A. Antennæ with the fourth and fifth joints of equal length; sixth shorter than the fifth. | |
| A. Abdomen wrapped with long and thick wool. | 3. <i>lanigera</i> . |
| AA. Abdomen slightly woolly or nearly bare. | 4. <i>lanuginosa</i> . |
| AA. Fourth joint of the antennæ longer than the fifth; sixth as long as the fifth. | 5. <i>Ulmi</i> . |

Genus 2. PEMPHIGUS, *Hartig*.

Antennæ six-jointed. Fore wings with four simple oblique veins. Hind wings with two oblique veins.

Typical species, *Aphis bursaria*, Linn.

- | | |
|---|---------------------------|
| A. Oblique veins of hind wings proceeding separately from the submarginal line. | |
| A. Sixth joint of the antennæ as long or longer than the fifth. | |
| A. Veins of the fore wings pale slender; first and second oblique veins joined together at the base. | |
| a. Sixth joint of the antennæ as long as the fifth or scarcely longer. First and second oblique veins very short, joined together at the base. | 1. <i>utricularius</i> . |
| aa. Sixth joint of the antennæ at least twice the length of the fifth. First and second oblique veins of the fore wings joined together for a long space from the base. | 2. <i>cornicularius</i> . |

- AA. Veins of the fore wings brown, rather stout; first and second oblique veins wholly separate from each other.
- a. Sixth joint of the antennæ longest. 3. *semilunarius*.
- * Third joint of the antennæ longest; fourth, fifth and sixth of equal length.
- † Third joint of the antennæ shorter than the fourth and fifth together. Abdomen bare. 4. *follicularius*.
- †† Third joint of the antennæ as long as the fourth and fifth together. Abdomen woolly. 5. *flaginis*.
- AA. Sixth joint of the antennæ shorter than the fifth.
- A. Third and fifth joints of the antennæ of equal length. Abdomen bare. 6. *Boyeri*.
- AA. Third joint of the antennæ longer than the fifth. Abdomen woolly. 7. *cærulescens*.
- AA. Oblique veins of the hind wings proceeding connectedly from the submarginal vein.
- A. Sixth joint of the antennæ as long as the fifth. 8. *affinis*.
- AA. Sixth joint of the antennæ longer than the fifth.
- A. Fifth joint of the antennæ almost twice longer than the fourth.
- a. Joints of the antennæ smooth. Hind side of the stigma not angular. 9. *Coluteæ*.
- aa. Joints of the antennæ ringed. Hind side of the stigma angular. 10. *bursarius*.
- AA. Fourth and fifth joints of the antennæ nearly equal in length.
- a. Hind side of the stigma not angular. 11. *Spyrathecæ*.
- aa. Stigma angular at the base of the fourth vein.
- * Abdomen bare. 12. *vesicarius*.
- ** Abdomen woolly. 13. *lactucarius*.

Genus 3. TETRANEURA, *Hartig*.

Antennæ short, six-jointed; third joint longer than any of the others. Wings deflexed. Fore wings with four simple oblique veins. Hind wings with one oblique vein.

Type, *Aphis Ulmi*, Geoffr.

Genus 4. APLONEURA, *Passerini*.

Antennæ with the sixth joint longer than any of the others. Wings horizontal. In other characters like *Tetraneura*.

Type, *Tetraneura Lentisci*, *Passerini*.

Tribe 4. RHIZOBIINÆ, *Passerini*.

- A. Third joint of the antennæ much longer than the fourth. 1. *FORDA*.
- AA. Third and fourth joints of the antennæ nearly equal in length. 2. *RHIZOBIUS*.

Genus 1. FORDA, *Heyden*.

Antennæ six-jointed; third joint much longer than the fourth; sixth very short. Abdomen convex; no nectaries nor tail. Tarsi with two apical claws.

Type, *F. formicaria*, Heyden.

Genus 2. RHIZOBIUS, *Burmeister*.

Antennæ six-jointed; joints from the first to the sixth nearly equal in length. No nectaries nor tail. Tarsi with one apical claw.

Type, *R. Sonchi*, Passerini.

- A. Sixth joint of the antennæ subclavate, longer than the fifth. 1. *Sonchi*.
- AA. Joints of the antennæ nearly equal in length. 2. *Menthae*.

Tribe 5. TYCHEINÆ, *Passerini*.

Genus 1. TYCHEA, *Koch*.

Antennæ five-jointed, very short. Abdomen with a rim; no nectaries nor tail. Legs very short; tarsi with two apical claws.

- A. Joints of the antennæ nearly equal in length.
 - A. Body smooth. 1. *Eragrostidis*.
 - AA. Body pulverulent, setulose. 2. *setulosa*,
- AA. Joints of the antennæ various in length.
 - A. Second and third joints of the antennæ nearly equal in length; fifth longer than any of the others. 3. *Phaseoli*.
 - AA. Third joint of the antennæ longer than any of the others.
 - A. Body pearly white, pubescent. 4. *Setariæ*.
 - AA. Body luteous or orange, smooth. 5. *trivialis*.

Tribe 6. CHERMESINÆ, *Passerini*.

- A. Antennæ five-jointed.
 - A. Fore wings with four oblique veins, the cubital forked. 1. *VACUNA*.
 - AA. Fore wings with three oblique simple veins. 2. *CHERMES*.
- AA. Antennæ three-jointed. 3. *PHYLLOXERA*.

Genus 1. VACUNA.

Antennæ short, five-jointed; third joint longer than the others. Wings horizontal. Fore wings with four oblique veins; the cubital vein forked. Hind wings with one oblique vein.

Typical species, *Aphis dryophila*, Schrank.

- A. Dorsum brown or green, with a pale stripe. 1. *dryophila*.
- AA. Dorsum greenish brown, with a white stripe and with white marginal spots. 2. *Alni*.

Genus 2. CHERMES, *Linn.*

Antennæ five-jointed, very short. Wings deflexed. Fore wings with three oblique simple veins. Hind wings with one oblique vein, which is often evanescent.

C. Abietis, Linn.

Genus 3. PHYLLOXERA, *Fonscolombe.*

Antennæ three-jointed. Wings horizontal. Fore wings with three oblique simple veins. Hind wings with no oblique veins.

P. coccinea, Heyden.

(To be continued.)

PROCEEDINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY.

July 6, 1868.—H. W. BATES, Esq., President, in the chair.

Additions to the Library.

The following donations were announced, and thanks voted to the donors:—‘Proceedings of the Royal Society,’ Nos. 101 and 102; presented by the Society. ‘Journal of the Linnean Society,’ Zoology, No. 41; by the Society. ‘Proceedings of the Zoological Society,’ 1867, Part 3; by the Society. Hewitson’s ‘Exotic Butterflies,’ part 67; by W. W. Saunders, Esq. Newman’s ‘British Moths,’ No. 19; by the Author. ‘The Zoologist’ for July; by the Editor. ‘The Entomologist’s Monthly Magazine,’ for July; by the Editors.

The following additions, by purchase, were also announced:—Panzer, ‘Faunæ Insectorum Germanicæ Initia.’ Sturm, ‘Deutschland’s Fauna, Käfer;’ vols. 9—22. ‘Berliner Entomologische Zeitschrift,’ 1857—67.

Exhibitions, &c.

Mr. M’Lachlan mentioned that, out of twenty-one pupæ of *Hypercallia Christierinana*, he had bred nineteen of the perfect insect, and exhibited a dozen of them. The pupæ soon lost the beautiful bright green colour (Zool. S. S. 1303), became for a time pale dirty yellow or colourless, and finally assumed a rosy hue as the wings of the imago made progress towards their full development.

Mr. H. J. S. Pryer exhibited a specimen of *Halias quercana*, from West Wickham, with the wings unequally developed, one side being much shorter than the other.

Mr. Bond exhibited varieties of *Setina irrorella* and *Arctia villica*: the former was captured near Croydon; its colour was pale, the ordinary rows of dots were very indistinct, but there was a dark basal longitudinal mark, and a strong subapical dark fascia: the latter was bred from one of a number of larvæ found at Wormwood Scrubs, all of which were similarly treated, and, whilst the rest produced moths of the ordinary

type, the specimen exhibited was almost entirely of a deep rich fulvous colour, with a few black marks on the costa of the fore wings, and but for its origin being known could scarcely have been recognized as *Arctia villica*.

Mr. R. Davis, of Waltham Cross, Herts (who was present as a visitor) exhibited a large collection of larvæ of Lepidoptera, admirably dried and preserved, and expressed his desire to receive living larvæ from Lepidopterists in other parts of the country, a portion of which, when preserved, he would return to the sender.

Mr. T. W. Wood (who was present as a visitor) exhibited specimens and drawings of several exotic species of Saturniidæ, and made some observations on their habits. *Saturnia Cynthia* was remarkable for its attitude during repose, the wings being held perfectly horizontal, without any external support, and widely expanded, the hind wings being an inch or more apart. The attitude of *S. Promethea* and *S. Cecropia* was very similar to that of a *Papilio*, and there were other strongly-marked points of resemblance between the Saturniidæ and Papilionidæ, both in form and habits; for instance, the gentle waving up and down of the wings, as if for display, as observed in these moths, was more characteristic of diurnal than of nocturnal Lepidoptera: he had kept a pair of *S. Polyphemus* alive for a considerable time, and found that they sometimes (particularly the female) rested after the manner of butterflies, but at other times their wings were horizontal, a large portion of the hind wings, including the ocellus, being hidden by the fore wings. Mr. Wood had also observed that these insects possess a moveable appendage on the under side of the anterior tibiæ, which is used as a comb for cleaning the antennæ: he had many times seen the males of *S. Promethea* use these appendages for that purpose; the large feathery antenna was clasped at the base between the tibia and the comb, as between a finger and thumb, and was drawn slowly through to the tip, being thereby effectually cleared of all dust and scales or other foreign matters.

Prof. Westwood said that there was a similar appendage or plate on the fore tibiæ of *Papilio Machaon*.

Mr. A. G. Butler (who was present as a visitor) exhibited *Halia Wavaria* and its Dipterous parasite, a species of *Tachina*, bred from the pupæ.

Mr. Bond, after referring to the cases recorded in Proc. Ent. Soc. 1865, pp. 103, 104, of several males of *Ceceticus* and *Micropteryx* being discovered in simultaneous sexual contact with one female of their own species, mentioned that Dr. Knaggs had met with a still more remarkable case, inasmuch as he had found a male of *Tortrix viridana* and a male of *T. heparana* in contemporaneous union with a female of *T. viridana*.

Mr. Bond then exhibited a female of *Drilus flavescens*,—the third known British specimen of that sex (Zool. S. S. 1137),—and two males of the same species, the trio having been captured *in copulâ simultaneâ* near Freshwater, Isle of Wight, on the 12th of June, 1868, by Mr. H. Rogers, who had supplied the following account:—

“I captured them on Friday, June 12th, at a place called Blackbridge, Freshwater: they were on the high road, and first attracted my attention through the female crawling along and dragging both males behind her. I picked them up and closely examined them, and both males were *in cop.* with her at the same time, and remained so for upwards of two hours; both left her within ten minutes of each other. When I first saw them the males were quite helpless.”

Mr. J. Jenner Weir exhibited a fine large *Monochamus*, which had flown into and been captured in the London Custom House a few days previously.

Mr. Blackmore exhibited a collection of insects of all orders, captured in Tangier in March and April, 1868. The greater part consisted of Coleoptera, in which Tangier was very rich: during three years Mr. Rolfe had collected there 2700 species, two-thirds of which had not previously been taken in Morocco, and of these a large proportion were new to Science.

The Secretary read Reports, dated 2nd December, 1867, 4th January and 22nd April, 1868, by Dr. Bidie, the Government Commissioner for investigating the ravages of the borer (*Xylotrechus quadripes* of Chevrolat) in the coffee-plantations of Mysore and Coorg. (See Tr. Ent. Soc. 1868, p. 105; Proc. 1867, p. cix., 1868, pp. ii., xviii.) The following are extracts:—

“In the neighbourhood of Mercara, my attention was directed to another insect called the Ringer: it chiefly attacks young plants, and lives in the ground at the foot of the stem, coming up during the night and feeding on the bark. When a complete circle of bark is thus destroyed, the whole of the plant above that point dies, but the root throws up shoots which in time become productive. The Ringer seems identical with the black grub of the Ceylon plantations, which is the larva of the Dart Moth. I have failed to get the grub to pass into the imago state, the shaking during my travels having always proved fatal to it, but am quite sure that it is identical with the English *Agrotis segetum*.

“In a native garden in Veerajpettah I found twenty-year old stems in which the borer had been observed at work for five years at least, and various Coorgs have informed me that they have noticed the borer occasionally during the last eight or ten years. Two gentlemen engaged in planting have also told me that they now and again found the borer in coffee trees upwards of four years ago. In many of the native gardens I find that some Rodent (probably the coffee rat) has begun to destroy the pupa and beetle, by cutting down and extracting them for food. Red ants also to a small extent prey on the larva and pupa.

“I am now trying to discover whether the white borer did or does exist in indigenous trees.

“In Southern Coorg I have inspected thirty-eight estates belonging to Europeans, and a large number the property of natives. The effect of forest clearance on climate and its bearing on the immediate matter of my enquiry have received due attention. I quite agree that the destruction of forests in Coorg has had an influence in making the borer so prevalent and destructive to coffee. In other countries, such as America, as the clearing of the natural forests has gone on, insects destructive to trees and crops have vastly increased in numbers. In dense primeval woods, the conditions of light, heat and moisture are not favourable for the production of many of the insects injurious to cultivated plants; and besides Nature in such situations maintains enemies sufficient to keep them in check. When man comes in with his axe he disturbs this natural balance, and his fields and gardens suffer in consequence. No doubt also insects often attack cultivated plants when natural ones on which they used to subsist have been exterminated. Forest clearance would also seem to increase the number of many kinds of insects by producing various changes in local climate conducive to their multiplication. The Coorgs think that the borer used to live in

the bamboo, but, owing to the death of that tree throughout the district during the past year, it was no longer able to subsist in it, and has therefore attacked the coffee. This general dying out of the bamboo, they say, occurs once in sixty years—that being the term of its existence; but it seems strange that all the bamboos in Coorg should be so exactly of the same age as to perish in a single year. I am investigating these statements, however, and will soon be in a position to say positively whether or not they are founded on fact. Some think that the borer has increased from the destruction or departure of insect-eating birds, consequent on the cutting down of forest. Any one accustomed to jungle life knows that very few birds exist in dense forest, and that if not disturbed they rapidly increase wherever there is a clearing under cultivation. The comparative scarcity of birds in Coorg is doubtless caused by the great amount of dense forest that exists, the severity of the monsoon, and the destructive propensities of the Coorgs.

“In various jungle trees and in the orange I have found larvæ which in appearance and mode of tunnelling have a strong resemblance to the coffee-borers, but, as a rule, they differ from them in preferring dead to living wood. These and the coffee-borers are all the larvæ of beetles or of moths. The white coffee-borer (now so destructive) appears to belong to the genus *Clytus*.

“Since my last Report, I have found in coffee on native estates growing under shade a small beetle belonging to the genus *Tomicus*, which bores the young primaries and secondaries, causing them to turn black and perish. The perfect insect is only about the size of a pin's head, and yet it does a great deal of damage to the young fruit-bearing wood. I have also seen on some estates a locust very destructive to the foliage of the coffee, and thus causing a considerable loss in crop.

“The discovery of measures to destroy or prevent the appearance of the borer has of course formed the chief object of my solicitude, and although the peculiarities of its natural history are such as to throw serious obstacles in the way, still I hope to attain ultimately some measure of success. The fact of the insect being found in the perfect form in every month of the year nearly precludes the idea of being able to destroy it in the winged state; and the circumstance of its living as a grub and pupa in the interior of the stem renders it very difficult to attack it in either of these stages without destroying the tree. In the mean time I would recommend the covering of the stems of the plants with clean fresh moss up to the terminal pair of primaries from the surface of the ground. The moss should be about two inches in thickness and secured with several bands of fibre, and if put on about the beginning of the monsoon will live and become firmly banded round the stem in a short period, forming a mechanical barrier that would prevent the beetle from reaching the bark to deposit its eggs. The mossing would no doubt to some slight extent affect the health of the tree, but this would be largely compensated for by the protection that it would afford from so deadly an enemy as the borer. I believe, too, that although the eggs of the borer were deposited under the moss, its presence would prevent them from hatching. The manner of applying the moss here proposed is exactly the same as that recommended by Mr. M'Ivor for the cinchonas, to increase the amount of alkaloids in their bark. Coal-tar, pure or diluted with fish-oil, applied to the stems will also have the effect of keeping away the beetles, its smell being most offensive to all insects. I lately saw some trees to which tar had been applied nine months ago, and although exposed to the monsoon the coating had not lost its odour, and the trees looked very

vigorous. I mention these facts because it has been said that the tar soon loses its smell, and is also fatal to the coffee-tree. Lime-wash has been used on some estates, but the great objections to its use are that it is washed away by the first showers and scales off when the tree is shaken by the wind. I believe a mixture of cow-dung and clay, like that used by the natives for the walls and floors of their houses, would be more permanent and perhaps as effectual, while it would be much cheaper.

“The coffee crop has turned out better than was anticipated, and this agreeable surprise has led most planters to take a much more hopeful view of the future. I am happy to report, too, that the borer does not seem to be on the increase in South Coorg, but rather on the decline, as in most bored trees about five per cent. of the insects found are dead. Still it is very difficult to arrive at a satisfactory conclusion as to the state of the pest at present, as the insect is for the most part in the winged state and not easily seen, and it is only as the dry weather begins to tell on the trees that those tunnelled will show symptoms of the injury they have sustained. The Rodent alluded to in my last continues to prey on the insect, cutting a hole in the wood so as to reach its tunnel. It does not appear, however, to frequent estates of large extent and free exposure, but to live in native gardens of limited size, in which there is some shade and abundance of cover in the shape of under growth.”

“There is a very destructive insect called by planters the charcoal borer, as it frequently destroys the charcoal trees which are reared to give shade to the coffee. Its presence in a tree is indicated by a lump on the stem of sawdust-like wood-powder, matted together by silky fibres. On removing this the hole through which the insect enters and ejects the morsels of wood will be seen, and it is generally large enough to admit the tip of the little finger. If the tree be now cut down and split open, tunnels of the same size will be found running upwards and downwards from the external opening, and the grub lying snug in the bottom of a burrow at the base of the stem. The larva is from three to four inches long, thick, fleshy, and of a pale red colour. It has six pectoral, eight ventral and two anal feet, and is a very powerful creature, struggling violently in the hand, and attacking vigorously with its powerful jaws the cork of a bottle in which it may be confined. The chrysalis is smaller and of a darker red colour than the caterpillar, and rests about three months. Its abdominal segments are furnished with transverse rows of minute reflexed spines, and some weeks before the moth emerges, moved by some wonderful instinct, it pushes itself up by means of these, and clears away the *débris* of the wood from the external opening, so that there may be nothing to prevent the escape of the perfect insect. Having completed this task it once more descends to its former place, and rests until the moth arrives at maturity, when the same contrivance is made use of again to enable the moth to escape from the tunnel, within which it could never wriggle out of its case or develop its wings. The moth measures about three and a half inches across the upper pair of wings, which are much larger than the lower. Both pairs are of a grayish brown colour, and the upper ones are clouded with brown. The antennæ of the female (I have not seen a male) are very short and filiform. The wings are deflexed in repose, and furnished with a complicated series of strong nerves. The abdomen is elongated, and the female, when touched, discharges with considerable force immense numbers of minute white round eggs, which shortly turn black, when they have the appearance of very fine gunpowder. This moth belongs to the family Hepialidæ, and is closely allied to the *Hepialus humuli*, or ghost moth of England. It is very common in the

charcoal tree, and renders the stem so weak by its tunnelling that it is apt to be broken by the wind. In the monsoon, too, the rain enters by the exterior opening, gets to the heart of the tree and causes it to rot. The larva may be killed by passing a flexible wire into its burrow, and after this the hole should be closed with a soft wooden peg.

“There is not a tree in our forests but is liable when dead to the attacks of boring insects, and many in the living state, more especially if sickly, show traces of their depredations. As regards the coffee-plant, any diminution of vigour in it, no matter what the cause, renders it liable to the ravages of the borer, and the larva does not find a suitable field in a vigorous and absolutely healthy plant. There seems no reason to doubt, therefore, that one cause of the great prevalence of the borer of late years has been a general want of vigour in the plants. At the same time it must be stated that a vast majority of the trees that have died full of the borer’s tunnels would, but for its ravages, have lived and might have been restored to a more healthy state. The causes that produced this sickly condition were various, and some of them must have been very general, seeing that the borer has prevailed over such an extent of country. Not only in the actual coffee districts, but in places at a considerable distance from them—such as Hassan and Hoonsoor—I have found the borer present in coffee trees; occurrences that point to the reduction of vigour having been caused in part by some climatic influence. From this and other facts I also infer, that the borer beetle is a widely distributed insect, and indigenous to the country, as the distance of the stations of Hoonsoor and Hassan from estates infested with the borer, and the open nature of the intervening country, preclude the idea of its having been able to wing its way from the latter to the former. I cannot believe either that the ova of this beetle could have been carried so far by man’s or any natural agency. Concluding then that the borer beetle belongs to the insect Fauna of Southern India, and is widely distributed, it can hardly be expected that it will ever disappear, and although more favourable seasons and change of mode of cultivation may render coffee in general less liable to, or proof against, its attacks, still it will ever be ready to prey upon and destroy sickly plants. During a recent visit to the gardens on the Bababooden, in which coffee was first cultivated in Southern India, I was informed by the planter Ghaus Sha-Khadry that ‘he had known the borer there for thirty years.’ On an estate in Nugur, too, in 1860, or eight years ago, no less than 60,000 plants were destroyed by the borer. These facts also go to prove that the insect is an old and permanent resident in the coffee districts of the Peninsula. When at Ghaus Sha-Khadry’s plantations I saw coffee-plants growing in shade, seventy years old, and quite healthy, and was told that about twelve years ago there were plots of coffee in the open, the trees in which were one hundred years old. These have all since gradually died out, and the owner attributes their death to extreme age, drought and borer. He says that for twelve years back the seasons have gradually been getting drier and hotter, until at the present time the climate is such as to render it impossible to grow coffee trees in the open in that part of the country: there is much collateral evidence to support this statement regarding gradual deterioration of climate all along these Western Ghats.

“I have visited the chief estates in Munzerabad, and a few of the oldest and most interesting in Nugur. In both these districts, all the planters I have seen are of opinion that coffee must in that quarter be cultivated under shade, trees in the open

being liable to perish from the violence of the monsoon, drought, borer, &c. The most of the estates therefore are under shade, and as those so protected have suffered but little from the borer as compared with the few in the open, I went over them with great interest. The degree of shade is a point of great nicety and importance, too much being prejudicial to the reproductive powers of the tree, and too little exposing it to the effects of drought and the attacks of the borer. The native cultivators were the first to adopt this system, and there seems no doubt that they were led to do so by experience. It is worthy of note, too, that the first English coffee planters in Southern India followed their example, and that some of their estates, varying in age from twenty-five to forty years, still yield large and certain returns to the owners. On the whole, I entertain a very high opinion of the system of culture under shade, and think it might be introduced with advantage in many parts of Coorg."

Mr. M'Lachlan mentioned that the terrestrial Trichopterous larvæ exhibited at the previous Meeting (Zool. S. S. 1303), from which he had hoped to breed *Encocyta pusilla*, had unfortunately perished.

Mr. A. E. Eaton exhibited numerous drawings and microscopical preparations of the mouth and other parts of *Cænis*, *Leptophlebia*, *Ephemerella* and *Oligoneuria*—with reference to the paper mentioned below.

Prof. Westwood exhibited two remarkable forms of Chalcididæ, one from the Amazons, the other from Australia, both belonging to the *Cleonymus* group, and possessing peculiar modifications and elongation of the abdominal segments, whereby doubtless oviposition was facilitated. He proposed to describe each of them as the type of a new genus.

Mr. F. Smith exhibited two female specimens of *Ophion macrurus* (Drury, Exot. Ins. i. pl. xliii. fig. 5), bred by Mr. Chapman, of Glasgow, from cocoons of *Saturnia Cynthia*, which he had received from Mr. Angus, of New York. The specimens were alive when they reached Mr. Smith, and one of them stung him in the hand so severely as to lead to the belief that poison was injected, but fortunately the pain was not lasting. There were specimens of this *Ichneumon* in the British Museum from New York, with a memorandum by Edward Doubleday "parasitic on *Bombyx Cecropia*," a North American species: if there were no mistake as to the species from which the exhibited insects were bred, it was remarkable that the Asiatic *Bombyx Cynthia* should, so soon after its introduction into America, have been attacked by the parasite of its congener *B. Cecropia*.

Mr. F. Moore did not consider that these parasites were restricted to a single species. There was no doubt of the true *Bombyx Cynthia* having been introduced into America; and he had himself bred the same species of *Ophion* from *B. Cynthia* and *B. Polyphemus*.

The Secretary exhibited a spring wooden letter-clip, in the cavity between the limbs of which was placed the nest of a wasp, probably an *Odynerus*. This was found in June, in Hants, in a box which lay open on a writing-table which was in constant use, though the clip had remained untouched; and was communicated by Sir J. Clarke Jervoise, Bart., M.P.

The Secretary mentioned that petroleum oil, especially in the crude state, had in France been found of great use in destroying insects: the petroleum was mixed with water, in the proportion of an ounce to half an ounce to a pint of water, but when

applied to fruit trees or delicate plants the quantity of oil was still less: a very weak solution applied with a watering-pot, was said to be very efficacious against the larvæ of the cockchaffer; and a strong solution, poured into the holes and down walls infested by insects, was said to kill them rapidly. Another application of the solution was to rid dogs and other animals of parasites; but the parts must be rubbed with soap a few minutes after the solution was applied.

Papers read.

The following papers were read:—

“Descriptions of new Genera and Species of Heteromera” (conclusion); by Mr. F. Bates.

“On the Larva of *Micropeplus Staphylinoides*,” by Sir John Lubbock, Bart.

“On some points in the Anatomy of the immature *Cænix macrura* of Stephens;” by Mr. A. E. Eaton.

“A Tabular Comparison of some Representative Species of Diurnal Lepidoptera in Europe, India and North America;” by Mr. W. F. Kirby.

“In my paper on the geographical distribution of European Rhopalocera (Tr. Ent. Soc. 3rd series, i. 481), I did not attempt any generalizations from the results arrived at. It now appears to me that a Table showing the species common to Europe and India, or North America, may be useful, with reference to the claims of representative forms to be considered distinct. In some cases, as in *Papilio Zelicæon*, a named representative is now allowed to be a variety; in others, as in *Pyrameis Callirrhoe*, it is considered as indubitably a species. But my object is simply to start inquiry; I leave to others the decision of specific claims. A great number of European species range through North Asia (those common to Europe and North Asia are indicated in the Table by an asterisk), and I think it highly probable that many or most of these will ultimately be found to extend to the north slope of the Himalayas. The absence of continuous mountain chains running north and south will account for their wide distribution over Europe and North Asia. The South Indian Fauna is still very imperfectly known, but it is probably more African or Australian in character, and much poorer in species, than that of the North. My authorities for North Asia are Ménétries and Bremer; for India, Horsfield and Moore’s Catalogue, and subsequent papers by Mr. Moore; and for America, Morris’s Synopsis, published by the Smithsonian Institution. The letters N, S, E, W denote the points of the compass: H in the Indian column indicates a Himalayan species.

EUROPE.	INDIA.	NORTH AMERICA.
* <i>Papilio Machaon</i>	<i>P. Machaon</i> (H)	<i>P. Zelicæon</i> (W)
* <i>Pieris Brassicæ</i>	<i>P. Nipalensis</i> (N)	
„ <i>Krueperi</i>	<i>P. Gliciriæ</i>	
* „ <i>Rapæ</i>	<i>P. Rapæ</i> (N)	<i>P. Cruciferarum</i>
* „ <i>Callidice</i>	<i>P. Kalora</i> (H)	<i>P. Callidice?</i> (W)
* „ <i>Daplidice</i>	<i>P. Daplidice</i> (N)	
<i>Anthocharis Belia</i>		<i>A. Belia</i> (W)
* „ <i>Tagis</i>	<i>A. Daphalis</i> (H)	
* <i>Colias Pelidne</i> (N)		<i>C. Pelidne</i> (N)
* „ <i>Nastes</i> (N)		<i>C. Nastes</i> (N)

EUROPE.	INDIA.	NORTH AMERICA.
Colias Phicomone		C. Phicomone
* „ Hyale	C. Hyale	C. Hyale
* „ Erate	C. Erate (N)	
* „ Chrysotheme (E)		C. Eurytheme
„ Hecla (N)		C. Hecla ? (N)
„ Myrmidone (N)	C. Myrmidone? (H)	
* „ Edusa	C. Fieldii (H)	C. Amphidusa (W)
*Gonepteryx Rhamni	G. Nipalensis (H)	G. Rhamni (W)
Danaüs Chrysippus (E)	D. Chrysippus	
*Argynnis Aphirape		A. Aphirape (N)
* „ Freya (N)		A. Freya (N)
* „ Polaris (N)		A. Polaris (N)
„ Chariclea (N)		A. Chariclea (N)
„ Lathonia	A. Issæa (N)	
* „ Aglaia		A. Aglaia
* „ Selene		A. Myrina
„ Frigga (N)		A. Frigga (N)
*Grapta C-album		G. Comma
*Vanessa Xanthomelas	V. Xanthomelas (H)	
* „ V-album		V. J-album
* „ Urticæ	V. Kaschmirensis (N)	V. Milberti
* „ Antiopa	V. Antiopa (N)	V. Antiopa
Pyrameis Atalanta	P. Callirrhoe (N)	P. Atalanta
* „ Cardui	P. Cardui	P. Cardui
*Neptis Aceris (E)	N. Aceris	
Lasiommata Mæra	L. Schakra (N)	
„ Menava	L. Menava (N)	
Hipparchia Thelephassa (E)	H. Baldiva (H)	
Epinephele Janira	E. Cheena (H)	
* „ Lycaon	E. Davendra (H)	
Cœonympha Pamphilus		C. Mornata (W)
* „ Davus		C. Davus (W)
*Chionobas Jutta (N)		C. Jutta (N)
„ Taygete (N)		C. Taygete (N)
* „ Also (N)		C. Semidea (N)
„ Polixenes (N)		C. Polixenes (N)
*Thecla Rubi		T. Dumetorum (W)
*Chrysophanus Phlæas	C. Timens	C. Americanus
* „ Dorilis		C. Epixanthe
Polyommatus Bæticus (S)	P. Bæticus	
* „ Tiresias (S)	P. Tiresias	
* „ Argiolus		P. Pseudargiolus
„ Optilete		P. Filenus
* „ Semiargus		P. Xerces (W)

EUROPE.	INDIA.	NORTH AMERICA.
* <i>Polyommatus Ægon</i>		<i>P. Antægon</i> (W)
„ <i>Amandus</i>		<i>P. Icaroides</i> (W)
„ <i>Pheretes</i>		<i>P. Pheres</i> (W)
„ <i>Lysimon</i>	<i>P. Lysimon</i>	
* <i>Pamphila Sylvanus</i>		<i>P. Sylvanus</i> (W)
„ <i>Comma</i>		<i>P. Comma</i> (W)

It will be noticed that whenever a European genus occurs in India or North America at all, European species, or very closely allied forms, are also to be found in those countries. South or East European species frequently extend to India, North European species frequently reach America, while Central European species extend throughout North Asia, and only in a few instances reach North America, and are then usually confined to the West coast. Indeed almost every species common to the Old World and North America is either Polar or Californian.

There is still considerable doubt whether the European species of *Colias*, &c., which are reputed North American do actually occur there, or whether allied species may not have been mistaken for them. It is also asserted, but I believe without authority, that the common *Vanessæ* have been introduced into North America; but this is highly improbable, as they are all wide-ranging insects, and do not feed on garden plants.

Pieris Brassicæ is replaced by *P. Cheiranthi* in the Canaries, and by *P. Brassicoides* in Abyssinia. *P. Rapæ* has been lately introduced into Canada. May not *Anthocharis Creusa* be an American variety of the widely distributed and very variable *A. Belia*? *A. Ansonia* is the only variety of *Belia* which I know to occur in America; does it, or any other variety of this species, occur in North Asia? *Gonepteryx Cleopatra* appears distinct from *G. Rhamni*. Is *G. Cleobule*, from the Canaries, distinct from *G. Cleopatra*? The European *Colias Myrmidone* is very distinct from *C. Edusa*; I doubt the occurrence of the true *Myrmidone* in India. Perhaps the intermediate Indian form may indicate that these two should be united, as *Paruassius Apollo* and *P. Delius*, though perfectly distinct in Europe, appear to blend completely into each other in Siberia. Is *Lasiommata Menava* sufficiently distinct from *L. Hiera*? *Hipparchia Baldiva* has been erroneously placed in the genus *Lasiommata* or *Ameocera*. *Polyommatus Bæticus* and *Telicanus* are among the very few species common to Europe and South Africa; *P. Pheretes* is represented in North-East Asia by the var. (?) *P. Pheretiades*.”—*J. W. D.*

Sedge Warbler in Dry Places.—Bearing in mind the remarks of one or more of your correspondents, and a letter of my own in the ‘*Zoologist*’ for 1865, upon the resort of the sedge warbler to dry places, and especially to lilacs in such places, I wish to report that I have this summer, as in 1866 and 1867, very frequently heard and seen what must be either that or a closely-allied species, near Twickenham, away from the river, and always in lilacs. During the first ten days of this present month, a time of great heat, I heard it daily in some of these shrubs planted close to a brick wall, on its south side exposed to the mid-day sun, as hot and as dry a position as

could possibly be found. It is hard to believe that this can be the same bird with that found so commonly on the banks of the Thames, three hundred yards distant, and not in any intermediate spot, and yet the notes are identical to the ear, whether coming from the reed-bed in the water or from the scorched lilac under the south wall. It may be that some of your readers can answer two questions which arise from the foregoing observation, *viz.* Is there more than one species concerned? and if there is not, What kind of food equally attractive does the sedge warbler find among the reeds and on the lilacs?—*Clermont; Eatington Park, July 23, 1868.*

Scarcity of the House Martin.—I may here mention that I have observed a decided scarcity of the house martin this summer in various parts of the country, and have heard the same fact remarked upon by several persons in Sussex, especially near Uckfield, and in Warwickshire.—*Id.*

An Albino Humming Bird.—During the last summer a white humming bird visited many times a stand of plants on my piazza. I had several opportunities of observing it closely. It seemed a trifle larger than the ruby-throat. The neck and head were of a glossy gold-colour. Eyes large, black and brilliant. After dipping its bill into all the fuschias, it did what I never saw other humming birds do, alighted on a dwarf apple-tree within a few feet of me, and ate the aphides, or plant-lice, just as the sparrows and golden wrens do. After a hearty meal of insects it dressed its feathers, spread its wings one by one, and thrust out a very long tongue.—*L. A. Millington, in the 'American Naturalist' for April, 1868.*

Two Serpents and a Cat: a Singular Case.—The 'Messenger Algerien' relates the following curious story:—"A very singular occurrence took place in the warehouse of the Messageries Impériales at Stora. A large case containing two serpents, directed from Batna to the superintendent of the Zoological Gardens in Marseilles, was deposited in the warehouse for shipment. Whilst there a cat, ignorant of what the case contained, got into it. No sooner had it done so than the reptiles sprang at it with the rapidity of an arrow, and squeezed it to death in their immense coils. They then relaxed their hold, and commenced the process of swallowing. The male serpent seized the dead cat by the head end, the female swallowing the tail end. It is well known that when serpents take into their mouth a substance of a certain size, the conformation of the teeth and jaws is such that they cannot let go their hold. In the present case both snakes were thus brought face to face, the process of deglutition was arrested, and it became doubtful how the matter would end. At length the female snake made a desperate effort to swallow the other, and in doing so was choked." In corroboration of the above facts the animals have been preserved in spirits of wine. The directors of the Zoological Garden of Marseilles are going to bring an action against the Messageries Company for the loss of the serpents, whilst the owner of the cat demands that its skin at least should be given up to him as a matter of curiosity.

Parturition of Hippocampi.—To-day near noon I observed three young sea-horses swimming about. They had just made their *début*. Very minute creatures they were; but to my great joy, nearly perfect. From that hour the Paermater kept busy

setting his progeny adrift. At the bottom of the vessel was a broken shell, put there for the attachment of the animal's tail, when fatigued by swimming—as the sea-horse is very easily tired—and this, monkey-like, is its favourite mode of taking rest. The shell afforded real help in the labour of extruding the young, which is in no sense a parturient process, but, on the contrary, is entirely mechanical, and in the present case was effected in the following manner; with its abdomen turned towards the shell, its tail attached to the under part of it, the body erected to its full height, the animal, by a contractile exertion of the proper muscles, would draw itself downwards, and against the shell, thus rubbing the pouch upward, and in this simple yet effective way expelled the fry at the opening on top of the sack. It was said above that the sea-horse is soon wearied with even moderate exertion; hence, probably, it was that these repeated acts were each followed by a few minutes of rest. Indeed, the extrusion of its young lasted for nearly six hours, from three to six individuals being set free at a time. The scene that followed was one of singular and lively interest. I was nervous with delight, and wished that every naturalist could see it for himself. Using my best judgment—for, owing to the mazy motion of this tiny throng counting was out of the question—I set the number down as not far from a thousand. Each measured from five to six lines in length. Very minute creatures, truly, when one considers how large a portion is taken up by the tail, which organ was of but little more than thread-like dimensions. We might suppose it would require a few days for the young hippo to find out the remarkable monkey-like endowment of its tail. Not so. Only look at what my own eyes beheld many a time, when a “stampede” of these little colts was going on, although they were but one day old. There come two little hippos each swimming in a direction at right angles to that of the other. Just at the point of passing, one, lasso-like, whips his caudal extremity round that of his fellow, who, of course in like manner, returns the caudal compliment, which, to speak technically, acts as a “double-lock.” Of course both pull, and, by natural law, the force is exerted in exactly opposite directions, and the right angle is resolved into a straight line. It is but poor head-way they make, nor does it mend the matter much that a third little fellow comes giddily on, and, switching his tail, takes a hitch at that precise point in space where the other two met. Now a triple force is exerted, and the effect is, with two straight lines to project three obtuse angles. And so the three toil on, obtusely labouring *in statu quo*. But a droller sight is that of yonder juvenile Lophobranch, who seems to be of somewhat belligerent proclivities, as he is leading by the nose a weaker member of his own species, having with his caudal extremity noosed him on the snout. Unfortunately these little fish perished in a few days, none living beyond a fortnight.—*Rev. S. Lockwood, in the 'American Naturalist.'*

Are Bees injurious to Fruit?—Dr. H. A. Hagen, late of Königsburg, Prussia, who is an eminent entomologist, and who has paid special attention to the literature of bees and bee-keeping, thus writes us regarding this question:—“I have never known, and find nothing in the literature now at hand to prove that bees are obnoxious to fruits and to fields. Bees can never use the fields of *red* clover; the corolla is too long for their proboscis. But they are very frequently seen in the fields of white clover, and I have heard that these fields are obnoxious to bees, if shortly before rain has fallen.”—*'American Naturalist,' April, 1868.*

The Death of Species. By EDWARD NEWMAN.

“Je ne change qu'en mourant.”

I WAS taught, and from my earliest years accepted the teaching, that every living being was created perfect of its kind; and this view I maintained with unwavering faith until the appearance of Mr. Darwin's 'Origin of Species,' when a second view, entirely antagonistic to the first, was presented to my mind, since this distinguished and most accomplished naturalist contends, and attempts to prove, that the present status of Species results from innumerable infinitesimal improvements accumulated during countless ages that have past. Now while I admire more than I can express, the research and candour of the author, I fail entirely to perceive the logic of his conclusions; and I revert, as it were of necessity, to the teachings received in my childhood, not only fully believing in the original perfection of species, but also that the tendency of a prolonged existence is rather to deteriorate than to improve. A species like an individual appears to me to have an allotted term of life, which under very favourable circumstances may be prolonged; but I also believe that decay is the necessary concomitant of the prolongation, and death the inevitable issue.

Seeing that Mr. Darwin has, in his very title, employed the word "Species," it seems as though I had no choice but to adopt it when expressing opinions on his labours, or in connection with his labours; and seeing also that some diversity may exist in the interpretation of that term, I may perhaps be excused if I say a few words in explanation, at least so far as giving it my own interpretation. It would perhaps be easier to shirk the question, "What is a species?" on account of the difficulty of finding a reply, but it were more honest to look the difficulty, if it be one, full in the face, and give such explanation as I can. I conceive, then, a "species" to be composed of such living individual beings as possess perfect eugenism among themselves; that is, of individuals any pair of which can reproduce their kind, the descendants being equally prolific; and I conceive also that all structural characters, whether of form, size or colour, are insufficient to the differentiation of species; not useless, but insufficient. As an example, our domestic dogs and pigeons may vary almost infinitely in their structural characters, but no naturalist has ever ventured to raise such varieties to the rank of species. Nothing is more common in Entomology than for a species of insect to pass

through two generations in a year, and for the two generations to differ entirely in coloration and size: in every instance where this is the case, entomologists have treated the vernal and autumnal generations as species: it is scarcely needful to say that they are not so.

It is well known that the duration of individual life varies in different species; thus some insects pass through four or five generations in a year, although the usual term of life is twelve months: rabbits live four or five years, cats six or eight, dogs ten or twelve, horses sixteen or eighteen, and ravens and tortoises are said to live for centuries. This diversity in the term of years allotted to individual life has no ascertained relation to that allotted to the life of the species of which that individual forms an integral part: on this subject there are no statistics: the death of a species is an unobtrusive event, while that of an individual, whether an emperor or a fly, is an event that frequently forces itself on our notice: so that neither the brevity nor prolongation of individual life affords us any clew to the duration of specific life.

How then do we acquire a knowledge of the death of species? *first*, from the testimony of the rocks; *secondly*, from beholding with our own eyes the partial death of species; in other words, their extinction in certain limited localities; *thirdly*, from historic evidence.

Rocks contain the monuments of countless thousands of species: our lists of fossils (so called) are obituaries of species; but our knowledge of them being imperfect, they serve rather to excite than to satisfy our curiosity respecting the inhabitants of that vast cemetery of species, the superficial covering or crust of the earth. History has erected tombstones over a few; and imagination, hypothesis, theory,—call it what you will,—is even now preparing other tombstones not yet required, carving prospective epitaphs for species about to die. A great deal is said and written against the prevalent practice of promulgating prophetic dicta in physical science, but certain coming events cast such unmistakable shadows, or, more properly speaking, project such a blaze of light before them, that the general character of the future stands revealed. Those who have studied earth's inhabitants, with or without the assistance of Geology, have acquired a very fair insight into the future, and are gradually led to perceive, accept, and even enunciate results; yes, to enunciate them with a confidence which the dissentients call "dogmatism," the cavillers "hypothesis," the ingenuous "theory," and the approvers "logical deduction." Taking refuge under this diversity of sentiment, and certain that no expression of opinion can jeopardise the truth, I venture

to predict that the future will be simply a continuation of the past, an inevitable sequel to the present.

Races of men and animals are in constant antagonism, and one race of men, that which philosophers have called Caucasian, is continually pressing forwards towards the sole sovereignty of the earth: we still behold other vast races of men like the Chinese; races of huge beasts like the elephant; races of gigantic birds like the ostrich; in undisturbed possession of their original allotment of earth's surface; their peace, prosperity and power never apparently jeopardized, although sometimes interrupted by domestic jars; but history reveals so many gaps that have occurred by the extinction of races through the instrumentality of the Caucasian, that we feel certain such gaps will continually recur: we may accustom ourselves to look so deep into futurity, illuminated only by the light of past and passing events, that we cannot fail to prophecy that one favoured race of men is slowly but assuredly becoming sole master and occupant of the earth.

But the Caucasian in his onward course is not alone; as he moves forward he attracts or creates a fauna and flora of his own. The negro; the dog, the cat, the horse, the cow, the sheep, the pig; the turkey, the goose, the barn-door fowl; the honey bee; these are his companions, whether to serve him as slaves or for food: wheat, barley, peas and beans spring up beneath his feet. He bids fair to exterminate all that does not administer to his wants or his pleasures—in a word, to his will. Every other man will be his slave, every animal will be a domesticated animal. The only exceptions will occur in the rat, mouse, sparrow, cockroach, cricket, bug, flea, dock, thistles, and such other voluntary companions as are dependent on his bounty, however grudgingly bestowed.

The foot-prints of such a future are perpetually intruding themselves on the present. No one who gives his attention to the subject for a single hour can doubt that the change is progressing. It is clearly written on the earth's surface, marked as plainly as the hours and minutes on the dial-plate of a clock. Entire continents and islands, America, Australia, Tasmania, are changing their men and animals: even now the boundless plains of the Pampas resound with the hoofs of ten thousand horses, although a few years back a horse was as unknown as a phœnix: even now English weeds grow in the streets of Sydney, Melbourne and Adelaide; even now a hundred plants grow wild in Philadelphia that are alien to the soil. Even now the once dominant inhabitants of the land exist only as a source of innocent

amusement to the missionary, the philanthropist, the ethnologist, and the speculative naturalist: in Tasmania, the hotbed of missionary enterprise, the original master only occupies a seat below its surface. In a hundred instances the white man has rudely pushed aside and trampled down the former lords of the soil, and, taking possession of the seats they once occupied, gazes with philosophical curiosity on their approaching extermination. A glance at the animal kingdom will at once place this subject clearly before my readers, and will show that neither bulk nor strength, ferocity nor numbers, can avail against the favoured race of man: indeed it would seem that these attributes are antagonistic rather than conducive to the prolonged life of a species.

