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THE ZOOLOGIST:

13

A MONTHLY JOURNAL

OF

NATURAL HISTORY.

FOURTH SERIES.—VOL. IV.

EDITED BY

W. L. DISTANT.

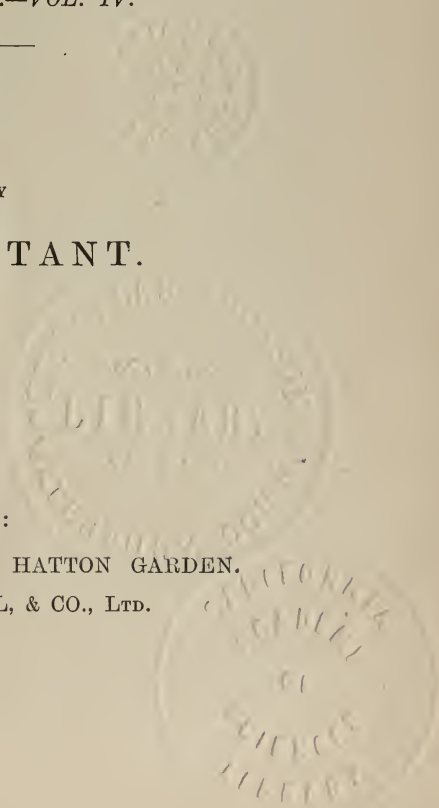
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LONDON:

WEST, NEWMAN, & CO., 54, HATTON GARDEN.

SIMPKIN, MARSHALL, & CO., LTD.

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P R E F A C E.

WITH the December issue 'THE ZOOLOGIST' has reached the end of the nineteenth century, and has completed its fifty-eighth volume. It is interesting to glance at the status of Zoology when this Journal was founded by Edward Newman in 1843, and its progress since.

The Zoological Society had been founded in 1826, and was thus in only the seventeenth year of its existence; the Entomological Society was but ten years old. The Ray Society was not started till the following year (1844), and is therefore one year younger than 'THE ZOOLOGIST.' In the year that 'THE ZOOLOGIST' first appeared there was published the concluding volume on the Zoology of the Voyage of H.M.S. 'Beagle,' the vessel in which Darwin made his celebrated voyage. Lyell was steadily preparing his 'Travels in North America,' which was published in the early part of 1845. May, 1843, is the published date of the eighteenth and last part of Agassiz' monumental work, 'Recherches sur les Poissons fossiles.' In the same year the Rev. W. Kirby was still alive, and a sixth edition (vols. i. and ii.) of his immortal 'Introduction,' with the addition of one hundred MS. pages of new matter, was published. Frank Buckland was at Winchester College with heart set on becoming a surgeon. Huxley was a student winning prizes. Eight months of this year were occupied by Audubon in his Missouri River journey in the interest of the 'Quadrupeds of North America.' The British Museum was under the influence of Panizzi, who this year inaugurated his extensive reforms in the Printed Library. In the epochs of this institution we can pass, according to our purview, from the acquisition of the Mantell Fossils in 1839 to that of the Croizet Fossil-Mammals in 1848. Bloomsbury was then the home of literature. In 1843 Catesby also completed his 'Natural History of Carolina, Florida, and the Bahama Islands,' a pioneer work, now seldom consulted amidst the ever increasing literature of North American biology. The voyages of the 'Erebus' and 'Terror,' rich in zoological results, terminated this year; John Gould was publishing his magnificent ornithological publications, and in 1843 Lovell Reeve commenced to issue his 'Conchologia Iconica.' In this year was also finished the Second Series of Jardine

and Selby's 'Illustrations of Ornithology,' while Macgillivray and Yarrell were publishing their works, which will be remembered and consulted as long as naturalists feel an interest in British Birds.