The partial or geographical death of a species, to which I have already alluded, gives us a kind of clew to the date of its final disappearance. In selecting a country in which to ascertain the precise date of the death of a species these islands have the great disadvantage of a very limited area; but this perhaps is compensated by their more accessible records. The records, however, are only incidental, and are invariably made without any reference to their bearing on scientific questions; indeed, there is every reason to suppose that had these facts any other object than the favourite pastimes of kings and princes who could neither read nor write, no records would ever have been preserved. Of the species formerly abundant, but now dead as regards the British Islands, the most familiar are the bear, the beaver, the pig and the wolf.

1. The BEAR as a British species died about 1041. In what is now called London, namely the districts of Southwark, Lambeth, Battersea, Westminster, Fleet, Hackney, Woodford, Plaistow, Stratford, Isle of Dogs, Greenwich, Peckham and Camberwell, bears were so numerous at the period of the Roman invasion that hunting-parties were systematically organized and armed, to diminish their numbers, and thus in some degree abate the nuisance: to compass their destruction was out of the question: nor perhaps was it altogether desired, for we may imagine that the preservation of bears, although a loss to the many, may have been a source of profit to the few, since we find that about the year 850 the Emperor Claudius imported vast numbers of British bears as a source of gratification to his subjects; they were large, strong and ferocious, and were highly prized for their prowess in the arena. Seven hundred years later, bears are incidentally mentioned as infesting English forests in great numbers; but no mention is made of

London, where they had probably been thinned. In 1035, and probably earlier and later, the city of Norwich was compelled to supply annually to Edward the Confessor, "one bear, together with six dogs to bait the bear;" a record from which three inferences may be fairly drawn; *first*, that bears were procurable at Norwich in 1035; *secondly*, that the eminently sainted monarch, Edward the Confessor, possessed and indulged a regal taste for bear-baiting; and *thirdly*, that but for the indulgence of this taste we should have been left uninformed on this interesting subject. The Norwich bear was furnished to the pious monarch in 1041, but I know of no subsequent record.

2. The BEAVER as a British species died in 1188. The beaver was formerly an inhabitant of Wales and Scotland, and its skin was always valuable as an article of commerce. The last record of its existence will be found in the Itinerary of Giraldus Cambrensis, who travelled in Wales in 1188: he states that the river Teivy, in Caernarvonshire, was the only river it then inhabited. The beaver may have existed here for another century, but we have no later records; a few colonies of this curious creature are still found on the banks of the Weser, the Rhone and the Danube.

3. The PIG as a British species died before 1625. Formerly the lordly pig was the favourite object of chase with our British monarchs, and was protected by the most sanguinary laws, the last of which, I believe, is that dated 1087, during the reign of the Conqueror. Amongst other provisions, this law decrees that "any man killing a wild boar should have his eyes put out." Notwithstanding this truly regal provision for the preservation of pigs, they had become extinct before the accession of Charles I., and we find that canonized monarch turning out domestic grunTERS in the New Forest, in the hope they would turn into wild boars. Vain are the ambitious aspirations even of princes: when the royal cavalcade arrived, the swine could not be persuaded to run, but continued munching acorns under the forest oaks, and would not deign to notice the august company associated to compass their destruction.

4. The WOLF as a British species died about 1678, as an Irish species about 1710. The wolf in the earlier period of English history was a terrific scourge. The struggle for existence between the wolf and Kelt was constant, and soon after the invasion of the island by continental legions both wolf and Kelt were driven to its extremities, Cornwall, Wales and Scotland. In Scotland the wolf obtained the ascendancy, and indeed became

absolute master of the position. In 1281 wolves had become so numerous and so formidable that the Kelt was compelled to hide his head entirely by night, and crept about by day in fear and trembling. We learn from Hollingshed that in 1577, three hundred years later, and after Saxon blood had been infused into Scotland, that the wolf was still troublesome, and subsequent history shows that the last wolf was slain in Scotland by Sir Evan Cameron in 1678. In Ireland he continued still longer a terror and devastating plague to the Kelt. It is very familiar to readers of history that Ireland was never completely conquered by the Caucasian; the feeble Kelt, the rightful owner of the soil, was never thoroughly extirpated as he has been in England; the Saxon crossed the Channel, having his own ends in view, and found two occupants equally opposed to him. Considerations, whether political, moral or religious, we need not consider, induced him to spare the Kelt, but the wolf enjoyed no such immunity. To the Kelt the wolf had been a terror and held in abject dread; to the Saxon he was simply a nuisance, and so was destroyed. Nevertheless, owing to the numerical preponderance of the Kelt, the task of destruction was very gradual, and the wolf held his own much longer than in Scotland, where the native, with a shrewd eye to self-interest, amalgamated with the Saxon, and availed himself of that powerful arm. It was not until the beginning of the eighteenth century that the wolf was exterminated in Ireland.

Of these four animals, two were important from their destructive powers, one from its value as human food, and one from its mercantile value in human clothing; yet they have so totally vanished that few amongst us have ever regarded them but as the inhabitants of other climes. They perished immediately they were brought into close contact with the favoured race of man; and this is no more than an indication of the future: wherever the Saxon shall come into close contact with the bear, the beaver, the wild boar or the wolf, these beasts will inevitably perish: on the continent of Europe they are for the moment protected only by the expanse of territory. It may here also be mentioned that the king of beasts, the lion himself, was once an inhabitant of Europe, although now exclusively Asiatic or African.

Let us now turn back to another page in the records of the past. Authentic history not only takes abundant cognizance of, but gives us every desired detail respecting species that are now absolutely dead. The few examples of which I have collected and arranged obituary

notices are no longer confined to the limited area of the British islands: they are derived from widely-separated localities; Ireland, England, Mauritius, Rodriguez, New Zealand, Bourbon, Behring's Straits, Newfoundland and Phillip Island.

1. The IRISH ELK died about the year 1070. The Irish elk is a misnomer: this gigantic deer was one of the platycerine division of the genus *Cervus*, and had little to do with the elk, as we now understand that animal. In the Preface to the 'Zoologist' for 1846 will be found a tolerably complete history of this remarkable animal: from this it appears that the females were killed as food for man by the blow of a pole-axe in the forehead, just as our butchers kill bullocks at the present day; there is, moreover, sufficient evidence of the females being domesticated and milked as our milch kine; they are also supposed to have been used as beasts of burthen. There is no evidence of the males being slaughtered. The bones are found in the greatest abundance in the Irish bogs, and are so recent, or so well preserved, by the antiseptic properties of the peat, that very tolerable soup has been made from them, and the marrow has been found to blaze like a candle. This enormous deer stood at least seven feet high at the shoulder; and the horns extended more than eleven feet from tip to tip: he probably became extinct at the period of the Roman invasion, but we are without the slightest evidence as to the people that destroyed so noble an animal. We have evidence of departed men far superior to the Kelt, but we scarcely know how to designate them: it is more than probable that the half-mythical race who built the round towers were also the destroyers of the Irish deer. It is, however, in vain we speculate whether foreign invaders or native bears and wolves, had this task of destruction assigned to them. Kelts were unequal to the task, and Saxons had not landed.

2. WILD CATTLE as a species died about the year 70. Enormous wild cattle, described by some authors as "*boves sylvestres*," and by Cæsar as "*Uri*," infested London at the period of the Roman invasion, indeed five distinct wild species of the genus *Taurus* then inhabited Europe. Every child will recollect the story of Guy Earl of Warwick and the dun cow: there is not the slightest reason for believing the story a romance. In a Swedish museum and in the British Museum are skulls of this great bull (*Bos primigenius* of Owen) that indicate a beast at least twelve feet long and high in proportion; indeed such an animal as would abundantly answer the description of the *Uri* of Hercynian forests given by Cæsar in the following words:—"These *Uri* are little

inferior to elephants in size, but are bulls in their nature, colour and figure, nor do they spare man or beast when once they have caught sight of him. These, when trapped in pitfalls, the hunters unsparingly kill. The youths, exercising themselves by this sort of hunting, are hardened by the toil, and those among them who have killed most, bringing with them the horns as testimonials, are given great praise. But these Uri cannot be habituated to man, nor made tractable, not even when taken young. The great size of the horns as well as the form and quality of them differ much from those of our oxen.* Now there is something extremely interesting in watching a methodical comparative anatomist like Nilsson or Owen as he constructs a ruminant of this enormous size from bones that have been discovered, and then finds the creature of his skill tally exactly with an unquestionable description from the life penned 1800 years previously.

I am obliged to omit many species whose deaths succeeded that of the Urus, and pass on to the date when modern Natural History may be said to commence; for between the date of Cæsar and the narratives of the early Dutch voyagers we have really no reliable accounts of animals. But directly these early navigators commenced their career the evidence is clear and decisive.

3. The DODO, a species that died about 1638. The dodo was a bulky bird with a hooked beak, a bald head, very small wings and very stout legs, that inhabited the island of Mauritius, where it was discovered by Jacob von Neck, in 1598. In 1638 a living specimen was exhibited in London, and a stuffed specimen, in all probability the skin of the same bird, was examined by three eminent naturalists, —Tradesant in 1656; Willughby and Lloyd in 1684; and by a Mr. Hyde in 1700: this invaluable relic of a dead species passed into the possession of Oxford University, and with the exception of the head and feet, now in the British Museum, was destroyed by order of the authorities in 1755. We have no subsequent account of the living bird, but abundance of its bones have been found in the island where it was first discovered.

4. The SOLITARY, a species of bird that died about 1700. The solitary or solitaire (*Pezophaps solitarius*) was an apterous bird discovered in 1691 by Francis Leguat in the Island of Rodriguez: it was described with the utmost minuteness in the account of Leguat's voyages published in English in 1708, and in French in 1720; but

* The translation is quoted from Gosse, 'Romance of Natural History,' ii. 64.

there appears to have been an earlier French edition, since that dated 1720 is the second. The species was probably entirely destroyed about the year 1700.

5. PALAPTERYX. Two enormous species of this genus of apterous birds existed in New Zealand formerly, and probably up to the middle of the last century: nothing is known of them beyond Professor Owen's admirable description of their bones, which are in a state of excellent preservation.

6. The BLUE BIRD. The *oiseau bleu* of French voyagers (*Porphyriopsis cyaneus*), a bird as large as a goose and entirely of a blue colour, was discovered on the Isle of Bourbon when visited by M. de la Haye about 1658: its beak and feet are described as having been bright red. This was probably a bird of the rail tribe, and perhaps allied to *Notornis Mantellii*. It was certainly in existence in 1735; and there is presumptive evidence that it survived as lately as 1763.

7. The RYTINA or STELLERIA (*Rytina Stelleri*) has a historical existence of only about twenty-seven years. This species was discovered in 1741 and died in 1768. There are many reasons for believing this may have been the mermaid of which so many circumstantial accounts have reached us from the northern seas. We have its complete history from the pen of Steller, a Russian naturalist. It was an enormous marine animal having a general superficial resemblance to a seal, and inhabited in great numbers Behring's Straits and the neighbouring seas. Its head was not separated from its body by any distinct neck; it had small eyes, and no external ears beyond a small opening on each side of the head; it had a thick and white moustache several inches long on the upper lip; its food was seaweed, which it tore from the rocks with its thick lips, which somewhat resembled those of a cow; it possessed but four teeth, all of them molar, one of them on each side of each jaw and occupying its entire surface; these great teeth had a flat crown composed of enamel disposed in transverse ridges as in the elephant. The females had very prominent breasts shaped like those of a woman, and placed between the arm-like flappers or fins, with which she clasped or hugged her young. These creatures generally swam with the body half out of the water, and often in an erect position. The length was twenty-five feet and upwards, the girth twenty feet and upwards, and the weight four tons and upwards. They were most lethargic and inoffensive creatures, and being highly prized as food for men were slain without mercy. Every ship that visited these seas supplied itself with their

flesh, and as they made no kind of resistance they really seemed to exist for no other purpose than to be killed and eaten: the last specimen of which we have any record was slaughtered in 1768.

8. The MOA (*Dinornis*) died about 1800. Moa is the name given by naturalists to certain very large birds which up to a comparatively late date inhabited New Zealand, but there is grave doubt whether the word in the native language had any such restricted application. Professor Owen, to whom we are indebted for clearly establishing five species of this bird, some of which possessed a frame as large as that of an English dray-horse, derives his characters entirely from the bones, no example of the living bird having yet been seen; but the remains of a specimen recently exhibited at a meeting of the Linnean Society by Mr. Allis, of York, still retained portions of skin, feathers and hair, which had undergone no change: some of those scientific men to whom Mr. Allis's observations were addressed, thought the bird had been living within ten years; others extended the period to fifty years; but we cannot with any show of probability date its extinction earlier than the year 1800.

9. The GREAT AUK (*Alca impennis*) died in 1848. This penguin of the arctic regions (garefowl, auk, or great auk of ornithologists) was an inhabitant of the arctic seas. It was a bird as large as a goose, but totally incapable of flight, the wings having the appearance and office of fins, and were used entirely in subaqueous progression. It was formerly most abundant, and formed so favourite an article of food with sailors that hundreds of ships from England, France, Spain, Holland and Portugal, visited the coasts of Iceland, Faroe and Newfoundland, during the sixteenth and seventeenth centuries, purposely to provision their crews with the bodies and eggs of these penguins: in addition to the supply required for immediate consumption, tons upon tons of the bodies were salted for future use. One of the old voyagers asserts that so easy was it to catch and destroy these helpless creatures that in the space of a single hour thirty boat-loads of their bodies could be obtained. Being unable to fly, or if on land to run, the only mode the penguin had of escape was by swimming or diving. The last of the species was killed in 1848.

10. The MOHO died in 1850. The moho (*Notornis Mantellii*) was a large and beautiful bird of the rail tribe that formerly inhabited New Zealand in profusion: its bones have been found in exactly the same state as those of the different species of moa, and its characters, excepting the colour of the plumage, were accurately described by

Professor Owen, so that when a single specimen was caught, killed and brought to England in 1850, it was at once recognized. The specimen was exhibited at a meeting of the Zoological Society in 1851, and this is assumed to have been the last of its race.

11. The NESTOR PARROT (*Nestor productus*) died in 1853. This bird lived and died on a small island called Phillip Island, which is about four miles from Norfolk Island, and both are situated to the east of Australia and to the north of New Zealand. Phillip Island is only four miles in length, yet the species of Nestor, and there were several, were confined to this little spot of land. The appearance of these birds was very remarkable, the upper mandible of the beak being twice as long as the lower and sickle-shaped: they were not only ardently sought by naturalists as curiosities for preservation in European museums, but, being remarkably quiet and docile birds, were caught and caged; and one of the species was taught to speak with great facility. Like most other parrots they ate in confinement all kind of vegetable substances, bread, potatoes, lettuces and cabbage; their food in a wild state is not so easily defined: some authors assert they lived on roots, which they dug out of the earth with their long pickaxe-like beaks; others state that they fed on the honey contained in the nectary of a white-flowered Hibiscus, and that the tongue is provided with a horny scoop on the under side near its extremity, for the purpose of extracting the nectar. Mr. Strange, writing to Mr. Gurney on the 7th of December, 1853, announces the destruction of the last Nestor: "I have seen the man who exterminated the Nestor productus from Phillip Island, he having shot the last of that species: he informs me that they rarely made use of their wings except when closely pressed: their mode of progression was by the upper mandible; and whenever he went to the island to shoot he invariably found them, all except one, on the ground, and that one used to stand sentry on one of the lower branches of the Araucaria excelsa, and, the instant any person landed, the rest would run to these trees and haul themselves up by the beak, and as a matter of course there remain until they were shot or the intruder had left the island."

This list might be extended to almost any extent: I have selected the species that are remarkable for their great size, their almost infinite numbers of individuals, or their remarkable figure: all of them were species of note, attracting the attention of the most unobservant,

All of them fell by the hand of man, and following out the theory already suggested, believing that the future is merely a continuation of the past, we cannot fail to see that hundreds of species now tottering over their graves will ere long cease from the earth, and their place will know them no more: let me enumerate a few.

1. The BISON or AUROCHS (*Bison europæus*), a huge bovine formerly as abundant as the Urus of Cæsar in every part of the European continent, is now restricted to some half-dozen herds in the forests of Lithuania.

2. The EMEU (*Dromaius irroratus*) inhabits the interior of Australia, and used formerly to be most abundant, and was always sought with avidity by the native Australian, who laid in wait to strike him with a spear; but since the white man has planted his foot in that new world, and has pursued the emeu with dog and gun, it has decreased so rapidly that before many years it must be exterminated: it owes its present existence to the difficulty and danger which attend penetrating to the interior.

3. The CASSOWARY (*Casuarus galeatus*) is a native of the Eastern Archipelago, and has been found in the islands of Banda, Ceram, Sumatra and Java: it is remarkable for its large size, great strength, and fierce resolute disposition, qualities which almost ensure its speedy extinction: so large a bird, perhaps the largest with the exception of the ostrich, cannot coexist with the enterprising Caucasian.

4. The MOURUK (*Casuarus Bennettii*) is another bird of the same family, but scarcely so large in size. I believe it has only been found in the small island of New Britain, to the north of New Guinea: it seems to be readily domesticated, but to possess none of those qualities which might induce the Caucasian to protect and preserve it; it must therefore perish before many generations have passed.

The three species of kiwi kiwi (*Apteryx*), the manumea (*Didunculus*), the kakapo (*Strigops habroptilus*), the aratoo (*Microglossum*), the hawk parrot (*Dasyptilus Pesquetii*), and the vast family of kangaroos, containing a hundred species and myriads of individuals, are all exhibiting so rapid a numerical decadence, without the slightest probability, I might almost say possibility, of its being arrested, that I can only be surprised the fact has not more forcibly attracted the attention of our philosophic naturalists.

Nevertheless the examples I have given of large species expired, expiring, or apparently doomed to expire, before many generations

have passed away, are numerically insignificant when compared with the multitude of insect races that are gradually disappearing from the surface of the earth. Every writer on geographical Zoology contributes his quota of information on this deeply interesting subject, although in no instance, so far as my reading has extended, has the knowledge of this fact been rendered available for advancing a comprehensive theory. I will quote only one: Mr. Wollaston, after speaking of a group of insects which infest the Euphorbiæ of the Atlantic Archipelago, and describing them as "without a parallel, both as regards the number of the individuals by which they are severally represented and the greater or less eccentricity of their structure," goes on to assert that "the quaint and grotesque shrubs on which this esoteric assemblage depends for subsistence, are becoming gradually exterminated." He continues: "True it is that the process of annihilation is extremely slow; yet, year after year sees portions of the rocky declivities brought into rude cultivation, whilst the constant search which is made after the dead plants for fuel still further operates to direct the axe of the destroyer. Here then we have an unmistakable fact, and one over which it is worth while to pause—not of a single species, but of a *whole fauna* surely dying out before circumstances which were adverse to its continuance. * * * In two of the islands, Lanzarote and Fuerteventura, *Euphorbia canariensis* seems to have already gone; and what is the consequence? Simply that not one of the numerous species which characterize that plant appears to have adapted itself even to the other Euphorbians. And if this be the case, can we wonder that the extinction of the latter should result in the complete disappearance and for ever of their entire fauna?" Probably in reference to the hypothesis of evolution hereafter briefly noticed, Mr. Wollaston remarks, "In vain do we look around for anything like an adaptation to altered, and ever altering, conditions; and I will venture to affirm that no one instance can be produced throughout this noble fauna, in which the slightest tendency is shown by even a single species to accommodate itself to the change of circumstances, and to become modified accordingly." It may here be observed that the laurel fauna of the same interesting islands is as clearly on its way to extinction as that of the Euphorbiæ.

Thus we see that the number of species in the world of animals is decreasing year by year, month by month, and probably day by day.

From these instances we gather the following conclusions:—

1st. That in limited districts, such as Britain, species—as the wolf—formerly abundant have been entirely exterminated; that in districts less limited, as Europe, the number of individuals constituting a species—as the aurochs—is rapidly diminishing.

2nd. That within the historic period large species—as the dodo—have been utterly exterminated, swept from the face of the earth, and that others—as the cassowary—are now tottering over their graves.

3rd. That man, generally the Caucasian, especially the Anglo-Saxon, has been the great agent in this destruction.

EDWARD NEWMAN.

(To be continued.)

On the Habits of a Tipulideous Larva. By EDW. D. COPE.

(From the 'Proceedings of the Academy of Natural Sciences of Philadelphia,' 1867, p. 222.)

THERE has been known in Europe for many years a small white larva, which is called the army worm, which gathers itself into large bodies forming streams of several feet in length. These bodies move forward at a slow rate, and appear to be a form of migration which the species adopts for some purpose unknown. Their superficial resemblance to a sluggish serpent usually excites repugnance in the minds of many observers. It has been found that these larvæ are those of different species of the flies of the genus *Sciara*, which belongs to the *Mycetophilidæ*, which was formerly regarded as a group of the great family *Tipulidæ*, or the crane-flies.

Of this genus Osten Sacken* says:—"All the larvæ of the *Mycetophilidæ* are gregarious, and live among decaying vegetable matters. * * *Sciara* is found among decaying leaves in vegetable mould, in cow-dung, under the bark of dead trees, &c. * * They may be distinguished from the larvæ of *Mycetophila* by their greater delicacy, and by the structure of the trophi; most of them seem to have no bristles or spines on the locomotive processes on the under side of the body, whereas the majority of the *Mycetophilæ* have them.

* Who has described the larvæ, and given the bibliography of the European species (*Proc. Entom. Soc. Phila.* 1854, pp. 163—170). I am indebted to this excellent entomologist for the identification of larvæ from Westtown, sent him, and for reference to the above essay.

They are even more gregarious than the other larvæ of this family, and have the singular propensity of sticking together in dense patches, in which situation they are frequently found, for instance, under the bark of trees. It is probably to the same propensity that the phenomenon known in Germany under the name of army worm (heerwurm), is due. This is a procession of larvæ, sometimes from twelve to fourteen feet long, and two or three inches broad, consisting of numberless specimens, sticking closely together, and forming a layer of about half an inch in thickness. Such processions have been often observed in woods in Germany, Sweden and Russia, but never sufficiently investigated to explain their object. That the larvæ do not migrate in search of food, we can infer from the fact that they appear to be full grown when they form these processions.

Prof. Berthold, of the University of Göttingen, gives a more detailed account of this larva,* as follows:—

“Mr. Berthold imparted, on the 17th of December, 1853, to the Royal Society of Sciences, a zoological examination of the heerwurm (army worm), which in certain years in the forests of Thuringia, Hanover, Sweden and Norway, moves like a snake several feet long, four to six inches broad, and thumb thick, which consists of myriads of small dipterous larvæ, four to five lines long. Eight years ago (Reports from the G. A. University and the Royal Society of Sciences at Göttingen, 1845, No. 5), he stated that the *Tipula* which was observed by the forest keeper, Mr. Raude, at Birkenmoor, was the Thomastrauer gnat (*Sciara Thomæ*), and was the means of solving a problem, which has been for hundreds of years a returning stimulus of bigotry and fear for the peasants, and for zoologists a point of earnest consideration. But when he obtained last summer from the Eilenriede, near Hanover, more new heerwurm larvæ, and Mr. L. Bechstein bred some flies out of the larvæ of a heerwurm, it gave him occasion to institute further examinations.

“The desire for association and migration cannot be compared with the migrations of all other insects and animals; for this is not done to procure nourishment, because the maggots are in such great quantity above each other, that but few would have a chance to reach the food. Also, the maggots do not show the desire for travelling immediately after leaving the egg, like many other insects, but the movement commences when the worm is grown, and not less than three lines

* Nachrichten Univ. Göttingen, 1854, p. 1.

long. From this it would appear to have some connection with the entrance into the pupa state.

“Their metamorphosis is known; it takes place in earth, in roots of plants, under rotten logs, or in swamps. Such moist localities are selected by the heerwurm larvæ after they have come to a certain age, and the time of pupa change has arrived, which is known by the desire for association.

“The mucus which keeps the maggots together is a product of the salivary gland in *Sciara ingenua*, and almost all other dipterous larvæ which have a head, and which make a fine cocoon. The formation of pupæ of the heerwurm takes place surrounded by this mucous saliva. The heerwurm can be regarded as a collection of larvæ, for the purpose of mutual transformation; that is, it is accomplished through mutual protection as a period favorable to development. This connection is given up before the formation of nymphs really arrives, the individuals separating, from time to time, in search of food. When now the larvæ of large divisions of Diptera, as the Pupipares, Notacanthes, &c., have the peculiarity of changing their own skin into a cover, which is the grave of the larva and the cradle for the pupa; and the larvæ of another division of the Diptera, as the Tanystomes and the Nemoceres, before changing, strip off their cover, and are transformed free or in a cocoon, so the *Sciara Thomæ* presents a process intermediate between these, as the construction of the cocoon is not performed within the skin of the larva itself, but in a cavity which is made of the skins of numbers of other larvæ.”

There appears, however, to have been no record of the observation of this peculiar habit of larvæ in North America, up to within a short time. The genus is known to exist here, and Osten Sacken (*l. c.*) describes a species which he calls *Sciara toxoneura*. Hence the following account, which I have received from my friend William Kite, teacher at Westtown School, in Chester county, Pa., is of considerable interest. The statements are those of a careful naturalist, well acquainted with the field and field study. Before quoting it, it must be noted that another account of the same phenomenon was published in ‘The Friend’ journal (Philada., 1864), by Charles Potts, another teacher in the same excellent institution. Some statements of this writer need correction, as farther observation convinced him: *e. g.* that they could climb.

The following are observations of Wm. Kite:—

“On the morning of Ninth Month, 11th, 1866, a company of worms

was observed crossing the brick walk, or passage, east of Westtown School: the mass presented much the appearance of a thin grey snake. This is the third year that these worms have been seen about our grounds.

“This company extended over a length of about twenty-two inches, with a breadth of from three-quarters of an inch in the thickest part, to about one-eighth of an inch at the head, and one-tenth at the tail; five or six worms deep in thicker parts. The mode of progression of these singular creatures was by the contraction of an annulus at a time. They had distinct heads, and the motion of each was like that observed in caterpillars rather than that seen in earth-worms. The contraction commenced posteriorly, and was passed forward to the head in the successive rings.

“They advanced at the rate of four inches in five minutes, the hinder ones working their way over the top of the rest. Those who reached the ground or bricks by thus traversing their comrades' backs seemed unable to proceed, so that their progression naturally assumed the singular shape that drew our attention to them. Occasionally a few would diverge from the mass, near the front, forming another head, as it were; but they would soon return to the general company by crawling back over each other.

“This observation was also made on the procession which appeared in 1864; *i. e.* that the hinder ones progressed over the bodies of those that preceded, the whole mass thus taking up in the rear and laying down in front.” [This is a much more rational explanation of their progress than has been offered; we having been left to suppose that the lower stratum of larvæ carry the general mass.—*E. D. C.*]

“To arrive at an idea of their numbers, about half an inch of them were lifted out of their ranks on the point of a knife; of these ninety-five adhered to it, giving say two-hundred to the inch, or, by rough estimation, 2400 in the party.

“They were about half an inch long, semi-transparent, with black heads; their alimentary canals were clearly distinguishable by the unaided eye; the colour of their contents would lead to the supposition that their food resembled that of the earth-worm. They crossed the brick path, conforming to one general direction, but varying to suit the inequalities of the walk. On reaching the grass they immediately buried themselves in the ground. This was observed to happen with a company which was seen here a year or two ago.”

“Seventh mo. 1, 1867. A large company of the ‘snake worms’ attempted to cross a gravel walk in the yard this morning, but became entangled in the sand, which adhered to their bodies and seemed to bewilder them. School duties interfered with watching them, but I anticipated their perishing in the sand. They had managed to keep together when I saw them, after having crawled through three or four feet of sandy gravel, and may have eventually escaped. The most noticeable fact in regard to them was the presence among them, travelling with and over them, of a full-grown maggot of a fly! It was very lively, diving into the mass and emerging again, as though quite at home. How did it get there? and why did it associate with them? Was it hatched among them? Their course was about N.W.”

“Seventh mo. 5, 1867. A small company of *those worms* again on the gravel walk, within a few feet of the same place as on the 1st inst. As they were going in an opposite direction from those on the 1st, they may be the same company. There were several many-footed worms, about an inch long, accompanying them; these were engaged in pulling worms out of the procession and devouring them. On both occasions the companies were noticed early in the morning, as though they commenced moving in the night. Their course was about S.”

“Seventh mo. 8, 1867. A much larger company of these worms were on the brick walk. They had nearly crossed the walk before 7 A. M., showing they commenced moving early in the morning. They appeared unusually lively. Upon careful examination, we found the train extending back into the grass eighteen inches to a cluster of them which appeared to be issuing out of the ground. They moved on the surface of the ground, winding among the grass to avoid the stems. This disproves our former supposition that they emerged to avoid some obstruction. We were necessarily called off, and on our return the traces of them were lost. Some ants and one small worm seemed engaged in eating them; the worms apparently appreciated their danger, shrinking from the touch of these animals. This procession measured six feet six inches. Occasionally one would be left on the ground after the train had passed, but most of them kept with the general mass. Their course was about N.W.”

“Seventh mo. 9, 1867. Two more small companies of these worms appeared, apparently the remains of the large party of yesterday. Each company was short of a foot in length, and was accompanied by quite a number of the worms noticed before with them. I caught

and preserved a number of these; they resemble the worms found in cured meat, or similar ones found in many garden vegetables. Their connection with the emigrant parties seems to be that of enemies, preying on them. Course N.W.”

“Seventh mo. 15, 1867. 7 o'clock.—A cool morning. Found a small company of these worms on the brick walk near the office. Some passer had trodden on them, and they were thrown into confusion: added to this, a colony of ants had intercepted their course, and carried them off in numbers. They were massed in a crowd, and their efforts to move on were defeated by the ants seizing their leaders at each attempt to move. 8.30.—The perseverance of the ants in carrying away the worms seems to demoralize them entirely, and finally two bricks being placed to protect them from passers' feet, the greater portion of them crept under one of them and huddled together in a confused mass, where they became an easy prey to their indefatigable little enemies, who were to be seen through the morning marching off with their captives, though much larger than themselves. 10 o'clock.—All gone. Course, so far as they were permitted to go, N.W.”

The “many-footed worms” which devoured the *Sciara* larvæ were larvæ of some species of the Coleopterous family Staphylinidæ. Several specimens were sent with the *Sciara*.

I am also informed that a procession of this species has been seen on Quaker Hill, in the borough of West Chester. Dr. Benj. H. Coates informs me that he has seen their trains in Hunterdon county, N. J., and T. A. Conrad saw them some years ago in his garden in Burlington, in the same State.

On inquiry of my friend Jacob Stauffer, of Lancaster, whose MS. notes on the species of insects of his region, and their habits, are numerous, I received the following additions to our stock of knowledge of the habits of the larva of the *Sciara*:—

“On the 10th of August, 1865, Mr. Rathvon and myself were informed by Dr. Geo. M'Calla that we would be interested by examining an army of small shining worms on the march in the yard of Col. D. Patterson, in W. King-street, Lancaster.

“On our arrival we found the order of march thrown into great confusion by boiling water, which the women had poured along the line. I collected quite a number of stragglers from the main army thus routed, as did also friend Rathvon. These I subjected to a close examination under a strong magnifying power. My notes read thus: ‘A portion, about two feet in length, looked like a shining cord, not

uniform in outline, yet compact. These larvæ were about half an inch long mostly, perhaps three-eighths of an inch, and seven-sixteenths and one-thirty-second parts of an inch in diameter. Their heads of a glossy jet-black colour, as also the anterior edge of the first joint of segment: rest of the first, and the second and third joints of a translucent milky white, dorsally watery, with an interior wavy, brownish, intestinal canal, visible through the transparent skin; there is also a lateral tinge or bronze-yellow; otherwise of a shining, water-and-milk-like colour. I could observe no pectoral or anal legs; they moved by contracting and extending the segments of their body (twelve in number) alternately, like that of a dipterous larva of Tipulidæ. In motion the convolutions of the intestinal canal were very apparent. They seemed to interlace with each other, but, having been disturbed, I cannot venture to say whether after any precise order, or by simple conglomeration as chance may demand. When first seen they were moving in a broad columnar mass, rope-like, seeming like a shining guard-chain cord, of considerable thickness and quite ornamental, like jet beads mixed in with pearly white beads in motion.'

The following is a copy from a letter by Prof. W. S. Roedel, Wytheville, Virginia, Aug. 4, 1865, in his own words:—

“On Saturday, July 15, 1865, at North Lebanon, Pa., I observed in a path at the foot of a hill, what I at first glance supposed to be the cast-off skin of a serpent, which the object resembled in colour and general appearance, but what, upon close inspection, I found to be a multitude of caterpillars, a half-inch in length and one-thirty-second part of an inch in diameter; head of a dull red or brownish colour; bodies smooth and somewhat glistening.

“These worms moved upon one another, piled upon and irregularly interwoven among each other like a flattened rope. The head of the column was much broader than the rest, being two inches wide, from which dimension the column gradually tapered (to a point, I suppose, for I did not see the end of it). The length of the column was four feet to a fence, beyond which I did not examine it.

“A portion of the column lay in the grass, through which it moved without interruption, as if it had been a solid mass. The rate of motion was extremely slow, not exceeding one-eighth of an inch in a minute. The colour of the mass was as much like a rope of tow which has been exposed to the weather as anything I can think of; it might be called a rusty gray. The column was not cylindrical—that is, a cross section would be elliptical.”

The 'Springfield (Mass.) Republican' of August, 1865, gives an account of a "reptile" found at Lee. "It was nearly four feet in length, about the size of a man's finger, and shaped like a whip-lash; and on close examination the whole body was found to be composed of small worms about half an inch in length, with large black heads, and semi-transparent body. On separating them into fragments, they would immediately re-form into a snake shape, and crawl slowly off. One or two similar snakes have recently been seen in that vicinity." This was copied into the 'Lancaster Evening Express' of Saturday, August 12, 1865.

Remarks on the Birds of Ailsa Craig.

By THEODORE C. WALKER, Esq.

IN June, 1866, having obtained permission to visit Ailsa Craig, I proceeded to Girvan, from whence I took a sailing-boat across to the Craig, which lies opposite the harbour, eleven or twelve miles out, in the Firth of Clyde. The huge dome-shaped rock rises to the height of more than 1100 feet: it is precipitous on all sides except on the east, where, on a triangular delta of shingle and rock, a house is built for the accommodation of the cragsmen and keeper, who net the sea-fowl, for the sake of whose feathers the Craig is rented from the Marquis of Ailsa. In winter there is a man always employed in cutting curling-stones. Having taken notes at the time, perhaps an abridgment of them may not prove uninteresting to the readers of the 'Zoologist.'

Gannet.—The gannet or Solan goose breeds in great numbers on the south-west of Ailsa. Their breeding-place is mostly confined to a small bay or amphitheatre of rock rising precipitously from the sea. When I first saw the "gant's city," as the cragsmen call their haunts, the period of incubation was at its height: it was about the 20th of June. After clambering over masses of rock and threading an imperceptible path like the track of a wild goat, I follow the climber as he leads the way to the west side of Ailsa. Our way led along the "Barr Head," or edge of the precipice: on one side the slope of the craig rises steep as the roof of a house, and on the other is the precipice, in some places overhanging the beach. The myriad voices of the gannets are heard long before their haunts are reached: cautiously clambering to the edge of the precipice, what a sight is displayed! A huge amphitheatre of basaltic columns ranged all up the side in the most

perfect order round a lovely little bay, the top of each column being broken off, and each supporting the nest of a gannet with the adult bird sitting. A superb sight it is to see hundreds of the snow-white birds sitting on their nests, from close to your feet down the whole side of the rock to the water's edge, and to hear their discordant and deafening cries, till one is almost bewildered. At our approach the nearest gannets fly off their nests, but keeping close round and uttering their guttural cackle. Alarmed at our continued shouting the whole legion of birds leave their ledges and whirl round and round thick as snow-flakes in the winter wind, until one's eyes are almost dazed with their flight, and one is fain obliged to retreat from the edge of the precipice. They gradually settle down again, and in the calm and lovely evening, it is an interesting sight to watch their mates flying from afar across the deep blue sea, their long black-tipped white wings glancing in the setting sun, as they near the craig, when, wheeling in the air, they perch beside their mates, who welcome them with a satisfied cackle, which changes to a choking gulp as they swallow the fish which their partners have disgorged. And to see them from on high plunge, with the speed of thought, into the blue-green sea beneath, dashing up the spray as they dive after their finny prey! With what force they descend, and how marvellously their bodies are adapted for the plunge! Many of the gannets have built their nests on the verge of the precipices, and some a few feet down on the tops of the octagonal columns, and cautiously stepping down I examine their nests: they are of large size and mostly made of coarse campion-stalks, fern-leaves, sea-weed, &c., lined with finer grass and weed, and in each one large egg, which, being nearly the end of the hatching-season, are soiled and much pecked at. In a few nests further down I observe several newly-hatched wee gannets, totally black, with a downy powder like the germs of feathers. In several eggs the young are squeaking through the holes which the parent bird has chipped. I break the shell and liberate several astonished youngsters, much to the discomfiture of the old folks, who hover round cackling most ferociously. The young when just hatched have a curious look, little black imps with a big head, fat body and tiny webbed feet sprawling about the nest. They are perfectly bald, about four inches long, and very lively. The gannets here are much wilder than those at the Bass, where they allow themselves to be approached and even handled; but woe betide the hand that is gripped! they bite to the bone. A long time we linger by the haunts of the gannets, watching

the birds return from their foraging expedition and disgorging their prey at the nest.

Kittiwake Gull.—The kittiwake gull breeds in great numbers all round the precipitous sides of Ailsa, the ledges and slabs of the columnar rock affording unusual facilities. They generally select the highest parts of the cliffs, as being more inaccessible and less liable to intrusion. The nests to which I scaled on the cliffs were very difficult of access, clinging to the rocks high overhead; but a good opportunity occurred when the cragsman offered to show me a breeding-place that could be easily scaled. After passing the ruins of the castle and keeping in the hollow, where the bracken fern grows luxuriantly, we come to a gully, down which in wet weather a streamlet trickles; here I am shown some ledges on which are eighteen or twenty nests. I take off my boots and jacket and cautiously creep along the verge of the precipice and along the ledges which overhang the sea. The kittiwakes, alarmed at my approach, leave their nests and fly around me, boldly dashing close to my face, so that I can feel the fan of their wings, crying their mournful “kittiwake, kittiwake.” Their nest is composed of a layer of mud at the base, on which is laid a thick matting of dry campion-stalks (*Silene maritima*), and lined with shreds of grass and sea-weed. They do not build a fresh nest every year, but partly demolish the old one, and add fresh dry weed, &c., so that some nests are much thicker and deeper than others. They plaster the foundation to the rock with wet mud, for which purpose one very frequently sees them hovering over a dripping spring which trickles down the cliffs at the back of the house. They seem rather various in the time of laying, for in some nests the young are just hatched, while in others only the first egg is laid, and I saw one nest in the process of building. The eggs vary greatly in colour and markings, from a creamy blue speckled with slaty brown, varying in every shade of brown to a rich deep umber, clouded with darker blotches. Their number varies also: of the many nests which I visited in different parts of the cliffs, four was the prevailing number; some had but three, others five, but six is the greatest number of eggs I have ever seen in one nest. The young when newly hatched, until they are fledged are mottled with darker brown like the eggs: this is a curious feature in all the gull tribe from the blackheaded to the great blackbacked, that the young are always brown mottled with darker shade. The delicate tints and gentle manners of this handsome gull remind one of a dove. Breeding on the inaccessible cliffs and

not so much given to perching on the rocks, and being more timorous and cautious birds, they are seldom caught in the nets like the puffins, razorbills and guillemots. Their eggs seem to be considered great delicacies by the cragsmen, as the heap of egg-shells behind the house testifies; but the flavour I cannot vouch for, as the eggs I saw were all "clocked" or addled.

Puffin.—The puffin seems the most numerous of the birds which frequent Ailsa Craig: it breeds everywhere all up the sides of the precipice where a patch of soil is found in which it can burrow, as it always prefers to burrow in soil to laying its egg in the crannies of rock. Wherever a tuft of campion blooms there it makes its burrow, at the extremity of which it lays its single egg, of dull white ingrained in the shell or clouded with very light drab. The eggs vary very little in markings, with the exception of being lighter or darker, but the form of those I saw varied a good deal. The "patie," as the cragsmen call the puffin, breeds not only about the cliffs, but all over the dome of the craig to its very summit. Wherever a heap of stones occur there is sure to be the burrow of the puffin, with two or three demure little puffins sitting on the stones looking at you; they allow themselves to be approached very closely, and then by a rapid motion of the wings dart down and plunge into the sea. A very pretty sight it is to see them sitting on a gray stone surrounded with the pure white blooming bladder campion and rich green of the bracken fern: their pretty orange feet contrasts with the green, and their short wings and curious beak look very grotesque. They often use a rabbit-burrow to lay their eggs in, instead of excavating one for themselves, but woe to the ungloved hand that is put into their burrow when the puffin is at home! their neb meets in the flesh, and they hold on, and will not let go, as my hands can testify.

Razorbill Auk and Guillemot.—The three rock-birds, razorbill auk, guillemot and puffin, or, in the craig phraseology, "strannie," "cock" and "patie," are the most numerous birds which breed on Ailsa, and it is for their feathers that the craig is rented. As they all breed on the precipices and *débris* of rock they are easily captured with nets, traps, poles, &c., owing to their habit of perching on the rocks and cairns of stone. The razorbills and guillemots are caught in great quantities with large meshed nets, not unlike herring-nets, spread over the rocks. Being eager to obtain a few specimens of birds and also to see their breeding-haunts, I follow the climber one morning as he trudges along the path through the chaos of stones, on which raised beach of

boulders the house is built. Our path lay up a steep track among huge fallen masses of rock many tons in weight. Arriving at the stunted elder bushes, which are the only trees which grow on the Craig, we take off coats, jackets and boots, and all superfluous clothing, and strapping a vasculum tightly on my back, I am ready to proceed. The morning mist is just rising from the summit of the Craig, and the sun shines bright and clear, and the sea, without a ripple, lies sleeping in the sunlight. The birds far above us are wheeling round, and every moment arriving from out at sea, flickering like ethereal spirits in the glowing light. Eager to explore the crags above I keep close behind the cragsman as he leads the way, clambering over huge fallen rocks, leaping from crag to crag, now cautiously creeping along narrow ledges overhanging the sea, carefully avoiding all loose masses, till we gain a considerable elevation; but only puffins as yet breed here, and on every patch of earth between the rocks a demure wee "patie" sits, which as we approach flies, or rather darts, downwards with a swift flickering of its wings, and plunges into the sea. After resting a minute the climber takes a different path, while he points out to me the way to reach a net above. I scrape my stockings into the earth to prevent slipping on the sharp rocks, and clamber up, and aided by a cool head and careful step, I near the net. Three or four razorbills are struggling violently as I approach, and groaning with their peculiar note: I seize hold of an unfortunate "patie," and it seizes hold of me, giving a severe bite. I set to work to extricate the razorbills, but have great difficulty in taking hold of them, as they seem all mouth, biting most savagely and holding on grimly. I obtain two very fair specimens and kill them, tie them together ready for the climber to carry down, and have time to survey the scene. A sublime yet awfully grand spot! High above me the dizzy precipice frowns with grim crags and huge rocks that have fallen from the heights above, blocking up the path—all wild, barren and grim, with scarce a patch of soil. Hundreds of kittiwakes have built their neat little nests to the rocks, and are flying about me and arriving from the sea, and wheeling far overhead: on every crag, or cranny, or jumble of rock, a solemn razorbill or guillemot sits, anon darting downwards into the sea, where, in the glassy green sea below, they are floating in chains or circles, or diving and gambolling and splashing the water over their backs in sport. The net is just stretched over the rocks and held in its place by blocks of rock, which with a very slight touch

could be sent crashing down the precipice: I have to use great caution in not displacing them, as a stumble against the meshes of the net would send the whole lot down. The birds, as they perch on the rock or come down to their eggs in the crannies, get entangled in the net, and in struggling they only get held the faster, some of them getting entangled and doubled up in a remarkable manner. But far below me I see the climber, after resetting several nets, tie the birds together and pitch them down, when they fall into the sea with a great splash and remain floating about. I have leisure to examine the haunts of the rock-birds while I wait for the climber. I climb higher up the rocks, to a place where the razorbills are sitting close together. They allow me to approach almost within arm's length, and then dart down into the sea. They lay their single egg on the bare rock, without a vestige of a nest, generally laying in a crack or fissure of the rock, where their eggs are screened from the observation of the great blackbacked and lesser blackbacked gulls, which, as the cragsmen tell me, devour their eggs. I scramble to a huge mass of rock against which other masses have fallen, and in the fissures I find lots of richly-marked eggs. The egg of the razorbill is not unlike that of the guillemot, only blunter at the thin end, and the ground colour is generally white or dull light cream or brown, speckled, often very richly, with red and brown. The eggs which abound on Ailsa are more richly marked and speckled with minute spots than specimens I obtained at Flamborough Head and Bempton, where they had generally a white ground, sparingly speckled with dark brown. The shell is extremely thick. The climber now coming up, we shoulder the bunches of birds and proceed along the rocks to several more nets, carefully avoiding the loose masses of rock, and leaping from rock to rock. We kill the birds by wringing their necks; we tie them in bunches, and, where we can, pitch them into the sea or down on the beach beneath. Here the birds are in great quantities, and the noise they make is terrible; the deep baying of the guillemots, the groaning of the razorbills, as we approach, and the wail of the kittiwakes, make a horrible clamour, enough to make one's blood run cold to hear them. The eye is almost dazzled by the multitude of flickering wings, and as I look down I am almost tempted to throw myself over into the bright sea. Taking a wee pull at the whiskey-flask I feel better, and while the climber is busy with the birds, I climb to the guillemot's roosts and see their breeding-places. The guillemot prefers to lay apart from the razorbills, but I have several

times found their eggs close together. They are not so much given to laying their eggs in the crannies; they lay on the bare rock, sometimes on ledges two inches wide, where, owing to their pear-shaped form, they turn round instead of rolling off when the bird gets off its perch. The bright colours of the beautiful eggs look very pretty on the gray rocks; they are of all colours, from deep green to pale sea-green, from pure white to light blue, and of all kinds of marking, zigzag lines and blotches and spots and speckles and specks. After examining their breeding-places we prepare to descend, which is by far the most difficult task, owing to the smoothness of the rocks, rendered slippery by the excrement of the birds. With great care I follow the climber, and clamber down the precipice; one false step and one would be dashed to pieces on the beach below. The only place where I have a difficulty is crossing a sort of chasm with slippery rocks on each side: I leap and throw myself on the rock on the other side in safety, and a few more cool and cautious steps bring us to the bottom, which I am thankful to reach safely. Donning coat and boots, &c., we each shoulder a bunch of sixteen or eighteen birds and trudge along to the house, leaving the rest to be brought round in the boat. The birds are spread out in the empty room of the house, ready to be conveyed to Girvan, Ballantrae and other places to be plucked. I observed on the ledges many ringed guillemots breeding promiscuously with the common guillemot: the proportion seems about twelve common to one of the ringed.

Lesser Blackbacked Gull.—The lesser blackbacked gull breeds on the dome of Ailsa among the bracken fern and campion-leaves: their eggs are very difficult to distinguish except one sees the bird leave the nest. On their haunts being approached they leave the nest, and sitting on the rocks watch whether they are observed. They are more shy than the rock-birds, as their nests are placed in more exposed situations. Their nests are difficult to find; they are generally made at the foot of a rock or stone, in a slight depression in the ground, and lined with leaves and dry grass, and generally contain three eggs of a stone-brown, speckled and blotched with darker brown. The young when first hatched are very like those of the kittiwake, only considerably larger. When the young are hatched the parent gulls are more daring. On approaching a nest with two young gulls in it, I handled one rather roughly, so as to make it squeak, on which the old gull soared to a great height and dashed down close to my head, rising again in a graceful curve, and swooping

down almost touched my cap; the rustling of its feathers and its cry were clearly meant to intimidate me. I stood admiring it for a considerable time as it swooped down, and, altering the angle of its wings, was as quickly borne aloft, and wheeled round again without even flapping its wings. The cragsmen tell me that they sometimes venture to strike a man if he meddles with their young; they also say that they devour the eggs of the guillemot and kittiwake, brushing them off the ledges and feeding on the tempting morsels "like a christian." They keep their breeding-places remarkably clean, unlike the rock-birds, which defile the rocks on which they perch, and one may see them sitting on the rocks basking in the sunlight for hours while preening their feathers. They did not appear to feed in the immediate neighbourhood of Ailsa, but to bring their food from long distances, following the shoals of herrings, sprats, &c., and often seizing their food from the surface of the water without settling.

Herring Gull.—The herring gull also breeds among the bracken ferns, &c., on the terraces above the precipice where the Craig rises in a dome shape, intersected by irregular terraces. The herring gull is seemingly a very suspicious bird, directly an intruder approaches flying to meet him, and soaring overhead cackles and croaks, disturbing all the birds that are near. When one is stalking a bird or watching, this provoking gull will come soaring above and putting the birds on their guard. The eggs of this gull are very difficult to distinguish from those of the lesser blackbacked gull: they are on the whole rather larger, but the eggs of all the gulls vary so much in size and colour that the only safe plan is to identify the birds on the nest, which is not an easy matter to do with this wary and suspicious bird. I forgot to notice the proportion of lesser blackbacked to herring gulls, but I believe the latter predominate. The cragsmen tell me this bird is very much given to eating the eggs of the kittiwake, but I did not observe it myself. The nest of this gull is placed at the foot of a stone or rock, from which its mate keeps watch when near. It is a shallow structure, formed of half-dried campion-stalks. The bracken fern, hyacinth and bladder campion are the common plants on the Craig: in summer the flowers of the bladder campion give the dome of Ailsa a beautiful white colour, like a carpet of snow. The mate of the sitting bird often takes its stand on the rock above the nest when unoccupied, and, while one is yet some distance off, soars aloft with its mate, circling round one and uttering its cry, and occasionally swooping down. The herring and lesser blackbacked gulls would

seem by this to prefer nesting on islands and flat ground to the precipices, when they have a choice: I did not observe one nesting on the precipices. The larger gulls, being wary, are not often caught: occasionally one is caught in the steel traps set for the puffins, but they are not sought for their feathers. I did not observe any immature gulls of any kind whatever at Ailsa Craig.

Great Blackbacked Gull.—A few pairs nestle on the upper part of the Craig, in similar situations to the two last mentioned. I did not observe either the common or blackheaded gulls: the locality is not suitable for their breeding haunts.

Peregrine Falcon.—I was told that a pair annually nest on an inaccessible ledge on the highest precipice of Ailsa, called, if I mistake not, "Ashy-doo," but I did not observe them during my last visit.

Raven.—Several pairs of ravens nest on the inaccessible ledges, finding abundance of food in the dead sea-fowl, &c.

Grouse.—A weathered egg in the yelk was brought to me by the cragsman: it was found by itself on the turf near the summit of the Craig, showing that grouse sometimes fly across from Ayrshire, but there being no heather they do not stay.

Shag.—Three or four pairs nest on the ledges of the highest precipice: their favourite fishing station is a flat rock at its foot called the "Scart Rock." The shags were formerly more abundant than now.

Stormy Petrel.—Fellow-members of the Glasgow Natural History Society have told me that they have found this petrel under the huge fallen masses of rock on the shore, and have also observed them in the evening flying about at sea.

The above list is far from being perfect, a great number of birds nesting and frequenting the Craig which I have not enumerated, besides occasional visitors; but the above is the substance of notes written at the time, and I hope at some future period to be able to give a further list.

THEODORE C. WALKER.

Woodside, Leicester.

Bos scoticus.—Seeing Mr. Alston's account of these cattle at Cadzow (Zool. S. S. 669), I inquired of my friend Mr. J. M——, late of Chartley Hall, concerning these cattle in the park at Chartley. He informed me that during several seasons they had not bred, owing to the superabundance of bulls; and having introduced

some heifers into the park the calves produced were in colour like the bull, having black hoofs, mouth, &c., and could scarcely be distinguished from *Bos scoticus*, thus showing the strong native blood; but this may not hold good in all cases. The herd always kept exclusively apart from the tame heifers, and since their introduction were tamer: the cattle previously were very wild. A keeper going to tend an aged cow which was dying, she turned upon him and threw him down, but managing to extricate himself he took to flight just in time to save himself from the infuriated herd, as the bellowing of the cow brought them around her. He described them to me as being larger and finer than those at Chillingham.—*Theodore C. Walker; Woodside, Leicester.*

Malabar Superstition respecting the Liver of the Tiger.—In the 'Zoologist' (Zool. S. S. 1217 and 1253) I have called attention to some curious local superstitions respecting the livers of the otter, the bear and the wild boar. I have just met with an instance of a similar idea as to the tiger, which obtains amongst the natives of the Malabar State of Cochin, and is recorded in the following words in Mr. Francis Day's interesting work, 'The Land of the Permauls,' p. 440:—"Natives assert that a new lobe grows on to the liver of a tiger every year it lives, and therefore by an examination of that organ the animal's age can be accurately ascertained." It seems very singular that this opinion should be so widely spread, and applied to four such very different animals as those above mentioned.—*J. H. Gurney; Marlton, Totnes, August 24, 1868.*

Honey Buzzard at Yarm.—I had a very fine female specimen of the honey buzzard sent to me in May: it was obtained in this neighbourhood, where I have known a specimen to occur before.—*William Lister, jun.; Glaisdale, Yarm, Yorkshire, July 27, 1868.*

Note on Montagu's Harriers, old and young, obtained in Cornwall.—In examining two specimens of this year's Montagu's harrier (male and female) which were shot this week with the parent birds, on the property of Mr. M. Henry Williams, near Michell, in this county, I observe the plumage of the two birds agrees, with the exception of a darker tone of colour along the mesial line of the feathers of the breast and belly of the male: in other respects the colour of the under parts in both specimens exhibits a uniform light bay-brown colour, and the upper plumage dark umber-brown, with the feathers more or less deeply bordered with rufous-yellow: the male and female parent birds were sent with these specimens; the former apparently a two-year old bird, the gray slate plumage gradually cropping out with the rust-coloured drop-like streaks on the flanks.—*Edward Hearle Rodd.*

Snowy Owls in Shetland.—Dr. Saxby has sent me three magnificent snowy owls from Shetland this year: their skins are still soft and pliant.—*J. H. Gurney, jun.*

Sedge Warbler in Dry Places.—I have read with much interest Lord Clermont's note on the sedge warbler in dry places (Zool. S. S. 1342). It is, I think, not the sedge warbler, but the reed warbler or wren, or a closely allied species, which Lord Clermont has heard at Twickenham. I have resided here between seven and eight years, and every summer a pair or two of birds similar to those heard by Lord Clermont frequent and breed in my garden. They arrive about the middle of May and nest the middle of June. On the 19th of June, 1862, I took the nest, containing three eggs similar in colour to those of the reed warbler, and shot the parent birds: it was

built in a small cypress tree and attached to the twigs in a similar manner to that of the reed warbler to the stems of the reeds: the materials were rather different, and it was not so deep. The parent birds strongly resembled the reed warbler, but struck me as being taller on the leg, and altogether a longer and slenderer bird. I sent them without note or comment to Mr. Cook, the birdstuffer, at Derby, who is a very intelligent and observant man, and was for some years in Mr. Leadbeater's establishment. I at once received a letter from him, requesting me to tell him what species of warbler I considered the species to be, as he had never seen or stuffed any like them before. "I have stuffed," he said, "scores of reed warblers, but never any like these." As soon as Mr. Cook returned the case containing the birds and nest I took it to London, and showed them to my kind and excellent friend Mr. Gould. He examined them with much care and interest, but said he could not consider them to be anything but the reed warbler. He told me he had frequently taken the nest of this bird at some distance from water. Since then I have not thought much about the matter. Still I cannot but think that it is a matter deserving much closer study and investigation than have ever yet been bestowed upon it—whether we have not two closely allied species confounded under the name of reed warbler. There are two very interesting notes by Mr. Robert Mitford, of Hampstead (Zool. 9109 and 9847), which tend most strongly to confirm this suspicion, and I have often looked for something more on this interesting subject from Mr. Mitford's pen. My friend Dr. Bree, in his 'Birds of Europe not observed in the British Isles,' describes a closely-allied species, *Sylvia palustris*, *Bechstein*, in words which precisely tally with the observations made on the birds which frequent my garden. The male bird immediately took the place of the female on the nest when she had been shot. I believe, however, that it is a habit in several of the Sylviadæ for the male and female bird to sit alternately upon the eggs. I know that this is the case with the blackcap. During the breeding-season on warm nights the male bird of my warbler sings most sweetly the greater part of the night.—*H. Harpur Crewe; Rectory, Drayton-Beauchamp, Tring, August 7, 1868.*

English Sparrows in America.—I think the following newspaper paragraph will be interesting to some of the readers of the 'Zoologist':—"In the spring of 1866 four pairs of English sparrows came to the Union-square Park, New York, and there built. Three pairs occupied the trees, one ejected a wren from her little house, the only bird-house then in the square, and took possession; a fifth built in the ivy of Dr. Cheever's church, facing the square. The industry of these little fellows in devouring the measuring worm (so great a nuisance that most persons avoided passing through the park, preferring to go round during their occupancy; and so numerous were they that they did not leave a leaf on any tree except the *Ailanthus*) were such that boxes were provided on almost all the trees for them. They were very prolific, those hatched in the spring rearing a brood in the autumn, and the old pair rearing four or five broods. In one year they increased from five pairs to a flock of seventy, and they are now estimated at 600. Last summer a reward of one dollar a-head was offered for worms, but the birds had eaten the last one: they also ate moths, grasshoppers and many other insects. These birds have extended about forty miles in every direction. The estimate that they destroy in Europe one half-million bushels of grain was probably correct; but how much more or less would the insects they devour destroy? The question is, simply, which is the greater evil, worm or bird, and which most readily controlled." When I was in America, some few years since, I noticed in many

places, both in the States and in Canada, small wooden boxes, fancifully made to imitate churches, houses, &c., placed about; some in trees, on poles and in places where the little wren frequented, and it was strange how quickly a pair of these little birds would take possession and rear their young in one of these fancy abodes. These little birds are very strictly preserved in many parts of North America, and I am very glad to find that our common sparrow's services are likely to be better appreciated in America than they are in this country.—*Edward Sweetapple; Lydney, August 24, 1868.*

Common Crossbill in Surrey.—On Sunday, the 12th of July, my attention was directed to a fine male crossbill, one of a flock which had been observed during that and two previous days in the grounds of a relative. I watched the male feeding on the fir-cones for some time, and, as the flock were considered to be doing mischief, the order went forth for their execution. On the following day the gardener procured five, *viz.* the old male and female, two young males of last year, and one female of this year, which, from the strength of its bill, general size and stoutness, would appear to be a young parrot crossbill, supposing *Loxia pityopsittacus* a good species and not merely a variety of *L. curvirostra*.—[Signature omitted.]

Whitewinged Crossbill in the County Dublin.—If I have not met with the crossbill in Dublin for the last five years, I have this year made a more important addition to our Avifauna in its congener, the European whitewinged or two-barred crossbill of authors. This bird is apparently a female or young bird; it is dull brown, scarcely tinted with greenish yellow, having conspicuous white tips to the wing-coverts forming the two broad distinctive white bars across the wing. I have saved the bird beautifully, and preserved it in my collection.—*H. Blake-Knox.*

Crossbill at Wingham.—On the 27th of July I heard crossbills as I was walking in the grounds close to my house, and almost immediately I saw a splendid old male with a female on a Lebanon cedar some twenty yards from me. The male bird shone like scarlet coral in the sun, as he swayed to and fro on the extremities of the branches. They seemed restless, and soon went off to an old larch, which they left again, and I lost them. Having never before seen crossbills in the summer, I strongly suspected they had been breeding here. This morning I have just learned that some masons, who are at work about my house, picked up a young crossbill at the edge of a pond where they were mixing their mortar: the bird was covered with mud and half-drowned. It lived one day, and then died. It was seen by my gardener and also by my game-keeper, to whom the men showed it. I think this is conclusive as to the fact that the crossbill occasionally breeds in this country.—*W. Oxenden Hammond; St. Alban's Court, Wingham, Kent, August 8, 1868.*

PS.—A closer inquiry refutes the persuasion I felt that the crossbills had bred at my place. The bird caught (not *the pair*) was thrown away when it died; but I have seen the man who caught it, and he says it had red and green feathers. If I am right in thinking that no red feathers come till the first moult, it then was not a young bird, and my nesting theory fails. However, the presence of these birds in summer still would lead me to suspect that it bred.—*W. O. Hammond.*

Common Crossbill in Cornwall.—I believe I have mentioned the general distribution of the crossbill in the Land's End locality—extending, in fact, to the Scilly Isles. I find from correspondents that the eastern part of the county has had an immense immigration of this species, and from what I have seen and heard during the past

week the numbers appear to be steadily on the increase. I have received from Scilly for some weeks several specimens, and seven or eight specimens were brought over yesterday from the Abbey Gardens at Trescoe. I have seen no specimen in a vermilion state of red, but in those specimens where the colour of red prevailed at all there was generally a subdued dull tile-red tone clouded over with brown and bluish gray more or less. One of the specimens from Scilly yesterday was remarkable for its colouring; the upper tail-coverts were bright canary-yellow, and the rest of the body was intermixed with blotches of red, brown, gray and yellow. A very large proportion of the specimens which have come under my notice have been a dull brown, with an extra tone either of red, yellow or green on the upper tail-coverts.—*Edward Hearle Rodd; Penzance, July 29, 1868.*

Migration of Crossbills.—There appears no mention in the 'Field' of the migration of crossbills now taking place. The first notice I had of their arrival was hearing of the receipt of several specimens by Mr. Vingoe, of Penzance, from Scilly. This made me keep a sharp look-out in the eastern part of Cornwall, where the fir plantations on the edge of the moors would be a likely locality; and on the 18th of July I captured the first specimen, since which date their numbers have been steadily increasing, and there are now several parties of from six to fifteen individuals in all the different states of plumage. It has been nearly impossible, from the way they hide among the fir trees, to find them, except by listening early in the morning for their peculiar sharp note. There are two letters in the 'Standard' saying they have appeared in Gloucestershire and Tipperary; and it would seem that, contrary to what we should expect, the migration has taken place first in the west.—*Correspondent from Trebartha, in the 'Field.'*

Crossbill in Ireland in 1868.—I have had many reports of crossbills in the north-east of Ireland this year—the fruit of my last communication (Zool. S. S. 1133) on these birds breeding in Kildare; but unfortunately they were anonymous, and of course worthless, except to my own conscience. In no case was breeding mentioned. Irrespective of these communications, I have seen many birds from Templepatrick and various parts of Armagh and Downshire—perhaps forty in all. The most lamentable sight one could imagine was a bundle of twenty of these beautiful birds cruelly mangled: some were intense rose-pink, like the pine bullfinch—others duller red—others yellow and green, but all beautifully glossed; in some all the tints were blended, having a rainbow-like effect: all were adult birds—all quite worthless. In July I succeeded in saving three tolerable birds from a lot killed in Templepatrick: they are adult males in full plumage, but the dress is changing from rose-pink to yellow and copper—the pink, however, greatly predominating. This change of colour is not the effect of moult, but from the sun; it is common in all our pink glossy feathered birds, as the linnet, redpole, &c., which all turn from pink to yellow and copper-colour in the autumn; it is precursory to the autumn moult. The linnet, however, is often permanently golden on the breast. There can be no doubt that these crossbills bred in Ireland, and that in all likelihood it commonly breeds in this country.—*H. Blake-Knox; Belfast, July, 1868.*

Rosecoloured Pastor near Yarmouth.—Yesterday my nephew, Henry Harmer, shot in the garden of Mrs. Charles Brown, in Southtown (a suburb of this town), a female of this species. It was feeding under a mulberry tree, where it had been observed twice the day before. On being disturbed the first time it flew off with a mulberry in

its mouth. It is an adult female, in fair plumage, and very fat.—*Fielding Harmer; Great Yarmouth, August 12, 1868.—From the 'Field.'*

Roller near Carlisle.—A fine specimen of the female European roller (*Coracias garrula*, Linn.) was killed on the 17th of July last, at Carlatten, near Carlisle, and is now in my possession. It was in fine plumage, and is a very beautiful bird. The stomach when opened contained black beetles and caterpillars, some of which were alive.—*Samuel Watson; Solway Terrace, Carlisle.—Id.*

Scarcity of Hirundines.—I wish to record that I have never known so few of the two common species of swallows as this year.—*T. Bell; The Wakes, Selborne, Alton, Hants.*

Three Species of Columbidae breeding at Selborne.—Both last year and this three species of our Columbidae have nested in my park, the stock dove having selected a hole in a large pollard ash formerly occupied by owls.—*Id.*

Land's End Waders.—I have observed that we get very early visits of various migratorial species of sandpipers, *Tringæ*, &c., which go northward to breed, and as soon as the plumage of the young birds will admit of a lengthened flight we can generally calculate upon their visiting the southern and western shores and marshes of Cornwall, in most seasons about the second week in August. I observed the other day a specimen of the reeve, also an adult specimen of the green sandpiper, and a very finely plumaged specimen of the wood sandpiper, apparently a bird of this year, from the dorsal spots having a strong tinge of yellow, which in the adult bird are pure white. The early appearance of these birds seem to show that the uninterrupted fine summer weather we have had has favoured the early crops both in the animal as well as vegetable world.—*Edward Hearle Rodd.*

Bitterns in Ireland.—I doubt if Ireland was ever a great place for bitterns, turf-bogs being more numerous than fens, and fens being the habitat of the bittern; still more so is it a scarce bird in the present day. I therefore think it worth recording that two of these birds occurred last winter in the North of Ireland, one at Ballygowan, the other in the County Donegal.—*H. Blake-Knox.*

Lesser Tern in Devonshire.—On the 14th of August I received one of these birds from Exmouth: it had been shot the day before. It was an adult bird, but partially in moult.—*Cecil Smith; Lydeard House, August 19, 1868.*

Black Tern in Somersetshire.—On Tuesday, the 18th of August, I was at Burnham, in search of birds for my collection: I saw a rather large flock of black tern, in number perhaps about twenty, out of which myself and a friend who was with me obtained three each, and, had we been so disposed, might have shot nearly the whole flock, as they came and hovered over their dead companions, quite regardless of our breech-loaders. Five of the birds killed were young birds of the year; the other a mature bird, but changing to its winter plumage, the neck and breast being mottled with white.—*Id.*

The Ashby Decoy.—The enclosed, which I have cut from the 'Stamford Mercury,' may perhaps interest the readers of the 'Zoologist:—“One of the best existing decoys in the kingdom is now in the market, namely, that of Ashby, Lincolnshire, which is announced for sale by auction, by Mr. C. J. Calthorpe, in October next. The late Henry Healey, Esq., had a careful account kept of every day's capture during the last thirty-five winters, and the book containing these details show the following results:—

An Account of Wild Fowl killed at the Ashby Decoy, from September, 1833, to April, 1868.

	Ducks.	Teal.	Widgeon.	Shoveller.	Pintail.	Gadwall.	Tot.
1833-34	1884	1232	102	—	9	—	3227
1834-35	4287	1860	140	16	54	—	6357
1835-36	959	788	38	16	7	—	1808
1836-37	768	326	24	14	—	—	1132
1837-38	1511	509	47	11	4	—	2082
1838-39	758	791	21	2	4	—	1576
1839-40	2014	2002	94	21	74	—	4205
1840-41	2584	993	126	13	8	—	3724
1841-42	1666	908	28	5	6	—	2613
1842-43	1094	2077	49	6	2	—	3228
1843-44	1004	1036	88	3	3	—	2134
1844-45	1298	1181	65	1	2	1	2548
1845-46	1022	1321	39	3	5	1	2391
1846-47	1428	1005	43	5	4	1	2486
1847-48	1212	883	36	—	1	1	2133
1848-49	1740	1971	53	9	5	—	3778
1849-50	1145	956	27	—	2	1	2131
1850-51	380	853	34	—	3	—	1270
1851-52	632	1003	72	1	2	1	1711
1852-53	2682	3279	67	2	26	3	6059
1853-54	2425	1605	75	1	3	2	4111
1854-55	1298	1221	89	3	2	3	2616
1855-56	1004	781	33	4	4	—	1826
1856-57	763	771	27	11	1	2	1575
1857-58	634	1566	110	24	11	3	2948
1858-59	715	1208	82	4	4	—	2013
1859-60	734	1204	83	7	1	—	2029
1860-61	1121	2365	23	34	3	1	3547
1861-62	1605	1145	54	11	6	—	2821
1862-63	843	1481	25	14	1	1	2365
1863-64	2326	1842	82	20	6	1	4277
1864-65	1663	1205	85	5	1	—	2959
1865-66	282	637	17	—	—	—	936
1866-67	1891	1502	66	4	12	—	3475
1867-68	1292	1161	75	15	2	—	2545

The place, now offered for sale, is the most famous of our Lincolnshire decoys.—*John Cordeaux; Great Cotes, Ulceby, July 31, 1868.*

Little Gull at Flamborough.—On the 13th of July a little gull, an adult in breeding plumage, with black head, was sent me, fresh, from Flamborough.—*J. H. Gurney, jun.; Bank, Darlington.*

Position of the Divers (Colymbi) when on Land.—The divers never come to land except in the breeding season, and then only the female. I am satisfied the male

never goes ashore, but lives on the wing or on the water. The female but seeks land to deposit and hatch her eggs, which are laid quite close to the edge of the water; the young take to it on extrusion. As long as the bird has a beaten path to guide her, she can reach the water quickly; without such a guide she appears confused, though water may be close in sight. They can never take wing from the land, though freely from water. When unalarmed the female quietly works her body along the ground by aid of the feet; when alarmed the carpi act as fore feet, the true feet being brought forward along the sides of the body, and then being pressed outwards and backwards lever the body forward in a surprising manner; they can spring by this means ten feet; at an altitude of two feet the wings are of great aid. They never stand on their toes like many sea and all land fowl, nor on their feet like puffins, guillemots, &c., but always when on land lie on the breast and belly; the feet are not kept lying backwards under the tail, but before it, inclining outwards, the webs spread. I could never keep divers alive, they wearing the feet away in a night by vainly endeavouring to swim on the ground. They are fierce and sullen out of their true element, springing like a dog at one the height of a man's head, merely by aid of the feet. The anatomy of the feet is very beautiful, the texture most delicate: a glance at their organism will show their propulsive power on water, their total uselessness on land.—*H. Blake-Knox; Inverary, N.B., August 5, 1868.*

Blackthroated Diver.—In answer to Mr. Harvie Brown's query (Zool. S. S. 1320), I have frequently observed the blackthroated diver in its breeding haunts in Scotland, and have never seen it sitting or walking upright. The nests which I have seen have been placed within a foot of the water—a mere depression in the turf, with a few rushes very sparingly arranged over its surface, and generally two young. The nest being so close to the water, the bird just shuffles or slides on its stomach into the water, but I have not noticed its track very distinctly traced. The only time I have observed it upright was when on the water flapping its wings; while doing so it seemed to “tread water.” It is a bird that is seldom seen on land. Concerning the great northern diver (Zool. S. S. 1309) I may mention that two of my correspondents have noticed this bird in two different localities in Scotland all through the summer, but I have not myself heard of its nest being found.—*Theodore C. Walker; Woodside, Leicester.*

Tortoises laying Eggs in Confinement.—A pair of tortoises were recently brought here from the island of Scilly. They have been kept in a garden ever since their arrival, and yesterday it was discovered that the female had laid an egg. Is there any instance on record of such in Britain? If not you are at liberty to make the announcement in your most valuable magazine, the ‘Zoologist.’ The egg is about the size of a bantam hen's, but rounder in shape, and to appearance the shell is like that sometimes extruded by hens prematurely, only quite hard.—*Mary Pine; Portsoy, Banffshire, N.B., August 15, 1868.*

[The circumstance of the box tortoise laying in confinement is very common in England.—*Edward Newman.*]

A regular Visitor.—With regard to the land turtle which is said to visit Mr. Smith's farm annually (Zool. S. S. 1321), the great probability is that it is constantly resident on the property, that it hibernates there, and makes its appearance about the

same time every year as other land tortoises do.—*Thomas Bell; The Wakes, Selborne, Alton, Hants.*

“*Two Serpents and a Cat*” (Zool. S. S. 1343).—I had some years since two beautiful snakes from America, about eighteen inches in length, which I fed on frogs. On one occasion one of the snakes seized the frog by the hind leg, and the other by the head. Each continued to advance upon his proper portion of the poor frog, until the jaws of each invaded its rival's. One of them immediately commenced a violent shaking of the other and the frog, and thus after one or two efforts threw him off the prey, which he proceeded to swallow without further hindrance.—*Id.*

Lacerta viridis in the Rhine Valley.—Were any testimony required I could speak to the accuracy of Mr. Alston's wayside notes, as far as the Black Forest and Rhine Valley are concerned, as I was born and bred in the latter, and have trod many a weary foot in search of its natural productions. There is, however, one remark of Mr. Alston's which gives me the opportunity of pointing out a geographical fact in the history of the true green lizard (*Lacerta viridis*); I allude to his statement that he has never met with it in Germany (Zool. S. S. 1316). This beautiful reptile, it is well known, occurs throughout the South of Europe and also (perhaps imported) near Berlin; but, according to F. von Tschudi, it has not been found north of the St. Gothard in Switzerland. However, I have met with it abundantly, though locally, all along the southern heights of the Black Forest; for instance, on the Grenzacherberg (on Swiss ground), the Tüllingerberg, the Isteinerklotz, &c., heights surrounding the Rhine near Basle; but, singularly enough, I have never seen a specimen on the Jurassian Hills opposite, although it is said to occur there too. This lizard breeds in July and August in the loose rubbish-heaps shot out of the numerous quarries on the hills; but the eggs are mostly found in such stone heaps as are densely overgrown and of old date. It is a splendid sight to see a couple of these fine lizards, often full a foot in length, bask in the afternoon's sun, lying motionless and quite flat on some projecting ledge until disturbed by approaching footsteps, when off they are over “stock und stein” to some convenient hiding-place, not to show up again for a considerable time.—*Albert Müller; Penge, S.E., August 12, 1868.*

Shells seen or collected, early in June, during a Four-days' Walk in Lancashire and Craven. By GEORGE ROBERTS, Esq.

THE following list would probably have been more extended had the weather been more favourable for shell-hunting. Land-shells, owing to the unusual dryness of the weather, were then, as they have been through summer, exceedingly difficult to find.

Cyclas cornea.

Pisidium fontinale, var. 4-cinerea. Near Morecombe.

Bithinia tentaculata.

Zonites crystallinus.

Helix aspersa. Very few abroad.

H. Arbustorum. Near Hornby, and other places. A conical variety.

H. nemoralis. Only seen in two places. Appears to be less common than *H. Arbustorum*.

H. virgata. Dead shells in an old quarry. Craven.

H. Ericetorum. Only in one spot; dead.

H. rufescens.

H. hispida.

H. rotundata. Common with *H. rufescens*, about the foot of Ingleboro'. Nearly all the *Helices* were found attached to plants, with closed mouths.

H. umbilicata. On the top of a grit-stone wall near Ingleboro'.

Bulimus obscurus. On mossy walls and rocks on the limestone. More common than expected.

Pupa umbilicata. Common.

Clausilia nigricans. Some very dark specimens.

Zua lubrica.

Succinia putris. Nearly on the top of Ingleboro'. Common in other places.

Physa fontinalis. Poulton-le-Fylde. One large specimen.

Planorbis nautilus. Poulton-le-Fylde. On water plantain.

P. marginatus. Near Morecombe.

P. spirorbis. Near Morecombe. When I and my friend who was with me (Mr. Willis, of Wakefield) were hunting, net in hand, over a pond here, some boys approached, and with earnest looks and open mouths wondered what we were going to do with the "tiny little things" we had in our boxes. One, more prompt than the rest, settled it that they were to fish with.

P. contortus. Morecombe. I have found *P. contortus* near Selby and near Bridlington; I therefore infer that it occurs, but perhaps sparingly, right across the country from the east coast to the west. The soil at Morecombe rests on new red sandstone, at Selby the same, and at Bridlington on chalk. I may just observe here that when I was looking about for shells on the east coast last spring, on the chalk, I found *Helix virgata* and *H. cantiana* the commonest of all, the latter being far more common than either *H. nemoralis* or *H. Arbustorum*.

Limnæus pereger. Common. A small variety with a longish spire near Ingleboro'.

L. auricularius. In a deep ditch at Poulton-le-Fylde, in Lanca-

shire, along with *Limnæus palustris*, *Physa fontinalis* and *Cyclas cornea*.

L. truncatulus. Nearly at the top of Ingleboro'.

L. palustris. Poulton-le-Fylde.

Ancylus fluviatilis. On Ingleboro', with *Succinia putris* and *Limnæus truncatulus*.

The Canadian weed (*Anacharis alsinastrum*) seems to be a favourite with aquatic mollusks: I have almost always found some of the genus *Planorbis* on it. In our journey we never met with this plant. I seldom find shells on the broad pond-weed (*Potamogeton natans*), though it is one of the commonest pond-plants. I lately examined a pond which was full of broad pond-weed, and all I found was *Limnæus pereger*: the plant was in flower, and the surface of the pond was covered with bees and flies, some creeping on the floating leaves, some at the flowers—a rather curious sight.

GEORGE ROBERTS.

Lothhouse, near Wakefield.

Rare Butterflies.—I think it may interest the readers of the 'Zoologist' to know that, during a month's sojourn at Dover, I and my boy have been very successful in our entomological captures. The beautiful *Colias Edusa* we met with frequently, and many was the hard chase we had after this brilliant insect; indeed I never thought a butterfly could fly so fast and so far as they did, and often they beat our best efforts, but we nevertheless captured a few pairs. Our chief interest, however, was excited by the abundance of that rarer insect, *C. Hyale*, and its still more uncommon relative *C. Helice*, and we captured a number of each; in fact, we frequently saw as many as twenty in a morning's ramble, but like *C. Edusa* they led us many a race up and down hill, and during the late intensely hot weather this was no joke, and we were not unfrequently compelled to acknowledge ourselves beaten. All these three species we found most plentiful on clover or sain-foin stubbles that had been mown or eaten off by sheep. Few to our surprise frequented the clover in flower, of which there was plenty. So partial were they to this clover-stubble that on sunny days we were always sure of meeting with them in two fields especially, about half a mile out of Dover on the Deal side. In one of these fields, at the back of Dover Castle, a much rarer capture we saw made by a young gentleman, being no other than the Bath White (*Pieris Daplidice*), a fine female insect and a good specimen. It does not often fall to the entomologist's lot either to see this rare butterfly or to capture it, and we gazed on it with delight: it was taken on the 11th of August, and I think its occurrence is worth recording. We found the Grayling (*Hipparchia Semele*) plentiful on one spot of cliff near the "Zig-zag" at the coast-guard station. The Chalk-hill Blue (*Polyommatus Corydon*) covered the Downs in thousands. We also took *P. Argiolus*, *P. Alsus* and *P. Ægon*.—*W. J. Sterland; Grove Road, Colney*

Hatch Park, August 19, 1868. [*Colias Helice* of Haworth is a variety of the female of *C. Edusa*.—*Edward Newman.*]

Colias Edusa, var. *Helice*, near *Ipswich*.—Seeing the following letter in the 'Ipswich Journal' I inclose a copy of it, thinking the readers of the 'Zoologist' may like to see it:—

“A RARE BUTTERFLY.—Some of your entomological readers may be glad to know that a butterfly, very rare in these parts, and I believe never found here except in unusually hot seasons, may now be commonly seen in certain localities, *viz.* *Colias Helice*, one of the Clouded Yellows. I have caught ten specimens in Melton, and on Friday last saw several on Aldeburgh Common. Mr. Hele has also caught them at Aldeburgh, and my sister at Westleton. Every one I have seen, who has noticed these insects, has described them as *Colias Hyale*, which I take to be quite a separate species; and though *C. Helice* is thought by many entomologists to be only a variety of *C. Edusa*, surely being now found in such plenty proves it to be, as a few suppose, distinct.—*Iredk. Spalding; Woodbridge, August 20, 1868.*”

Mr. Spalding does not say he has taken *C. Edusa* this year, so I conclude he has not done so. Thus, supposing the insects he has taken to be a variety of *C. Edusa*, I think it would be almost impossible to take them in such numbers. Of course varieties are rarer than the others. *Colias Edusa* was pretty common here last year; and I took several, but only saw one variety taken.—*Edward F. Bisshopp; 36, High Street, Ipswich, August 25, 1868.*

[I should have liked more information on this subject, particularly as to the question raised by Mr. Bisshopp, whether Mr. Spalding has taken *Colias Edusa*? The paragraph quoted does not imply that *Helice* and *Edusa* were on the wing together; and it would be a very remarkable thing if this were *not* the case. I have not heard of there ever having been seen anything like a company of *Helice*, observed apart from *Edusa*. I cannot suppose it a species, since it has no male, and has, moreover, been so frequently taken *in coitu* with male *Edusa*.—*Edward Newman.*]

Vanessa Antiopa at *Chatteris*.—My son caught, on the 6th of August, a very fine specimen of the Camberwell Beauty (*Vanessa Antiopa*): it was hovering over a flower-bed in the garden, and was taken in perfect condition. Am I right in assuming that this beautiful butterfly has not been seen in England for many years? Is it possible that the recent great and continuous heat has induced some of these insects to cross the Channel, and take up their abode here? This idea is rather confirmed by the fact that several fine specimens of the Pale Clouded Yellow (*Colias Hyale*) have been taken here within the last week; this latter butterfly being also one very rarely seen on the wing in this country.—*John Fryer; Manor House, Chatteris, Cambridgeshire.* [Many specimens of *Vanessa Antiopa* have been taken in England within the last ten years, but always singly, and generally inland: there are no attendant circumstances that would at all justify the conclusion that they come from over sea, although there is nothing in the distance between the Kentish and the French coast that would render the transit difficult.—*Ed.*].—*From the 'Field.'*

Deilephila Livornica at *Truro*.—On the 2nd of August I had the good luck to take a specimen of *Deilephila Livornica*, in a garden near here. As it is one of the rarest of our British moths, it may be interesting to your entomological readers to hear of its capture.—*Id.*

The Death of Species. By EDWARD NEWMAN.

(Continued from S. S. 1358.)

DESIRING to establish conclusions from the past and present state of human beings similar to those deduced from the world of animals, I have endeavoured to collect facts from sources the most opposite: 1st, the investigations of the scientific; 2nd, the conclusions of those who view the coloured races as scarcely human, and, repudiating all idea of a common origin, desire their extermination as they would that of noxious beasts; and 3rdly, the conclusions and arguments of those who regard the coloured man from a philanthropic point of view, and who believe that all men are descended from one pair who trod the earth 5872 years ago. I cannot but regard the first of these sources as the most reliable; the second allows too much scope for prejudice; and the third completely turns the table on the white man, and, scarcely content with accepting the black as a man and a brother, seems to look up to him with something approaching to veneration.

As an example of what the calm and quiet philosopher has to say on this subject of extinction of races, let us read Paul Broca on Human Hybridity. He says, at p. 11, of the English Edition: "It is undoubted that several American races have been destroyed within three hundred years; others, having been reduced to a few families, will soon disappear. The Charruas were exterminated in 1831 by the Spaniards of South America, root and branch. In 1835, four years later, the English of Van Diemen's Land, after a horrible massacre, transported two hundred and ten Tasmanians, men, women and children, to a small island (Flinders), in Bass's Straits. In 1842, after seven years of exile, the numbers of these unfortunates amounted to fifty-four. This was all that remained of a race which forty years previously occupied the whole of Van Diemen's Land, as large as Ireland, and we may soon learn that none of them are in existence. The Malays have entirely destroyed the black races who preceded them in certain isles of the great Indian Archipelago. The Guanches only now exist in a mummified state. The black and prognathous race which occupied the isles of Japan before the arrival of the Mongolians, have left no other traces behind than their crania imbedded in the soil; and it is easy to foresee that within one or two centuries all the black races will have disappeared from these parts and have been succeeded by Malaysians and Europeans." The under-mentioned scientific works corroborate these statements:—'Natural History of

Man,' by James Cowles Prichard; 'De la Pluralité des Races,' par Georges Pouchet; 'Types of Mankind,' by Dr. Nott; 'The Races of Men,' by Dr. Robert Knox; 'La Terre et l'Homme,' par M. L. Maury; 'Observations sur la Constitution physique des Papous,' par Quoy et Gaimard; 'The Natural History of the Varieties of Man,' by Dr. Latham; and it would be impossible to cite any scientific author who has studied the subject and yet has acknowledged views antagonistic to those I am endeavouring to express; and not one of them, so far as my memory serves me, has applied them with the same ultimate object.

Secondly. It is the aim of every newspaper in the United States and Australia to show that the native races are in rapid process of destruction, that they must be extinguished, that they are doomed, and that the white man is as a matter of necessity carrying out their doom: to quote where every assertion, every aspiration, every conclusion, is so concurrent would add nothing to the strength of my argument: it cannot be concealed that the most violent prejudice dictates many of these most morbid effusions: our own Dickens and Hepworth Dixon seem to take a very similar view.

Thirdly and lastly. What is the evidence of the philanthropist? What says the man who cares very little for scientific precision, and who abhors the views forced into notice by the newspaper literature to which I have alluded? In the year 1836 a number of these philanthropists associated themselves in a body which they called the Aborigines' Protection Society: they took for a motto the words "Ab uno sanguine;" and their avowed object was to protect those savages whom they found in the possession of the soil, on the ground that all the races or varieties of the genus *Homo* were descended from one stock. They even objected to the word "savage" as applied to men, and went so far as to express a belief, that the Caucasians were emphatically the "savages," and not those to whom the word had been applied. In March, 1847, these gentlemen commenced a periodical called the 'Colonial Intelligencer; or, Aborigines' Friend,' and continued it through four volumes. Of the motives which influenced these gentlemen there can be no doubt; the purest Christianity was their guide, and "doing good was their religion." The name of Dr. Hodgkin, their honorary secretary, is of itself a guarantee. Differing as I do *in toto* from the abstract views advocated by this Society, but thoroughly agreeing with their motives, I may with perfect consistency cite their assertions, which

have never been called in question. I will therefore extract with full unity the following passage from their introduction, or as they call it, "prologue."

"The navigator has shown his humanity by giving the pig and the potato as lasting resources for the supply of food; the missionary has laboured to substitute the blessings of Christianity for the impure and homicidal rites of paganism; but with comparatively few exceptions of this kind, the intercourse of civilized man with the aborigines has been a visitation of unmitigated evil, varying in its kind but uniform in its tendency towards the annihilation of the feebler race. A century or two were spent by the Portuguese in the extermination of the Guanches, the aborigines of Teneriffe and Fuerteventura. After a similar period of English occupation in Newfoundland the last of the original race had ceased to exist in the island. In the nineteenth century the work of aboriginal destruction, like many other processes of civilized art, has been wonderfully expedited; and about thirty years have sufficed to blot out the existence of the once numerous aboriginal race from the fertile soil of Tasmania. In various parts of the globe the assassination of races is perpetrated, and the fact causes far less emotion than is often exhibited when a minor catastrophe has befallen an individual."—p. 3.

It is inferred in the opening of this passage that the attempted introduction of Christianity was a counteracting or beneficial influence; let it be so; but it is nevertheless easy to show that this influence has not always been exerted in the same direction. No sooner has a tract of country become a colony of Britain than the original inhabitant has been deprived of all his possessions, and was either exterminated or driven back into the primæval forest; but let me glance at the three races especially noticed by the Aborigines Protection Society—races of which not an individual remains; *all*—men, women and children—have been slaughtered by the Caucasian: I shall be guilty of some repetition, but that is inevitable.

1. The GUANCHES. These people have so utterly disappeared and have been so entirely forgotten that one has to search diligently through the records of the past for evidence that they ever existed. They inhabited several islands of the Atlantic, more particularly Fuerteventura and Teneriffe. They were totally destroyed by the Portuguese, and the only trace of their having existed is to be found in certain mummified bodies of older date than the discovery of these islands by Europeans.

2. The NEWFOUNDLANDER, the species or race destroyed in 1823. "On our first visit to that country the natives were seen in every part of the coast. We occupied the stations where they used to hunt and fish, thus reducing them to want, while we took no trouble to indemnify them; so that doubtless many of them perished by famine: we also treated them with hostility and cruelty. * * * They must, however, have recently been very numerous, since in one place Captain Buchan found they had run up fences to the extent of thirty miles, with a variety of ramifications, for the purpose of conducting the deer down to the water, a work which would have required a multitude of hands." These people, who are represented as a remarkably fine race, were slaughtered by the English without any parley whatever. The Report of a Select Committee of the House of Commons, appointed at the instigation of the Aborigines' Protection Society, observes: "It does not appear that any measures were taken to open a communication with them before the year 1810, when, by order of Sir J. Duckworth, an attempt was made by Captain Buchan, which proved ineffectual." Thus it is shown that for a hundred and fifty years the murderous system was carried on as against unreasoning vermin of any kind, and that then the attempt at a compromise was untried. "At that time," I still quote the Report, "he (Captain Buchan) conceived that their numbers around their chief place of resort, the Great Lake, were reduced to 400 or 500. Under our treatment they continued rapidly to diminish; and it appears probable that the last of the tribe left at large, a man and a woman, were shot by two Englishmen in 1823." Fit climax.

3. The TASMANIAN was destroyed in 1860. This race, like many others, was extremely circumscribed in its limits: regarded superficially all the inhabitants of that vast assemblage of islands which occupy the Pacific are Australasian; but when brought under the cognizance of Science a number of technical differences are perceived which prove that they are entirely distinct. The Tasmanian differed in the most marked manner from his nearest neighbour, the Australian, in having a woolly head like the negro, while the Australian possessed the straight lank hair of the Malay. Tasmania was discovered in 1642, and was visited by Cook in 1777. At first it was supposed to form part of New Holland, and was called Van Diemen's Land, but this mistake was rectified by the discovery of Bass's Straits, through which our ships very early made their way. Concerning the inhabitants of Tasmania the statements made, or rather collected, by

Paul Broca, harmonize so exactly with those published by the Aborigines' Protection Society as to remove all doubts of the truthfulness of either. "The English," says Broca, "so humane and patient as regards the Australians, have committed on the Tasmanian race, and that in the nineteenth century, execrable atrocities a hundred times less excusable than the previously unrivalled crimes of which the Spaniards were guilty in the fifteenth century in the Antilles.