How much has transpired since then, which now almost reads as ancient history! In 1847 Hooker started for India on his memorable journey, which ultimately produced the well-read 'Himalayan Journals.' In 1848 Bates left England for Para, and the narrative of 'The Naturalist on the Amazons' may be said to have commenced. 1854 found Wallace at Singapore, and from that day the biological story of 'The Malay Archipelago' has been told, followed, and imitated. In 1843 South Africa was little known, and its Mammalia to be found in vast herds by those who could penetrate the country. To-day the country is open, but the Mammalia a vanishing quantity. Délegorgue completed his journey—known to all naturalists—in 1844; the conclusion of the zoological results of Sir Andrew Smith's expedition appeared in 1849; Gordon Cumming did not tell his wonderful tale of the wild life of the veld till 1850, before Mauch and Holub inaugurated the new era. Central Africa was marked "desert," at least on school maps; to-day we tabulate its fauna, and read Emin Pasha. And, last of all, with national pride, we may refer to the Voyage of the 'Challenger,' and the volumes devoted to its zoological results.

But, greater than all, is the difference in our philosophical conception of the teachings of Biology. In 1859 Darwin published his 'Origin of Species,' and from that date modern biology will recognise the commencement of a new period. As in San Francisco, it is said, everything dates back to 1849, so our present zoological conceptions take birth from 1859.

Of the contributors to our first number probably J. W. Douglas is now the only survivor. The aims and scope of the publication are precisely the same as in 1843—bionomic primarily. In philosophy there is great change, but no new creed. It is undoubtedly the case that a naturalist may exist without being an evolutionist; it is equally true that evolutionists can be found who are neither Lamarckians nor Darwinists; and it is certain that Darwinists are to be found in plenty who are quite outside the school of neo-Darwinism, and who have no desire to risk wrecking a great conception on speculative side issues. Hence 'THE ZOOLOGIST' welcomes all phases of thought, but stipulates for facts rather than theories, argument more than advocacy. All contributors may at least speculate on what our Journal may be made for the cause of Zoology during the next century. The summing up will then be in other hands.

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THE ZOOLOGIST

No. 703.—January, 1900.

THE RING-OUZEL IN DERBYSHIRE.

BY W. STORRS FOX, M.A., F.Z.S.

IN recording my observations on the Ring-Ouzel (*Turdus torquatus*), I have no expectation of writing anything original. But I think it possible that personal notes on this interesting bird may be acceptable to those ornithologists who are less familiar with it than I am. On certain points I am bound to disagree with well-known writers. Where I have not felt sufficient confidence in my own experience, I have consulted my friend Mr. David Peat, who has lived all his life on the Derbyshire moors, and who now lives in the midst of the best ground for Ring-Ouzels which I know. He is a most careful and accurate observer of birds. And I am glad to find that his experience entirely supports my own. I am inclined to suppose that the birds of one locality sometimes differ slightly in habits from those of another. It is for this reason that I have headed my paper "The Ring-Ouzel in Derbyshire."

I believe that most ornithologists agree with me in considering this bird a special favourite. There is something so romantic, so wild, so free about it and its surroundings. Macgillivray's lines on the Song-Thrush—

"Far away, far away, far away
The haunts of men"—

seem specially true of the Ring-Ouzel. For we may walk for
Zool. 4th ser. vol. IV., January, 1900.

hours over the moors without so much as a sight or sound of a human being, hearing only the swish of the wind in the heather, the cheep of the Meadow Pipit, the angry cry of the Lapwing as we approach too near to her eggs or brood, the distant complaint of the Curlew, or the sad sweet whistle of the Golden Plover, when suddenly a sharp sound startles us. Is it some geologist chipping off a specimen of millstone grit? But what can he want so far on the open moor? Again we hear the clear "tac tac tac." We look around, and, behold, not far off is a bird, not "black as jet," like the Blackbird, but sooty-black, relieved only by the white crescent on his breast. "Tac tac tac" we hear again, and with each syllable up goes his tail. His cry alarms the Grouse-cock, who flies off, and from a distance calls warningly "Go back, go back." I first made his acquaintance near Loch Skeen, in Dumfriesshire. There I came suddenly upon a party of six, no doubt a family party. But it is here in Derbyshire that I have become familiar with him, either on the open moor, or down a gully cut by a peaty brook, or under those grand "edges" of gritstone clear-cut and precipitous against the blue sky which to the uninitiated suggest cliffs bounding an inland sea. But it is not only in the land of heather that the Ring-Ouzel is to be found. Soon after I came to live in Derbyshire, to my surprise I met him in the wilder parts of our dales, and there found his nest concealed in some corner of the limestone crags. Nor is it really surprising that he loves to haunt these dales. They are not wide fertile valleys, nor are they glens with sloping sides, dividing mountain from mountain. They are rather rifts cut right through the middle of a flat-topped hill. On a bleak April day the traveller may wander over the dreary uplands, disheartened by the everlasting greyness around him—grey sky above, grey stone walls, grey grass—with no colour; not even a hedge or ploughed field to relieve the monotony with their deeper browns. Quite suddenly the scene changes. He is standing at the edge of a dale, looking down upon the deep green of spruce-firs, and below them is a little river clear as crystal, bright with the most vivid emerald-green of the water-weeds over which it runs. Is it fancy? Is it fairy-land? He clammers down to the water. Here he is sheltered from the biting wind. He finds woods carpeted with dog's-mercury (*Mercurialis*