* * * These atrocities have terminated in a regular extermination." Strzelecki, whose 'Physical Description of New South Wales and Van Diemen's Land' has always been regarded as a work of the highest authority, writes thus: "In 1835 the English of Van Diemen's Land undertook to get rid of the natives altogether. A regular battue was organized in the whole island, and in a short time all Tasmanians, without distinction of age or sex, were exterminated, with the exception of two hundred and ten individuals who were transported to a small island, Flinders or Fourneaux, in Bass's Straits. This was all the remnant of a race which before the arrival of the English had occupied a territory nearly as large as Ireland. This dreadful massacre produced a profound horror in the English Parliament, but no one suggested the propriety of sending back these unfortunates to their native soil. Measures, however, were taken to treat them humanely in the Isle of Flinders, and to provide them with abundance of food; they were also instructed in religion. The island is about thirteen leagues in length and seven in breadth; the refugees had thus no want of space. Nevertheless, these two hundred and ten individuals, most of them adults, perished rapidly, and in 1842 fifty-four only survived. During seven years and a few months only fourteen children were born." There is no question that some of the English made certain attempts to improve and civilize these poor creatures, but without beneficial result. One of these philanthropists, writing to Rienzi, also a friend and advocate of the natives, says, "Several of the children have been sent to the schools in Hobart Town, but when arrived at the age of puberty an irresistible impulse compels them to return to their solitudes." Every scrap of information that we can obtain of these poor creatures, from whatever source derived, tells the same tale; their persecutors and their defenders,—those whose object it was to exterminate and those who laboured to preserve,—all agree with the philosophic Frenchmen who were mere spectators and not performers, that the Tasmanian could not be tamed and has been exterminated.

The CARIBS. "Of the Caribs, the native inhabitants of the West Indies, we need not speak, as of them little more remains than the tradition that they once existed." In these few words the Select Committee of the House of Commons disposes of a people once as numerous as the grains of sand on the sea-shore.

Although the authorities I have consulted offer many other examples of races that have perished and not left a trace behind, these are quite sufficient to show that species, or races, or families of men, as numerous as those of the countries of modern Europe, have been exterminated by the Caucasian so completely as to have left just sufficient evidence to show that they once existed, and nothing more.

Let us now turn to peoples that are dying, and here two examples will be sufficient, because of their vastness, because of the awful reflection that in each case myriads upon myriads are being destroyed by the hand of the Anglo-Saxon.

1. The AUSTRALIAN. The Report of the Select Committee says, "The effects of planting our penal settlements among them have been dreadful beyond example, both in the diminution of their numbers and in their demoralization;" and Bishop Broughton, quoted in the same Report, says, "they do not so much retire as decay; wherever Europeans meet with them they appear to wear out and gradually to decay; they diminish in numbers; they appear actually to vanish from the face of the earth. I am led to apprehend that within a very limited period, a few years at most, those who are most in contact with Europeans will be utterly extinct—I will not say exterminated, but they will be extinct." Such is the concurrent testimony of all who are acquainted with Australia and Australian affairs, but this evidence of the Bishop, endorsed by the Select Committee and circulated by command of Parliament, is irresistible—no one will call it in question.

2. The RED INDIAN. Our earliest contact with the North-American Indian is the date of his declension. The Select Committee's Report says it seems to have been for a length of time accounted a meritorious act to kill an Indian, and Cotton Mather tells us that "it was considered a religious act to kill Indians." But the English Puritans, who it may be observed in passing were the most highly professing religionists the world has yet seen, reduced the Indo-destruction to a

systematic course of action, and expressed their views in this syllogistic form:—

1. "The earth is the Lord's and the fullness thereof.
2. "God has given the earth to be inhabited by his Saints.
3. "We are his Saints, and therefore the earth and the fullness thereof is given to us."

The Saints acted on this view of the case, and it must be said carried it out with spirit and perseverance. First, they seized corn and cattle, then the land, shooting down the owners without the slightest compunction: at last the Indians, driven to desperation, retaliated, and such scenes of rapine and murder followed, such atrocities were perpetrated, both by the natives and the Saints, as the world has never witnessed elsewhere: the white man of course came off triumphant, and from that hour to this has been pursuing the poor Indian with unrelenting assiduity, nor will he desist while a single red skin remains between the Atlantic and the Pacific. The Report of the Select Committee touches on the different tribes by name, and speaks of them as a very degraded race. The Indians of New Brunswick are "in a wretched condition." The Cree Indians, "once a powerful tribe, have now degenerated into a few families." The Copper Indians "have decreased within the last five years to one half the number of what they were." The Report dwells at considerable length, and with decided approbation, on the attempts now being made to christianize the Indians, and regards this movement as having a marked effect in diminishing the ratio of decrease.

Thus the races of men have died exactly in the same way as the species of animals; they are also still dying in the same way: the two are decreasing *pari passu*. The death of the Carib is an exactly similar case to the death of the dodo; the death of the Tasmanian corresponds exactly with the death of the moho: all these are obedient to one law, and that law is the death of species. These facts are open to any scrutiny, however rigid, but they are so generally admitted that nothing is to be apprehended from the most searching investigation.

And here, before entering on the great question of the degradation, deterioration or decay of races, it seems desirable to forestall two objections or suggestions that will certainly occur to the reader who has favoured me by attentively considering the subject. *First*, that seeing that exhaustion or depletion of Nature's ranks must result from

the constant death of species, and seeing that there are no manifest signs of that depletion, it seems to follow that a series of creations must have been required to supply the deficiencies caused by death; and, *secondly*, that if such creations have supplied, from time to time, such gaps or deficiencies, that they *may* occur again, and Caucasian man may be dethroned, and a higher race be substituted in his stead as universal monarch.

I will take the second of these objections first, because the most simple. Seeing that the Almighty originally created man, whether in his present form or as a protogerm from which his present form has been evolved (every one will concede a creation of some kind), it would appear to me an act of insanity to express a doubt as to the continued existence of that creative power; and therefore the possibility of the creation of a being superior to the Caucasian must be admitted also. This, however, is nothing more than the admission of an Almighty Existence, and is totally different from expecting or prophesying such an event: so vague and crude a guess is unworthy the dignity of science, because removed so entirely from the possibility of proof.

The *second* suggestion stands on a different footing, and, having a direct bearing on the subject under consideration, is open to investigation, the rocks themselves being the court of appeal. These unequivocally reveal the fact that additional species of animals have from time to time made their appearance on the earth's surface.

The classification of rocks, which was regarded sufficient for our school-days, is also abundantly sufficient for the present inquiry. The igneous rocks contain no evidence of the existence of organized beings; but no sooner do we examine the superincumbent series, than we find traces of both animal and plant life. That the stratified rocks follow each other in point of antiquity, the lowest being the most ancient, is now universally admitted: I give their order both of position and antiquity according to De la Bèche. "1, Grauwacke, which includes the Silurian of Murchison; 2nd, the carboniferous, which includes the old red sandstone, the carboniferous limestone and the coal measures; 3rd, the red sandstone; 4th, the oolite; 5th, the chalk or cretaceous; 6th, the supra-cretaceous, divided by Sir Charles Lyell into the eocene, miocene, older pliocene and newer pliocene; and 7th, the modern." This sequence or system of superposition has not been called in question, and, together with the author's explanatory note, is still considered sufficient and satisfactory.

Here is his explanation:—"By a given order of superposition among the fossiliferous rocks, we mean that certain masses of mineral substances, no matter what kind of mineral substances they may be, *have been produced at distinct geological periods, one after the other: and that as far as researches have yet extended in Europe, where they have been most studied, they contain as masses certain assemblages of organic remains not detected in the others; that is, if, for the sake of illustration, we suppose a series of fossiliferous rocks to rest upon one another, each would contain organic remains differing as a whole from those discovered in the others either above or below it.*"

In the old red sandstone we find fishes, and as no fishes existed during the Silurian epoch, we may, I think, assume that a creation of fishes took place after the Silurian system was complete. Again, the new red sandstone contains the foot-prints of huge animals, which may have been reptiles, birds or sucklers, but which certainly were not fishes; therefore another creation must have taken place after the old red sandstone system was complete. Again, the oolite contains three extraordinary creatures, the plesiosaur, the ichthyosaur and the pterodactyle, no trace of which has been discovered in lower strata, thus implying their non-existence at an earlier period. Lastly, come the elephant, rhinoceros, tapir, hippopotamus, bear, stag, &c., &c., not found in either of the underlying formations. Now unless we admit the Silurian animals to be the progenitors of the old red sandstone animals, the red sandstone animals to be the progenitors of the oolite animals, and the oolite animals the progenitors of the still more recent elephants, &c., these various creatures must have resulted from a number of creations widely separated as to time; for it is a very noteworthy fact, and one which I think cannot be called in question, that there does not exist a tittle of evidence to show that the creatures of any supposed era are the descendants of those of a prior era; if, for instance, the plesiosaur in ten thousand generations had culminated in an elephant, or the pterodactyle in a stag (I take the names at random), there must have existed ten thousand forms intermediate between each pair of extremes. "Why then," says Mr. Darwin, "is not every geological formation and every stratum full of such intermediate links? Geology assuredly does not reveal any such finely graduated organic chain; and this perhaps is the most obvious and gravest objection that can be urged against my theory. The explanation lies, as I believe, in the extreme imperfection of the geological record."—'*Origin of Species*,' p. 280 of the original edition.

Such is Mr. Darwin's own admission, and such his explanation of the admission. Candid, courteous and transparently truthful, it seems hard thus to quote Mr. Darwin against himself, but the facts must remain that there is an entire absence of all evidence that such intermediates ever existed, and the only conclusion to which the rocks can possibly lead us is that such intermediates never did exist. It is notorious to the geologist that the elephant, the sloth, the stag, the tortoise, the shark, come before us with no feeble or uncertain form: they exhibit no gradation from what are called inferior beings; far from this, they evidently leaped into life in the zenith of their glory, in the plenitude of power, strength and bulk. Mr. Darwin asks of those naturalists (if such there be) who advocate the theory of successive creation, "Do they really believe that at innumerable periods in the earth's history certain elemental atoms have been commanded suddenly to flash into living tissues?" Certainly, there is no more difficulty in believing this than believing in the creation of an "elemental atom." "These authors seem no more startled at a miraculous act of creation than at an ordinary birth." Confessedly so; but the antithesis might have been still more striking if worded thus, "These authors seem no more startled at the miraculous creation of a mastodon than of an elemental atom." The obvious reason is they believe the Almighty equally competent to either case. The simplest form, considered as an object to be called into existence, presents no greater facility than the most complicated; all acts of creation are equally removed from the sphere of man's feeble powers, but are equally within the range of Almighty will. But, admitting the grandeur, the ineffable grandeur, of the miraculous creation of a mastodon, it is in reality far less difficult to believe, than the entire destruction of all trace of those myriads of generations which must have been required to evolve a mastodon from either of the oolite monstrosities. We are required to give up our faith in one miracle in order that we may receive a miracle infinitely more astounding: we are forbidden to strain at a gnat in order that we may swallow a camel. I fully believe in the possibility of the stupendous miracle of obliterating all trace of those supposed generations which have led up to the present status of organized beings; but I am utterly at a loss to conceive the *cui bono* of such a miracle. I think also the unprejudiced reader cannot fail to be struck with the importance given to magnitude by all the evolutionists to such terms as "elementary atom," "molecule," "protogerm," "monad," &c., &c., being in frequent requisition: now I regard

large and small as simply matters of degree, not essential properties or characters, and therefore that they have no bearing on the question.

EDWARD NEWMAN.

(To be continued.)

Acclimatisation of Parrots. By CHARLES BUXTON, Esq., M.P.*

I HAVE undertaken to tell you a little about the experiment that has been tried here of letting parrots fly wild about the place; but, though it has been a source of great interest and amusement to us, I much fear that there is very little to relate that could be thought worthy of the attention, even in their holiday moments, of an association for the advancement of science. Nor can I honestly say that the attempt to acclimatise these birds—that is to say, to establish them as an addition to our English fauna—has in that respect been attended by success. It is true that they have several times made nests, and on five of these occasions the young ones have been brought to maturity; and, “were it not for those vile guns,” the birds would flourish extremely, for illness and death from natural causes would seem to be almost unknown among them. But, unhappily, they share in many of the characteristics of human nature, and in this one above all, that they do not know when they are well off, and every now and then they are seized with a desire to see the world, and take flight to a distance, twelve or fifteen miles perhaps, and sometimes much more; and then they are almost sure to fall a prey to some gamekeeper or lad who is keeping crows off, and who is astonished by seeing these brilliant apparitions among the trees. As regards their breeding, a pair of cockatoos led the way by most unsuccessfully attempting to make a nest in one of the chimneys; but before it was half finished it gave way, and the nest and cockatoos fell to the bottom. It being summer time, they were only discovered after spending a day and a night among the soot. When they were brought out they looked like two dwarf chimney-sweeps. They persevered, however, and made another nest in one of the boxes that had been hung against the gables of the house, in hopes of such an event; but though they laid two eggs, and the hen cockatoo sat most perseveringly till September, it was all in

* Read at the recent Meeting of the British Association at Norwich.

vain; the eggs were addled. Afterwards a pair of green parrots—a cock of the Amazonian and a hen of the Honduras breed—made a nest in one of the boxes, and brought up a young one; but when he was nearly fledged one of the cockatoos thought it right to murder him. The year after the same pair brought up two children, and it was really a beautiful sight to see the family party flying about, always together, and living on the most loving terms; but the mother and her eldest son both, unhappily, were shot. Afterwards one of the common white cockatoos and the hen Leadbeater (a very large rose-coloured cockatoo) dug out their own nest in the rotten branch of an acacia tree, laid two eggs and brought up the young birds. These hybrids are very handsome, but do not resemble either of the parents, having very beautiful crests of a red-orange colour; otherwise they are perfectly white. The parent birds were so pleased with the success of this experiment that last year they repeated it, and brought up three young ones, thus making up a flock of seven with the two first born. Unluckily, one of them was shot at in the winter, and came home severely wounded; after which the other birds would not permit him to associate with them, and he always lived in a bush near the house, quite apart from the rest. One day I moved him into the garden, upon which some of the other cockatoos—not, however, his own relations—fell upon him the moment my back was turned, and killed him. One of those traits of character which, as I said just now, these birds, and in fact most wild animals, share with human nature, is their general dislike of cripples. Another of them was also injured, so I took him away to Surrey, where, in spite of his broken wing and broken leg, an old cockatoo befriended him, and treated him as her own son. This year we hoped that the same pair would have nested again; but unluckily a pair of gray parrots anticipated them in the possession of the hollow branch, and, having made a nest in it, brought up the two young gray parrots that you have just seen, and which are afflicted with the most awful temper. The maternal instinct of another pair of gray parrots took a very absurd form. This year a cat made her lodging in one of the nest-boxes, and brought up her kittens in it; and two of the gray parrots, who had not been industrious enough to lay eggs and have a family of their own, were seized with the idea that these kittens were their children. They kept up a constant warfare with the old cat, and whenever she left the box one of them used to get in and sit with the kittens; and they were constantly in close attendance, even when the mother cat was at home.

When the cockatoos I have spoken of had their nest in the acacia tree it was very ridiculous to see the extravagant interest taken in the matter by the others of the same species. They used to sit most of the day on the branches, just above the nest, and whenever the parent bird flew out she was attended by a troop of the others, screaming horrible acclamations in her honour. There is an immense deal of originality about this race of birds. They have none of the commonplace, humdrum mediocrity. Their curiosity is unbounded, and they evidently look on man and his doings with the keenest interest, mingled with surprise, and perhaps with just a *souçon* of contempt. There is, moreover, strongly marked individual character amongst them. No two of them behave in exactly the same manner. I think the large white cockatoo with the broad white crest is the most intelligent of the lot. I had one of them whom I wished to keep chained to a perch, but, though a first-rate London blacksmith tried everything his ingenuity could suggest, the cockatoo beat him utterly. Without breaking it, he contrived to open the ring, or other instrument for holding him, with his beak, though one or two of them must, one would have thought, have required real study to understand.

The experiment of acclimatising parrots has been tried on a somewhat large scale. We have had African, Amazonian and Carolina parrots; Rosella parrakeets; large Bengal parrakeets; four species of cockatoos, and two of lories. The last are magnificent birds, with their scarlet bodies, and very long wings and tail of rich metallic-green: curiously enough, however, they are far less seen than any of the others, as they almost always sit buried in the thickest foliage, and have none of the sensibility and intellectual excitement of the cockatoos or parrots. In fact, however, all these birds vanish completely out of sight during the greater part of the day. Many of them, indeed, live in the woods at a distance from the house, but even those who have selected the trees in the garden for their residence would not easily be discovered. You would have supposed that at any rate the white cockatoos would have been visible anywhere; but the inclination of all animals is to slip out of the sight of man, and, with the shadows of the trees upon them, an unpractised eye would rarely discover them. In the morning and evening they come to feed upon hemp-seed and bread and milk, which is hung in a basket from a tripod; and then, I can assure you, the groups of them are sometimes most beautiful. Lately we have had great losses—so many have flown away and been shot. But I will read a memorandum which I put down one day, a

couple of years ago, of the scene I was watching, and which recurred morning after morning as I sat reading in my study at my house in Surrey:—"The parrots' breakfast having been put in the basket, a pair of white cockatoos, who had been anxiously watching the proceedings from the tree above, swooped down, and set instantly to work. A Bengal parrakeet, with long green wings, presently comes skimming up, and flutters for a few minutes almost perpendicularly in the air, exactly in the attitude so often represented by Mr. Gould in his book of the 'Humming Birds,' with the head and tail curved inwards, and the wings extended. Two or three rose-coloured cockatoos follow, and hang about on the tripod, but do not venture to take their places on the edge of the basket while their fiercer brethren are at work; but presently one of the huge white cockatoos with yellow crests comes swinging heavily down over the lawn, putting all the lesser ones to flight in a moment. But they soon gather round again, and a lory, resplendent in red and green, darts through the air, and lights on the top of the tripod, his burnished hues contrasting well with the pure white of the cockatoo below; and the group is completed by a Cornish chough, whose glossy blue-black plumage and orange beak and legs are not the least striking of their costumes: he always at once engages in a fierce strife with his rivals, and his long beak gives him the advantage over them."

I can assure you, ladies and gentlemen, that a spectacle of this sort, which I have witnessed hundreds of times, is one of exquisite beauty, especially on a sparkling winter's morning with the snow on the ground, when the colours of the birds seem peculiarly gorgeous. Nor do they appear to be injured by the cold: the gray parrots have the sense to get into a house that was built for shelter to them, but none of the others can ever be persuaded to enter it, and they live in the woods the whole year through; but even last winter, when the thermometer in my neighbourhood fell six degrees below zero, though one cockatoo unaccountably disappeared, all the rest appeared to be as full of life and spirits as possible. In fact, so long as birds are well fed and in good health, I do not believe that cold is fatal to them. Their migration depends altogether on food, and not on the fear of cold: even the delicate little longtailed titmouse, and the still more delicate little goldencrested wren, and numbers of other seemingly tender birds, remain with us the whole winter through without appearing to suffer. The fact is that birds have such a wonderful great-coat, such a dense mass of down below their feathers, and have also, if I am not mistaken,

such a supply of caloric—much beyond that of animals—that cold rarely kills them; though I do not mean to say that they like it. It certainly, however, is curious that these African parrots, Bengal parakeets, and lorries from the Philippine Islands have never appeared to suffer even from our frost and snow. I may observe the gardener declares that the gray parrots foresee a storm, and often take refuge before it comes in their glass-houses.

Nothing can be more striking than the contrast between the plumage of the parrots when they first come, and its appearance after they have been flying about for a few weeks, when it acquires a gloss and glitter like that of burnished metal. Variety of food is not less essential to them than abundance, and they also require exercise. Some of them, who cannot fly, or who prefer moping at home, always look woebegone, and are gloomy and irritable; while the industrious Pollies who fly about and help to earn their own livelihood are cheerful, contented and kindly. It is curious how clearly they have the idea of property and possession. An old parrot who always sits in the ivy on an old wall is just as indignant if any other parrot seeks to share in his part of it as my cook would be if some of you insisted on taking up your residence in my kitchen. Generally, however, they pay the utmost respect to each other's prescriptive rights.

We usually have got our parrots from Mr. Jamrach, a Jew, who has a shop near Wapping, and who buys all kinds of animals from the ships that come into the docks: his shop is a queer place, and well worth a visit. One day when I was there he had in his little back yard a crocodile twelve feet long, and another, a baby crocodile, which I bought and kept alive for some time, about eighteen inches long; and sundry bears, lions, monkeys, racoons and other animals, while all the rooms in the house itself were given up to birds, mostly of the parrot kind, and the screaming and shrieking is terrific. Every now and then there is a perfect avalanche of the little green parroquets from Australia, and on one occasion Mr. Jamrach had 3000 of them in his bed-rooms. Parrots that can talk fetch a high price, so we rarely buy them, as we don't want pets; moreover, they very soon lose their power of talking when they are out in the woods; but sometimes they learn to imitate other sounds. At my house in Surrey the jackdaws build in boxes placed for them in the gables, and a gray parrot who flies about has learned to imitate them exactly; while one of the cockatoos can imitate the clucking of a hen so cleverly that no one could conceive that it was not the fowl herself. A large Amazonian

parrot, who has been at Northrepps Hall for twenty years, used to be a first-rate talker: he it was who originated the plan of turning the parrots out, for, having escaped from his cage, he remained in the oaks and beech trees for nearly three months, and only came back when the winter set in, but looking so magnificent that the idea suggested itself of trying the effect of liberty on other parrots as well. After he returned he amused us very much by walking up and down on the sill of the dining-room window, repeating the phrases of anxious entreaty that had been addressed to him by the maid-servants to induce him to come in, exactly imitating their different voices as well as words. On one occasion he nearly frightened a poor woman out of her wits by suddenly plumping down on the top of her head as she was walking along the road. On two or three occasions strangers, when approaching the house, have been perfectly astounded by hearing what they took for the voices of invisible human beings issuing from the trees over their heads. One of the young cockatoos that was born in the acacia tree disappeared last spring, but returned the other day in a beggarly, ruinous condition, having evidently been nearly starved, but soon recovered his good looks: it is curious what could have become of him, and how he found his way back after so long an absence. The same thing has occurred with others: one of the large cockatoos deserted my place in Surrey for several months, and was continually seen associating with a flock of rooks some miles away, but at length returned. On one occasion a flock of our parrots flew to a place named Brooke, full twenty-five miles away, and eleven of them were shot by a game-keeper who naturally thought he had secured a wonderful prize. Afterwards five cockatoos were shot altogether in the same way.

It is curious what friendships arise between birds, some of which belong to different species. A parrakeet and a green parrot were perfectly inseparable: and so, too, at my house in Surrey I had at one time a flock of eleven gray parrots; but ten of them having got killed, the survivor devoted himself to some cockatoos, and for the last two years has invariably flown about in their company. One Carolina parrot was frost-bitten in the hard winter of 1860, and lost both her legs: she looked a deplorable object ever after; but a magnificent Amazonian parrot took pity on her, and devoted himself to her in a most chivalrous manner, defending her from the attacks of other parrots, who would have murdered her, cleaning her feathers, and generally sitting close to her side. The contrast was most ridiculous between this diseased old cripple and the splendid young knight who

had this infatuation for her. After some years, however, the cockatoos made a combined attack upon her; a tremendous scrimmage took place, certainly not without the "din of battle," and it ended in the slaughter of the poor old bird. They are very fond of the under gardener, who feeds them, and he is rarely to be seen at work in the garden without one or two of the cockatoos sitting on his head or shoulders.

Their arrangement of the hours is a very sensible one. Soon after dawn their voices may be heard from a distant wood, in which most of them sleep: they then come and wait for their breakfast, but the mid-day hours are always spent in sleep, after which they again seek for food, and come for their supper; but before going to bed they, like rooks, devote themselves to a regular jollification, the parrots often flying round at a great height in circles, screaming with delight; while the cockatoos fly from tree to tree with their crests erected, shrieking at the top of their sweet voices, especially if they see people in the garden, which always is a great amusement. I must confess that some of them, if not all, are mischievous, especially in the way of picking fruit; but we think ourselves more than repaid by the animation they give to the garden, and the exquisite beauty of their colouring.

Ornithological Notes from the County Dublin for 1867.

By HARRY BLAKE-KNOX, Esq., J.P.

(Continued from Zool. S. S. 1196).

Ring Dove: fondness for Salt and Sea-weed.—I have elsewhere in the 'Zoologist' mentioned favourite foods of the wood pigeon, but omitted, perhaps, an important item in its bill of fare, viz. the young growth of various sea-weeds peculiar to rocky coasts. Both in spring and autumn "wood-quests" come from inland in the early morning to feed upon the sea-rocks left bare by the tide, and here feed upon sea-weeds and copiously drink the salt water from the rock-pools. In autumn they are most commonly met with along the coast. *Breeding on the Cliffs at Lambay.*—On the north and north-east side of Lambay Island the cliffs are well clothed with verdure, ferns, &c., and are inclined to be shelvy: ivy, too, grows luxuriantly in places. On the shelves and crevices of these cliffs and amongst the ivy the ring dove breeds in considerable numbers. A few rock doves still frequent this island. *Gregarious in May.*—May 6. Corn crakes are incubating,

yet still the wood-quests are going in large flocks, and apparently have not commenced to pair yet. It is, I think, unusual to see the ring dove so gregarious at this season.

Rook: malformations.—No bird seems to suffer so from accident as the rook: one brought me to-day had the bill very curiously formed, the mandibles at the tip crossing after the manner of the crossbill.

Injurious to Growing Corn.—Everyone knows, or at least all who have unprejudiced eyes, that the rook is a very destructive bird to growing seed-corn as well as to fresh-sown grain: thus the farmer has many weeks to suffer loss (?)—yes, even when the grain has a sprout of green two inches and more above the ground. The following note, taken on the 5th of February, must convince even the sceptical that undue numbers of rooks *may occasionally* injure the farmer during seed-time and early growth:—“Whilst shooting on a friend’s farm to-day I was asked by him to shoot some rooks, which, he said, were devastating a field of wheat. On refusing to do so, on the plea that they did not injure corn once it had appeared above ground, I was met by the answer, ‘Wait till you see.’ Thinking it impolitic to refuse I discharged my gun, and both barrels brought pain and sorrow to sundry rooks, whose crops indeed were full of corn. I examined the field, and though it was a large one, not a square foot of it but had been bored in by the rooks (a whole rookery): there was the sprout bitten off and the grain consumed, and many sprouts laid bare all but to the grain: in fact, the whole field appeared as if walked over by a legion of giants in cricket-shoes, or, in the emphatic words of Charley, ‘One ’id think it rained crow’s bills.’ ‘Boring for grubs and wire-worms! count the grain in that fellow’s throat, and show me one grub. There are friends of mine, though: look at those willy waters (wagtails) and tits (meadow pipits); they are destroying *wires* and maggots; and where do they get them, but in the *bores* of the rooks?’” There can be no mistake but this is a habit of the rooks: it cannot be fairly glossed over—he does tear up corn. But, if he wants any champion but that of common sense, I am his defender still. What good does the destruction of a few birds do? None; merely “so many the less.” Five squibs of powder a-day and a boy, and not a grain of your corn goes down a rook’s throat. Reason, friend: is it politic to prevent the destruction of a certain quantity of grain? Could all that is sown come up and thrive? Frequently, notwithstanding the ravages of birds, cereals grow far too thickly, in rich soils lodging with the first heavy rain: this is particularly applicable

to our rich Irish soils and humid climate. Many farmers have told me that they sow extra, purposely for the crow, and yet at the same time do all in their power to prevent "her" eating the "extra." The consequence is often deplorable to themselves, in long, husky, thin and shrivelled grain, if not a total lodgment of the crop. Many farmers throw away in seed-oats the keep of a horse for the year, to get no return for the same but disappointment. In Scotland I have seen most ingenious devices to keep away rooks. About the best is to vein your field with yarn stretched from sticks: fields done in this manner appear as if covered with a huge white cob-web; the cost being very trifling. "Caps" of cotton-yarn are the best for this purpose. No rook will ever approach such a field. I never remarked any better produce in such a field than in one frequented by rooks. The rook has destroyed a vast amount of vermin off the lands where your cereals are now growing: you know it. Would it not, then, be required by Nature that something should supply the place of, perhaps, too large an amount of insect-life destroyed (it is well known that insects and birds are required to keep down vegetation, else vegetation would destroy itself), and what more worthy of his hire than the rook? Place yourself between two evils—the minimum destruction by the bird, the maximum and finally total destruction by the insect—and is it not better to submit cheerfully to the laws of Nature and her God, by whose breath all things were created, than to fight vainly on the side of avarice, the blindest canker on man's soul—the seed of every sin. It is useless for ornithologists to deny certain destructive properties of the bird; they should rather try to teach and make known their uses, for we could not live without them—paramount in Britain is the rook. In the story of the Creation we find blessing applied only to three orders of creation—the creatures of the waters, the fowl of the waters and the air, and man. Fowl are more mentioned in the creation than any other order of created beings put under man's dominion. What a delight the beautiful creatures are to our eyes and ears! what years of delight their study gives to many! If more could say with the Psalmist, "I meditate on all thy works; I muse on the works of thy hands," there would be less ignorance, and brighter days for the poor birds. "I muse on the works of thy hands *destroyed*," is too often the thought of the scientific man who never is a naturalist except by name. Though the Creator gave man dominion over the birds, as over all created life, their destruction was never intended, except for purposes of utility; food, &c. Such birds as are used for food are

vastly more prolific than those meant for other ends: this at once points out their object in creation. Birds with dark unpalatable flesh were evidently not intended at all for destruction by man: being loathsome to him in this respect, he would not trouble to kill them, except to decorate himself with their plumes, and limited death would amply suffice for that: these birds chiefly destroy small birds and vermin, carrion and insect life, and are true friends to man. There is another class of birds relentlessly hated by man,—seed-eaters,—destroyers of tens of thousands of weeds, at the same time destroyers of a small amount of man's fruit and crops: most of these birds feed their young on caterpillars, and thus at once counterbalance any harm they have done: such are the vast races of the finch. The buntings and the grosbeaks counteract none of their depredations by feeding their young on insects, but amply do so by destroying the seeds of weeds. It is only a Frenchman's appetite that can be gratified by devouring small birds, quite useless, except in their own way—that of pleasing man and devouring creatures, which, were it not for their aid, would become perfect pests. These were not created to be killed, for their numbers are never excessive—never increase to an unreasonable extent. *Rookeries uniting.*—I have two good rookeries in my neighbourhood, one at Loughlinstown, the other (much the smaller) at the Hon. Mr. Talbot's, Ballinlea, Killiney. What has always seemed very strange to me is the juncture of these two rookeries in winter—all roosting in the large rookery at Loughlinstown. In the autumn the birds of each rookery, though associating during the day, sleep in their own (apparently) rookery at night. Rooks of different rookeries I have always understood to be most jealous and antagonistic to any encroachments on their feudal rights, yet such does not seem the case here. When both these rookeries join with their concomitant jackdaws, they make one tremendous whole, I really believe of some thousands. It is a grand sight to see them against a red winter evening sky, wheeling and waving in mazy flight before settling down to roost, the various cawings of the rooks and the "jackings" of the daws blending in one great strain of melody—speaking so straight to the heart of innocence, peace and plenty, of domesticity and husbandry. How often have I stopped my tandem, greatly to the annoyance of my fidgety leader, and the sovereign contempt of my friend, for one ten minutes to be in fancy among that kaleidoscopic mass; yet it is almost a scene of every day to me—at all events of those I spend on land; yet, mayhap, I enjoy that ten minutes far more than

the prior hours of the day spent upon some grouse-mountain, snipe-bog or hunting country—aye, mayhap it is pleasanter than “tooling” my three quarter-breds, though my heart is in each buckle of their harness, each step they take. So much for being a lover of Nature. How dear is the scene, after months spent on the changing sea! so have I felt—so has many another. The traveller who for years has been from home, on his return to his native land and village will inwardly remark, “The old rooks are about here still, just the same as when I was a boy.” Is there not a close tie between the rook and man? May generations hence say with love, “And the dear old rook is here still.”

Mealy Redpole.—Mr. Doubleday has, with extreme kindness, presented me with a beautiful case of mealy redpoles, an adult male, a young male, and two females. This bird is very distinct, both in size and markings, from the lesser redpole. I can now say, without hesitation, that I have never met with this bird in Ireland; in fact, till the kind present reached me, I was totally ignorant of the mealy redpole. The bird forwarded to me by Mr. Gardiner, taxidermist, of High Holborn (Zool. S. S. 225), was not the mealy redpole; hence my doubts on the species being distinct.

Snow Bunting associating with Larks.—March 20. As they flew past I noticed the white bird, and, taking it for a variety of the sky lark, I followed it up and shot it: it was feeding quite amicably with the larks. Common as the snow bunting is in this county, I never met it inland or with larks before.

Wheatear: early arrival in 1867.—March 21. Ballybrack beach.

Magpie: gregariousness.—Magpies have flocked in unusually large numbers this winter about Ballybrack. There has been in existence since last December a flock containing from eighteen to twenty of these birds. They are invariably seen together, though perhaps scattered over an extent of some fields, rarely more than one field, but more often in immediate company. They fly in a straggling flock when disturbed, usually getting up one after another, till the beholder invariably ejaculates, “What a devil of a lot of magpies!” Some days the number rises to twenty-three; once I counted twenty-six. They roost together in a pine wood, and appear dreadfully stupid before going to sleep. A person at this time could kill any number of them by remaining in the dark wood. A friend returning with me from snipe shooting, one evening in January, killed six to get their tail-feathers to make a fan, and would, I believe, have bagged the whole

flock had I not stopped him. March 21—April 4. No diminution in the magpie family: I do not miss the six shot.

Willow Wren: early arrival in 1867.—Though the past winter has been the hardest for very many years, and this month particularly severe, being a continuation of snow storms and easterly gales, yet to-day (March 27th) the little willow wren made his appearance—considerably earlier than usual. The wheatear, too, has come very early. This should prove that climatic influence cannot sway migration. Here we have birds leaving their winter quarters in the face of snow and storm to reach a country not yet free from the thrall of winter, even earlier than their appointed time.

Sand Martin: early arrival in 1867.—April 2nd.

Spotted Flycatcher: occurrence in the County Dublin.—May 16. Shot one of these rare little Irish migrants: it was perched on the branch of a tree, and was shot without knowing the species: there were other birds with it, perhaps of the same kind. I never met with it before in Ireland, though I know of instances of its occurrence in this county. Watters, in his little book on Irish birds, says, "Unusual" in the "eastern counties," and "Very seldom remarked in any of the counties about Dublin." Thompson says, "A regular summer migrant to some parts of Ireland." This bird is in my collection. My English experience of *grisola* is that it only frequents gardens and shrubberies, preferring to build between the boughs of old timber in such places to any other. It is therefore only known to such as frequent such places, and therefore may be more common than believed in this country.

Variety of the Sparrow.—There is a sparrow frequents the Ulverton Road, Dalkey, with a white tail.

Decrease of the Martin: Query on Name.—The martin has been a rare bird in my district this year: at Howth and Lambay Island, where it breeds usually in great numbers, on the face and edges of the bold sea-cliffs, amongst razorbills, guillemots and herring gulls, I saw nothing like the usual numbers. Why is this bird called "urbica" (city-frequenting)? In Ireland it is far more "maritima."

Swift: decrease and its cause.—The line of the Dublin, Wicklow and Wexford Railway Company is skirted by the sea-shore for many miles immediately on leaving the Dalkey tunnel: under Killiney Hill it is a considerable height above the shore, and so close is it built to the edge of the cliff that it has been found necessary to build immense walls from the sands below to the summit, to prevent the natural

embankment from falling, and against the ravages of the sea which washes the base of these cliffs. The sea is slowly encroaching on our east coast and receding on the west. In these steep walls several pairs of swifts have bred now for years, making their nests in the holes either where the mortar has dropped out or where they picked it out themselves. The aspect of this part of the coast is almost due south, easting; so when the sun strikes on the walls they must be intensely warm and congenial to the swifts. This year about fifteen pairs of swifts bred in these holes, and it was my delight to watch them playing about on their wonderful wings. One day in June, going along the coast, as usual I stopped to watch my dear little friends, and see if any young had yet made their appearance. I was surprised to see only three old birds hawking about where I expected a score at least; nor had I long to wait to discover the cause, for soon one of the three birds fell struggling at my feet—shot; the sportsman, a bearded individual, about fifty years of age: he was evidently some frowsy townsman, come to Dalkey for sea air, and was living in a peaceful little spot overhanging the railway at this delicious place, from the garden-wall of which he had shot not only all my poor swifts, but also every martin in his neighbourhood. Just fancy the horrible position of the poor young swifts in their nests dying of starvation—perhaps a poor wounded mother, just able to struggle into her nest to die with her offspring. Tell me, is there no retributive justice hereafter? are there sins that do not need repentance? I remember these walls some years ago to be inhabited by about fifty pairs of swifts, and, allowing eighty young—a small average—to the one hundred old birds, I had in this one breeding-place nearly two hundred swifts. Oh! such a grand sight, on a still calm July evening, as this mighty host of wings would be at one time—a massive scribble upon the firmament, resplendent with the hues of sunset; at another, beneath, between the sea and the spectator a kaleidoscopic cloud, dizzying the brain to follow: again, with the rush of a torrent, the whole mass would drive past, screaming like so many demon imps in pursuit of prey—off out of sight in an instant on their gay journey to gladden by their strange flight some far-off scene. In their absence, how oppressive feels the air, uncooled by their winnowing wings: the silence equally so, were it not for the gentle murmur of the sea upon the rocks beneath, or the quiet “chack, chack” of the stonechat to its young, or the ventriloqueous “burr” of the nightjar far up on the hill-side; yet these sounds but spoke of silence the more. The tired eye might drop on the

jerking wings of the stonechat, perched on the loftiest spray of a furze-bush; or, mayhap, on the innocent dark eyes of a rabbit, gazing from its burrow; or above, upon the hill-side, the form of a kestrel sharply defined on the clear evening sky, poised in air above its prey. But no time for noting more; again the dark forms of the "black martins" scrawl and scribble and knit and weave with mazy lines the bright face of heaven; again their cheery cries ring out and say, "But one month more and we're away to sunny climes; so watch our gambols well, for life is short, the winter comes, for where you watch us now the storm will rage, and gulls and sea-fowl fill the place of swifts." Yes, summer's gone and winter's come these many years, and thou, poor swift, art dying out apace! Swifts breed in the old Castles of Dalkey, in its Roman Catholic Chapel, and formerly in its Church also, in Bullock Castle (three or four pairs), in the battlements of Castle Park (the residence of Mr. Walter R. Atkin), and in some of the old hill-quarries of Dalkey; in Kingstown, in some of the sacred edifices, and several pairs in the sides of an old quarry at Stoneview: in my own district I can quote no other places, and am decidedly of opinion that swifts are on a rapid decrease.

Night Heron.—I mentioned a night heron as having occurred in Belfast (Zool. S. S. 457). The gentleman who communicated the intelligence to me got possession of the bird, and it is now in my collection: it is a young bird of the year. The authenticity of its occurrence is also vouched for by my friend Sheals, of Belfast, who is restuffing it for me: the bird was brought to him to stuff, but his charge being too high the person got it done elsewhere. I believe the bird was alive, having only its wing broken by the shot. The person who had it called it a bittern.

Merlin: abundance in County Dublin in the Autumn of 1867.—August 25. Merlins have been unusually numerous about Dalkey this year, and I have also met with them in other parts of the county; I have been informed, too, of their general occurrence. I shot the first in Dalkey Sound, flying from Dalkey Island to the mainland: I had perceived it previously chasing a titlark on the island: it was a female in first plumage. August 28. A second was seen, at Booterstown, chasing a small bird. A third I killed, about two miles from land, during a dense fog, in mistake for a tern, so small did it appear: it was a male, in first plumage. September 19. A fourth started off the rocks of Dalkey Island, while running in for shelter from a terrific squall; made straight away for sea: I doubt if it could have borne up

against the wind, so in all likelihood it found shelter on the Welch coast. I met with about a dozen altogether. Considering its rarity in this county, it is only fair to conclude that a flight of migrants must have arrived on our shores. In no instance did I see them hover or take prey from the ground, but invariably from the wing: the small birds, on which they solely preyed, were rarely taken till quite terrified and exhausted in their endeavours to escape.

Kingfisher: Notes on its Food.—Whilst frequenting our granite coast the little kingfisher is quite a gem out of place—not disparagingly said of the beautiful denizens of the sea, but so bright a bird does not seem at home amongst the brown sea-weed and the granite rock. Notwithstanding his gaudy coat he can fish in salt water and take from our rock-pools fare he never gets at home—small shrimps, prawns, and the young of many of our rock-fish. I cannot understand why they frequent the coast from August to November and December, because the streams are just as full of fish then as at any other time.

Heron: on its Food.—Most people think that the heron is quite a land bird, frequenting only swamps, lakes and rivers; but such is by no means the case: he seems quite as much at home on our wild strands and slobbs—perhaps I should say more so, for there he is out of danger—as when fishing by the edge of a river in some inland county. Along our rocky coast they may be seen, from September to April, standing motionless or stalking among the sea-weed-covered rocks and pools at low water. At all seasons they are to be met with wading upon our wild “slobbs.” Their food in such places consists of various fishes, green and other crabs, prawns, shrimps and many other crustaceans and *Assteriæ*: they will go, without any seeming dislike, from a feed of trout to this more humble fare. October 10. The stomach of a heron examined to-day was very empty, containing only a few small sticklebacks. How miserably hungry the poor giant must have been to have condescended to strike such atoms! October 20. Three fishermen this year work cod and conger lines from the little harbour of Bullock. Herring is the bait used for the conger, the whelk that for the cod. In breaking up the whelks and cutting the herrings* there is a certain amount of fishy *débris* left about the quay; this, added to the bits of herring not eaten off the hooks, and not used a second time (the conger eel is only

* A herring makes three baits: the lines have frequently upwards of five hundred hooks. The congers weigh from fifteen to eighty pounds; twenty, thirty and fifty pounds are common weights.

taken on the purest bait), bits of whelk discarded for the same reason, together with quantities of sea anemones, star-fish, &c., adherent to the lines, a certain amount of entrails, the trimmings of skates and rays, &c., makes a banquet for a number of herons. Any morning I go down I see five or six of these ogres making away, in the dim dawn, from their horrid feast—their huge wings looming through the gray darkness, phantom-like, in the air—their wild-sounding and reiterated “pha-hank”—and the leavings of their repast, and the ground around soiled by their sœtid fœces—forcibly calls back one’s school-days and Virgil’s harpies:—

“ ——— With ordure still, unclean,
 With claws for hands, and looks for ever lean:
 * * * * *
 They snatch the meat, defiling all they find,
 And, parting, leave a loathsome stench behind.
 * * * * *
 With filthy claws their odious meal repeat,
 And mix their loathsome ordures with their meat.”

Heron in nature will eat other than live fish. I think the poor heron a wrongly blamed bird in many respects. Many authors have calculated his depredations by the *weight* of fish he will eat when crammed in confinement: surely this is not fair, for in nature he cannot, if he would, eat to satiety; for fish are quite as well endowed with instinct as the heron, and I fear the poor fellow often feels this. I have watched herons by the hour, through a glass, standing motionless upon a lake’s margin, or standing on one leg by a river, waiting as patiently as any Isaac Walton for a nibble—have seen them miss their stroke, too, as will the cleverest fly-fisher. I have walked streams where the trout might be seen scudding under the banks in abundance, and have shot herons patiently fishing in them, and yet without a trout or fish in either gullet or stomach. In the spawning season they are more destructive, the infatuation of spawning making the trout quite reckless, and the shallow water giving the heron plenty of time to catch them. I can offer no extenuating circumstance for their destruction of frogs and brook-eels—perhaps no one will grudge the “old crane” such fare.

Missel Thrush.—The missel thrush sung, for the first time, on the 13th of December.

HARRY BLAKE-KNOX.

Dalkey, September 7, 1868.

Errata.—Zool. S. S. 1187, line 18, for “will come the winter breezes,” read “will cause,” &c. Page 1192, line 18, for “In parts of May,” read “In parts of Mayo.” Page 1195, for “And last, not least, the redbreast,” read “red breast”—“red” and “breast” disconnected.—H. B.-K.

Ornithological Notes from North Lincolnshire.

By JOHN CORDEAUX, Esq.

(Continued from Zool. S. S. 1286.)

JUNE, JULY AND AUGUST.

Swift.—We have certainly more than an average number of swifts in the neighbourhood, and I am glad to see two or three pairs have this season taken up their quarters in an old church tower. They have also appeared in other localities where not previously seen, at least for many years.

Corn Crake.—Common as this species was in this parish during the seasons of 1866 and 1867, I have this year never heard its well-known call-note. The absence of this bird from its late haunts is remarkable, and not confined to this parish: a gentleman living in the neighbourhood has also remarked the absence of the corn crake, and informs me that he has not heard them calling during the spring and summer. Perhaps the excessive drought has induced them to seek other quarters in preference to our burnt-up meadow lands, which have barely afforded shelter for a lark.

Effect of Dry, Hot Weather on Birds.—Have any of the readers of the ‘Zoologist’ noticed during the late dry and hot season any difference in the plumage of some of our familiar birds? I have, in this district, so repeatedly been struck with the unusually lighter appearance of our sparrows, larks and corn buntings than is the case with these species in ordinary seasons, that I think I cannot altogether be mistaken, and that this is not a mere fancy on my part. This lighter shade of plumage has been most apparent in the corn bunting, which bird, by the way, I have observed is more subject to variations of plumage than any other of our smaller species. The dry weather has driven many of our birds to seek out unusual and unseasonable sources of food. Peewits have frequented the moist margins of the drains instead of the open fields, feeding along the edge of the water; thrushes have drawn upon their winter supplies and accumulated large collections of broken shells around some favourite stone or stump;

blackbirds I have seen on the roads searching in horse-dung for stray grains of corn; rooks attacked the crops in an earlier stage of their growth than is ordinarily the case. The supply of insects has been almost inexhaustible, and it may be owing to this circumstance that the sparrows have done so little damage to the wheat crop: I never had less to lay to their charge on this head.

Grasshopper Warbler.—This is a rare species in North Lincolnshire. Up to this season I have only noted a single instance of its appearance (May 15, 1863). This year is, however, an exception: their peculiar and unmistakable note might daily be heard in the low-lying plantations near the streams: I have heard in the summer evenings as many as three all “reeling” in concert. They are a most difficult bird to see, as on the slightest noise they drop from their perch—often the side of a tall reed—and are lost amidst the dense aquatic vegetation.

Missel Thrush.—July 27. Small flocks seen flying over the parish.

Probability of the Green Sandpiper breeding in North Lincolnshire.—Two pairs of these birds have remained on our “beck” during the summer,—one pair in this, the other in the adjoining parish,—and I think it is very probable they nest in some one of the dense plantations in the vicinity of this stream. Some years since I remember putting up several young birds near a willow holt on this same stream: this was early in August; and the fish-keeper informs me that he has yearly observed the young brood with the old birds about this date: this year he saw the two old and two young birds together on the 31st of July: he says that they usually have three or four young ones, but this year only two. Occasionally during July I put up a single bird from a beach on this stream: it would fly round and round the adjoining plantations, constantly uttering its shrill whistle, and might be found every day near the same spot.

Snipe.—First seen on the 26th of July.

Whimbrel.—July 28. First autumnal appearance: a flock of about thirty seen in the marsh.

Golden Plover.—August 6. Four seen together in the marsh were in full summer plumage.

Greenshank and Redshank.—August 18. I shot a beautiful mature male greenshank on the “fittiss” this evening: it was flying in company with a redshank, and, by a singular coincidence, got both birds at the same shot. The stomach of the greenshank contained, exclusively, the remains of a small crab about the size of a large pea.

Another bird of this species was seen the same evening flying along the foreshore.

Variety of the Lark.—August 22. Saw a very beautiful variety of the lark in the marsh this afternoon; it was all over a rich buff or isabelline colour. The note and manner in no way different from its companions: it was, however, much tamer, permitting a rather close inspection.

Swift.—August 22. Last noted in Lincolnshire; six seen together. August 28. Last noted in Cheshire; one seen.

Bartailed Godwit.—August 22. Three seen on the "flats;" had a long look at them through the telescope. One was in full summer dress, the other showed slight traces on the flanks and back of a change to the winter plumage. These birds were constantly thrusting their long bills into the ooze: I never saw such energetic feeders; it seems with them the one object of life; but they are not so absorbed in eating as to neglect their safety, for on the slightest sign of danger they rise, and, sounding a shrill wild alarm-note, are off to a more distant part of the flats.

Summer Warblers.—August 22. Many of our smaller summer visitors are now moving southward: this is evident from the number I now see in our isolated marsh hedge-rows and bushes—situations where they are not seen during the spring and summer. These marsh "hedge-shelters" now swarm with little wanderers, principally white-throats, lesser whitethroats, willow wrens, sedge warblers and an odd redstart or two. I never knew the latter bird breed in this parish: I once saw one in an osier-bed near the stream as late as the 8th of October.

JOHN CORDEAUX.

Great Cotes, Ulceby, Lincolnshire,
September 8, 1868.

Life-Histories of Sawflies. Translated from the Dutch of M. S. C. SNELLEN VAN VOLLENHOVEN, by J. W. MAY, Esq.

(Continued from Zool. S. S. 642).

NEMATUS VARUS, *De Vill.*

Larva and imago, *De Geer, Mémoires* (German translation), vol. ii. 2, p. 264. *Ratzeburg, Die Forstinsecten*, iii. p. 119, note.

Nematus niger, ore pallido, femoribus et abdominis cingulo rufo, tarsorum posteriorum articulo primo dilatato.

De Geer, in his 'Mémoires pour servir à l'Histoire des Insectes,' gives a description of *Nematus septentrionalis*, *Linn.*,* the imago of which has the hinder legs broad and flattened in the same manner as in this species, and at the end of his description he states that he has reared a similar imago from an entirely green larva having only some black dots at the side of the body, and which merely differed from the former in the females having red-brown femora the same as the males. De Geer added, "Perhaps nothing more than a variety of the former, but also possibly a distinct species, although the difference is nearly imperceptible."

I take the insect reared by the Swedish naturalist to be *Nematus varus*, more especially from the description of the larva, however imperfect that may be. I am strengthened in this opinion by the following observations of Ratzeburg (*loc. cit.*):—"Linné (Fauna Suec. 10, 1558) hatte unzweifelhaft die ächte *T. septentrionalis*, jedoch nur ♂, vor sich. De Geer's (l. l. ii. p. 264) Erziehungsresultate stimmen mit den meinigen überein, denn er beschreibt nur die ♂, wie Hr. Hartig und sagt von dem ♀, alle Hüftbeine (worunter er die Schenkel versteht) seien schwarz. Aus andern ganz grünen Erlenasterraupen, nur mit einigen schwarzen Punkten an den Seiten des körpers, erhielt De Geer dergleichen Blattwespen mit langen und breiten Hinterfüßen, nur hatten die ♀ eben so rothbraune Hüften, wie die ♂. Sicher war diese Blattwespe dieselbe, welche Hr. Graff erzog und die, nach den von mir auf dem Berl. Museum verglichenen Stücken zu urtheilen, zu *Nematus varus* Villaret gehören würde."

The result of my observations of this species may be stated as follows:—

At the end of the summer (August and September) I often found solitary green sawfly larvæ feeding on the alder: these larvæ had no other ornamentation than some black dots on the sides and the legs. A similar larva was once sent to me by my friend Wittewaall in the month of July, from which it appeared to me that there must be more than one brood in the year. Most of mine went into the earth as larvæ, a few spun up: only two imagos appeared from the cocoon. It was thus apparent that this species was difficult to rear. I have not seen the egg, and am not aware whether it is deposited in the petiole or the nervures of the leaf. I also did not see any very young larvæ; but

* Described in vol. ii. of the 'Transactions of the Netherland Entomological Society,' and at p. 8175 of the 'Zoologist.'

I observed some which I supposed had undergone but two moults, and these completely resembled the full-grown larva.

When full grown they exceed 20 mm. in length, and are nearly cylindrical, but somewhat strongly wrinkled on the dorsum. The head is brownish green, the colour of dead leaves, with a round spot on each side, in which the eye is placed. The colour of the body is sea-green. A row of black dots and dashes extends along the sides, beginning at the neck and following the direction of the spiracles to the last segment; a similar row is found just above the legs, but does not extend quite so far (fig. 2). There are in all twenty legs; the thoracic legs are green, with black dots; the abdominal and anal legs are without dots; the tail end is produced on both sides into a spine, and has the posterior border brown (fig. 3).

This species, like most, if not all, of the genus *Nematus*, on being touched defended itself by raising and curving the abdomen, displaying the under side of that part of the body. On observing this with a lens I found on the sixth, seventh, eighth and ninth segments four dark green glands of a very elliptical shape, which the animal had the power of entirely retracting, so that nothing could be seen in their place but little folds of skin. When only moderately projected these glands had the appearance of *a* in fig. 4, in which *b* represents the two legs: if, however, I took the animal between the fingers and gently compressed it the gland was made to project further, and assumed the appearance of *a* in fig. 5, when it also appeared to me that I could distinguish an opening at its extremity. Although, after this treatment, when I released the animal, the gland was entirely retracted again, I doubt whether this excessive protrusion of it was normal, as I never saw the larva protrude it so far of its own accord. Beyond this I have not observed anything remarkable about this insect in its larval state. When it was full grown it crept into the earth, where it made a simple hard cocoon, which I have represented at fig. 6.

The larvæ, which had spun up in August or September, produced the imago in the early spring. I found one imago, which, however, was dead, in a tin box on the 1st of March; the larva had spun up in the first week of August. I cannot be quite certain that this imago had not emerged in the autumn, but as it is my habit frequently to inspect my nursery during the summer and until late in the autumn, I presume the perfect insect emerged in February, which would certainly be very early.

The other imago made its appearance later in the year. On comparing this sawfly with that represented on plate 5 in the second volume of the 'Transactions' (*Nematus septentrionalis*), it will be seen that a great resemblance exists between them. Both are characterized by the remarkably expanded hinder tibiæ and tarsi: the great difference between the present and the species before treated of consists in the red femora and unspotted wings. The head is black, with the emarginate border of the clypeus and the upper lip obscure white; palpi reddish white; mandibles shining dark brown. Antennæ long, normal, black; eyes also black, but the ocelli pale brown. Thorax shining, black, but hirsute, in consequence of which the smoothness is somewhat obscured; the borders of the prothorax and the tegulæ are brown. Wings brownish white, transparent; the radius, posterior margin of the stigma and the externo median nervure pale brown (fig. 7); the anterior nervure of the posterior wings is also of this tint, the remaining nervures being deep brown or black. In the second submarginal cell is a black horny spot. The cenchri are white; abdomen black, shining; the third, fourth and fifth segments and the margin of the second clear red; the anal projections and the parts surrounding the saw are black and pubescent. All the coxæ are black, with the extremities obscure white; the anterior legs are pale brown; the femora of the second pair of legs are pale reddish brown, with their tibiæ pale brown and the tarsi of a yet paler tint. The posterior legs have the femora thickened and of a clear red colour, the knees being black; the tibiæ are just tipped with black at the base, then white nearly to the middle, then dilated, flattened, black, very shortly hirsute, and having two unequal spines. Tarsi black, the first joint being particularly broad and flattened; claws brown.

This insect is very seldom taken on the wing. According to Hartig the male has the same colouring as the female.

CLADIUS ALBIPES, Hartig.

Larva and imago, *Hartig, Blatt. und Holzwespen*, p. 178 (*albipes*).
Brischke, Abbildungen, &c., p. 10, tab. ii., fig. 2. *Ratzburg, Die Forstinsecten*, vol. iii. p. 129.

Cladius antennis maris simplicibus, niger, pedibus, pro majori parte albis.

We have now to describe a species having four generations in the year, which appears a large number when we consider that most saw-

flies have but two broods in the year, while many have but one, and even some *Cimbices*, as a rule, pass two years in the larva state. We have also to do with a species, which, if it be not yet classed among injurious insects, will probably soon have to be placed in that category. If I remember rightly Dr. J. Wittewaall informed me that more than one cherry-orchard in Gelderland had been defoliated by the larvæ of this species.

My first acquaintance with these larvæ dates from July, 1845, at which time I found them in my garden on the bird cherry and hawthorn. I have since found it in great numbers on cherry trees. Hartig and Brischke found it on the cherry; the latter author observed it on the raspberry also. The larva (figs. 1 and 2) attains a length of 13 mm.: it is depressed and laterally expanded; body hirsute; legs twenty. The colour of the head varies in different examples; in some it is shining ochre-brown, the upper jaws being dark brown; on the vertex is a quadrate black spot, and two circular black ones forming rings round the eyes; in others (fig. 4) the head is greenish, irrorate with brown; the upper jaws green, with the apices ferruginous, a transverse brown spot between the eyes, a black rounded spot on the vertex, and two similar ones on the sides; in all cases the head is pretty closely beset with gray hairs. The ventral surface and sides of the body, as also the legs, are sordid greenish white; dorsum grayish or brownish olive-green, and not cinnamon-brown, as represented in Brischke's figure, nor bright green, as described by Hartig. I have only once observed a full-grown larva, which had the dorsal surface of the four anterior rings ferruginous; this was in the month of August, and the larva in question was on a Morelle cherry tree. A narrow yellow line runs along the middle of the olive-green space. On the back are two interrupted rows of small projections, always in little clusters of three or five, as shown at fig. 5, which represents the back of the fourth abdominal segment. The back and sides are covered with pretty long blackish hairs. Between the head and the green coloured dorsum is a greenish white transverse line; a similar but somewhat undefined line is also found at the base of the last segment.

The trophi of the larva are described and figured by Hartig.

There are no distinct scales on the thoracic legs; the claws of these legs are small and of a brown colour. The fourth and penultimate segments are apodal.

The larvæ were generally on the under surface of the leaves, and ate holes in the centre portions, as shown in the left-hand leaf in our

figure: when there are many together they only leave the principal veins and here and there a little piece of the margin, as shown in the right-hand leaf in the figure just referred to.

These larvæ spun up on the 12th of July; the wasps appeared on the 4th and 5th of the August following. I have since observed that the change from larva to imago does not always take twenty-four days, but that sometimes the unusually short period of four or five days is sufficient. A larva taken on the Morelle cherry spun up on the 21st of June, and the imago was produced on the 26th of the same month. If the metamorphosis always proceeded as rapidly six generations might reasonably be looked for in favourable years.

The pupa of this quickly-changing larva is represented at fig. 6; it had spun a cocoon against the side of the glass bottle in which it had been placed: this cocoon was not closed in at the side against the glass, so that it could easily be observed through the side of the bottle. The cocoon was double, and had the appearance of dried green sputa; fig. 6 *bb* represents the outer margin or cocoon, *a* being the inner one; the pupa is seen lying on its back, having already nearly acquired its full colour, while the larval skin is not, as might have been anticipated, at the end of the body, but under the meso- and meta-thorax: it may, however, have been pushed up towards the head by the movements of the pupa. The larvæ construct their cocoons against the stems of trees in cracks and crevices, and also among dead and fallen leaves.

The imago is between 7 and 8 mm. long, expanding to 16 mm. The body is of a brownish black colour; head flat and broad; the antennæ, composed of nine joints, are of the length of the body; the first two joints are very small and the third is cylindrical, a little compressed on the inner side; the fourth is somewhat longer, the succeeding joints being gradually shorter; they are hirsute, especially on the upper side, but have no knobs or pectinations. The cenchri on the thorax are sordid white. The legs are slender and weak; the bases of the coxæ and the middle of the femora brownish black, all the remainder being obscure white, or even, in some individuals, pure white as far as the tips of the tibiæ, which, with the tarsi, are pale brown, less so, however, in the case of the anterior than of the posterior legs (see fig. 7).

The wings are somewhat broad and rounded, having the radius and stigma very pale brown, the other nervures black. The nervure between the first and second submarginal is rudimentary, but in the

last-named cell is a black horny spot. The saw (fig. 10) and ovipositor (fig. 11) of the female have much resemblance with those of *Cladius uncinatus*, *Klug*, which I described in the fourth volume of this periodical, and represented at plate 4. It will be found on comparison that the difference between them is very small.

I think *Cladius albipes* occurs in every part of this country; I have also received it from Belgium: according to the works referred to, it is common in some districts of Germany. I am uncertain whether it is found in France or England, as I cannot identify it as being mentioned in the works of Lepelletier, de St. Fargeau or Curtis.

Arrival of a young Koodoo at the Zoological Gardens.—We are glad to announce the accession of a young male koodoo to the collection in the Regent's Park. The koodoo is one of the most magnificent and stately of the African antelopes, the full-grown animals being furnished with magnificent spiral antlers of four feet and upwards in length. Some years since a specimen was received at the Gardens, but in such bad condition that it lived only a few days. The recent arrival is in good health, and is gaining flesh rapidly.—*From the 'Field.'*

Arrival of a Two-horned Rhinoceros at the Zoological Gardens.—The Zoological Society of London have just received an important addition to their extensive living collection, in the shape of a two-horned rhinoceros (*Rhinoceros bicornis*). The Indian form of rhinoceros has long been well represented in the Society's menagerie, but the very different African type, to which the present animal belongs, has been hitherto a *hiatus valdè deflendus* in the series. The animal which arrived yesterday, and which is believed to be the only individual of the species that has reached Europe alive since the days of the Romans, is a young male, about six feet long and three and a half feet high. It was captured in the autumn of last year, in the vicinity of Casalá, in Upper Nubia, by the native hunters employed by Herr Casanova, an enterprising traveller of Vienna, and conveyed to Hamburg (*viâ* Alexandria and Trieste), along with a number of African elephants and other animals. Here it passed into the possession of Mr. Carl Hagenbeck, a well-known dealer in living animals, of that city, who has now parted with it to the Zoological Society at the price of £1000—being, we are informed, the largest sum they have ever paid for a single animal. The rhinoceros is remarkably tame, and in excellent health and condition. It is fed principally on clover hay. Pending the completion of the large building now in process of erection, which is destined to contain the Society's series of elephants, rhinoceroses and tapirs, it is temporarily lodged in the giraffe-house.—*Id.*

Albino Water Rat.—I am not aware whether a white, or rather a sort of creamy pink, water rat, with pink eyes, has been often seen before; I certainly never saw or heard of one until I caught the one I now have ten days ago. One of the gardeners saw an odd animal run out of the grass, and threw his hoe at it, which cut off about two inches of the tail. A cage-trap was set near the hole it ran into. In less than half an hour the rat walked quietly into it, and was caught alive. It seems quite

contented in a cage, and eats cabbage-leaves in your presence, when you give them to it; in fact, it seems quite at home.—‘*Field.*’

White Kangaroo.—One of the most beautiful natural curiosities in the colony is in the possession of Mr. Hepburn, of Ballarat. It is a milk-white kangaroo, as tame, docile and harmless as it is possible for any domestic animal to be.—*Australasian.*

Uncommon Birds at Cobham, Kent.—We have had several rare birds at Cobham this summer. During the beginning of August a buzzard, of the common species I think, was several times observed. I saw it myself quite near me one afternoon, and it was observed near the same spot on the evening of that day, and on the next day. Each observer described it as a very big hawk, of owlsh appearance and brown colour. A young crossbill was caught in the garden of Cobham Vicarage during the summer. As usual the hobbies are to be seen in their old quarters, and the same number—three: with my glass I could examine them with great accuracy, noticing the white cheeks, black moustache, and the stripes on the breast. In the same wood I heard and saw a raven on the 3rd of September: it is the first I have seen for a long time: one ancient pair were shot on account of their annoying the herons so much. Two broods of the great spotted woodpecker have been reared here this summer: the natives call them “magpie galley-birds,” galley-bird being their name for woodpecker.—*Clifton; Cobham Hall, September 4, 1868.*

A White Sparrowhawk in Suffolk.—A beautiful variety of the sparrowhawk, perfectly white, was shot by Mr. Charles Nunn, on his farm at Fornham St. Genevieve, during the latter part of last July, and was, I am informed, preserved by a bird-stuffer at Bury St. Edmunds.—*T. E. Gunn; Norwich, September, 1868.*

Blackbird nesting in a Cauliflower.—During the past season a cauliflower was growing in the garden of Mr. W. Tunnill, on the Downham Road, Ely, weighing nearly nine pounds, on the top of which was a blackbird’s nest containing four eggs. The nest was neatly covered with the leaves of the plant.—*Id.*

Reed Warbler.—As I see, in the September number of the ‘*Zoologist*’ (S. S. 1375), that the Rev. H. Harpur Crewe does me the honour of wishing to hear further from me on the subject of the doubtful reed warbler, which I brought before the notice of the readers of this publication some few years since, I can only say that the experience of the subsequent year strengthened my belief that this bird will eventually be placed as a distinct species from Arundinacea. The year after my first communication on this subject I obtained at the lilac plantation four specimens about the last day of May: being obliged to shoot them at very close quarters, as the lilacs, drawn up to a height of twelve feet or more, form nearly a thick canopy at the top, two specimens only were good, one of them exceedingly good; both are added to my collection. Since that time, although carefully looked for each season, not another specimen has been seen there, or indeed in any part of our parish. The plumage looks altogether of a darker hue than Arundinacea, the head flatter, in a straighter line with the beak, which seems both longer and narrower. The whole head more resembles in shape and appearance the grasshopper warbler than the reed warbler. The gape also of this bird is towards the base and throat of a fine orange colour when fresh killed, whereas in Arundinacea—at least, in those I have seen in the flesh—the gape is yellower. My

smaller birds being cased in classes, I have placed the common and this doubtful species in close proximity, and shall have much pleasure any time after October, when I am again settled at home, in giving any ornithologist who may think it worth coming as far as Hampstead an opportunity of comparing them together. Mr. Crewe adds that Mr. Gould saw his specimen, but ignored it as a distinct species. Mr. Gould also saw my *earliest* specimens, which were, I confess, in bad plumage, as they were killed after the breeding season, but still they had such a distinctive appearance that, on his very kindly giving me his box of skins of Arundinacea to examine, I was able at once to pick out *one*, and *only one*, similar bird to mine, from his series: I remember it was ticketed, but I forget the locality.—*Robert H. Mitford; Hampstead, N.W., Sept. 17, 1868.*

Isles of Scilly: Autumnal Migration.—It is a curious fact, and one which I have noticed for several years, that a great number of the British summer visitants, which are almost, and some entirely, unknown in West Cornwall in the spring and summer months, are every autumn in the migratory season to be found at the Scilly Isles, with the exception of the nightingale. Amongst the common warblers I may instance the garden warbler, lesser whitethroat, common redstart, reed warbler, wood warbler, pied flycatcher, and also species of other families, which, for some hidden cause, scarcely ever are seen in this neighbourhood, have repeatedly been observed in the Scilly Isles in the great southern movement season. I have just had word that whitethroats (a common species with us all the summer), redstarts, redbacked shrikes, whinchats, reeves, &c., have made their appearance at Scilly. I may add that a swift and sand martins were observed at the same time, and also two crossbills: a late date for the swift. Temminck's stint was shot at Scilly last week. A large flight of yellow (Ray's) wagtails arrived with the other birds, all in pale buff plumage, without much tone of yellow: these, and I expect a large proportion of the first flight of other migrants, are birds of the year. I have remarked for several years that the species of *Tringa*, *Limosa*, and other waders in the early autumn, exhibit immature plumage, from the borders of the dorsal plumage being margined with buff-yellow, such as the knot, godwits, curlew, *Tringa*, &c., &c.—*Edward Hearle Rodd; Penzance, September 15, 1868.*

Crossbills at Leicester.—On the 12th of July a flock of eight crossbills visited our garden, attracted by a pair of tame caged crossbills which were hung on a tree. They were very clamorous on observing the caged birds, and flew round several times before alighting on the fir trees. There were two richly-coloured red birds, and the rest greenish. They stayed for three or four days, scattered about the gardens and plantings in the neighbourhood. They generally fed in silence, and were not easily alarmed: in feeding they clung to the branch or to a fir-cone, and wrenched the scales of the cones asunder, pecking out the seed and dropping the empty cone. Quantities of open cones were scattered under the trees: cones which have been opened by crossbills generally have a ragged look. In the pine wood of Ben's Cliff, in this county, I have noticed great quantities of these ragged or frayed cones, and am convinced they were eaten by crossbills, as cones from which the seeds have been extracted by our tame crossbills have the same appearance. I have never observed crossbills in this county before, and was on the point of shooting several, to make assurance doubly sure, but forbore doing so. Macgillivray, in vol. iii., mentions a pair breeding on the borders of Bradgate Park; and I think some visit the large fir woods in winter. But this is also interesting, as they occurred so near a large town—within half a mile. A pair

were seen in the garden and neighbouring woods last week. Our tame birds climbed about the cage with their bill, like parrots, lifting the larch-cones off the floor, but leaving the larger cones on the cage bottom, holding them with the claw and wrenching the seeds out. They had a curious way of tearing the laminæ or scales off the cones to pieces, after extracting the seeds.—*Theodore C. Walker; Woodside, Leicester.*

Scarcity of Hirundines.—There seems to be a great complaint of the scarcity of Hirundines; my experience of the seasons leads me to quite a different conclusion. The swallow (*Hirundo rustica*) arrived very early: the first was seen on the 29th of March; but the first martin (*H. urbica*) did not arrive until the 1st of May. Of swallows we have a great increase, and of martins it will be sufficient to say that where there were eight nests last year there were this year above forty, chiefly owing to the additional buildings and the putting of a large projecting eave round the house. I believe, if the protection from weather was made better in any given locality, there would be a large and continued increase. Some years ago, when resident in Lincolnshire, there was not a martin's nest in the village, but upon the erection of a new vicarage, with projecting eaves, they soon made their appearance, and from a solitary nest increased in three years to above fifty. The martins this year, with the exception of five that had young ones, left the village on the 14th of August, and now (the 7th of September) they have all gone. The swallows have also begun to congregate, morning and evening, and to-day they have been basking in the sun, on the slates, the greater part of the day.—*J. Ranson; Linton-on-Ouse, York.*

White Woodcock: Correction of an Error.—In my former note on this subject (Zool. S. S. 1220) I stated that the bird was shot in the North of Yorkshire: I have since found this to be a mistake, it having been killed at Tain, in Scotland.—*T. E. Gunn; September, 1868.*

Parasitical Worms in the Intestines of a Cuckoo.—On the 29th of August I dissected a young male cuckoo, and, although very fat, I found a large number of tape-worms attached to the intestines: they measured from one inch to two inches and a half in length, and were collected in clusters of three, four, seven and eight individuals: each group had worked a hole nearly one-eighth of an inch in diameter, from which they derived nutriment: they were loosely attached. I have preserved some of the worms in spirits.—*Id.; September 10, 1868.*

Great Snipe near Christchurch.—A great snipe was shot near Christchurch, in Hampshire, on the 1st of September. I skinned the bird with difficulty, for it was excessively fat and swollen besides, owing to the hot weather. The inter-scapulars, scapulars and back, instead of being "rich brownish black," as described in Yarrell, are buff; hence I conclude it must be a bird of the year. Mr. Gatcombe informs me that, on Thursday, the 3rd of September, he saw another, in the flesh, at a London birdstuffer's, just sent up from the neighbourhood of Reading, shot probably the same day as mine. When my father visited Norwich fish-market, in former years, he always used to see one or two, or perhaps three, great snipes there during the first fortnight in September.—*J. H. Gurney, jun.; The Bank, Darlington.*

Sabine's Snipe.—I wish to invite opinions on this bird: one says it is merely a darker variety of the common snipe, while others affirm equally strongly that it is a separate species, and quite as distinct as the solitary snipe. I have lately spoken to a most enthusiastic snipe shooter, and he believes it to be a totally different bird, and not a variety of the common snipe. Are not the pages of the 'Zoologist' the best

medium for settling this question? I should be glad if any one would give names of places wherever the bird has been met with, not only in this country, but elsewhere.—*W. Watson.*

[Perhaps the following extract from page 318 of my edition of Montagu's Dictionary may be of some use to my correspondent:—"This bird was described by the late Mr. Vigors, at p. 556 of the fourteenth volume of the 'Transactions of the Linnean Society,' from a specimen killed in Queen's County, Ireland, in August, 1822. A second specimen, as recorded by Mr. Selby, was shot on the banks of the Medway, near Rochester, in October, 1824; a third at Morpeth, in Northumberland, as also recorded by Mr. Selby, but without date; and Mr. Thompson, in his 'Natural History of Ireland,' gives full particulars of a fourth, killed in December, 1827, about a mile from Garvagh, in the County Londonderry. In the 'Zoologist' for 1845 Mr. Knox records, at p. 1025, the occurrence of a fifth specimen, shot early in May of that year, near one of the estuaries of Chichester Harbour: in the volume for 1846 Mr. Selater, the active Secretary of the Zoological Society, mentions, at p. 1300, a sixth killed on Basing Moor, in Hampshire: in the volume for 1857 Mr. Stevenson notices, at p. 5427, the occurrence of a seventh at Rainham, near Fakenham, in Norfolk, on the 17th of October, 1856: and finally, in the volume for 1862, Mr. Rodd records, at p. 7882, the occurrence of an eighth example at Carnauton, near Penzance, in 1861. After reading, with the care which such valuable remarks deserve, the opinions of Mr. Salvin (Zool. 5593) and Mr. Rodd (Zool. 7938), I incline to the opinion suggested, but not enforced, by those accomplished ornithologists, that Sabine's snipe is nothing more than a variety of the common snipe. It seems to me a remarkably apt illustration of that deviation from normal colouring which so frequently occurs in nature, not only among birds, but in every department of the animal kingdom."—*Edward Newman.*]

Occurrence of the Common Dotterel at the Lizard.—The common dotterel seldom makes its appearance in Cornwall: we find them sometimes on our open moors near the sea, and generally in the autumn. I observed two in the birdstuffer's hands, which came from the Lizard district near Helston.—*Edward Hearle Rodd; Penzance, September 16, 1868.*

Glossy Ibis in Norfolk.—I have received this day, for preservation, a beautiful immature male specimen of the glossy ibis, in the flesh, from Stalham (but cannot at present say whether shot in that particular locality). The bird was rather fat, and weighed one pound six ounces, being four ounces more than Morris, in his 'British Birds,' allows for the average weight of adult birds, and six ounces above the average of immature birds.—*T. E. Gunn; 21, Regent Street, Norwich, September 14, 1868.*

Divers on Land.—I have stated (Zool. S. S. 1379) that divers never come to land except in the breeding season: this in its natural sense is true, but, unnaturally, sometimes a poor diver will find himself in a midland county in England or thrown upon a beach. The most probable supposition to account for the former predicament is that storm had compelled the bird to seek inland water for its subsistence, or that it was crossing the island from a stormy sea to seek quieter water under the lee of the land: in either case we must suppose that either fatigue, error or accident caused it to alight, as it certainly would not wittingly alight on land, from which it could never rise. In the case of its being thrown ashore, fatigue, sickness, or its inadvertently diving within the power of a roller, will account: it certainly never goes ashore willingly, except, as I said, the female to lay and incubate. Those pictures we see of divers perched on

rocks and the edges of lakes are visions of the sketcher we naturalists do not see in life. I once saw a diver ashore in winter, and only once; that was behind the West Pier, Kingstown; it was *Colymbus glacialis*: it had been thrown up by the waves caused by a strong easterly gale, while diving among the rocks: a more helpless creature I never met with: I got down and liberated it; it instantly dived, appeared again two hundred yards off, appearing fully alive to the peril it had escaped.—*Harry Blake-Knox*.

Erratum.—Zool. S. S. 1380, line 10, leave out the semicolon between "feet" and "at"; and read, "They can spring by this means ten feet at an altitude of two feet, the wings being of great aid."—*Id.*

Great Northern Diver breeding in Scotland.—In addition to the notes previously given (Zool. S. S. 1309), I may mention that a friend also heard of the great northern diver breeding in another part of Scotland. The person who described the bird to him quite satisfied him as to the correctness of his statement, and described the cry as differing from any that he had ever heard the blackthroated diver to utter, and agreeing, as far as my friend could trace, with the cry of the birds I saw in Sutherland, and which I imitated in his hearing.—*John A. Harvie Brown; Dunipace House, Falkirk, September 5, 1868.*

Blackthroated Diver off the Dublin Coast.—February 11, 1867. Shot an adult. March 5, 1867. Watched, through a glass, an adult in full breeding dress. January 5, 1868. Watched an adult: it was in the spring moult.—*H. Blake-Knox; September 7, 1868.*

Little Auk in Dublin Bay.—November 7, 1867. Shot a little auk in the bay: it was a young bird in its second winter, and in very rich plumage.—*Id.*

Leach's Petrel in Dublin Bay.—January 10. Shot an adult of this little petrel in the bay; there were others with it.—*Id.*

Eared Grebe in County Dublin and County Antrim, Ireland.—December 7, 1867. To-day I was brought an eared grebe that a fisherman's son killed with a stone or a whelk-shell, while swimming off the Kolamore, Dalkey, County Dublin. It appeared a young bird, without any of the head plumes, and was in the plumage of the "dusky grebe" of some authors. A day or so later another of these grebes came under my observation: it was killed at Six Mile Water, Doagh, County Antrim, and was in exactly the same plumage as my bird. I believe this to be the rarest of our Irish grebes.—*Id.*

Kittiwake: Correction of an Error.—I find in my notes on the kittiwake (Zool. S. S. 1367) that I mention that "four was the prevailing number of eggs laid": this ought to have been written "three"; in several cases I found more than that number, but they were exceptional. In June of this year, at Barra Head, I found in no case more than three, but the birds had not finished laying, and more nests had one and two eggs in than three. I see in the 'Leisure Hour' for October, in which I give an account of Ailsa, I mention rock dove, rock pipit, curlew, thrush and ring ouzel: these will be included in a future list.—*Theodore C. Walker.*

Little Gull near Bridlington.—Mr. Jones has just sent me two little gulls (*Larus minutus*) from Bridlington Quay, shot by Sheffield excursionists. Both have the occiput and nape of the neck streaked with grayish black on a white ground, but one is somewhat larger than the other.—*J. H. Gurney, jun.; September 8, 1868.*

NOTICES OF NEW BOOKS.

‘*The Nile Tributaries of Abyssinia.*’ By Sir SAMUEL W. BAKER, M.A., F.R.G.S. London: Macmillan, 1868. 596 pp. letter-press and numerous illustrations.

WERE it my duty to express any opinion as to the *originality* of the discoveries of Bruce, Speke, Grant and Baker, I should be inclined to refer to those ancient maps of Africa lately republished in ‘Good Words,’ and to compare Lakes Zembre and Zaflan with Albert Nyanza and Victoria Nyanza; and I should like also to inquire how it happens that trading-stations, certainly existing in 1450, should have been entirely forgotten in 1850. I find it impossible to conquer a belief that the Magungo of Sir Samuel Baker was a trading-station familiarly known to the Portuguese, centuries previously, and that, under the influence of an Ethiopian atmosphere and surroundings, the black races of man have been gradually making head against the white races, who at an earlier period were certainly the aggressors. We have learned from the writings of Mr. Bates that when man rests from his aggressive policy, even for a few months, Nature and Nature’s forestry reconquer the ground they had lost; and thus it has been in Africa: the white man has halted in his onward course, and Nature, in the person of the black man, has reclaimed and regained her own. But, difficult though it be to perceive the *originality* of their recent discoveries, it is still more difficult to attach any scientific value to the zoological labour of these enthusiastic travellers; indeed, when we seek for precise information, we really seem further removed from it than before we had read a line of the description or glanced at one of the illustrations. Thus, what is the “seroot fly,” described and figured at p. 185? And what are the “bayard” and the “coor,” described and figured at p. 225? A little, a very little, knowledge of the scientific or technical department of Natural History would have enabled Sir Samuel to convey to us some idea of these novelties, indeed I may say some knowledge of the Zoology of a region almost entirely unexplored by the scientific naturalist. Our intrepid traveller is familiar enough with the lion and the leopard, the elephant and the rhinoceros, the giraffe and the hippo, the baboon and the crocodile, the gazelle and the ostrich; and when he tells us of his encounters

with these, modestly enough, but always intelligibly, we feel that he might truly say of these struggles,

“ Quorum pars magna fui :”

we feel that we can receive with unqualified belief everything he asserts, even to the most minute detail; but when we read such descriptions, and contemplate such figures as those to which I have referred, we cannot help wondering what evil spirit could have induced him to venture on tasks for which he was so unqualified. On the other hand, nothing can be finer than the description of one of the rhinoceros hunts: a pair of these massive creatures were found lying side by side, like a couple of pigs, under a mimosa bush: up they rose, and galloped off neck and neck, like a pair of carriage-horses regularly broken to their work. Sir Samuel and his mounted aggageers immediately pursue, the dark forms of the Arabs contrasting strongly with the yellow sand, their long straight hair floating behind them, and their naked swords flashing in the blazing sun: on sweeps the calvacade like a simoom; on, on, for twenty minutes the pursued and the pursuers have maintained their utmost speed; at last the forestry appears in sight and the quarry escapes, one, however, receiving a sword-cut from the foremost aggageer as his unwieldy form disappears in the impenetrable jungle.

The great eastern affluent of the Nile, known as the Atbara, is the principal scene of Sir Samuel Baker's exploits. This little known and still very imperfectly explored river, presents characters as interesting to the zoologist as they are instructive to the geographer. In no part is the stream, when stream there is, less than four hundred yards in width; in many places this width is greatly exceeded. The banks are from twenty-five to thirty feet high, but the river, at the period when Sir Samuel reached its banks, was not only partially dry, but so glaring was the sandy bed that the reflection of the sun was almost unbearable. Great numbers of the dome palm (*Hyphæne thebaica*) grow on its banks, and this singular tree appears to be the great support of life during the dry season. The Arabs then forsake the deserts and flock to the river-banks, not only for the sake of the fruit of the palm and the seed-pods of the mimosa, but also because animal life is in spots so abundant, and therefore food so readily attainable. Here and there, at intervals of three or four miles, were pools of deep water, and around these the Arab inhabitants had established little villages or camps of the usual mat-tents, constructed of palm-leaves.

“Many pools were of considerable size and of great depth. In flood time a tremendous torrent sweeps down the course of the Atbara, and the sudden bends of the river are hollowed out by the force of the stream to a depth of twenty or thirty feet below the level of the bed. Accordingly, these holes become reservoirs of water when the river is otherwise exhausted. In such asylums all the usual inhabitants of this large river are crowded together in a comparatively small space. Although these pools vary in size, from only a few hundred yards to a mile in length, they are positively full of life; huge fish, crocodiles of immense size, turtles, and occasionally hippopotami consort together in close and unwished-for proximity. The animals of the desert—gazelles, hyenas, and wild asses—are compelled to resort to these crowded drinking-places, occupied by the flocks of the Arabs, equally with the timid beasts of the chase. The birds that during the cooler months would wander free through the country, are now collected in vast numbers along the margin of the exhausted river; innumerable doves, varying in species, throng the trees and seek the shade of the dome palms; thousands of desert grouse arrive morning and evening to drink and to depart; while birds in multitudes, of lovely plumage, escape from the burning desert, and colonize the poor but welcome bushes that fringe the Atbara river.”—p. 34.

How pleasant and how striking is this picture, but we shall see in the next paragraph how evanescent also. Imagine the bustle and disturbance, the excitement, the shouting, the uproar, incidental to the scene which the author next describes. I think, had this scene happened within the scope of my own observation, I could not have resisted the temptation to accept the phenomenon described as at least a precursor or accessory, if not the sole cause, of the annual inundation which takes place hundreds of miles nearer the Mediterranean. However, without speculating on either the cause or the result, I will cite the author's marvellous narrative.

“The cool night arrived, and at about half-past eight I was lying half asleep upon my bed by the margin of the river, when I fancied that I heard a rumbling like distant thunder: I had not heard such a sound for months, but a low uninterrupted roll appeared to increase in volume, although far distant. Hardly had I raised my head to listen more attentively when a confusion of voices arose from the Arabs' camp, with a sound of many feet, and in a few minutes they

rushed into my camp, shouting to my men in the darkness, 'El Bahr! El Bahr!' (the river! the river!)

"We were up in an instant, and my interpreter, Mahomet, in a state of intense confusion, explained that the river was coming down, and that the supposed distant thunder was the roar of approaching water. Many of the people were asleep on the clean sand on the river's bed; these were quickly awaked by the Arabs, who rushed down the steep bank to save the skulls of my two hippopotami that were exposed to dry. Hardly had they descended, when the sound of the river in the darkness beneath told us that the water had arrived, and the men, dripping with wet, had just sufficient time to drag their heavy burdens up the bank.

"All was darkness and confusion; everybody was talking and no one listening, but the great event had occurred, the river had arrived 'like a thief in the night.' On the morning of the 24th June, I stood on the banks of the noble Atbara river, at the break of day. The wonder of the desert! Yesterday there was a barren sheet of glaring sand, with a fringe of withered bush and trees upon its borders, that cut the yellow expanse of desert. For days we had journeyed along the exhausted bed: all Nature, even in Nature's poverty, was most poor: no bush could boast a leaf: no tree could throw a shade: crisp gums crackled upon the stems of the mimosas, the sap dried upon the burst bark, sprung with the withering heat of the simoom. In one night there was a mysterious change—wonders of the mighty Nile! — an army of water was hastening to the wasted river; there was no drop of rain, no thunder-cloud on the horizon to give hope, all had been dry and sultry; dust and desolation yesterday, to-day a magnificent stream, some 500 yards in width, and from fifteen to twenty feet in depth, flowed through the dreary desert! Bamboos and reeds, with trash of all kinds, were hurried along the muddy waters. Where were all the crowded inhabitants of the pool? The prison doors were broken, the prisoners were released, and rejoiced in the mighty stream of the Atbara."—p. 51.

Now for a somewhat more detailed account of the Zoology. The monkeys unquestionably take the post of honour among the beasts of the forest; and although our glimpses of the quadrumanes are few and far between, they are well worth searching for, and well worth reading and quoting when found. The first peep of our four-handed friends exhibits them in a shrewd, careful, and I may say sagacious character.

“The large tamarind trees on the opposite bank are generally full of the dog-faced baboons (*Cynocephalus*) in the evening, at their drinking-hour. I watched a large crocodile creep slyly out of the water, and lie in waiting among the rocks at the usual drinking-place before they arrived, but the baboons were too wide awake to be taken in so easily. A young fellow was the first to discover the enemy; he had accompanied several wise and experienced old hands to the extremity of a bough that at a considerable height overhung the river; from this post they had a bird’s-eye view, and reconnoitred before one of the numerous party descended to drink. The sharp eyes of the young one at once detected the crocodile, who matched in colour so well with the rocks that most probably a man would not have noticed it until too late. At once the young one commenced shaking the bough and screaming with all his might to attract the attention of the crocodile, and to induce it to move. In this he was immediately joined by the whole party, who yelled in chorus, while the large old males bellowed defiance, and descended to the lowest branches within eight or ten feet of the crocodile. It was of no use—the pretender never stirred, and I watched it until dark; it remained still in the same place, waiting for some unfortunate baboon whose thirst might provoke his fate; but not one was sufficiently foolish, although the perpendicular banks prevented them from drinking except at that particular spot.”—p. 177.

I have inserted a note of interrogation after the few words which introduce the compliment paid in the next extract to the contemplative character of the baboons. I have done so because it does not seem to me that this mighty Nimrod of the desert is always quite so forbearing as he would have us believe.

“I never allow either the monkeys or baboons to be disturbed (?): thus they have no fear of our party, but with perfect confidence they approach within thirty or forty yards of the tents, sitting upon the rocks and trees, and curiously watching all that takes place in the camp.”—p. 224.

This is quiet and pretty, but the next quotation exhibits a little more action.

“We had several times disturbed antelopes during the early portion of the march, and we had just ascended from the rugged slopes of the valley, when we observed a troop of about a hundred

baboons, who were gathering gum-arabic from the mimosas; upon seeing us, they immediately waddled off. 'Would the lady like to have a girrit (baboon)?' exclaimed the ever-excited Jali: being answered in the affirmative, away dashed the three hunters in full gallop after the astonished apes, who, finding themselves pursued, went off at their best speed. The ground was rough, being full of broken hollows, covered scantily with mimosas, and the stupid baboons, instead of turning to the right into the rugged and steep valley of the Settite, where they would have been secure from the aggageers, kept a straight course before the horses. It was a curious hunt; some of the very young baboons were riding on their mothers' backs; these were now going at their best pace, holding on to their maternal steeds, and looking absurdly human; but, in a few minutes, as we closely followed the Arabs, we were all in the midst of the herd, and with great dexterity two of the aggageers, while at full speed, stooped like falcons from their saddles, and seized each a half-grown ape by the back of the neck, and hoisted them upon the necks of the horses. Instead of biting as I had expected, the astonished captives sat astride of the horses, and clung tenaciously with both arms to the necks of their steeds, screaming with fear. The hunt was over and we halted to secure the prisoners. Dismounting, to my surprise the Arabs immediately stripped from a mimosa several thongs of bark, and having tied the baboons by the neck, they gave them a merciless whipping with their powerful coorbatches of hippopotamus hide. It was in vain that I remonstrated against this harsh treatment; they persisted in the punishment, otherwise, they declared, the baboons would bite, but if well whipped they would become 'miskeen' (humble). At length my wife insisted upon mercy, and the unfortunate captives wore an expression of countenance like prisoners about to be led to execution, and they looked imploringly in our faces, in which they evidently discovered some sympathy with their fate."—p. 306.

I cannot reconcile this wild scene with the author's previous assertion that he never allowed the baboons to be disturbed: however, there is no more reason to doubt the good intentions which dictated the first passage than the truthfulness of the cruel scene so graphically described in the second. The next passage which touches on the habits of baboons mentions a fact that is so new to me, and so apparently improbable, that I cannot accept it without some misgiving. I have no doubt that there were appearances which

suggested the idea that the baboons had really been digging for water; but the matter seems never to have received that careful investigation which a theory so extraordinary certainly demands.

“The wild animals have now deserted this immediate neighbourhood; the only creatures that are to be seen in numbers are the apes and monkeys; these throng the sides of the river, eating the tamarinds from the few large trees, and collecting gum from the mimosas. These hungry animals gather the tamarinds before they are ripe, and I fear they will not leave a handful for us; nothing is more agreeable, in this hot climate, than the acidity of the tamarind water. I remarked a few days ago, when walking along the dry sandy bed of the Till about five miles from the river, that the monkeys had been digging wells in the sand for water.”—p. 233.

My next and concluding quotation about these Abyssinian quadrumanes represents them in undisturbed possession of their native haunts, no Arabs pursuing, and no one attempting, either from the love of mischief or of the chase, to interfere with their apparently patriarchal government.

“Troops of baboons are now exceedingly numerous, as, the country being entirely dried up, they are forced to the river for water, and the shady banks covered with berry-bearing shrubs induce them to remain. It is very amusing to watch these great male baboons stalking majestically along, followed by a large herd of all ages, the mothers carrying their little ones upon their backs, the latter with a regular jockey-seat riding most comfortably, while at other times they relieve the monotony of the position by sprawling at full length and holding on by their mothers' back hair. Suddenly a sharp-eyed young ape discovers a bush well covered with berries, and his greedy munching being quickly observed, a general rush of youngsters takes place, and much squabbling for the best places ensues among the boys: this ends in great uproar, when down comes a great male, who cuffs one, pulls another by the hair, bites another on the hind quarters just as he thinks he has escaped, drags back a would-be deserter by his tail, and shakes him thoroughly, and thus he shortly restores order, preventing all further disputes by sitting under the bush, and quietly enjoying the berries by himself. These baboons have a great variety of expressions that may perhaps represent their vocabulary: a few of these I begin to understand, such as their notes of alarm, and the cry to attract attention; thus, when I am sitting alone beneath

the shade of a tree to watch their habits, they are at first not quite certain what kind of a creature I may be, and they give a peculiar cry to induce me to move and show myself more distinctly.”—p. 237.