perennis), and here and there an early primrose. As he wanders further up the dale the woods give place to low thorn-bushes. After a while even these cease, and he soon comes to a cave out of which the clear waters of the river flow. It is here that the river has its origin. Here in the cave he finds a Dipper's (*Cinclus aquaticus*) nest already containing eggs. Further up the dale no murmuring stream accompanies our traveller. Even here it is lonely enough. All is still. Though perhaps, if he is lucky, he may hear the cheery song of the Dipper, or the monotonous warble of a solitary Wheatear. Only one loud sound greets his ear—the chatter of the busy Jackdaws as they fly to and from the cracks in the rocks, or talk business and gossip on the ledges. But what is that ?

“A whistle strikes his startled ear !
A pipe of shrillest, wildest tone.”*

It is the Ring-Ouzel high up on the rocks, his song echoing from crag to crag.

Having given this brief picture of the haunts of the bird, we must now consider his habits more or less in detail.

Time of Arrival.—In the ‘Birds of Northamptonshire’ (vol. i. p. 99), Lord Lilford says:—“I have observed the bird in our immediate neighbourhood on its return migration about the end of April.” Rev. H. A. Macpherson (‘Fauna of Lakeland,’ p. 89) writes:—“The last days of March witness the return of the Ring-Ouzels to their upland home.” The earliest date on which I have heard or seen these birds in the Peak district was April 4th; but there are no Ring-Ouzels within three miles of my house, so that I may easily miss them on their first arrival. Mr. Peat recorded their advent on March 26th, 1894. So far as he remembers that is the earliest date he has known. The spring of 1894 was apparently an “early” one, for Mr. Peat found a Lapwing’s egg on March 29th, a week before the usual date. But in that same year the Ring-Ouzels had not arrived in Lathkil Dale by March 30th. As a rule only a few birds appear at first, but are soon reinforced by a second batch.

General Habits, Food, Range, &c.—Mr. Peat informs me that when first the birds arrive the margins of the feathers are paler than they are a little later in the season, giving the bird a more

* Colquhoun’s ‘Moor and the Loch,’ vol. ii. p. 119.

greyish tint. Birds have been noticed with a few white feathers on the sides of the neck; and a cock in my collection has a dark spot in the centre of its white crescent.