Were I to attempt the merest outline of all that Sir Samuel Baker has written on elephants and elephant-hunting, or to give any idea of the prowess required and the danger incurred in this most exciting occupation, I could fill an entire number of the ‘Zoologist’ without the slightest difficulty, but I forbear; and as a plea or an excuse for the remorseless energy with which this majestic beast is pursued, persecuted, hamstrung and slaughtered, I will quote a passage that treats of him as a depredator, a dangerous aggressor on the property of the human inhabitants of these primitive wilds.

“The country for several miles upon the table-land above Wat el Néгур was highly cultivated, and several thousand acres were planted with dhurra, that was at this season in full grain and nearly ripe. Much sesamé was grown for the manufacture of oil; cotton was also cultivated, and the neighbourhood was a fair example of the wonderful capabilities of the entire country that was allowed to lie in idleness. There was little rest for the inhabitants at this time, as the nights were spent in watching their extensive plantations, and endeavouring to scare away the elephants. These animals, with extreme cunning, invaded the dhurra crops at different positions every night, and retreated before morning to great distances in the thick thorny jungles of the Settite.

“Our arrival was welcomed with general enthusiasm, as the Arabs were unprovided with fire-arms, and the celebrated aggageers or sword-hunters were useless, as the elephants only appeared at night, and were far too cunning to give them a chance. There was a particular range of almost impenetrably thorny covert in the neighbourhood of Geera, well known as the asylum for these animals, to which they retreated, after having satiated themselves by a few hours’ feeding upon the crops of corn. I promised to assist in protecting the plantations, although the Arabs assured me that, in spite of our rifles, the elephants would return every night. Wishing to judge personally of the damage, I rode up to the dhurra fields, and for a few hours I examined the crops, through which I could ride with ease, as the plants were arranged like hops.

“Many acres were absolutely destroyed, as the elephants had not only carefully stripped off the heavy heads of corn, but had trampled

down and wilfully broken much more than they had consumed. The Arabs knew nothing about guns, or their effect upon elephants, and I felt quite sure that a few nights with the heavy rifles would very soon scare them from the fields.”—p. 249.

I have already cited a vivid description of the rush of water into the river-bed, dried by the long-continued and uninterrupted influence of a tropical sun. The torrent sweeps everything before it in its impetuous course, and even the bulky elephant, though so fond of his bath, is unable to stand against the weight of waters. Elephants, giraffes, gazelles, alike share the dangers of the sudden influx of water, and, unable to stem the torrent, perish in the attempt.

“A dead elephant floated down the river to-day; this is the second that has passed within the last few days; they have been most probably drowned in attempting to cross some powerful torrent tributary to the Atbara. As usual, upon the fact becoming known, the entire village rushed out, and, despite the crocodiles, a crowd of men plunged into the river about a quarter of a mile below Sofi, and swimming out they interrupted the swollen carcass, which was quickly covered with people; they were carried several miles down the river before they could tow the body to shore, by ropes fastened to the swimmers. Afterwards, there was a general quarrel over the division of the spoil: the skin, in sections, and the tusks, were brought home in triumph.”—p. 178.

The same reason which compelled me to omit the exciting scenes of elephant-hunting must be my excuse for passing over, without even a syllable of comment, the chase of the rhinoceros and hippopotamus; but I cannot forego the pleasure of presenting my readers with just one glimpse of the hippopotamus at home.

“The hippopotami were in great numbers; many were lying beneath the shady trees upon the banks, and splashed into the water as we appeared; others were basking in large herds upon the shallows; while the young calves, supported upon the backs of their mothers, sailed about upon their animated rafts in perfect security.”—p. 376.

And here let me introduce a word for the donkeys: of zebras we hear nothing, but the ass of Abyssinia appears to have received Sir Samuel's approbation. The interesting question whether this “high-actioned” animal is really the original of our donkey is not discussed, but the

affirmative is assumed. There are at least three species of *Equus* which might claim this honour, and it seems very difficult to decide between them. Supposing the Abyssinian to have the right to this distinction, it is one of the very few quadrupeds that are equally at home in a state of nature and under the protection of man. And supposing, again, the wild ass of Abyssinia and the domestic ass of Egypt to constitute but a single species, there follows a second possibility, namely, that the wild animal may have escaped from servitude, just as the wild horses of America have descended from the war-steeds that accompanied the Spaniards.

“The tracks of wild asses had been frequent, but hitherto I had not seen the animals, as their drinking-hour was at night, after which they travelled far into the desert: however, on the morning of the 29th June, shortly after the start at about 6 A.M., we perceived three of these beautiful creatures on our left—an ass, a female, and a foal. They were about half a mile distant when first observed, and upon our approach to within half that distance they halted and faced about; they were evidently on their return to the desert from the river. Those who have only seen donkeys in their civilized state have no conception of the beauty of the wild and original animal. Far from the passive and subdued appearance of the English ass, the animal in its native desert is the perfection of activity and courage; there is a high-bred tone in the deportment, a high-acted step when it trots freely over the rocks and sand, with the speed of a horse when it gallops over the boundless desert. No animal is more difficult of approach; and, although they are frequently captured by the Arabs, those taken are invariably the foals, which are ridden down by fast dromedaries, while the mothers escape. The colour of the wild ass is a reddish cream, tinged with the shade most prevalent of the ground that it inhabits; thus it much resembles the sand of the desert.” Sir Samuel killed a male, and observes, “This fine specimen was in excellent condition, although the miserable pasturage of the desert is confined to the wiry herbage already mentioned: of this the stomach was full, chewed into morsels like chopped reeds. The height of this male ass was about 13.3 or 14 hands: the shoulder was far more sloping than that of the domestic ass: the hoofs were remarkable for their size; they were wide, firm, and as broad as those of a horse of 15 hands.” —p. 55.

Now for a few paragraphs about the birds; and it is here that the

zoologist feels most severely the author's want of scientific knowledge: in a region abounding in the feathered tribes, and with such extraordinary facilities for observing them, one cannot but express regret that so little information is given; and this regret one feels the more deeply from the evidence the author gives of his descriptive powers. The Ornithology of Nubia is left almost as complete a blank as before Sir Samuel's visit, and the information for which we are all thirsting as to the migrants and residents of that *terra incognita* is withheld us, simply from the fact of the narrator not knowing exactly what facts to observe. How different is the result of Tristram's visit to the Great Zaara or to Palestine, which seem to have brought so vividly before us the winged inhabitants of these previously unexplored districts. But we must take what we can get. Sir Samuel records the slaughter of a beautiful gazelle, and thus continues:—

“Having done the needful with my beautiful prize, and extracted the interior, I returned for my camel that had assisted so well in the stalk. Hardly had I led the animal to the body of the ariel, when I heard a rushing sound like a strong wind, and down came a vulture with its wings collapsed, falling from an immense height direct to its prey, in its eagerness to be the first in the race. By the time that I had fastened the ariel across the back of the camel, many vultures were sitting upon the ground at a few yards' distance, while others were arriving every minute: before I had shot the ariel, not a vulture had been in sight; the instant that I retreated from the spot a flock of ravenous beaks were tearing at the offal.”—p. 87.

The seemingly miraculous transit of information respecting the presence of food is a subject that has long since attracted the notice of all naturalists travelling in the desert regions of earth's surface. Charles Waterton, the wanderer *par excellence*, was particularly struck by it; and his amusing controversy with Audubon, on the question of “eyes or nose,” “scent or sight,” will long be remembered by all who take an interest in such inquiries. Sir Samuel Baker makes it a subject for serious investigation, as will be seen from a second passage which I have extracted below; and he has broached a theory which is quite new to me, and which I cannot accept in its entirety, although I do not doubt it may derive considerable support from the observations of naturalists. The main question between “eyes and nose” Sir Samuel gives unhesitatingly in favour of “eyes;” but he believes also that the higher and cooler realms of air abound

in birds which, at different elevations, are searching earth's surface for the dead and the dying. The passage is a long one, but would suffer so much from abridgment that I prefer giving it entire.

“As I passed the body of the first rhinoceros, I found a regiment of vultures already collected around it, while fresh arrivals took place every minute, as they gathered from all quarters: they had already torn out the eyes, and dragged a portion of flesh from the bullet-wound in the shoulder; but the tough hide of the rhinoceros was proof against their greedy beaks. A number of Marabou storks had also arrived, and were standing proudly amongst the crowd of vultures, preparing to perform the duty of sextons, when the skin should become sufficiently decomposed. Throughout all the countries that I had traversed these birds were in enormous numbers. A question has been frequently discussed whether the vulture is directed to his prey by the sense of smell or by keenness of vision; I have paid much attention to their habits, and, although there can be no question that their power of scent is great, I feel convinced that all birds of prey are attracted to their food principally by their acuteness of sight. If a vulture were blind it would starve; but were the nostrils plugged up with some foreign substance to destroy its power of smell, it would not materially interfere with its usual mode of hunting. Scent is always stronger near the surface of the ground: thus hyænas, lions and other beasts of prey will scent a carcase from a great distance, provided they are to leeward; but the same animals would be unaware of the presence of the body, if they were but a short distance to windward.

“If birds of prey trusted to their nostrils, they would keep as near the ground as possible, like the carrion crow, which I believe is the exception that proves the rule. It is an astonishing sight to witness the arrival of vultures at the death of an animal, when a few moments before not a bird has been in sight in the cloudless sky. I have frequently lain down beneath a bush after having shot an animal, to watch the arrival of the various species of birds in regular succession: they invariably appear in the following order:—

“No. 1, the black and white crow: this knowing individual is most industrious in searching for his food, and is generally to be seen either perched upon rocks or upon trees: I believe he trusts much to his sense of smell, as he is never far from the ground; at the same time he keeps a vigilant look out with a very sharp pair of eyes.

“No. 2 is the common buzzard: this bird, so well known for its

extreme daring, is omnipresent, and trusts generally to sight, as it will stoop at a piece of red cloth in mistake for flesh; thus proving that it depends more upon vision than smell.

“No. 3 is the red-faced small vulture.

“No. 4 is the large bare-throated vulture.

“No. 5 the Marabou stork, sometimes accompanied by the adjutant.

“When employed in watching the habits of these birds, it is interesting to make the experiment of concealing a dead animal beneath a dense bush. This I have frequently done; in which case the vultures never find it, unless they have witnessed its death; if so they will already have pounced in their descent while you have been engaged in concealing the body: they will then, upon near approach, discover it by the smell. But, if an animal be killed in thick grass, eight or ten feet high, the vultures will seldom discover it. I have frequently known the bodies of large animals, such as elephants and buffaloes, to lie for days beneath the shade of the dense nabbuk bushes, unattended by a single vulture; whereas, if visible, they would have been visited by these birds in thousands.

“Vultures and the Marabou stork fly at enormous altitudes. I believe that every species keeps to its own particular elevation, and that the atmosphere contains regular strata of birds of prey, who, invisible to the human eye at their enormous height, are constantly resting upon their wide-spread wings, and soaring in circles, watching with telescopic sight the world beneath. At that great elevation they are in an exceedingly cool temperature, therefore they require no water; but some birds that make long flights over arid deserts, such as the Marabou stork and the bustard, are provided with water-sacks; the former in an external bag a little below the throat, the latter in an internal sack, both of which carry a large supply. As the birds of prey that I have enumerated invariably appear at a carcase in their regular succession, I can only suggest that they travel from different distances or altitudes. Thus the Marabou stork would be farthest from the earth; the large bare-necked vulture would be next below him, followed by the red-faced vulture, the buzzard, and the crow that is generally about the surface. From their immense elevation the birds of prey possess an extraordinary field of vision; and although they are invisible from the earth, there can be no doubt that they are perpetually hunting in circles within sight of each other. Thus, should one bird discover some object upon the surface of the earth below, his sudden pounce

would at once be observed and imitated by every vulture in succession. Should one vulture nearest the earth perceive a body, or even should he notice the buzzards collecting at a given point, he would at once become aware of a prey; his rush towards the spot would act like a telegraphic signal to others, that would be rapidly communicated to every vulture at successive airy stations.

“If an animal be skinned the red surface will attract the vultures in an instant; this proves that their sight and not their scent has been attracted by an object that suggests blood. I have frequently watched them when I have shot an animal, and my people have commenced the process of skinning. At first not a bird has been in sight, as I have lain upon my back and gazed into the spotless blue sky; but hardly has the skin been half withdrawn, than specks have appeared in the heavens, rapidly increasing. ‘Caw, caw,’ has been heard several times from the neighbouring bushes; the buzzards have swept down close to my people, and have snatched a morsel of clotted blood from the ground. The specks have increased to winged creatures, at the great height resembling flies, when presently a rushing sound behind me, like a whirlwind, has been followed by the pounce of a red-faced vulture that has fallen from the heavens in haste with closed wings to the bloody feast, followed quickly by many of his brethren. The sky has become alive with black specks in the far-distant blue, with wings hurrying from all quarters. At length a coronet of steady, soaring vultures, forms a wide circle far above, as they hesitate to descend, but continue to revolve around the object of attraction. The great bare-necked vulture suddenly appears. The animal has been skinned, and the required flesh secured by the men; we withdraw a hundred paces from the scene. A general rush and descent takes place; hundreds of hungry beaks are tearing at the offal. The great bare-necked vulture claims respect among the crowd; but another form has appeared in the blue sky, and rapidly descends. A pair of long, ungainly legs, hanging down beneath the enormous wings, now touch the ground, and Abou Seen (father of the teeth or beak, the Arab name for the Marabou) has arrived, and he stalks proudly towards the crowds, pecking his way with his long bill through the struggling vultures, and swallows the lion’s share of the repast. Abou Seen, last but not least, had arrived from the highest region, while the others had the advantage of the start. This bird is very numerous through the Nile tributaries of Abyssinia, and may generally be seen perched upon the rocks by the water-side, watching for small fish, or

any reptile that may chance to come within his reach. The well-known feathers are situated in a plume beneath the tail.”—p. 491.

After this tribute to the volatile powers of the marabou, we must descend to his relative the stork, concerning which familiar bird and a species of flycatcher, and the strange partnership which seems to exist between the two, there is one of the most interesting details of economy I have ever chanced to find in the journals of a traveller. The fellowship or co-partnership between widely different animals is one which requires the most careful investigation; it meets us at almost every step; and yet it is with the greatest difficulty that we can decide whether the apparent partners are friends or enemies. Think of the prairie dog, the owl and the rattlesnake forming a sociable community; meditate on the anxiety of the titlark to provide for the cuckoo; study the economy of every wild bee, and of the parasite always living at its expense; and a world of hitherto unexplained wonders seems to open up to our astonished vision.

“During the march over a portion of the country that had been cleared by burning we met a remarkably curious hunting-party. A number of the common black and white stork were hunting for grasshoppers and other insects, but mounted upon the back of each stork was a large copper-coloured flycatcher, which, perched like a rider on his horse, kept a bright look-out for insects, which from its elevated position it could easily discover upon the ground. I watched them for some time: whenever the storks perceived a grasshopper or other winged insect, they chased them on foot, but if they missed their game the flycatchers darted from their backs and flew after the insects like falcons, catching them in their beaks, and then returning to their steeds to look out for another opportunity.”—p. 547.

In the next passage I shall cite, flycatchers are introduced, and the curious fact is recorded that these birds, together with the buzzards, hover in the smoke of the burning prairie to catch the locusts that are disturbed by the unwonted blaze. What were these buzzards, and these flycatchers, and these locusts?

“A fine breeze; therefore I set fire to the grass in all directions, which spread into a blaze over many miles of country. The fire immediately attracts great numbers of flycatchers and buzzards; these hover in the smoke to catch the locusts and other insects that escape from the heat. Buzzards are so exceedingly bold, that it is

one person's special duty to protect the strips of flesh when an animal is being cut up, at which time many scores collect, and swoop down upon their prey, clutching a piece of meat with their claws, if left unguarded for a moment. Upon one occasion, the cook had just cleaned a fish of about a pound and a half weight, which he laid upon the ground while he stooped to blow up the fire; in an instant a large buzzard darted upon it, and carried it off."—p. 235.

"One touch of nature makes the whole world kin," and thirst brings together the most incongruous elements of the animal world wherever there appears the opportunity of allaying it. Thus, when the desert is reduced to a state of glowing, shifting sand, and the only chance of obtaining water is from those pools which at long intervals occur in the bed of what was lately a majestic river, all living creatures seem to throng to these oases in the desert; and one cannot help envying the man who has enjoyed the opportunity of watching the scene so closely: he might have taken a census of the species thus collected, or at least informed us what are the families and tribes of birds which inhabit these desert wastes.

"The banks of the Atbara are now swarming with small birds that throng the bushes (a species of willow) growing by the water's edge; the weight of a large flock bends down the slender boughs until they touch the water: this is their opportunity for drinking, as their beaks for an instant kiss the stream. These unfortunate little birds get no rest; the large fish and the crocodiles grab at them when they attempt to drink, while the falcons and hawks pursue them at all times and in every direction."—p. 238.

One more extract and I have done: it is impossible to quit the banks of rivers teeming with crocodiles without giving to these huge reptiles the honour of a passing notice, and the one I select doubtless conveys a correct idea of their fearful peculiarities.

"This evening I took a walk, accompanied by my wife, and Bacheet with a spare gun, to try for a shot at guinea-fowl. We were strolling along the margin of the river, when we heard a great shrieking of women on the opposite side, in the spot from which the people of Sofi fetch their water. About a dozen women had been filling their water-skins, when suddenly they were attacked by a large crocodile, who attempted to seize a woman, but she, springing back, avoided it, and the animal swallowed her girba (water-skin), that,

being full of water and of a brown exterior, resembled the body of a woman. The women rushed out of the river, when the crocodile made a second dash at them, and seized another water-skin, that a woman had dropped in her flight. They believe this to be the same monster that took a woman a few months ago. Few creatures are so sly and wary as the crocodile. I watch them continually as they attack flocks of small birds that throng the bushes at the water's edge. These birds are perfectly aware of the danger, and they fly from the attack, if possible. The crocodile then quietly and innocently lies upon the surface, as though it had appeared quite by an accident; it thus attracts the attention of the birds, and it slowly sails away to a considerable distance, exposed to their view. The birds, thus beguiled by the deceiver, believe that the danger is removed, and they again flock to the bush, and once more dip their thirsty beaks into the stream. Thus absorbed in slaking their thirst, they do not observe that their enemy is no longer on the surface. A sudden splash, followed by a huge pair of jaws beneath the bush that engulfs some dozens of victims, is the signal unexpectedly given of the crocodile's return, who has thus slyly dived, and hastened under cover of water to his victims. I have seen the crocodiles repeat this manœuvre constantly; they deceive by a feigned retreat and then attack from below.

“In like manner the crocodile perceives, while it is floating on the surface in mid-stream, or from the opposite side of the river, a woman filling her girba, or an animal drinking, &c., &c. Sinking immediately, it swims perhaps a hundred yards nearer, and again appearing for an instant upon the surface, it assures itself of the position of its prey by a stealthy look; once more it sinks, and reaches the exact spot above which the person or animal may be. Seeing distinctly through the water, it generally makes its fatal rush from beneath—sometimes seizing with its jaws, and at other times striking the object into the water with its tail, after which it is seized and carried off.

“The crocodile does not attempt to swallow a large prey at once, but generally carries it away, and keeps it for a considerable time in its jaws in some deep hole beneath a rock, or the root of a tree, where it eats it at its leisure. The tongue of the crocodile is so unlike that of any other creature that it can hardly be called by the same name; no portion throughout the entire length is detached from the flesh of

the lower jaw—it is more like a thickened membrane from the gullet to about half-way along the length of the jaw.”—p. 239.

I close the bulky volume with regret: it is full of animation, although full of the records of death: I suppose it is in vain to hope that the hunter will stay his hand when he has once enjoyed the excitement of the chase: I cannot but think it were a worthier object to learn the habits of the living than to leave the bones of the dead to bleach on the desert sands: but in fairness it must be admitted the hunter makes a kind of capital out of the spoils; he feeds the Arabs with the flesh, preserves some of the specimens, and partially pays the wages of his followers with ivory and hides.

EDWARD NEWMAN.

The Great Auk. By J. H. GURNEY, jun., F.Z.S.

ABOUT the year 1812 Bullock prosecuted his ornithological researches in the Orkneys, and one of the great auks in the British Museum was a part of the fruits of that expedition. According to Montagu, who published in the year following, the natives informed Mr. Bullock that “One male* only had made its appearance for a long time, which had regularly visited Papa Westra for several years [and doubtless had bred there]. The female (which the natives call the queen of the auks) was killed just before Mr. Bullock arrived [or subsequently according to some accounts]. The king or male Mr. Bullock had the pleasure of chasing for several hours, in a six-oared boat, but without being able to kill him, for though he frequently got near him, so expert was the bird in its natural element, that it appeared impossible to shoot him. The rapidity with which he pursued his course under water was almost incredible.” (Orn. Dict. Appendix, and p. 5 of Newman’s Edition.)

But Montagu does not mention the ultimate fate of the auk, and its coming to London; for that we turn to Latham, who says (Gen. Hist. Birds, vol. x. pp. 56, 57) that after Mr. Bullock was gone, the great auk suffered the Papa Westra boatmen “by themselves to approach so near, as to knock it down with an oar.”

It was deposited in the “London Museum” in Piccadilly, and when that splendid collection was broken up, in 1819, Dr. Leach

* They had no means of telling it was a male; the sexes are alike in plumage.

purchased the great auk for the British Museum, where any one may still see it.

Another account, furnished Professor Newton by a relative of the lady who transmitted the bird to Bullock, states that one of the two which about this time frequented the "Auk Craig" on Papa Westra was killed by some boys with stones, and that it was not got at the time, but sometime afterwards washed on shore (Nat. Hist. Review, October, 1865).

We are not to infer that a pair had frequented the Orkney Islands from time immemorial: Fleming only considered it an occasional visitant (Brit. Animals, p. 130), and Low, who lived prior to 1812, states (Fauna Orcadensis, p. 107) that he has "often inquired about the great auk especially, but cannot find it is ever seen here." May not this pair of great auks have originally been driven by stress of weather from the American coast? The island of Papa Westra has been visited by numerous ornithologists; many ornithological excursions have been at different times made into those remote regions, and there is a resident collector at Stromness; yet the great auk has never since been observed. We must therefore conclude that it ceased to visit the Orkneys after the above-mentioned pair at Papa Westra were destroyed: had such a remarkable bird been seen of late years it must have created a sensation among the inhabitants of those islands; as it is they scarcely know the great auk even by tradition. One of these great auks is recorded to have been observed off Fair Island, in June, 1798, and Dr. Hamilton, a native of Stromness, but who left for America about eight years ago, told Mr. J. H. Dunn that about the time when one of the pair at Papa Westra was shot for Mr. Bullock, he saw a great auk in Hoy Sound, and chased it for some time in a well-manned boat, but its wonderful power of diving long distances prevented his ever getting within shot.

Dr. Fleming has given an account of a great auk taken at St. Kilda in 1821 or 1822, but which is said to have made its escape: in the 'Edinburgh Philosophical Journal' (vol. x. pp. 96, 97) he states that "when on the eve of our departure from this island [Glass] we got on board a live specimen of the great auk (*Alca impennis*), which Mr. Maclellan, the tacksman of Glass, had captured some time before off St. Kilda. It was emaciated, and had the appearance of being sickly; but in the course of a few days it became sprightly, having been plentifully supplied with fresh fish, and permitted occasionally to sport in the water, with a cord fastened to one of its legs, to prevent

its escape. Even in this state of restraint it performed the motions of diving and swimming under water with a rapidity that set all pursuit from a boat at defiance. A few white feathers were at this time making their appearance on the sides of its neck and throat, which increased considerably during the following week, and left no room to doubt that, like its congeners, the blackness of the throat-feathers of summer is exchanged for white during the winter season." In his 'History of Animals' (p. 130), Dr. Fleming adds, "When fed in confinement it holds up its head, expressing its anxiety by shaking the head and neck, and uttering a gurgling noise."

Macgillivray says (Brit. Birds, vol. v. p. 361), "Another was obtained there [at St. Kilda] in 1829, by Mr. Murdoch McLellan (query, Maclellan), and presented to the late Mr. Stephenson (query, Stevenson, whom Fleming accompanied in 1821), who intended it for the Edinburgh Museum; but it afterwards made its escape." One is always inclined to question the identity of escaped birds, and in this instance the whole story is confused, and it seems very probable that no second great auk was taken. I suppose this latter is the one mentioned in Wood's popular 'Illustrated Natural History' (vol. ii. p. 742) as caught in a net by Mr. Adams, of Lewis.

In Pinkerton's 'Voyages and Travels,' in an account of Hirta, it is stated, "There be many sorts of (these) fowls; some of them of strange shapes, among which there is one they call the garefowl, which is bigger than a goose, and hath eggs as big, almost, as those of an ostrich." Prof. Newton, commenting upon this, remarks that Pinkerton gives no clew to the date of the communication, or to the source whence he reprinted it.

Sir Robert Sibbald enumerates, in 1684, in his 'Scotia Illustrata,' among the birds of North Britain, "Avis Gare dicta, Corvo marino similis, ovo maximo." It is not clear why he likened it to a cormorant.

"M. Martin, Gent.," who in 1698 resided three weeks in St. Kilda, for the purpose of investigating its natural curiosities, published a most interesting account of his expedition, in which he says:—"The sea-fowl are, first, gairfowl, being the stateliest, as well as the largest sort, and above the size of a Solan goose, of a black colour, red about the eyes, a large white spot under each, a long broad bill; it stands stately, its whole body erected, its wings short, flies not at all; lays its egg upon the bare rock, which if taken away, she lays no more for that year; she is whole-footed, and has the hatching spot upon her

breast, *i. e.* a bare spot from which the feathers have fallen off with the heat in hatching; its egg is twice as big as that of a Solan goose, and is variously spotted, black, green, and dark; it comes without regard to any wind, appears the first of May, and goes away about the middle of June." This account is very good, considering when it was written, but it contains some singular errors: the "bare spot," if it existed at all, could not have been from the feathers falling off the bird's breast with the heat in hatching, since the Alcadæ do not cover their eggs with their breasts. Then "above the size of a Solan goose, of a black colour, red about the eyes, a large white spot under each eye," is a sentence containing four mistakes: the great auk is a little less than the Solan goose, it was as much white as black, the white spot was over rather than under the eye, and probably the irides themselves were dark brown, as in the razorbill, little auk, black guillemot, &c., which I have had several opportunities of examining in the flesh. It is rather amusing to note the difference among the glass eyes in our stuffed great auks, which are of every shade between coal-black and bright red; and so, in their pictures, Lewin, Edwards, and others, have given the great auk red eyes, but subsequent authors have painted them black.

The formerly-known breeding-place at St. Kilda has not, in my opinion, been satisfactorily ascertained to be abandoned: hardly any naturalists have of late years visited that desolate spot.* The Hebrides are some little distance from the mainland of Scotland, and on turning to the map one finds St. Kilda to be twenty leagues from them; in fact small maps do not take it in.

Sir Wm. Milner, when in St. Kilda, was shown the precise spot where the great auk had its home; it was at one extremity of St. Kilda proper. Martin makes no mention of this; and we might infer from what he says that Soa, an adjacent island (too small to be marked on the map), was the breeding-place, Stakley being mentioned as the principal rock for the Solan geese, and the dominions of the oily fulmar being a terrific precipice, 1300 feet high, and supposed, says Bishop Stanley, to be the loftiest precipitous face of rock in Britain. To St. Kilda proper, then, we may presume, without regard to any wind, the great auk annually returned about the 1st of May, to perform the duties of reproduction.

* Since this was written Captain Elwes has been there: he showed a drawing of the great auk to the people, some of whom appeared to recognize it.

Martin says: — “Whither the fowls fly (and where the great auk spends the winter), the inhabitants are utterly ignorant of. * * * Every fowl lays an egg three different times (except the Gairfowl and fulmar, which lay but once).” (‘Voyage to St. Kilda,’ pp. 64, 65).

The eggs of the sea-fowl are found to be of an astringent quality. The inhabitants of St. Kilda used to preserve them in stone pyramids, scattering the burnt ashes of turf under and about them, to defend them from the air, dryness being their only preservative; the dried bodies they use for fuel, and with the remnant of their “giben”^{*} feasts they strew the soil to manure it. I mention these things because there is every probability that the last generation of St. Kildians “made away with” several great auks for food.

Macaulay (1758) says: — “The St. Kildians do not receive an annual visit from this strange bird (the garefowl) as from all the rest. It keeps at a distance from them, they know not where, for a course of years.” Further on he speaks of the garefowl as “an absolute stranger, I am apt to believe, in every other part of Scotland.” In short, even as far back as the time of Macaulay, the great auk was considered an exceedingly rare bird.

Mr. John Gatcombe, to whom I am under many obligations, has consulted, on my behalf, a copy of Dr. Ed. Moore’s ‘Catalogue of the Web-footed Birds of Devonshire,’ contained in the Library at Plymouth. The original account of the great auk found on Lundy Island, which has been quoted into so many books, is as follows:—

“*Alca impennis.* ‘Great Auk’ or ‘Penguin.’ — Mr. Gosling, of Leigham, informed me that a specimen of this bird was picked up dead, *near*† Lundy Island, in the year 1829, and Prof. Jameson (?) suggests that it might have been the one which had been obtained by Mr. Stevenson in St. Kilda, and escaped from the Lighthouse of Pladda, about that time, when on its way to Edinburgh.”

Mr. T. E. Gosling is more than once referred to as an ornithologist in Bellamy’s ‘Natural History of South Devon.’ This Catalogue, written subsequently to Moore’s, does not even allude to the great auk, from which we may infer Mr. Bellamy partly discredited the specimen said to have been washed ashore at Lundy Island.

The following interesting extract is from a letter written to the

* That is, the fat of the fowls, their sovereign remedy for disease, and beloved catholicon at all times.

† Either on the island or in the channel somewhere off the island, but which is not clear.

Rev. M. A. Mathews by the Rev. H. G. Heaven, of Lundy, and was printed in the 'Zoologist' for 1866 (p. 100). Although highly interesting, it must be received *cum grano salis* :—

“Lundy Island, September 6, 1865.—With regard to your question whether we have ever *seen* the great auk, I must answer in the negative. There is strong presumptive evidence, however, that the great auk has been seen *alive* on the island within the last thirty years; at least I cannot imagine what other bird it was. The facts are as follows, and I must leave it to more experienced ornithologists to draw the conclusion :— In the year 1838 or 1839, as nearly as I can recollect, — not, however, more recently, — one of our men in the egging season brought us an enormous egg, which we took for an abnormal specimen of the guillemot's egg, or, as they are locally named, the 'picked-billed murr.' This, however, the man strenuously denied, saying it was the egg of the 'king and queen murr,' and that it was very rare to get them, as there were only two or three 'king and queen murre' ever on the island. On being further questioned he said they were not like the 'picked-bills,' but like the 'razor-billed murre' (*i. e.*, the razorbilled auk); that they were much larger than either of them; and he did not think they could fly, as he never saw them on the wing nor high up the cliffs like the other birds, and that they, as he expressed it, 'scuttled' into the water, tumbling among the boulders, the egg being only a little way above high-water. He thought they had deserted the island, as he had not seen them or an egg for (I believe) fifteen years till the one he brought to us; but that they (*i. e.*, the people of the island) sometimes saw nothing of them for four or five years,* but he accounted for this by supposing the birds had fixed on a spot, inaccessible to the eggers from the land, for breeding purposes. The shell of the egg we kept for some years, but unfortunately it at last got broken. It was precisely like the guillemot's egg in shape, nearly, if not quite, twice the size, with white ground and black and brown spots and blotches. We have never, however, met with bird or egg since, but as the island has become since that time constantly and yearly more frequented and populous, it may have permanently deserted the place. The man has been dead some years now, being then past middle age, and I think he had been an inhabitant of the island some twenty-five or thirty years. He spoke of the birds in such a way that one felt convinced

* How precisely this agrees with Kenneth Macaulay's statements respecting the ones at St. Kilda.

of their existence, and that he himself had seen them, but he evidently knew no other name for them than 'king and queen murre,'* which he said the islanders called them 'because they were so big, and stood up so bold-like.' In colour they were also like the 'razorbilled murre.' Nobody, he said, had ever succeeded in catching or destroying a bird, as far as he knew, because they were so close to the water, and scuttled into it so fast. The existence of these birds had been traditional on the island when he came to it, and even the oldest agreed there were never more than two or three couples. He himself never knew of more than one couple at a time."

It is likely that the egg "precisely like a guillemot's in shape" was really a double-yolk egg of that bird; but the birds which the Lundy people called "king and queen murre," "because they were so big, and stood up so bold-like," may have been veritable examples of *Alca impennis*; yet that *A. impennis* was ever a resident on Lundy Island I think exceedingly doubtful; Dr. Moore and his informant Mr. Gosling evidently entertained no such idea; in fact there is nothing to show that its range during the breeding season extended south of St. Kilda.

With regard to Mr. Heaven's account, there is so much "finish" about it that one inclines to suspect it has been all written from memory. Now, although Mr. Heaven may make his statements with the utmost good faith, no ornithologist will place very much confidence in them; for if the account be separated into, first, what is only traditional, and, secondly, what actually came to Mr. Heaven's personal knowledge, it will be seen to rest on next to nothing: the fisherman who, in 1838 or '39, brought Mr. Heaven the monstrous egg, went to live on the island twenty-five years before that time, and even then the great auk's existence was traditional; nevertheless the fisherman supposes he saw one or more up to about 1823. What are we to infer? That the fisherman saw a real great auk? that he mistook some other bird for one? or that he told an untruth? Be this as it may, the bird's ancient haunts know it no longer, and its existence is now but a matter of tradition.

It may not be out of place to give another reputed occurrence of the great auk in Devonshire. A person at Plymouth often told Mr.

* The "king and queen" were the titles bestowed by the fishermen on the great auks at Papa Westra: strange that this name should be persistent elsewhere. Query, what besides the great auk merits the appellation?

Gatcombe of his having once seen the great auk on the rocks in the Plymouth Sound, adding that it looked like a child with a white apron on. This happened one very stormy day; the time of the year Mr. Gatcombe could not ascertain, but of course great auks do not get on rocks in winter.

The account of the great auk taken at the entrance of Waterford Harbour, printed in the 'Proceedings of the Zoological Society,' and reprinted in the 'Birds of Ireland,' is very inaccurate, as various notes from Dr. Burkitt enable me to show. In these publications it is recorded that "On the 7th of September, 1834, Dr. Burkitt, of Waterford, received a Great Auk from Mr. Robert Davis, jun., of Clonmel, who stated that it was taken in the (preceding) month of May (by the fisherman of whom he purchased it), at a short distance from the shore, at the mouth of Waterford Harbour, off Ballymacan. According to the captor, it was apparently almost starved. When in his yawl off the coast, he saw the auk swimming about near him, and held out some sprats, for which it came close to the boat. It was taken with little difficulty."

Now, here we have an instance of the dependence to be placed on second-hand information. It was presented to Dr. Burkitt by the late Mr. Francis Davis, of Waterford, and not by the individual named in Thompson's book (now deceased).

The auk was dead for some days before it came into Dr. Burkitt's hands; he did not see it alive, his notice of it, as sent to Mr. Thompson, and in a great measure as it appears in his book (vol. iii. pp. 238—9), being furnished by two individuals—Mr. Davis, who forwarded it to him, and who, being the *immediate* purchaser of it from its captor, was able to afford many important particulars, both from the fisherman and from his own observations; the second, the late Captain John Spence, 89th Regiment, who in fact, seeing the bird at Mr. Jacob Goff's, of Horetown (where he happened to be on a visit), considerably bespoke it for Dr. Burkitt's collection should it die: thus, through his instrumentality in all probability it was saved.

The account says, "It was taken with little difficulty." This may, however, have been only that the bird was so little acquainted with man. Latham states the Papa-Westra great auks to have been very familiar with the boatmen; and we cannot tell where this individual may not have wandered from; but its being enticed in this manner by a few sprats (which were *thrown* to it, and not held out, as

asserted in the text), agrees with the ancient accounts of its stupid character.

If the great auk, like the razorbill, be more than two years in attaining maturity, this individual could hardly have been bred the preceding season; on the other hand, although said to have been supplied with a mate, we cannot suppose it was itself old enough to breed.

The fisherman "kept it for some days, feeding it chiefly with potatoes mashed in milk, which were partaken of greedily. After having the bird for ten days he sold it to Mr. Davis, by whom it was sent to Mr. Gough, of Horetown, county Wexford, where it lived for about four months."

One would have thought that, of all the birds in his book, the accurate Thompson would have devoted most pains to the great auk; instead of this he confuses names, and here, as before, is guilty of attributing to one person what in reality was effected by another. "Mr. Gough, of Horetown, Co. Wexford," was no other than the late Mr. Jacob Goff, at whose house Captain Spence (then a lieutenant) saw the auk. Strange to say, this person, to whom credit is chiefly due, is entirely ignored in Mr. Thompson's book. Dr. Burkitt firmly believes that but for the late Captain Spence no notice whatever would have been taken of the great auk when at Horetown, more than as an odd-looking bird "of the penguin tribe;" and it would in all probability have been thrown away when dead. "For a considerable time, perhaps three weeks," continues Thompson, "it was not known to eat of anything at its new destination, but potatoes and milk were then forced down its throat, from which time it ate voraciously until a day or two before its death. (Query, did not the wash-potatoes cause its death?) This auk stood very erect, and frequently stroked its head with its foot, especially when any favourite food was presented." The late lamented Mr. Thompson made an inexcusable mistake in stating the great auk to have "frequently stroked its head with its foot." It appears from Dr. Burkitt's memoranda that it should have been written thus:—This auk stood very erect, was a very stately-looking bird, and had a habit of frequently *shaking* its head in a peculiar manner, more especially when any particularly favourite food was presented to it (that is, if a small trout, for instance, was shown it, or was held up at some little distance before it, the bird would at once commence shaking its head in the manner described); and this is precisely what Dr. Fleming's great auk did

when in confinement. The printed account goes on to say that, "when in Mr. Gough's possession, it was chiefly fed on fish, of which fresh-water species (trout, etc.) were preferred to sea-fish (probably because they could be had fresher): they were swallowed entire. It was rather fierce."

In addition to the above particulars, of deep interest, since they are the relics of a species soon to be forgotten, I am able to record, on Dr. Burkitt's authority, that the great auk, when alive, seemed to have an aversion to water,—a very strange and unaccountable thing. When dead it was stuffed by Dr. Burkitt, who is tolerably confident that the sex was noted by dissection: he cured it with arsenical soap; the glass eyes are the exact colour that they were in life. The following description was, at Mr. Thompson's request, supplied by Dr. Burkitt at the same time as the particulars of capture which we have been criticizing; and the author of the 'Birds of Ireland' would have deserved the thanks of ornithologists had he preserved all these facts with proper accuracy and minuteness: as year succeeds year, and it becomes more certain that the great auk is extinct, we may well be annoyed that those who had it in their power did not hand down the fullest particulars:—

"This bird—a young female—is not in good plumage; the head, back, wings, legs and feet, are sooty black; between the bill and eye on each side of the head there is a large patch of white, mottled with blackish feathers; the neck is white, slightly mottled with black; the front of the body white; the lesser quills tipped with white.

" Length (total); tail not perfect	29 inches.
" of folded wing [from carpus to point of longest quill]	5½ "
" " bill from forehead	3¾ "
" " bill from gape or rictus	4½ "
" " tarsus	2¼ "
" " middle toe	2⅝ "
" " middle toe and nail	3⅜ "
" " inner toe	2⅞ "
" " inner toe and nail	2⅞ "
" " outer toe	2⅝ "
" " outer toe and nail	3⅞ "
" " tail, which is broken (during confinement probably) may have been about	2 "
Depth (greatest) of bill, exceeding	1½ inch."

Although in the foregoing account this bird is spoken of as a young female, it appears from a photograph sent me by Professor Newton to be very nearly adult, and decidedly older than the specimen in the Newcastle Museum.

All that concerns an expiring race is important. Dr. Burkitt was persuaded by Dr. Ball to present his specimen, the latest survivor of its species in this country, to the Museum of Trinity College, Dublin, where, the last time Mr. Newton saw it, "it was carefully enshrined in the professorial sanctum, in company with Brian Boru's harp, and some other *palladia* of the sister island."

It will be observed that this great auk was taken in the month of May, at the very time when it should have been preparing to revisit its breeding-station: it was in St. George's Channel, half-starved and probably unable to make head against the current, its case being precisely similar to the Lundy specimen five years before.

Thompson says that Mr. R. Davis, of Clonmell, afterwards ascertained that a second great auk was procured on the coast of Waterford, about the same time as the one already noticed, but, falling into ignorant hands, it was not preserved; but of this bird Dr. Burkitt has grave doubts, believing it and his own to be one and the same specimen, which would account for the misapprehension into which Mr. Thompson has fallen in attributing the presentation of Dr. Burkitt's specimen to Mr. Robert Davis, of Clonmell, in place of the real donor, Mr. Francis Davis, of Waterford, the former being an ornithologist of some repute, and in former years a contributor to the 'Zoologist.'

Thompson says (Nat. Hist. of Ireland, vol. iii. p. 239) that the Rev. Joseph Stopford, in February, 1844, communicated a note to Dr. Harvey, of Cork, stating, but without any mention of date, that one of these birds had been "obtained on the long strand of Castle Freke (in the west of the county of Cork), having been water-soaked in a storm."

Thompson had "little doubt that two great auks were seen in Belfast Bay on the 23rd of September, 1845, by H. Bell, a wild-fowl shooter. He saw two large birds, the size of great northern divers, but with much smaller wings. He imagined they might be young birds of that species, until he remarked that their heads and bills were 'much more clumsy' than those of the *Colymbus*. They kept almost constantly diving, and went to an extraordinary distance each time with great rapidity."

I take this opportunity of noticing a misprint in Dr. Charlton's paper, read before the Tyneside Naturalist's Club. As reprinted in the 'Zoologist,' the writer is made to say seven auks were killed by a peasant at Lautrum, on the north-west coast of Ireland—a very obvious misprint for Iceland.

J. H. GURNEY, JUN.

The Wolf: date of its Extinction in Britain.—In the September number of the 'Zoologist' (S. S. 1349), I see some remarks by Mr. Newman on the extinction of the wolf in Scotland, which he supposes to have taken place at an earlier period than it really did. In Scrope's 'Days of Deer-stalking' will be found an account of the death of the last wolf in Sutherland, which took place between 1690 and 1700 near Sledale in Glenloth. I have no doubt, however, that a few wolves remained in Invernesshire at a later period than this, as in the second volume of 'Lays of the Deer-forest,' by the brothers Stuart, whose intimate knowledge of the language and traditions of the Highlands makes all their writings well worthy of credence, will be found an account of the slaying of a wolf between Fi-Ginths and Pall-a-crocain, in Strath Dearn, about the year 1743, by Macqueen of Pall-a-crocain, a celebrated man in that district, who did not die till 1797. I shall take the liberty of extracting from this most interesting book some passages which tend very much to clear up the matter in question. Speaking of the wolves in the Highlands, the authors say, "This last great outbreak in the time of Queen Mary led to more vigorous measures, which, in the time of Charles II., reduced their race to so small a number that in some districts their extinction is believed to have followed soon after that period. Thus in Lochaber the last of that country is said to have been killed by Sir Ewen Cameron in 1680, which Pennant misunderstood to have been the last of the species in Scotland." Every district, however, has its "last wolf," and there were probably several which were later than that killed by Sir Ewen Cameron. The last of Strathglass was killed, according to tradition, "at no very distant period." The last in Glen Urquhart, on the east side of the valley between Loch-Leitir and Sheagly, at a place called "Slochd-a-mhadaidh" (the wolf's den). The last of the Findhorn, and also, as there seems every reason to believe, the last of his species in Scotland, at a place between Fi-Ginths and Pall-a-crocain, and, according to popular chronology, no longer ago than 1743. There is, however, a passage in Mr. Newman's paper, accounting for the extirpation of the wolf, which I cannot agree with at all: he says, "To the Kelt (meaning, I presume, the Highlanders and native Irish) the wolf had been a terror, and held in abject dread; to the Saxon he was simply a nuisance, and so was destroyed. Nevertheless, owing to the numerical preponderance of the Kelt, the task of destruction was very gradual, and the wolf held his own much longer than in Scotland, where the native, with a shrewd eye to self-interest, amalgamated with the Saxon, and availed himself of that powerful arm." I do not believe that the brave and warlike Highlanders could have been, as Mr. Newman imagines, in such abject dread of the wolf, which at best is but a cowardly beast; more especially as, in all the instances I know of, the last wolves were killed by native Highlanders, some of them by women and children. At that time the Saxon had hardly penetrated to the remoter parts of the Highlands, where

wolves were found, and was looked upon with contempt by the natives, who were certainly far better able to kill their own wolves than any stranger could have been. I think that the increase of population and the introduction of fire-arms were much more likely to have caused their destruction.—*H. J. Elwes.*

Weasel killing Frogs.—When out shooting to-day I almost walked over a small weasel trailing along some object apparently as large and heavy as his own body. The little fellow was sadly bothered by the long coarse grass of the hedge-bank, and, judging delay under the circumstances dangerous, reluctantly dropped his burden and made off. I was surprised to find he had been carrying a large full-grown frog, killed, weasel-fashion, by a bite at the back of the head.—*John Cordeaux; Great Cotes, Ulceby, September 29, 1868.*

Departures and Arrivals of Migratory Birds observed in Cornwall and Devonshire during August and September, 1868.—The following were last seen as under:—

August 17. Swift, near Marazion; several in company skimming over a marsh.

„ 21. Cuckoo, near Helston; a single young bird.

„ 22. Wheatear, near Helston; a few seen.

„ 24. Ray's Wagtail, near Falmouth; two seen, either females or immature.

September 12. Sand Martin, Marldon, near Totnes; two seen.

„ 16. Corn Crane, Newton Abbot; two exposed for sale.

„ 19. Chiff Chaff and Willow Warbler, Marldon.

„ 20. Chimney Swallow, Marldon; a large flock observed on the wing early in the morning. House Martin, Marldon; congregating on telegraph-wires. Spotted Flycatcher, Marldon; three seen.

The following were first seen as under:—

August 8. Sanderling, near Marazion; in flocks on the beach; three which I examined were more advanced in the assumption of winter plumage than were some dunlins killed at the same time.

August 10. Turnstone, St. Mary's, Scilly; a single specimen still in breeding-dress. Another single specimen in the same plumage observed on Marazion beach on the 18th. Also, on the same beach, four in the young plumage, seen together on the 17th.

August 22. Curlew, Falmouth; a few specimens exposed for sale.

September 12. Knot, near Newton; a specimen, in full winter plumage, killed on the Teign.

On the 21st of September I was informed that kingfishers had for some days previously been unusually plentiful on the River Teign, and I have subsequently heard that a similar phenomenon was contemporaneously observed on the Thames in Berkshire, and also in the marshes of North Lincolnshire. These observations lead to the conclusion that the autumnal immigration of kingfishers is larger this year than usual.—*J. H. Gurney; Marldon, Totnes, October 1, 1868.*

Notes from Stirlingshire from July to September, inclusive.—July 10. A young robin flew in at the kitchen window to-day, and was secured and put in a cage by the servants. It has a most curious malformed bill, the two mandibles crossing each other like a crossbill's, very much curved and elongated. It fed well on bread-crumbs softened in milk, but died late on the next day.

July 18. Keeper brought in a wild duck, a small specimen, calling it the "muir duck." All the common people here distinguish between the two sizes, calling the larger the "wild duck" and the smaller the "muir duck."

August 5. Saw no less than ten ravens in company: they came from different directions, and after circling about for some little time finally made off in a north-easterly direction towards the Ochil Hills, still circling and ascending as they went. I have frequently seen such gatherings of ravens in Sutherland and in wild parts of the country, where ravens are a commoner bird, but I never observed such in the low grounds; indeed, it is a rare sight even to see a solitary bird here at all.

August 18. Mushrooms are here, as I believe they are elsewhere this season, unusually abundant. Our gardener brought in this morning four large clothes-baskets full, principally gathered from one old lee field, where horses have for some time been grazing. This, or from the end of July, is the time in which snipe are most abundant with us: there are now a good many—say between twenty and thirty—in our small marsh.

August 28. Went down to Grangemouth. Only killed two lapwings, one golden plover, one redshank, one whimbrel and one dunlin, which last two I lost. The whimbrel when I fired at it, at nearly 100 yards distance, with green cartridge, was feeding in company with six oystercatchers on the "slink," or mud-banks: it was only wing-broken, and not having my retrieving terrier with me to-day, it managed to scramble into the water, and got beyond reach. There were few birds on the shore, the bulk of the waders not having yet arrived. The dunlin was a solitary bird, and I only saw a very few others throughout the day. Two small flocks of redshanks were all to be seen of that species, and some scattered flocks of lapwings and golden plovers were feeding in the fields.

Sunday, September 6. A buzzard came from the south-east, circled for some time over a stubble-field behind the house, and then made off in a straight line, flying high towards the north-west, or in the direction of Loch Lomond.

Sunday, September 13. Just about the same hour to-day, as on last Sunday, *viz.* about half-past 9 A.M., the buzzard again made its appearance, coming from the same direction, and circling nearly over the same place as last time, but going off this time in a more westerly direction, and still circling and ascending. Whether it was a roughlegged or common buzzard I cannot say, as it was with great difficulty I could fix my glass on it at all.

September 14. At Grangemouth a friend and myself obtained four bartailed godwits, one golden plover, one ringed plover, three knots, and dunlins. Tide high; wind pretty fresh and blowing up the Firth from the east. Many birds seen to cross the Firth to the Culross or Fifeshire shore, as I invariably find they do in an east wind, seeking shelter on the lee shore. Consequently birds were not so numerous: the flocks of dunlins were small; redshanks scarce; godwits, about thirty seen altogether; ring plover—never very plentiful on this part of the coast—only in stray individuals. One of the godwits only was an adult bird. A large flight of golden plover came down off the land when the tide had receded about 100 or 150 yards from the shell-bank, and before we were prepared for them; we thus only got one bird, which was a straggler behind the main body. We saw other large flights sweeping down over the sea-embankment, all along the coast as far as we could see: the flight was over in less than ten minutes, and the whole edge of the water along the "slink" seemed to be

almost instantaneously peopled with thousands of golden plover, where a short ten minutes before only a solitary gull or two were to be seen. Some of the dunlins shot to-day still retain a considerable portion of the black-breasted plumage. Only one individual dunlin to-day had an unusually long bill, and there was a decided buffish mark on its breast, which, for the moment, made me think I had got a curlew sand-piper. These long-billed dunlins are certainly rarities, and I fancy even more uncommon than the very short-billed birds, which are found breeding in the North. Do dunlins breed in any numbers in Wales or in any of the midland counties of England? It would be interesting to examine specimens which have been shot there in the breeding-season, and to compare the length of their bills with those shot during the breeding-season in the different districts further north.

September 15. To-day we got twelve knots, three golden plovers, and dunlins. Saw one bird I took for a sanderling: this seems a rare bird on our coast, probably owing to the general want of sandy beaches, the "shell-bank" at Grangemouth being the only thing of the kind between this and Queensferry. At the latter place there is a sandy bay on which the shells are thrown up in regular rows, and is known, or was known, as "the bank where shelly-coat shook himself."

September 16. To-day we got six knots, one bartailed godwit, one golden plover and dunlins. Saw two greenshanks—very wild: recognized them first by their cry and then by their flight, in both of which they considerably differ from their congener the redshank, as well as in their greatly superior size. Five herons were to-day as well as yesterday feeding out on the "slink," as were on each day some five or six oystercatchers. Two small flocks of terns crossed over our heads on each day when the tide was about half full: some had the adult black head, but most had the white or grayish frontlet of the immature plumage. (Several in the latter plumage, and shot at Queensferry, came into Mr. Small's shop in Edinburgh shortly after this). We killed an apparently adult bird, but it fell out at sea. Two male pochards, along with some five or six females, were several times seen, and once came within 150 yards of us. Great blackbacked gulls, both in adult and immature plumage, were occasionally seen, and I watched one magnificent fellow through my glass, as he rested on the water, between us and Bo'ness (contracted for Borrowstouness). Wind to-day, as on the two previous days, easterly, and tides very high. At full tide we were standing up to our ankles in water, the whole of the shell-bank being covered.—*John A. Harvie Brown; Dunipace House, Falkirk, October 1, 1868.*

An Usurper.—I was not aware before this year that any birds, except the house martin and the sand martin, were subject to the annoying interference of the sparrow, while engaged in the work of nidification. Last April I found the nest of a sparrow in a holly-bush, founded on the nest of a song thrush. The thrush's nest contained two eggs when the sparrow began to build. The pair of thrushes of course abandoned the spot when they found their nest covered with straw and roots. The two blue eggs were entire when I removed the nest of the sparrow.—*Geo. Roberts; Loft-house, near Wakefield, September 29, 1868.*

Egyptian Vulture near Colchester.—On the 28th of September last the labourer who had charge of an off-hand farm of Mr. Woollard, of Stanway Hall, situated at Peldon, Essex, had been killing his Michaelmas geese. On going some time after into the yard where said geese had been slaughtered, he saw a strange bird feeding upon the blood. The bird flew away, and the man loaded his gun. Presently the

bird came and hovered over the spot, in hopes of another spell at the blood; but his fate was sealed, and he fell dead to the labourer's shot. I saw the bird next day at the house of Mr. Ambrose, of this place, to whom it had been sent for preservation. Mr. Wollard has since kindly furnished me with the above information. As far as I know, this is only the second instance of the capture of *Vultur percnopterus* in Great Britain, the first having been shot on the shores of the Bristol Channel, as recorded by Yarrell, Morris, Macgillivray, &c., in 1825. It is quite possible that it has more frequently visited our shores, though not captured. Mr. Laver, of this town, informs me that many years ago his father, who lived near Burnham, further up the Essex coast than Peldon, had a flock of vultures for several days among the large trees on his farm. They were known by their bare heads, and were most probably the Egyptian vulture. At all events, this bird must now, I think, be ranked without doubt among the occasional strangers which visit our shores. The specimen now shot was in immature plumage. As it differs in some respects from all the definitions of this bird, I will detail its description, made by myself the day after the bird was shot:—Length 26 inches; expanse of wings 5 feet 3 inches; carpus to tip of wing 18 inches; tail 10 inches; beak from gape $2\frac{3}{4}$ inches; tarsus 3 inches; middle toe, without claw, $2\frac{1}{2}$ inches; claw $\frac{3}{4}$ th inch; scales on outer toe 2, on middle 3, on inner toe 3, hind toe 1. Beak bluish flesh-colour, with hook black; iris brown; cere blue, with stumpy feathers down to occipital ridge and between the eye and the nasal aperture, which is in middle of beak and oblong, $\frac{1}{2}$ inch long. Ear open and surrounded by stumpy feathers. Crown of head naked, with small downy rudimentary feathers brown and cream-coloured. *Upper plumage*.—Back of neck brown, each feather tipped with dark cream-colour; nape cream-colour, with dark shaft; back and rump cream-colour; scapularies long, light brown, tipped with light cream-colour; upper tail-coverts cream-colour; tail fourteen feathers, wedge-shaped, the upper feathers brown, broadly tipped with cream-colour. Wings: primaries dark brown, the third longest; secondaries brown, darker at the tips, but edged on to outer side of the middle of each feather with cream-colour; tertiaries brown, tipped with cream-colour; upper wing-coverts mottled with brown and cream-colour. *Under plumage*.—Neck and crop dark brown; abdomen light brown, with a few dark feathers; under tail-coverts light cream-colour; under tail-feathers slate-brown, broadly tipped and margined with light cream-colour; wings underneath dark slaty brown, the upper margin beautifully mottled with dark brown and cream-colour; primaries, as seen from below, emarginated or scolloped at their base, and the shafts marked with blue dots. The Egyptian vulture is common in Spain, and has a wide range, extending through France, Norway, Egypt (where it is known as Pharaoh's chicken), South Africa, and is abundant in India. Peldon, where this bird was shot, is the next parish inland to Mersea.—*C. R. Bree; Colchester, October 8, 1868.*

Snowy Owl in Inverness-shire.—A beautiful specimen of the snowy owl (*Surnia nyctea*) was shot last week at Knockie, by Mr. Charles Peel, and sent to Mr. Macleay, Inverness, for preservation. It measures 4 ft. 10 in. from tip to tip of its wings, 2 ft. 3 in. from the beak to the end of the tail, and is in splendid plumage. It is rather a curious circumstance that the last specimen known to have been killed in these parts should have been got at Knockie about four years ago.—*Inverness Advertiser.*

Blackbird with white-barred Tail.—We have a blackbird, taken from a nest in our garden at Winchester last July, with a beautifully white-barred tail: it is ten weeks

old, and this change did not appear until a week ago. — *Alexander Clark-Kennedy*; October, 1868.

Richard's Pipit at Dover.—On the 21st of October I shot a most superb specimen of Richard's pipit (*Anthus Richardi*) in a corn-field in the environs of Dover: it attracted my attention by its loud call. The specimen is in good condition, having just completed its moult: its length is seven and three-quarter inches, and its weight an ounce and a half, less one scruple. On dissection the bird proved to be a male.—*Charles Gordon, Curator of the Dover Museum*; October 23, 1868.

The Tawny Pipit and Richard's Pipit at Scilly.—I have just examined a good-plumaged specimen of the tawny pipit, shot at Scilly to-day by Mr. A. Pechell. It is a male bird, and apparently in its recently-acquired autumnal plumage. The upper plumage is almost hair-brown, with the centres of the feathers a shade darker, scarcely giving the bird a mottled appearance; the whole of the under parts, with a little variation here and there, white with a wash of buff; moustache indistinct; upper rump grayish brown, fat much smaller than the tree pipit; tarsi longer than the tree pipit's, flesh-colour; back claw almost straight, and short; outer tail-feather white, the next blotched on the inner web half-way with brown. Three Richard's pipits were sent at the same time, and two tree pipits. The three species bore an interesting comparison when lying side by side.—*Edward Hearle Rodd*; *Penzance*, September 19.

Whinchat in the County Dublin.—September 14. Shot a female whinchat at Loughlinstown: in company with a female stonechat it was feeding in a bramble-brake. The whinchat is one of the rarer summer migrants to Ireland, and is a very local species.—*H. Blake-Knox*.

Nightjar or Goatsucker in the County Dublin.—September 22. My friend Mr. F. J. Rose brought me a female nightjar, which his dogs found when hunting for partridge: it was shot near Kilbogget, among furze. No nightjars breed about this locality, so it must have been on its migration south. It is an extremely local summer visitor to Ireland: as well as local it is rare.—*Id.*

Siskin in the County Dublin.—September 8. A siskin brought me to-day, caught near Glen Druid with a linnet-decoy. The "siskin finch" is not at all a common bird in Ireland.—*Id.*

Spotted Crake in the County Dublin.—September 5. Shot a spotted crake at a little bog in the Vale of Shangannah. It is one of the scarcest birds that fall to the gun of the snipe-shooter in these parts.—*Id.*

Ring Ouzel at Howth, County Dublin.—September 10. I have to thank "Anonyma" for the beautiful ring ouzel so kindly sent me, and beg to say that Howth, from whence she procured the bird, is one of the few localities in this county where the ring ouzel used formerly to breed. Whether or not we still can claim the ring ouzel as a summer migrant, or merely as a bird of passage, I cannot say, but should think a truly authenticated nest and eggs of this bird, taken in the County Dublin, not only a prize to a young lady's collection, but a valuable addition to any of our Dublin Museums. I fear, though, a dark corner, a bleaching glass-case, or utter oblivion would be the lot of the eggs. I do not collect eggs, but shall be most happy to prove them, particularly as the nest is preserved, from those of the blackbird. I fear I am encroaching on the liberties of the 'Zoologist,' it not having a "correspondents' column," which I agree with "Anonyma" is a *desideratum*. If "Anonyma" will favour me with her address, I shall be delighted to answer any questions in my power on birds and shells.—*Id.*

Rook with a crossed Beak.—While walking over the Downs at Seaford, in August, with my gun, I saw a rook which allowed me to come within range, when I fired and killed it. The mandibles of the beak were curved exactly as in the crossbill: it appeared to be a bird of the year, and was in fair condition, but very much infested with vermin.—*James Dutton*; 2, *Theresa Place, Hammersmith, October, 1868.*

Scarcity of the Corn Crake.—Mr. Cordeaux remarks (Zool. S. S. 1411) on the scarcity of the land rail (*Crex pratensis*) this year in North Lincolnshire. The same has been the case here: it has only been heard two or three times during the season, whilst, in preceding years, its monotonous “crake, crake,” could be heard in all directions.—*F. G. Binnie*; *Healough Lodge, Tadcaster, October 5, 1868.*

Creamcoloured Courser in Scotland.—A specimen was shot, on the 8th of October, at Cleghorn, near Lanark, by Mr. C. Walker, jun., of Braxfield, Lanark.—*Francis Walker.*

Further Remarks on the Green Sandpiper breeding in North Lincolnshire.—In my last paper in the ‘Zoologist’ (S. S. 1412) I mentioned the fact of two pairs of green sandpipers remaining on our small stream during the summer—one pair in this, the other in the next parish of Aylesby. The farmer who occupies the land adjoining the stream in that parish has since informed me that he is quite certain that these birds nested somewhere not far from the stream: he had seen them about one particular spot through the summer; and, some time towards the *end of July*, noticed four young birds along with the old ones sitting on a sand-bank in the “beck.” He says that these young birds “*were quite little things,*” and could “*only fly a few yards at once;*” they were “*quite a different colour to the old birds*”—“*much lighter.*” He nearly every day for some weeks after this saw the old and young birds about the stream. Hearing from the fish-keeper that I wanted a young green sandpiper, he one day shot one and sent it to me. He says “*it was about as large as a jack snipe.*” Unfortunately I had just gone from home for a fortnight, and never received this bird, so lost the opportunity of confirming his evidence. I have not the slightest doubt, however, that he is perfectly correct in his information; and I know he can speak to a green sandpiper, or any other of our familiar “beck” birds, as well as I can myself. He says that this is now the third summer these birds have bred near their stream.—*John Cordeaux*; *Great Cotes, Ulceby, October 5, 1868.*

Blacktailed Godwit in Devonshire.—An example of this species, a young bird in intermediate plumage, was shot on the banks of the Taw at the latter end of September. This is only the second specimen that, to my knowledge, has been obtained in the north of Devon, the first, which was in fine summer plumage, being killed by myself in the autumn of 1859.—*Gervase F. Mathew*; *H.M.S. ‘Britannia,’ Dartmouth, October 20, 1868.*

Arrival of Snipes, Land Rails and Spotted Crakes on the Cornish Moors.—My nephew writes me word that he killed in four hours seven and a half couples of snipe, four couples of land rails and two couples of spotted crakes, on the moors about the Cheese Ring and Dosmary Pool District.—*Edward Hearle Rodd.*

Fawn-coloured Snipe.—I am indebted to Mr. Gatcombe for an extraordinary snipe, bought at Leadenhall about the 3rd of September. It is fawn-coloured, retaining, however, all the zigzag mottling of the normal plumage, but so faint as to be hardly discernible. I may also add that I have had three greenshanks this autumn.—*J. H. Gurney, jun.*; *The Bank, Darlington.*

Solitary Snipe, Montagu's Harrier, Osprey, &c., at Barnstaple.—Several interesting birds have been obtained in this neighbourhood within the last few weeks. Crossbills, which seem to have occurred generally throughout the country this summer, have been tolerably plentiful here, and there are at least a dozen, in different stages of plumage, in our birdstuffer's shop, and he tells me many more have been shot: a few of these birds have likewise been killed in the south of Devon, in the vicinity of Kingsbridge. After the heavy westerly gales we had, about four weeks ago, three little auks were picked up dead on the banks of the Taw between Barnstaple and Instow; only one of these was preserved, and is a young bird of the year. I have not heard whether any guillemots or razorbills were washed up on the coast of Barnstaple Bay; but if the weather was severe enough to cause the death of the auks, it is to be presumed that these birds would not have escaped: I recollect a few years ago, after a heavy gale, they were thrown up in hundreds—in fact, there was quite a high-water mark of them. A few days after this I picked up a Leach's petrel on Braunton Burrows: it is strange that these birds, whose very home is on the sea, should be so soon affected by rough weather. At Parracombe, last week, a solitary snipe was shot; it was a male, weighing seven and a half ounces, and from its appearance I should say was a young bird: a day or two after a second was killed in the same locality, so it is possible they may have been bred there, though I do not think it probable. The country around Parracombe is very wild and mostly moorland, interspersed with small woods of oak and birch, with numerous grassy swamps. If these birds were migrating they were a long way to the westward of their usual course of flight: this species, although not uncommon in the eastern counties during the beginning of autumn, is with us in Devonshire looked on as a rarity. The next species I have to notice is Montagu's harrier: this bird has bred this year in our neighbourhood, and the young, I am sorry to say, have been taken by, and are now in possession of, a gamekeeper, who has, I am afraid, also shot both the old birds. Three others have been shot and preserved, but I have only seen one of them—a young bird; the other two (which I suspect were the parents of the young ones just alluded to) were sold before I arrived here: I have not yet seen the keeper who procured them, so have not been able to ascertain the position or locality of the nest. The next and finest species to record is the osprey, a magnificent specimen of which was shot last week in the Braunton marshes: it is a male bird, and is, I believe, the first that has been observed here. I am sorry to add that several peregrines have been killed or their nests robbed: I am sadly afraid that, in the course of a year or two, this splendid falcon will come to be reckoned among the things that were, unless our landowners take the matter up and give orders that this and other fast-disappearing species are not to be killed up in the ruthless manner they are: a few could do no great harm; on the contrary, they would tend to improve the appearance of any one's property, for I am sure every one will agree with me in saying there is no finer sight to witness than a peregrine in graceful flight, or in its grand rush as it strikes down its prey, or to watch the windhover motionless against a clear sky; and this latter comparatively harmless little bird is as much persecuted by the ignorant gamekeeper as the largest falcon.—*Gervase F. Mathew; Barnstaple, September 28, 1868.*

Solitary Snipe on Dartmoor.—When shooting on Dartmoor, in a gale of wind and rain, on the 28th of September, I was fortunate enough to flush and bag a very fine specimen of the solitary snipe (*Scolopax major*). My brother sends me word of

another example having been recently obtained near Barnstaple.—*Murray A. Mathew; Chagford, Exeter, October 1, 1868.*

Solitary Snipes near Parracombe.—Since my last communication two more solitary snipes have been shot near Parracombe, and were, it is said, in excellent condition.—*Gervase F. Mathew; H.M.S. 'Britannia,' Dartmouth, October 3, 1868.*

Solitary Snipe in Wiltshire.—On Wednesday, the 23rd of September, while beating a piece of potatoes on a dry sand near Milton Pewsey, Wilts, for partridges, I moved and killed a fine specimen of the solitary snipe, in beautiful plumage and exceedingly good condition: the weight was $7\frac{3}{4}$ ounces.—*'Field' Newspaper.*

Solitary Snipe on Salisbury Plain.—A fine specimen of the solitary snipe was killed on my shooting, on the 24th of September, in some heather on Salisbury Plain, and is now being preserved by Mr. King, Warminster.—*Alex. P. E. Powell; Hurdcott House, Salisbury.—Id.*

Solitary Snipe.—On the 23rd of September I saw one of these birds hanging at a game-dealer's shop, which I bought, he remarking that it was a very fine snipe, as it certainly was: it is the third I have met with sent accidentally for sale with other game. All these, and several others that have come under my observation, which have been killed during this month in various years, are young birds, hatched the previous summer, in the first feathers they get after the downy state.—*C. M. Adamson.—Id.*

Solitary Snipe in Hampshire.—On the 2nd of September I received a great snipe, in the flesh, from Christchurch, in Hampshire; another was shot the same day near Reading. On the 20th a third specimen occurred at Christchurch, as I learned from Mr. E. Hart, the birdstuffer; and I heard of yet another exposed for sale in Leadenhall Market, on Saturday, the 26th. The great snipe differs from the common in being more bulky and weighing more, in having much larger legs and a shorter bill, and in having the belly and abdomen always barred with brown and white. It has besides sixteen tail-feathers, and the eye is somewhere higher in the head than in the common snipe. They seem to have visited us this year in more than usual numbers; they were similarly plentiful in this county (Durham) and in Norfolk in the autumn of 1826, which a friend remembers to have also been a season of heat and drought.—*Id.*

Solitary Snipe in Devonshire.—The snipe I wrote to you about as being killed here (Witheridge, North Devon), now some fortnight since, was named "solitary" by the gentleman who shot it, he having killed similar snipe before in Finland. The weight was seven ounces and a half, about double that of the ordinary snipe, and of which some specimens may be found all the year round here. No one that I have inquired of has ever heard of such a species of snipe visiting the neighbourhood before.—*Id.*

Occurrence of the Ringed Guillemot in three instances off the Dublin Coast.—Shot two ringed guillemots in the beginning of 1868; one on the 12th of February, the other on the 28th of March: both were in their first winter plumage, and both fully ringed and bridled with white. On examining some birds of Mr. W. R. Atkins's, I found he had one of these birds in similar plumage, shot in the autumn of 1867 off this coast.—*H. Blake-Knox; September 7, 1868.*

Fulmar Petrel at Flamborough.—On the 14th of October Mr. Knaggs, fisherman, brought Mr. Bailey a live Fulmar, with the following history:—It had kept about his vessel for two or three days; the first time they saw it they were about twenty miles from Flamborough Head, then again the following morning about thirty miles. If a

herring fell into the sea when they were taking in their net the petrel dashed after it: it was quite tame, and came alongside the boat until Knaggs got a boat-hook and took it on board. Mr. Bailey fed it on herrings; afterwards he killed it and sent it me, and I forwarded it, in the flesh, to Mr. Gould. These petrels vary much in size and weight: most authors, I observe, state the legs and eyes to be yellow, but my specimens have had nearly black eyes, and Captain Elwes, who visited St. Kilda last May, is sure they are not yellow.—*J. H. Gurney, jun.; Darlington.*

Fulmar Petrel near Sunderland.—On the 15th of September, as Mr. Thomas Simpson was going along the sea-beach at Hendon, near Sunderland, very early in the morning, he observed a dead Fulmar petrel tossing in the waves: when secured it was found to be in excellent feather and nearly adult. I never skinned a bird with the breast plumage so dense. The body was thickly clothed with compact yet elastic feathers upon a close fine down of a darker colour: no wonder the St. Kildians use it for their beds; it must be a great protection against the cold. When perfectly fresh I was struck with the exceeding paleness of the feet and legs, each toe-joint being darker by a shade. The tarsus (less in length than the middle toe) is much compressed, its circumference when fresh three-fourths of an inch: in lieu of a back toe it has a sort of spur. The web is a delicate striated membrane, partly transparent, showing even the veins; its breadth three inches and a quarter. The windpipe is divided into two channels for about half its length upwards from the divarication of the bronchial tubes, a circumstance noticed by Mr. Backhouse (Zool. 1263), but unmentioned in Macgillivray. This is not the case in the storm petrel.—*Id.*

Common Skua on the Dogger Bank.—On the 16th of October Mr. Jones sent me a common skua, or “murrel hen,” in the flesh, which some fishermen had got on the Dogger Bank. I suspect, from the pale colouring of the edges and tips of the feathers, that it is immature; but the plumage of this species is not subject to any important variation, nor does it assume by age the lighter colours peculiar to the other skuas.—*Id.*

Pomarine Skua near Bridlington.—A pomarine skua was shot on the 14th of October, at Bridlington, which I obtained for Dr. Tristram.—*Id.*

Richardson's Skua near Flamborough.—Of the species of skua which visit Flamborough Richardson's is the most numerous, and may annually be seen chasing the terns and smaller gulls: two have been sent me this month in adult plumage.—*Id.*

Little Gull at Flamborough.—On the 15th of October I received four little gulls, shot off Flamborough Head, three by Mr. Brook and one by Mr. Bailey. They are light birds, the four together not weighing one pound.—*Id.*

Little Gull near Bridlington.—On the 16th Mr. Jones sent me a little gull (an adult in winter plumage), shot by himself at Bridlington Quay.—*Id.*

Little Gull near Filey.—On the 17th of October two more little gulls arrived from Filey. Seven in three days is pretty fair work: they were all in the flesh.—*Id.*

Little Gull in the Thames.—From amongst a lot of gulls, &c., shot for me a little below Gravesend, I have found a fine adult specimen of the little gull, in winter plumage. This comparatively scarce species of *Larus* was observed in company with the common tern, and in death run a risk of not being distinguished from them, his late associates with himself being intended for ladies' hat-plumes.—*G. B. Ashmead; Bishopgate, E.C., October 6, 1868.*

Iceland and Glaucous Gulls off the Dublin Coast.—September 5, 1867. Saw a perfectly adult Iceland gull: it still had the white head of summer. November 19, 1867. An Iceland gull passed me in cream-coloured plumage. March 8, 1868. Iceland gull in cream-coloured plumage. December 13, 1867. An adult glaucous gull passed me to-day. In the beginning of 1868 I also noticed a few young birds of this fine species.—*H. Blake-Knox*; September 7, 1868.

Alice Shad at St. Ives.—The allice shad was taken yesterday off St. Ives. The fish is not of common occurrence in our western seas.—*Thomas Cornish*; Penzance, September 19, 1868.

Short-finned Tunny (*Thynnus brachypterus*) at Penzance.—The specimen was $8\frac{9}{10}$ inches over all. It had not so many fin-rays in the first dorsal as Mr. Couch's figure and letter-press show, and it had two short free soft rays between the first and second dorsals. The fish was taken in the pilchard drift-nets on the 20th of August.—*Id.*

Saury Pike or Skipper at Penzance.—A specimen of the Saury pike or skipper (*Scomberesox Saurus*, Yarrell) leaped of its own accord on board a fishing-boat, about two miles off the Black Head, near Falmouth, on Thursday night. There is nothing remarkable in the specimen. The fish, which is a surface-swimmer, is mentioned as having been commonly captured when the pilchard drift-nets fished shoal, but now they fish deep it but rarely occurs. This is the first specimen I have seen. I had the fish dressed, and found it not agreeable as food: the flesh was very white, remarkable for an absence of anything like flake, and had a slight and disagreeable sour flavour.—*Id.*; October 3, 1868.

Bream in the Lea.—Bream are a curious fish, and appear here and there where least expected; but, however erratic may be the sudden congregations of these *Abramis vulgaris*, there is doubtless some good and sufficient reason for the phenomenon. The last two years they appeared in the Wey at Guildford in immense quantities; and their advent at Walton-on-the-Thames, where they continue, it would seem, as abundant as ever, is of comparatively recent date. This season they have shown themselves in the Lea about Tottenham Mills, and two of Joe Noakes's subscribers of the Ferry Boat fishery took, on the 13th of October, forty-five pounds weight of these fish; and since that date (say to the 16th) there have been more than an additional aggregate of one hundred pounds, the fish varying from three-quarters of a pound to four pounds in weight—an occurrence never known in this vicinity before.—'*Field*' Newspaper.

The Colour-patterns of Butterflies.—The Rev. H. H. Higgins, in a paper published in the 'Quarterly Journal of Science' for July, 1868, discusses the possible origin of the colours and patterns upon the wings of Lepidoptera; but his views, though ingenious, must I think be acknowledged to be open to several grave objections, the more serious of which seem to be the following. *First*, at p. 324, Mr. Higgins asks, "Can any clue to the subsequent arrangement of the colours be found in the manner in which the wings are *folded* in the pupa state? If a scrawl of

any kind be made on paper with a pen, and if the paper be folded, the ink being inside and still wet, a symmetrical pattern is produced, the sides of which, *like the markings on the wings of a butterfly, exactly correspond.*" Mr. Higgins then proceeds to answer this question thus: "In the limited number of instances in which I have been able to examine the sufficiently advanced chrysalis of a butterfly nothing of this kind has been indicated: the like spots on the right and left side do not, in the pupa state, coincide; the *folds* do not bisect the markings; *that which becomes a beautifully formed band begins as a mere line, or a shapeless spot*; and this stage of the metamorphosis, if watched, conveys a decided impression that the resulting colour-pattern is not dependent on the folding of the wings in the immature condition." The thing which puzzles me and has puzzled others who have read the above observations is the mention of *folds* in the butterfly wing when in a pupal condition: in all the chrysalides that I have examined just before the exit of the imagines, the wings, as seen through the hyaline integument, have appeared as perfect, though miniature, facsimiles of these organs in their full-grown condition; none of the bands have been mere lines nor shapeless spots. But now we come to the second and more plausible part of the theory. The simplest type of colouring being pure white or yellow, and the first approach to definite marking being found in the *Cratægi* type of coloration, in which the nervures are clothed with black scales, Mr. Higgins supposes that all the dark scale colouring, as represented by the blacks and browns, may have proceeded from the nervures, and it is with the object of pointing this out most forcibly that the plate accompanying his paper is prepared.* As a striking evidence of the probable truth of this view, the genus *Hestia* is instanced, in which "the primary pattern is diversified by a great variety of black spots and blotches, which are *evidently dependent on the venation*: the spots occupy a *central position between the veins*, or they are bisected by a false vein, or they are in pairs contiguous to a vein." Now as it is perfectly evident that the spots must either be upon the veins or between them, I cannot see how this particular instance can bear any weight in the argument; nor does it appear that spots occupying a *central* position between the veins can well be dependent upon these veins. Again, with regard to the production of the "paler ground colour," we read that it finds its origin in a kind of blush or deepening of the primary coloration of the wings, "the transition" from one to the other being "*generally gradual, the richer being shaded off at its edges into the paler colour*;" but surely, unless this can be shown to be universally the case, this theory must continue to be a mere conjecture. The gloss or shot-colouring is caused, Mr. Higgins tells us, by infinitesimal iridescent striations "upon the surface of the scales which contain the pigment grains," but he does not proceed to inform us of the means by which these striæ are produced, so that we are left in as great a dilemma as we were in at the first.—*A. G. Butler.*

* It is to be regretted that an entomological artist was not chosen to produce this plate, as in such case several serious errors might have been avoided: fig. 1, the common Indian *Dissimilis* of Linnæus is queried as *Zagreus*, *Doubl.*, a scarce and well-marked American species; fig. 3, *O. Damaris* represented with antennæ and palpi broken off near the base; fig. 4, *P. Cratægi* represented with split club to antennæ.—*A. G. B.*

Life-Histories of Sawflies. Translated from the Dutch of M. S. C. SNELLEN VAN VOLLENHOVEN, by J. W. MAY, Esq.
(Continued from Zool. S. S. 1419).

SELANDRIA OVATA, Linn.

Linnæus, Syst. Nat. ii. p. 924, No. 28, Ed. Gmel. i. P. V., p. 2660, No. 28. *Fabricius, Syst. Piez.*, p. 27, No. 25. *Panzer, Fauna Germ.*, lii. tab. 3 (hæmatodes). *De Geer, Mémoires* (Goezes' trans.), ii. 2, p. 237, No. 5, pl. xxxv. figs. 1—11. *Klug, Die Blattwespen*, &c. (in *Mag. Naturf. Fr. Ser. Jhrg.*, p. 62, No. 54. *Lepelletier de St. Fargeau, Monogr. Tenthred.* p. 109, No. 316. *Hartig, Blatt. und. Holzwespen*, p. 280, No. 51. *Ratzeburg, Forst-insecten*, iii. p. 132, pl. 3, fig. 8. *Dahlbom, Clavis Novi Hymen. Syst.* p. 32, No. 48.

Selandria nigra, thoracis dorso rufo, tibiis basi albidis, capite thoracisque lateribus punctato-scabris.

Although this species is well known, and has even been described by many authors (its name dating from Linnæus' 'Fauna Suecica'), the male has hitherto remained undiscovered. I can only attribute our ignorance on this head to the following reasons:—In the first place, the male is very probably differently coloured to the female, so that in a collection it will not be readily matched with the female; secondly, it must be remembered that sawflies seem to copulate during the night or in concealed places, so that it is extremely difficult to observe the copulation of these insects, and will entirely depend upon a fortunate chance; thirdly, according to my own experience, it is anything but easy to rear this species through all the stages of its metamorphosis, so that probably those authors who have published their observations have not succeeded with more than one or two specimens, which, according to the calculation of chances, were much more likely to have been females than males.

There is another conjecture possible, which may serve to clear up the question as to why we are acquainted with only one sex of such a common species. According to this supposition, which, however, is not in anywise based upon observation, and is thus purely hypothetical, and only to be regarded as an idea, the larva of the male would not have the white woolly covering, and for that reason would be less conspicuous, and also, in consequence of that difference, would not be taken for the same species.

The larva is found, from June to September, exclusively on the alder; at first it eats holes in the leaves; it afterwards attacks the edges of the leaves, and goes on until there is nothing left but the principal nervures and one little piece in the middle: fig. 5 represents a leaf entirely eaten out in this manner. The larva is found generally, but certainly not, as stated by Klug, always, on the under side of the leaf; on the contrary, I remember walking in a lane with alders on either side, and seeing as I went along more than twenty larvæ of *Selandria ovata* on the upper sides of the leaves, their white appearance rendering them very conspicuous. It has not hitherto been discovered where the eggs are deposited, and I have not been able to find any, which, however, can only be attributed to my living in town, for from the large number of sawflies, which are frequently found in a comparatively small area it would surely not be difficult for any one living in the country to clear up this point. I expect the eggs are deposited singly in the petiole or the veins of the leaves, as the larvæ are always found at some distance from each other.

The larvæ are generally found when they are full grown, as they are then very conspicuous on account of their white appearance, which contrasts strongly with the green leaves. They seem at first sight to be entirely white, but they are merely covered with a substance which appears to the eye like white wool: on rubbing off this substance the body is found to be of a very pale bluish green. Fig. 2 represents a half-grown larva immediately after moulting, and when the woolly covering has not yet made its appearance. Its head was somewhat bluer than the body, but there was no spot on the vertex: on removing the white covering from the full-grown larva it is found to have twenty-two legs, the thoracic legs being pale green with brown claws; the body is bluish green, with a darker bluish stripe running along the dorsum. The head is yellowish green-brown on the vertex, and has black spots at the sides, in which the eyes are inserted; the head is thinly clad with fine hairs; the mandibles are brown at the tips. It appears, however, that the head is not always coloured in accordance with the above description, as I found in the case of a larva which I removed from the cocoon, the head of which is represented at fig. 3; in this case the head was olive-green, being darker posteriorly and on the vertex. According to De Geer a large circular black spot should be found on the top of the head.

The larva attains a length of 2·5 centimetres. De Geer is very circumstantial in his description of the white excretion, which he cou-

pare to the covering of some of the plant-lice and *Chermes* larvæ. He states that the material can be rubbed off the body, but is not very easily so entirely removed that the surface of the skin is completely exposed, some portion always appearing to remain attached to the body; further, according to this author, on the skin so exposed are observed darker elliptical transverse spots tapering at both ends: these spots indicate indentations out of which the white material is seen to protrude, of which he also gives figures. He likewise observes that the material in question is not moniliform, as Réaumur has stated with regard to the secretion of plant-lice, but is composed of bundles of remarkably fine short threads running across each other, and without order or arrangement. Hartig observes at the end of his quotation from De Geer that he has himself found woolly larvæ on the alder, but none in which he had been able to discover any deep-lying glands. I have myself also looked for these depressions or gland orifices, which are represented by De Geer as by no means minute, at fig. 6 in his plate xxxv., but I have never been able to discern them. I could see nothing at all resembling these black transverse lines or depressions, but I observed the white substance apparently issuing from various points of the skin, as if coming from invisible pores. The substance itself, when placed on the stage of the microscope and viewed with a power of 300, had the appearance shown at fig. 4; that is to say, of very fine contorted white hairs, not thicker than one of the dividing lines of my micrometer appeared under the same power, thus proving themselves to be of extreme fineness.

I have no doubt that De Geer has described the same larva as I have for that of *Selandria ovata*; but I am unable to clear up the difference in our observations. On attaining its full growth the larva takes to the earth and there spins a brownish black cocoon, to which the adhering grains of earth give an appearance of roughness; its two extremities are of a less compact texture. The cocoon is double; that is to say, there is an inner cocoon, which is shining and smooth like silk, it is of a yellowish brown colour, and has a white transverse band round the centre. This inner cocoon puts one in mind of those of some of the ichneumons, which also have bands of another colour. The outside case is represented at fig. 6; the inner cocoon at fig. 7.

If the larva spins up in the summer the imago appears after the lapse of five weeks, but if in September the imago does not come out until the following spring: it is singularly coloured, and it was no

doubt on account of its short compressed figure that Linnæus gave it the name of *Tenthredo ovata*.

The perfect insect is 9 millimetres long and expands to 16 mm. The head is black, somewhat shining and punctured, more especially on the sides behind the eyes; just above the place of insertion of the antennæ are two larger smooth pretty deep depressions, as if intended to contain the first two joints of the antennæ. From one of these depressions rises a narrow band which traverses the forehead, running round the most anterior of the three ocelli, and ends in the depression of the opposite side. Vertex and forehead are clothed with fine gray hairs. Mandibles very acute; palpi pale.

The antennæ are 9-jointed. The first joint rounded, the second cup-shaped, the third cylindrical, thicker at the end and longer than the two preceding joints together. These three joints are black, as is also the greater part of the fourth, which is of the same form as the preceding one, but is little more than half the length; the fifth joint is broader, but inserted obliquely into the fourth; the following joints become gradually shorter and narrower, so that the antenna is pointed at its termination. From the apex of the fourth joint the antennæ are black on the outer side only, for the rest white (fig. 9). I do not find that any author has hitherto noticed the oblique insertion of the fifth joint.

The prothorax, the sides and the anterior triangular division of the mesothorax are bright red, shining and sparsely hirsute. The sides of the breast, the scutellum and the part of the dorsum immediately behind it are thickly punctured; cenchri and tegulæ brownish.

Wings iridescent, more or less smoke-coloured; in some individuals a pale brown band traverses the anterior wings. The anterior division of the anal cell is obliquely divided, so that this insect belongs to the third section, *Eriocampa*, of Hartig. The thickened stigma and the remaining nervures are black or very deep brown, the only exception being that the costal nervure is white at the base. The abdomen being flat above and somewhat curved below, its section is triangular; it is, moreover, smooth, shining, black; the apex above the ovipositor is clothed with shining silvery hairs; a considerable portion of the legs is similarly clothed—these latter are black with white bands round the bases of the tibiæ, those of the posterior tibiæ being the broadest.

Fig. 10 represents the saw and ovipositor highly magnified; they

are of the usual brownish yellow colour. It will be seen that the median teeth of the saw are semitrifoliate.

Selandria ovata seems to be generally distributed throughout Europe; it has been taken in this country in many different localities where alders were growing.

NEMATUS PALLICERCUS, *Hartig.*

For the imago, see *Hartig, Blatt. und Holzwespen*, p. 190, No. 13. The larva is undescribed.

Nematus luteus, *antennis, genis, occipite, dorso, macula pectorali tarsisque posticis nigris, alarum stigmatate et costa pallidis.*

The larvæ of this and the following species* of *Nematus* indicate that they belong to the same group as *Salicis* and *Wttewaalli*. The food of the present species, however, clearly appears to be poplar, and not willow, on which the two last-named species feed.

In the month of August, 1859, I observed upon a poplar tree in my garden, at Leyden, some larvæ (fig. 1), which seemed to me to differ in colour and marking from all the species with which I was acquainted, and further observation confirmed the fact that I had a new species before me: my larvæ were somewhat less than two centimetres long, and rather stout in proportion to their length. The colour on the dorsum was shining bluish gray-green, yellowish green on the sides and under surface. The anterior border of the first segment, especially at the side, the eleventh segment, and the margin of the last, were orange-yellow. The thoracic legs were pale green, with black spots; claws brown; the abdominal and two anal legs were yellow. Head small and shining black; on the back were three rows of contiguous black spots. At the sides were some round mostly elliptical spots, irregularly placed, the most conspicuous being two transverse spots above each leg, and above these a triangular spot; on the upper surface of the last abdominal segment was a large quadrangular black spot, which was continued posteriorly on two rather long processes. The spiracles were very small and nearly circular. These animals were almost always feeding; when half grown they merely bit holes in the leaf, but on attaining their full size they ate into the border also, and only left the principal nervures. They were full grown in the first week of September, and on the 6th and 7th of that month

* *Nematus aurantiacus* of *Hartig.*

they descended to the ground, where they formed small egg-shaped elliptical cocoons just below the surface. These cocoons were entirely covered with little grains of earth and sand, which were tightly cemented to them (fig. 4): on these being detached the cocoon was found to be shining coppery black, and, with the exception of some loose threads, quite smooth. These cocoons did not produce me any living imago: after waiting in expectation a considerable time I determined, in July, 1860, to cut open the cocoons. In the greater number I found dried-up larvæ, but in two cocoons were dried-up pupæ, which had been just ready to emerge, and had even partly cast off the last thin integument. The colouring was very recognisable, so that the species of sawfly could be pretty clearly determined.

It was not until the 24th of May, 1863, that I was able to continue my observation of this insect. I found on the same poplar tree a leaf eaten entirely through, and in the state represented at fig. 6, a piece in the middle had been left upon which were seen a number of empty egg-shells: they were placed somewhat irregularly close together, but had all the same elliptical form, and were lying in the same direction; they are represented, slightly magnified, at fig. 7. I found some very young larvæ on that part of the leaf which had been eaten into holes, which larvæ were, apparently, about four days old; they were dark green or blackish, with black heads: one is represented in outline at fig. 8. On the 31st of the same month they had moulted, probably for the second time, and were of the size and appearance of our figure 9, and, as far as the general coloration and markings were concerned, had completely acquired the appearance represented at our fig. 1. The only distinction was that the green colour was not so much inclined towards bluish gray, but more nearly approached a pure green.

I daily visited and examined my nurslings, and on the 3rd of June I calculated that they would require eight or ten days before they were full grown. I was therefore not a little surprised when, on the 4th of June, I found that, with the exception of one individual, my whole sawfly family had disappeared. I thought at first that some hungry sparrow or titmouse had accidentally discovered the colony and had devoured them; it seemed to me strange that one individual should have been left, as birds, when once they have made such a discovery, do not usually leave anything remaining: however, I took the little animal that had been left and put it into a tin box with some earth and a couple of leaves: I then discovered that the whole family must

have voluntarily descended from the tree for the purpose of spinning up, for on the following day the remaining larva also began to make its cocoon. The cause of these larvæ being so much smaller than the former did not appear, nor could I see the reason of so short a time sufficing them in which to pass through the larva state. On the 30th of June I found, in the little box in which the larva in question had made its cocoon, a dead male sawfly of the species called by Hartig *Nematus pallicercus* lying next to the empty cocoon. I will now proceed to describe this imago, of which a representation is given at fig. 10, premising that the sawflies of 1860 fully agreed with it, with the exception of their wings not being unfolded.

It is 6 mm. in length, and expands to 13 mm. This species may be said to have but two tints, a pale reddish yellow and obscure black. The antennæ are of this latter tint, and somewhat thick when compared with those of many other species of *Nematus*; the eyes are gray-brown; head reddish yellow, the extremities of the upper jaws, the cheeks and the vertex, together with the posterior part of the head, are black; the prothorax is yellow; the dorsum of the mesothorax black, the under surface being shining brown; metathorax black superiorly, yellow inferiorly; the anterior and intermediate legs are yellow as far as the last two joints of the tarsi, which are blackish; the posterior legs, which are otherwise yellow, have the extremities of the femora reddish, the tibiæ brownish, the ends being decidedly brown; the tarsi grayish black. The dorsum of the abdomen is shining black, the lateral margins yellow, the under surface reddish yellow. Wings obscure white, slightly iridescent; the nervures brown. The costal and post-costal nervures are yellow at their insertion, the stigma being also of this colour.

The description given by Hartig of the female, *loc. cit.*, agrees with this description of the male, with the following slight exceptions. The black on the vertex is divided by yellow bands into three spots; the sides of the mesothorax are yellow, shaded with black at the insertion of the wings; the posterior coxæ are black in the middle and at the base; the spinous projections of the abdomen are pale brown.

This insect appears to be rare both in this country and in Germany.

The Birds of St. Helena. By EDEN BAKER, Esq. *

I WILLINGLY comply with your request to give you the best account I am able of the birds of St. Helena, only stipulating that, as I have no pretensions to scientific knowledge on the subject, you must expect accuracy only where facts and personal observations are mentioned.

Considering the position of St. Helena, it is singularly destitute of the oceanic birds of the South Atlantic. The great albatross and the smaller man-of-war bird are seen from ships near the island, but never approach its shores. The Cape pigeon follows ships with a south-easter from the Cape of Good Hope to St. Helena, but when the island is approached it leaves them to roam elsewhere. Penguins have been brought in numbers from Ichaboe and the other guana isles on the south-west coast, and let loose in the harbour here: they were never seen again. So far as I know we have only three sea-birds here as residents, and one visitor.

1. The "Tropic Bird," vulgarly so called, but whose card properly written bears the name of *Phaeton æthereus*, deserves the chief place. From its immense expanse of wing, its short legs, and the shape of the beak, it seems to belong to the albatross family, but doubtless its whole history can be found in any book of sea-birds. It inhabits certain lofty precipices overhanging the sea, and the nests are sometimes cruelly robbed of the young birds by skilful and daring climbers, who bring them to the town, vainly expecting a great price, in which, of course, they are disappointed, and the poor things soon die. The plumage of the old bird is wonderfully thick, downy, strong and light: the breast part is cut off with the skin to make plumes for ladies' hats; it is very beautiful, but the live bird itself, sailing in the air at about two hundred yards above the sea, apparently motionless, with its wings wide outspread, and the two long tail-feathers looking like the tail of a kite, and then to see it suddenly drop straight down into the water, as if shot, after the manner of sea-birds catching fish, is a far more beautiful sight, and makes one regret that any one should ever be able to get at their nests to plunder them. Nevertheless I will send you a tropic bird's egg.

2. Next comes the beautiful little "White Bird." It is a small tern, not so large as a pigeon, snow-white in plumage, red beak and legs; generally seen in pairs, very numerous in some parts of the coast;

* Communicated by Henry F. Bailey, Esq.

builds in holes in the face of perpendicular rocks, and generally has similar habits to the tropic bird, except flying lower and having always a great curiosity to examine every passing boat, hovering a few yards over one's head, peering inquisitively with its bright little eyes, and evincing generally a desire to fraternise with strangers—an unfortunate propensity in the white bird, for its advances are often met with a charge of shot, and the poor little creature, which offers no mark for skill, is quite useless when killed.

3. The third on the list, and most numerous of the sea-birds, is locally called the "Black Bird." It is the "Noddy" of sailors, or, if not, so resembles it that some one with more precise knowledge than I have would be required to state the points of difference. It is an ugly bird, rusty black with a white head: it is heavy in flight, although swift enough in darting on the fry which swarm near the surface of the sea in warm weather. These are gregarious birds, and swarm on certain rocks, whence they go forth to feed: they are most voracious, and their power of digestion seems to be wonderful for its rapidity; hence your friend who told you that guano was made by "black birds" was not so far wrong. Putting aside the confusion caused by the local name (which is no more absurd at St. Helena than in England), he was perhaps quite right; the black birds are *always* making it, and were it not that a good deal of rain falls here, and that the rocks and crags frequented by these birds are very steep, there would no doubt be large accumulations of guano at St. Helena.

4. There is one other sea-bird which only frequents the island for a few months in the year to lay and hatch its eggs, and then departs, probably to cruize over the South Atlantic for the rest of the year. The fishermen call it the "Egg-bird," because they collect the eggs in the season, which are very much sought after as a delicacy. The bird is brown and white, about the size of a pigeon, but I can give you no particular account of it, never having seen it close, nor can I find anyone who knows anything more about it. Next season (March to May) I could probably, without much difficulty, get one dead or alive, also the eggs. Eggs of the tropic bird and the booby might also be obtained: I am not so sure of those of the white bird—no doubt they would be difficult to get.

You will see that we are by no means rich in sea-birds, although St. Helena is favourably situated, and from the abundance of ocean birds in the South Atlantic it might have been expected to be a great breeding-station; but they seem to prefer higher latitudes for their

homes. Query, Are the sea-birds of Ascension the same as ours? and if not, why not? what reason for any great difference? I know nothing of the Ascension birds; but the fish are quite different from those at St. Helena, except certain kinds common to the whole South Atlantic Ocean.

Of land birds there are not a great many, and only one species known to be indigenous.

We have a noble pheasant from China, in size and general appearance similar to the English pheasant, but far more brilliant in plumage. The old cocks are splendid birds; the deep bronze of the breast becomes almost black, with a metallic lustre; the head is covered with scale-feathers from emerald-green to deep blue, and the whole of the markings are more distinct and brighter than the English bird. Its most notable distinctions are two small horns of feathers on the head and a ring of pure white round the neck: these are not perfect till the third year.

The partridge of St. Helena is also a fine bird, of full partridge size, rather slender in shape, light gray colour, with dark, almost black, markings, red beak and legs. It frequents the more barren parts of the island, and has immense power of flight and a habit of running up the rocks on the valley sides and flying down. The great object in partridge shooting, which would be more properly described in French "*chasse aux perdrix*," is to interrupt the coveys in their accustomed flights, turn them when running to the top of a hill, and otherwise bewilder and bother them till they separate and squat, to be put up singly by the pointer; but this can seldom be done, and the sport is fatiguing and somewhat dangerous from the nature of the ground traversed.

There is a small species of dove, from Africa; a few minahs, from India; Java sparrows, whose name indicates their origin; also the "cardinal," from Africa, not very long introduced, but now common: this is of the finch tribe, and when moulting wears a greenish gray tint, hardly distinguishable from a poorly dressed canary, but when summer comes and he appears in a full-dress suit of flame-colour, his appearance, glancing in the sunshine or sitting on the topmost sprig of a fruit tree, is most beautiful. He is a mischievous bird, delighting to pick off the buds and blossoms of fruit-trees (possibly in search of insects), and is very difficult to catch, avoiding all kinds of traps: birdlime is generally used, and in their struggles many are injured and

die. The boys get sometimes ten shillings for a fine bird from passing strangers. The nest is of grass, neatly built, but rather slightly furnished inside with thistle-down or other soft bedding; four or five white eggs; no song, but a pleasing twitter.

The St. Helena canary is a good deal in request as a singing bird: the note is very sweet and without the shrillness of the European canary: it is often compared to the song of the linnet. In appearance it differs somewhat both from the canary of South Africa and that of the Canary Islands. I am not naturalist enough to describe the exact points of difference; but although the general opinion is that canaries were imported here, I know of no record of the fact, and it is yet possible that these birds may be indigenous. Some of the males are nearly all yellow, but the greater number, and all the females, have a large admixture of green and grayish plumage.

The little aberdevat is the bird you have seen in London, sometimes called "waxbills" and "redbeaks:" they are very small, easily tamed and very gregarious, flying about in small flocks, and feeding chiefly on grass seeds: they are equally common at the Cape of Good Hope, and probably brought thence. They are pretty little birds; brown on the back, with red breasts and bills and lively manners (though without song), which make them favourites with those who keep birds as pets.

The only bird known to be indigenous at St. Helena is the "wire bird:" the local name is taken from its haunt, the "wire-grass," a kind of couch-grass that grows where the fertile parts of the island gradually changes to the barrenness of the outer rocks. This bird is of the plover family, and seems also to have some connexion with the sandpipers. I have procured the scientific name, on which you may rely, "*Charadrius pecuarius*," and there would be no great difficulty in getting a specimen. It is a small insignificant bird, a very swift runner, with the habit of flight, peculiar cry, strange actions to divert attention from its nest, &c., common to the plover tribe. Its eggs are dark coloured, two or three in a small depression in the earth or cow-dung: they are but rarely found, and the bird is not very numerous. It is about the size of a snipe; legs long and black; beak three-fourths of an inch, black; tail short; back and upper wing-feathers dark brown or blackish; breast and belly gray. Nothing very remarkable, if not that it is a peculiar species. I have heard that the same bird is found at Tristan d'Acunha, but cannot refer to any authority. If it be a species peculiar to these two islands the fact is of course very

interesting to naturalists, and the question, how it came there, highly interesting.

I think I have now told you all I know in reply to your inquiry about the birds of St. Helena. If there are any points on which you wish further information I will try my best to get it; but I fear there is nothing of very great interest in the subject. Of the other branches of the Natural History of the island the only one that offers much field to the naturalist is the Flora: there are some few peculiar indigenous plants, and others that, having already been noted, are now extinct. But you asked about birds, not plants.

EDEN BAKER.

St. Helena.

[Interesting as this communication certainly is, it would have been infinitely more so had the names of the birds been given. No. 2, the little "White Bird" completely puzzles me: the colour of the beak and legs indicate the genus *Sterna*, but I know of no species of tern that builds in holes in the perpendicular face of a rock. No. 3, the "Black Bird," may be either the noddy, as suggested, or the sooty tern. No. 4, the "Egg Bird," is unknown to me entirely. The pheasant is without doubt the species, variety or race, generally known as the Ringed Pheasant (*Phasianus torquatus*). It is observable this year that a very large proportion of the adult cock pheasants offered for sale in Leadenhall Market have this white ring more or less conspicuously developed.—*Edward Newman.*]

Ornithological Notes from North Lincolnshire.

By JOHN CORDEAUX, Esq.

(Continued from Zool. S. S. 1413.)

SEPTEMBER AND OCTOBER, 1868.

Wild Ducks.—September 7. All our common wild ducks are this season much earlier in their arrival, and from all appearances are likely to be plentiful in the Humber district. To-day, when partridge shooting in the marshes, my dog put up from a drain three ducks—all three fell to my two barrels; two were teal, the other a widgeon. Three hours afterwards, at the same spot, a fourth duck rose, which I also shot: it was a tufted duck (*Fuligula cristata*) in immature plumage, the tuft only partly developed.

Larks.—September 12. Large flocks have within the last few days arrived in the marshes. I have on several occasions during the month seen the isabelline-coloured lark mentioned in a previous paper; also another variety with white wings.

Heron.—September 12. These birds are this season very plentiful in the marsh; as many as eight have been seen together.

Dunlin.—September 16. A considerable flock examined by the telescope to-day showed more or less in transition plumage: two or three were apparently in complete winter dress, and one in full summer plumage.

Crossbill.—September 18. My little son brought into the house to-day a crossbill which the cat had killed in the garden. It is a young male in the plumage assumed after the first autumnal moult. The stomach contained a single coniferous seed and a quantity of coarse river-sand. I have heard of others having been seen and shot in this county.

Ray's Wagtail.—September 18. Last observed.

Jack Snipe.—September 21. First seen; have been plentiful since this date. I found the stomach of a jack snipe which I lately skinned contained broken fragments of fresh-water shells, also a few entire minute bivalve shells (*Pisidia*).

Gray Wagtail.—September 23. First seen. Is very common on all our small streams and drains.

Knot.—September 23. Small flocks of knots first observed on the fore-shore.

Hooded Crow.—September 26. First observed. A single bird seen in the marshes: I saw no more, however, until the morning of the 5th of October. Saturday, October 3rd, was a very wild and stormy day, with heavy rains from the east. On Monday morning the hooded crows were scattered all over the marsh district: I counted as many as twenty together feeding on the stubbles.

Merlin.—September 28. Have on several occasions lately seen these little falcons in the marshes: one bird in particular, which beats day after day over nearly the same ground. I saw this bird give chase to a dunlin; the turns and twists of both birds were wonderfully sharp and rapid. The stint, however, had the best of it, the merlin finally abandoning the pursuit.

Chaffinch.—September 29. A large flock of male chaffinches seen in one of the plantations.

Solitary Snipe.—October 8. I have heard of one shot this season in North Lincolnshire. It was killed by a friend of mine in a potato field.

Golden Plover.—October 9. First noted. This morning saw two or three small flocks, numbering about fifty altogether, in a grass-field

near the Humber. They were, as is usually the case on their first arrival, very tame. I rode my horse round them till within a very short distance: they appeared to be all young birds.

Whimbrel.—October 13. The stomach of a whimbrel which I dissected to-day was crammed with small crabs, entire, and in average size about as large as a sixpence.

House Martin.—October 21. Last seen.

Snipe.—October 31. During the last month have been very plentiful in our Humber district: are remarkably fine and very fat: one which I shot this day weighed four ounces and three-quarters.

JOHN CORDEAUX.

Great Cotes, Ulceby, Lincolnshire,
November 4, 1868.

Honey Buzzard at Lurgan.—In the latter end of September a fine example of this rare buzzard was shot at Lurgan, County Armagh, Ireland. Thompson records but four as being killed in this country; in two cases where one bird was shot the other escaped, making six recorded occurrences. From this we may learn that the honey buzzard has no claim to be Irish, but that any examples met in this country are accidental migrants.—*H. Blake-Knox; Dalkey*.

Richard's Pipit at Brighton: the Tawny Pipit.—On Monday, the 5th of October, a specimen of Richard's pipit (*Anthus Ricardi*) was caught near Brighton, and taken to Mr. Swaysland, Queen's-road. This bird was moulting all over, and its tail only half-grown—a circumstance which showed, I think, that it could not have been about to migrate, and indicates that this species moults very late. All the pipits have long finished the process, whereas our bird's state was what one would expect to find in a pipit early in August. If the species moults late, query, does it also breed late? Who can answer? No naturalist, either past or present. I have recorded in the 'Field' various other instances of the occurrence of Richard's pipit at Brighton, the last on the 9th of October, 1867: a former one was captured on the 10th of November, 1866. These three are all autumnal dates, and point to departure; yet I find one in my notes brought into Brighton on the 20th of January, 1865, notice of which I sent to the 'Zoologist' of March following (Zool. 9466). So I confess myself at a loss to understand the species. The one before me appears to be an old male, moulting all at once, which young birds seldom do. As I am on the subject of pipits, I cannot refrain from expressing my gratification when I read of the tawny pipit (*A. campestris*) lately captured at Scilly, mentioned by Mr. E. H. Rodd in the 'Field' of September 26th. This is the fourth example we have had, and I fully expect more will turn up. Notice of the first three may be found in Mr. Gould's fine work on British birds. Such strong flights of migrants as we have witnessed for the last few weeks have not been seen for some years on the south coast, clearly showing a good hatching season in the northern and midland counties.—*George Dawson Rowley; 5, Peel Terrace, Brighton.—From the 'Field.'*

On the Departure of the Swallow from Devonshire in 1868.—In communicating to the 'Zoologist' a list of the departures of summer birds from Cornwall and Devonshire, during the months of August and September, I mentioned the 21st of September as the latest day in that month on which I observed the chimney swallow. I however again observed a swallow on the 2nd of October, and found that they remained in this neighbourhood, but chiefly near the coast, in varying numbers, till the 26th of October, since which day I have not seen any of them. Most of the specimens observed in October appeared to be birds of the present year.—*J. H. Gurney; Marldon, Totnes, November 11, 1868.*

Hoopoe at Ely.—A young male hoopoe was shot near here a short time since: it frequented one particular field, probably in search of the larvæ of a beetle which abounds in it: it was exceedingly shy, and flew with a rather powerful undulating flight when disturbed.—*John Tilterton; Ely, November 3, 1868.*

Young Emeus at Clumber.—On a recent visit to the aviaries erected by the Duke of Newcastle, in the beautiful grounds at Clumber, I was much interested in the young emeus that have been reared during the present season. The chief food of the adult birds is grass. Those at Clumber graze with the cows and horses in an open field, and are fond of cabbage, lettuce or any garden refuse. During the laying season they are also supplied with a proportion of meal mixed thin with water, or soaked ship-biscuits. For their size and weight they are unquestionably small eaters. They are readily kept within bounds by ordinary fences, never attempting to force through a hedge or pass over a gate. They are also very prolific, the hen laying nearly thirty eggs every season. It is true that these are more than the male bird can cover; but there appears to be no valid reason why a portion of the eggs should not be hatched under turkeys without the slightest difficulty. When to these recommendations we add their strangely picturesque appearance as seen walking at a short distance, I can conceive no more useful or attractive addition to the Fauna of an inclosed park. The pair of birds at Clumber are now four years old; the female laid for the first time early in the year 1867. During the present year, of which only I have any accurate record, she commenced to lay on the 5th of January, and laid every second or third day until she had deposited twenty-seven eggs, which were placed on the floor of a shed, which opens into the small inclosure in which the birds were confined at that time. After seven eggs had been deposited the male proceeded to sit upon them, and sat steadily for eight days, when the female disturbed him, and he left the nest for eight days—the eggs being exposed during the whole of this time to the severe weather of last February. At the end of this period the cock resumed his task of incubation, and sat for sixty-two days after the commencement of the second incubation. At this time Mr. Douglas thought that the health of the bird would suffer from the long-continued confinement and abstinence from food, as he refused to eat anything whilst on the nest, although food and water were placed within his reach, and he only came off the eggs three times during the long period of incubation. As the date at which the eggs should have hatched, counting from the first commencement of incubation, had passed, it was feared they were not fertile; but on placing them in warm water their active motion soon testified to the existence of living emeus within: they were consequently returned to the nest and hatched in due course. Of the seven eggs one was rotten, two young emeu chicks died in the shell, and four were hatched, one of which was accidentally killed by the male. Of the remaining

eggs several were eaten, and found of unquestionable excellence: as they weigh about one pound and a quarter each, it does not take many to make a good-sized omelet. The beautiful dark green colour of the shells renders them most elegant objects when mounted as cups in gold or silver. The shell is very stout, even after the young chick has escaped; and were it not for the singular breaking up of the arrangement of the structure just before hatching, which was first observed and described by my late lamented friend Mr. J. Quekett, it would appear almost impossible for the chick to force its way through the stony walls of

. . . . that antenatal tomb

Where the young bird dreams of the life to come.

The young at birth are most interesting-looking creatures: in colour they do not resemble the mixture of dull brown and gray that characterizes the loose plumage of the old birds, but are striped longitudinally on the sides, like a zebra, the markings being dark on a light ground. Fearful of any injury that might arise from the parents, the young emeus were reared by hand, being for a few days crammed with chopped lettuce, rib-grass, clover, leaves, and custard. Before the end of the first week they had learned to feed themselves, and their chief food now consists of grass, rib-grass (*Plantago lanceolata*), cabbage, clover, with some bread and meal. Their mode of drinking is peculiar: they spoon the water up with the lower mandible, and allow it to run to the back of the mouth. They are now about four feet high, and weigh about sixteen pounds to eighteen pounds each. They are so tame that they became a trouble when at large, as they could not be kept out of the house; and now they run towards any one approaching the inclosure, uttering a soliciting note of "peep, peep," very unlike the pumping sound uttered by the adult female. Their gambols and play are strangely peculiar. The wings are so very rudimentary that the action is entirely confined to the neck and legs. They leap, they kick out with one leg, roll on their sides and backs, kicking with both legs: again they leap up, and chase each other in the most good-humoured frolic. In the midst of this play a rush comes against the strong wire-fencing that separates the inclosure from the field in which the old birds are grazing: it is their unnatural mother making a dash against the stout wire which alone protects them from death at the hands, or rather the legs, of their most unaffectionate parent. With regard to the emeu as an object of sport, Sir Thomas Mitchell, in his 'Eastern Australia,' writes, "It is one thing for a swift dog to overtake an emeu, and another to kill or even to seize it. Our dogs are only now learning to seize emeus, although they had chased and overtaken many. To attempt to seize them by the side or leg is dangerous, as an emeu could break a leg with a kick; but if they seize them by the neck, as good dogs learn to do, the bird is immediately overthrown, and easily killed. The flesh resembles a beef-steak, and has a very agreeable flavour, being far preferable to that of the kangaroo."—*W. B. Tegetmeier, in the 'Field.'*

Cuckoos in Confinement.—Some years since, when living in London, in walking down Oxford-street, I saw a boy with a number of nestling birds for sale, and amongst them a young cuckoo. This I bought. At that time I had a fine collection of soft-bill birds—nightingales, blackcaps, whitethroat, redstart, robin, titlark, &c. All these birds I fed on scraped lean beef, and hard-boiled yolk of egg, mixed moist with clean water: this, with a good supply of meal-worms, which I bred for them in large

quantities, and a little fruit occasionally, kept them in excellent health. Being thus provided, I found little trouble in rearing my new acquisition on a portion of the same food as the others, being, like them, an insectivorous bird. The difficulty at first with this bird is its pugnacious habit, as it will strike at your fingers like a hawk when trying to feed it; but the offer of the meal-worms, or a green caterpillar, or beetle of any sort, will soon overcome this, and render it tolerably familiar—it will never be entirely so, as it is naturally a solitary bird. If the live food is placed on the other food the bird will soon learn to feed itself; but for a long time after he could feed himself mine would call to be fed by hand, and this I used to do. Finding him very restless at first when put in an ordinary cage, I transferred him to a lark's cage. This seemed to suit him admirably. He immediately got on to the raised front, and as I placed the cage where he could get the sun, he spent the great part of the day sitting there, and only going back on the perch I had placed for him at night. Thus placed he grew rapidly, and in about five weeks from the time I bought him (the middle of July) he had acquired the plumage of what by some persons is termed a "red cuckoo," but which is, in fact, a bird of the first year, in immature plumage. Fearing that, as the period of migration was at hand, he might injure his plumage—now complete—I put him in a large cage, four feet square by two feet deep; but he had not the migratory impulse nearly as strong on him as some of my smaller birds—the blackcaps, for example. I thus kept him well through the winter. But now comes a piece of his history, which I have no doubt will be as new to your readers as it was to me, and to which I beg to invite their attention. One morning in January, about the middle of the month, whilst sitting at breakfast, my wife and myself were startled by what appeared to be a sharp treble bark of a young dog. Looking hastily round the room, we could see nothing to account for the unusual sound; but the wonderment in which we were was soon dissipated, for a few minutes after the barks were repeated, but this time accompanied by the pleasing sound "Cuckoo! cuckoo! cuckoo!" We were, as you may imagine, much delighted at the discovery. This continued for more than a month—the three small sharp barks always preceding the cuckoo; but the latter call would sometimes be repeated eight or ten times in succession. At the end of that time he ceased to call, but seemed to get more animated and restless for a short time, when he settled into his usual habit, and we heard his call no more until May, and then rarely accompanied by the barks. I kept him well all through the summer until the beginning of September, when he had nearly acquired his perfect plumage; but in my over-anxiety to prevent his injuring his beautiful new dress, I took him out of the cage and put him into a large attic, where he had only been a few days when, on going one morning to feed him as usual, to my great regret I found him dead, having been killed and part eaten by a rat from the adjoining building. In conclusion, if any of your readers can solve me the following, the affirmative of which are strongly impressed on my own mind, it may interest others besides myself:—*First*, does the cuckoo habitually at a certain season bark? *Secondly*, does the cuckoo migrate in Africa as well as in Europe?—in other words, is it subject to a double migration, as the observation of my bird would seem to indicate?—*Robert Essery; 4, Woodhill, Northampton, September 2, 1868.—From the 'Field' of September 5.*

Nutcracker near Christchurch.—On the 6th of November Mr. Hart sent me a nutcracker, in the flesh, from Christchurch. It was shot on a fir tree, and proved a male on dissection. This specimen has a *narrow pointed* beak, the extreme tip of both

mandibles horn-coloured, the upper slightly projecting, and this is so far confirmatory of the views expressed in the 'Birds of Norfolk' (p. 281), *viz.* that the disparity in the bills of this species is a sexual distinction. Mr. Cordeaux found its stomach to contain a great mass of Coleopterous insects, broken and entire, of several species and sizes, principally a small black-headed beetle, with brown wing-cases, a little vegetable fibre, a few white oats, also some small stones.—*J. H. Gurney, jun.*

Creamcoloured Courser in Lanarkshire.—This is the first specimen on record as having been obtained in Scotland: it was shot by my friend Mr. C. Walker, of Braxfield, Lanarkshire, as recorded in the 'Zoologist' for November (S. S. 1459), on his own estate, on the 7th of October, and by dissection proved a male. Through the kindness of Mr. J. H. Gurney, jun., who dissected the bird, I have been enabled to put in Mr. Gray's hands full particulars regarding it, for his 'Birds of Scotland,' and which need not be repeated at this time.—*John A. Harvie Brown; Dunipae House, Falkirk.*

Solitary Snipe in Sussex.—I beg to record an instance of the solitary snipe having been caught in a gin, which had been set by the side of a water-cress bed, at Sompting, a village about two miles from Worthing, Sussex. It was caught on the 24th of October last, and came into my possession on the same day.—*J. W. Stephenson; 2, Loudoun Place, Brixton Road, November 7, 1868.*

The Great Snipe: Number of Tail-feathers.—I saw a specimen of the great snipe, killed near Camelford, Cornwall, yesterday; and, amongst several specimens killed in the county, I refer to this example especially, as it had eighteen instead of sixteen tail-feathers.—*Edward Hearle Rodd; Penzance, November 4, 1868.*

Erratum.—In my notice of the tawny pipit (Zool. S. S. 1458), for "fat" read "feet."—*Id.*

Rednecked Phalarope in Norfolk.—A beautiful male of this elegant little species was shot, on the 30th of October, at Stalham. It rose from a pond (where it had been swimming not unlike a miniature duck), and took refuge on the roof of a barn in the immediate neighbourhood, but soon fell a victim to the aim of a sportsman.—*T. E. Gunn; 21, Regent Street, Norwich.*

Abundance of the Little Grebe in Sussex.—I have received an account, from Worthing, of an unusual number of the little grebe having been seen at, and in the neighbourhood of, Lancing, on the 6th instant. Mr. Wells, of Worthing, writes me that he had seven brought to him alive, which were caught in a small pool of salt water on the shingle near Lancing Gate, and at the same time there were a great number in the water between Lancing and Shoreham. In short, on that day they were said to be "in every ditch," and on the following day not one was to be seen.—*J. W. Stephenson; November 14, 1868.*

Little Gulls on the Yorkshire Coast.—On the 26th of October I had two little gulls (in a fresh state) from Bridlington Quay; and, on the 27th, another having two or three brown feathers on the head, probably part of the nest-plumage not cast. A fourth, which I examined in the flesh, possessed a rich rosy tint on the under parts—a lovely contrast to the fine pearl-gray of the upper plumage. These little gulls have been all shot within a radius of a few miles.—*J. H. Gurney, jun.*

Pomarine Skua at Flamborough.—On the 13th of November I had a brace of pomarine skuas, in the first plumage, from Flamborough (in the flesh). Young birds of this species are not very rare on this coast in autumn.—*Id.*

Pomarine Skua on the Norfolk Coast.—On the 5th and 6th of October two immature birds, male and female, of the pomarine skua were shot; the first, a female, at Stiffkey, and the other, a male, at Rollesby. Although both specimens measured exactly the same, the male weighed two ounces less than the female, being fifteen ounces. In their stomachs I found some pieces of cork, coal-cinders, bits of sea-weed, and some yellowish matter not unlike mustard.—*T. E. Gunn.*

Fulmar Petrel near Filey.—On the 26th of October an immature fulmar petrel was taken on a hook at Filey. I found the œsophagus contained a bird, which I have no hesitation in saying was a redwing, a fish of some description, a few gull's feathers, and what I have little doubt are the mandibles of some of the Sepiadæ (since identified as such by Mr. Cordeaux), alluded to by Macgillivray as forming the fulmar's principal food. The curved point of the bill pale yellow; the lower mandible and the sides of the upper horny flesh-colour; the superior ridge investing the nostrils black, and not grayish white, as in the adult.—*J. H. Gurney, jun.*

Fulmar Petrel at Flamborough.—On the 12th of November I had another pair of Fulmars from Flamborough (in the flesh). Considering the vast numbers that resort to St. Kilda, it is surprising that so few individuals are obtained along the English coasts.—*Id.*

The Great Auk.—It has been pointed out to me that the date given for the supposed extinction of the gare-fowl (Zool. S. S. 1354) is erroneous, there being no authentic record of its existence as lately as 1848. I must, however reluctantly, trace the source of this error. I believe it originates with Dr. Charlton, who, in the 'Transactions of the Tyneside Natural History Society,' reprinted in the 'Zoologist' (Zool. 6887), writes thus:—"It seems almost certain, too, that in 1848 a great auk was shot on the island of Wardoe, within the arctic circle, by one of the peasants there." Professor Newton, however, has I think satisfactorily shown in the 'Ibis' for October, 1861, reprinted in the 'Zoologist' (Zool. 8108) that this was a mistake. I believe the bird occurred in 1844, but not since.—*Edward Newman.*

Wild-fowl of Jamaica.—Now, during the rains (October and November), large flocks of wild-fowl are coming over from Cuba and South America. Cold, wet, windy weather is most favourable for their arrival. Blue-winged teal (*Cyanopterus discors*) especially numerous, arriving in flocks of from thirty to two and three hundred. The vast morasses and lagoons here afford shelter to innumerable aquatic birds at this season, and I have obtained from the market sportsmen, owing to the severity of the weather lately, several Scolopacidæ I had not seen before, *viz.* bartailed sandpiper (*Tringa solitaria*), spotted sandpiper (*T. macularia*), yellow-shanks gambet (*Totanus flavipes*), the willet (*Catoptrophorus semipalmatus*), and other species. The rufous-necked pelican is not uncommon, and may generally be observed in small parties of six or eight fishing in the shallows, which abound here about the Coral Reefs.—*Alwin S. Bell, 3rd West India Regiment; Falmouth, Jamaica, October 5, 1868.*

Ornithological Notes from Stirlingshire for October, 1868.—October 12. To-day my friend Mr. J. H. Belfrage shot a great spotted woodpecker here. Many others have been obtained in the counties further north, principally towards the east coast.

October 13. I mentioned in my last communication (Zool. S. S. 1454), that I had seen a buzzard on two consecutive Sundays last month. One, which I believe to be the same, was shot about a week ago at Fintry. Fintry is the part of this county

most frequently visited by this bird in autumn, and some are killed there almost every season.

October 28. To-day I received a fine osprey: it was shot, on the 26th, at Carron: it has frequented the Reservoir there for more than a month. The bird was observed to dash amongst a lot of heus and chickens on a former occasion by the same man who shot it, and he states that he is certain it carried off something in its talons. Mr. Dawson, Manager of the Carron Iron Works, has lately lost from amongst his poultry five or six hens and chickens, and blames this bird for having stolen them. I have furnished Mr. R. Gray with fuller notes on the subject, which I consider interesting, the more so as I can rely upon what my informant tells me as being true. When shot the bird had a good-sized perch in its talons. The whole bird, feathers, head and talons, had a most fish-like smell.—*John A. Harvie Brown.*

Rare Birds in the North of Scotland.—A roller, a nutcracker, a snowy owl, besides numbers of great spotted woodpeckers, have during the last month been obtained in the North of Scotland.—*Id.*

Rare Birds at Southwold.—Mr. Cooper, on a visit to Captain Rumbold, at Southwold, in Suffolk, saw a spoonbill, which a fisherman had shot there on the 26th of September: Captain Rumbold had had a long shot at the bird the day previous, but missed it. A hoopoe was also shot at Southwold in the early part of the month, and a shore lark on the 21st of October.—*William Gibson; 28, Radnor Street, St. Luke's.*

Globe Fish at Penzance.—On the 26th of October I received a specimen of Pennant's globe fish (*Tetrodon Pennantii*), nineteen inches over all. The last specimen of which I find any record was taken in August, 1851, in this bay, and its capture was noted by the late Mr. R. Q. Couch, in the second volume of the 'Transactions' of the Penzance Natural History Society. My specimen had a distinct lateral line beginning at the upper posterior part of the orbit, rising over the base of the pectoral, running parallel to the back high over the pectoral laid flat until it cleared it, then deflecting in a rapid curve until opposite the fork, whence it ran straight to the fork. Having a specimen in the Museum with the globe distended, I was anxious to preserve this one with the globe exhausted. The fish was brought to me with the globe in this state, but it was found that, on removing the ligaments which regulated it, the globe immediately distended itself to its full size, and so remained. In the stomach (and mouth) was fresh sea-weed in considerable quantity, showing that the fish had fed freely on it recently before its capture. The fish was taken at Perranporth, near Truro. It was floated in with a lot of sea-weed, and was alive when taken, but whether its globe was then distended I have no means of ascertaining. The globe was exhausted when the fish reached me, and inasmuch as the gentleman who gave it to me made no remark on it, I judge that the globe was in the same state as when it was taken. The globe when distended fresh was a light bladder, covered with a padded flexible spinous skin, capable of taking any amount of knocking about without sustaining injury.—*Thomas Cornish; Penzance, October 29, 1868.*

Enormous Eel.—An eel was caught by a fisherman at Oldbury-on-Severn, on the 24th of October, weighing over eighty pounds.—*Worcester Paper.*

Trout in Australia and New Zealand.—It is satisfactory to find that the trout established in Tasmania are being made the means of stocking other rivers both in

Australia and New Zealand, a portion of the ova furnished by them having been sent to Melbourne and Strathmore, and to Christchurch and Otago in New Zealand. They appear to have thriven wonderfully. No further certain news has been received with respect to the salmon. That several have been received far up the river admits of very little doubt; and that the fish have been seen in pairs, which leads to a hope that they may spawn successfully in the natural way, is also asserted. One difficulty which the salmon appear likely to have to contend with is the poaching with small-meshed nets in the mouths of the rivers, which appears to be very rife in places; and as the Victorian Acclimatisation Society are unable to afford the cost of sufficient bailiffs to keep it in check, and the police are not allowed to interfere,—though it seems hard, in such a case, to understand why,—there can be little doubt that a good deal of needless difficulty is likely to be thrown in the way of the free passage of the fish either up or down. It is to be hoped that the Society will see their way to appointing a sufficient force of bailiffs to keep this danger down as much as possible until the Derwent is fairly stocked with salmon.

Grasshoppers in British America.—At Fort Garry, Red River Settlement, Hudson's Bay, Mr. Power writes to the 'Times':—"The grasshoppers came in swarms of countless millions from the north-west, on last harvest, and destroyed a great portion of the grain and nearly the whole of the vegetable crops, and deposited their eggs in the ground an inch and a half deep, so that if you were to dig to that depth you would see the earth covered with their eggs. There never were seen finer crops in England or Scotland than were here last harvest, and this year they appeared equally good up to June, and the season continues beautiful up to this time. The grasshoppers began to hatch about the end of May, and to begin their work of destruction in June, and so complete was it, they would begin on a field of wheat, barley, oats, or potatoes, and leave it as though it were newly ploughed and harrowed, scarcely a weed being left or a particle of anything for the use of mankind. The most beautiful part of our settlement is from Fort Garry to the White Horse Plains, and from there to the Portage, a distance of about sixty miles, runs the deep-flowing Assiniboine, with small farm-houses all along its banks, and with large woods and plains all the way, and in all that distance there is not a fruit or a kernel, or a particle of anything left for the use of mankind."

PROCEEDINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY.

November 2, 1868.—H. W. BATES, Esq., President, in the chair.

Additions to the Library.

The following donations were announced, and thanks voted to the donors:—'Proceedings of the Royal Society,' No. 103; presented by the Society. 'Transactions of the Linnean Society,' Vol. xxvi. Part 1; 'Journal of the Linnean Society,' Zoology, Nos. 42 and 43; by the Society. 'Proceedings of the Zoological Society,' Index,

1848—1860; and 1868, Parts 1 and 2; by the Society. ‘Journal of the Royal Agricultural Society,’ Second Series, Vol. iv. Part 2; by the Society. ‘Annales de la Société Linnéenne de Lyon,’ N. S., Tome xv., 1867; by the Society. ‘Bulletin de la Société Impériale des Naturalistes de Moscou,’ 1867, Nos. 3 and 4; by the Society. ‘Berliner Entomologische Zeitschrift,’ Vol. xii. Parts 1 and 2; by the Entomological Society of Berlin. ‘Stettiner Entomologische Zeitung,’ 1868, Nos. 7—9; by the Society. ‘Journal of the Quekett Microscopical Club,’ Nos. 1—3; by the Club. Hewitson’s ‘Exotic Butterflies,’ Part 68; by W. W. Saunders, Esq. ‘Coleopterologische Hefte,’ herausgegeben von E. v. Harold, ii. and iii.; by the Editor. Newman’s ‘British Moths,’ Nos. 20—23; by the Author. ‘The Zoologist,’ August to November; by the Editor. ‘The Entomologist’s Monthly Magazine,’ August to November; by the Editors.

The following additions by purchase were also announced:—Schiner, ‘Diptera der Novara Reise.’ Redtenbacher, ‘Coleoptera der Novara Reise.’ Tournier, ‘Description des Dascillides du Bassin du Léman.’ Gerstäcker, ‘Bericht der Entomologie während der Jahre 1865 und 1866.’ ‘Catalogus Coleopterorum hucusque descriptorum Synonymicus et Systematicus;’ autoribus Dr. Gemminger et B. de Harold; Tom. i., Cicindelidæ, Carabidæ. F. Walker, ‘Catalogue of Heteropterous Hemiptera in the British Museum,’ Parts 1 and 2; ‘Catalogue of Blattariæ in the British Museum.’ A. G. Butler, ‘Catalogue of Satyridæ in the British Museum.’

Exhibitions, &c.

The President exhibited specimens of *Vanessa Urticæ* and *Zygæna Filipendulæ* from the Isle of Man, remarkable for their small size. The following note by the captor, Mr. Edwin Birchall, was read:—

“I captured about twenty specimens of *Vanessa Urticæ* in the Isle of Man in June last, all of the same diminutive size as the examples sent for exhibition. The outline of the wings is more angular than in English specimens, the black spots either larger in proportion, or in the case of the two spots in the centre of the fore wings, actually larger in the small insects from the Isle of Man than in the large English ones, the variation from the typical form being thus exactly the reverse of what occurs in the Corsican subspecies *Ichneusa*, in which these spots are altogether wanting. Whether some accidental cause has dwarfed the insects, or that we have here a distinct insular variety, and the opportunity, as it were, of watching the origination of a new species, future inquiry must decide. *Zygæna Filipendulæ* also occurs in a very dwarfed condition: this I have observed both in 1867 and 1868, and the specimens exhibited are certainly the ordinary condition of that insect in the island. I hope entomologists who may visit the Isle of Man will collect other common species found there, as well as the rare ones for which it has become celebrated, that a wider basis for generalization than at present exists may be obtained.”

Mr. F. Smith inquired whether *Vanessa Urticæ* was always thus dwarfed in the Isle of Man, or whether the smallness was one of the effects of the peculiarly hot season of 1868? He believed that during the past season many Hymenoptera had been observed in a dwarfed condition.

Mr. J. Jenner Weir had noticed that the common white butterflies of the past season were unusually small.

Prof. Westwood remarked that the diminutive size might perhaps be due to the heat, and the consequent rapidity of development of the insects, which remained a shorter time, and therefore ate less, in the larva state.

Mr. R. L. Davis (who was present as a visitor) mentioned that he had a number of pupæ of *Smerinthus ocellatus* of very small size: the larvæ had scarcely attained more than half their usual growth when they were driven into the pupa state by the frost destroying their food. According to his experience, scarcity of food was generally the cause of smallness. During the season of 1868 he had preserved for the cabinet larvæ of about sixty-five species of Lepidoptera, most of which (including some of the diminutive *Smerinthus ocellatus*) were exhibited.

Mr. S. Stevens exhibited a specimen of *Chærocampa Celerio* captured at Brighton by Mr. Swaysland, on the evening of the 20th of September, hovering over Verbena flowers; and a moth from the British collection of the late Mr. Desvignes, ticketed "*immoraria, Hub.*," which it was suggested was an extraordinary variety of *Srenia clathrata*.

The Secretary read a letter from Gunner John Wilson, of the Royal Artillery, Woolwich, stating that he had bred a gynandromorphous specimen of *Lasiocampa Quercus*: "it shows the chocolate wings and feathered antenna of the male on the left side; on the right the wings are buff, and the antenna is single as in the female, the abdomen thicker and not tufted as on the other."

Mr. Briggs (who was present as a visitor) exhibited a *Leucania* captured at Folkestone on the 15th of August, at sugar; a second specimen, much worn, was taken in the second week of October, within five yards of the same place. The insect appeared to differ from any species hitherto recorded as British.

Mr. H. Pryer exhibited a specimen of *Scoparia Zelleri* (*Wocke*), captured in the railway station at Norwood Junction, on the 17th of August, 1867. This was the first occurrence of the species in Britain; but the capture of a second specimen is announced in the '*Entomologist's Monthly Magazine*,' v. 131.

Mr. G. S. Mosse exhibited a collection of insects from the State of New York: they were principally Lepidoptera, and amongst them was a female of *Papilio Turnus*, which, contrary to the usual habit, was coloured like the male.

Mr. H. Pryer exhibited a specimen of *Agrypnia picta* (*Kolenati*), a new addition to the list of British Trichoptera. The insect, a male, was captured at a gas-lamp at Highgate, in June, 1868.

Mr. Frederick Smith read the following note:—"The Secretary has called my attention to the fact that the name *Æstropsis*, under which I described a new genus of Aculeate Hymenoptera in the '*Transactions*' of the Society for the present year (*Tr. Ent. Soc.* 1868, p. 253), has been applied by Dr. Brauer, during the present year, to a genus of Trichoptera (*Verh. zool.-bot. Gesells. Wien*, 1868, vol. xviii. p. 263). As Dr. Brauer's paper was published before mine, I have now to propose for my new genus of Aculeata the name *Gastropsis*, from the resemblance which the insect bears to the *Gastrus equi* of Meigen, the *Æstrus equi* of old authors."

The President read a letter from Mr. Albert Müller, of Penge, to the following effect:—"As regards British galls, Mr. H. Waring Kidd, of Godalming, and I are jointly working at a descriptive list of all excrescences or deformations caused by insect agency on plants growing wild or cultivated in these islands; and for the guidance of such persons as may be willing to aid us, a list of such plants has appeared in the

'Entomologist's Monthly Magazine' for October. Foreign galls and their insects, as well as the economy of the latter, form the special study of the writer, who will at all times be happy to enter into correspondence with any one desirous to further the object in view, either by contributing specimens or by giving information of any kind: this pursuit is intended to lead, at some future time, to the production of a work similar to the one proposed by my late friend Mr. Wilson Armistead, of Leeds."

Mr. Roland Trimen sent (from the Cape of Good Hope) some sketches of an Orthopterous insect, respecting which he wrote as follows:—"It is sometimes found in gardens about Cape Town. The extraordinary development of the parts of the mouth, particularly of the labrum and mandibles, makes me think it may be allied to the Australian genus *Anostostoma* of G. R. Gray, with which, however, I am unacquainted. I imagine this Cape cricket to belong to the Gryllidæ; but as my specimen has no trace of wings, it is very probably only a larva, and may result in a member of the Achetidæ. I shall be very glad to hear anything that you can ascertain about this ugly fellow, especially if the special use of such formidable mouth-armature be known. I tried my captive with leaves, but he would not touch them."

Prof. Westwood said the insect was an *Anostostoma*, or was nearly allied thereto: it might be the species figured by Stoll.

With reference to the plague of so-called "mosquitoes" at Plumstead and Woolwich, in the months of July and August, the Secretary mentioned that in the latter month he had had sent to him from Woolwich two insects, each of which was alleged to be the delinquent. The first was a golden-eye (*Chrysopa*)! The other was a veritable gnat, and was pronounced by Mr. F. Walker to be the *Culex nemorosus*, a species often troublesome in woods, though not usually found in houses. Mr. F. Smith added that specimens of the common house-gnat (*Culex ciliaris*) had been sent to the British Museum as "the mosquito."

The Secretary read a letter from Mr. R. W. Fereday, of Christchurch, New Zealand, requesting contributions of specimens, with a view to the formation of a collection of British insects for the Museum there; and a letter from Mr. H. L. Schrader, of Shanghai, containing observations on various insects (*Agathia*, *Æceticus*, *Cerura*, *Actias*, *Syrphus*, *Psylla*, &c.).

Papers read.

The following papers were read:—"Notes on some South-African Butterflies enumerated in Mr. A. G. Butler's Catalogue of Satyridæ in the British Museum;" by Mr. Roland Trimen.

"Contributions to a Knowledge of the European Trichoptera" (First Part); by Mr. R. M'Lachlan.

"Descriptions of new Genera and Species of Heteromera;" by Mr. Frederick Bates.

New Parts of 'Transactions.'

The 'Transactions' of the Society for the year 1868, Parts 2 and 3, published in July and September respectively, were on the table.—*J. W. D.*