I cannot agree with some authors as to the likeness of the Ring-Ouzel to the Blackbird. St. John ('Sport in Moray,' p. 103) writes:—"The Ring-Ouzel so much resembles the Blackbird in shape and figure that at a little distance they may be easily mistaken for each other." And Macgillivray ('British Birds,' vol. ii. p. 102) says that "its manners are very similar to those of the Blackbird." No doubt a casual observer might mistake one for the other, just as he might mistake a Fieldfare for a Song-Thrush. But the attention of the field naturalist is at once arrested by the larger size, less neat and sleek appearance (partly due to its duller colours), the bolder flight, and the very distinct cry of the Ring-Ouzel. The white crescent on the breast is also very noticeable in the mature cock, but would not help much towards the identification of the hen or young birds. In Prof. Newton's 'Dictionary of Birds' (p. 667) it is stated that this bird prefers "the shelter of rocks to that of trees." Again, Macgillivray states that, "like the Song-Thrush, it conceals itself among bushes, but is much more easily put to flight" ('British Birds,' vol. ii. p. 103). And Seebohm also ('British Birds,' vol. i. p. 246) gives the impression that it skulks, saying that it "either drops down into the heath, or flies away to a more secluded resting-place"; though in the earlier part of his account of this species he gives quite a contrary impression. I have seen Ring-Ouzels in Derbyshire, in Argyllshire, and in Dumfriesshire, but never have I known any tendency to skulk on the part of old birds. On the contrary, in this respect their habits much more nearly approach those of the Missel-Thrush. Indeed, if they have a nest, they remain in sight much more than the Missel-Thrush. This is partly due to the nature of their haunts, where the cover is generally low-growing. But under all circumstances, during their stay with us, they fly boldly up when alarmed, pitching on the top of a rock or wall, or sometimes a tree, from whence they can closely watch all the movements of intruders. Very rarely have I been able to approach near enough to see the sitting bird before it left the nest. I say *it*, because I have some reason to believe that at times the cock assists in the duties of

incubation. On June 2nd, 1894, I found a Ring-Ouzel's nest in a hollow on the moors. The eggs were partly incubated, and the cock was on the nest. I retired some distance, and then returned, again to find the cock on the nest. I then sat down at a short distance from the nest. The cock kept hanging around, and in about ten minutes entered the hollow, and there remained for two or three minutes. I had taken the eggs for a museum, so that there was nothing to induce him to stay longer. They certainly are shy birds. Gätke ('Birds of Heligoland,' p. 252) writes:—"They are here, next to the Missel-Thrush, the shyest and most cunning of all the Thrushes." When disturbed feeding in some lonely moorland field, on their first arrival here, or far from their nests, or, again, when family duties are at an end, up they fly, perch on a wall, and presently, if the unwelcome visitor does not withdraw, they betake themselves to some distant feeding ground. By stealing quietly up to a wall, and slowly raising the eyes above its top, one may watch the Ring-Ouzels as they hop about such a field, feeding after the manner of the other members of their genus, hopping quietly for a few paces, then stopping as if listening for some expected sound, and sooner or later bounding suddenly forward, and with vigorous tugs hauling an unlucky worm from its retreat. Seebohm states ('British Birds,' vol. i. p. 245) that the Ring-Ouzel, like the Song-Thrush and Blackbird, breaks snails' shells against stones. I should like to have some further evidence of this. I can only say that neither Mr. Peat nor I have ever witnessed anything of the sort. On the moors there are very few snails, but in the wilder parts of the dales great quantities may be found.

There is no doubt that Ring-Ouzels are fond of berries. In July and August their droppings are often stained as a result of the bilberries and cloudbberries which they have eaten. And at times they take heavy toll on gardens near their haunts.

But I must recur to their supposed skulking habits. When the young birds first leave the nest they have a peculiar twittering call, not altogether unlike the song of the Wheatear. If, attracted by this sound, an attempt is made to approach them, and to observe them at close quarters, they will generally fly for some fifty yards, and plunge into the heather. I have caught many young Ring-Ouzels by marking the spot where they thus

disappeared, and quietly stalking up to it, and then quickly searching the heather, and seizing the bird. For instance, I have a note, "Caught four young Ring-Ouzels" on June 22nd, 1887. Years ago I kept many for weeks in my aviary, but unfortunately I have no notes respecting them. As to the old birds, I must repeat that, according to my experience, they always fly to some point of vantage, just as a Missel-Thrush flies to a tree. Sometimes in rough country they are out of sight for a few minutes behind a hillock, and before or after the nesting season they often fly off to a distance; but I have never known one skulk. I have, moreover, questioned Mr. Peat very particularly on this point, and his experience is exactly similar to mine.

When they have eggs or nestlings they are often very bold. I have known them dash past my face, nearly touching it. I have also witnessed a pair driving a Kestrel from their neighbourhood. I have, however, never known them "reel and tumble on the ground to decoy you away," as Seebohm states ("British Birds," vol. i. p. 248). This can hardly be a common habit. Many brooding birds fly low and feebly when first leaving the nest, as if stiff with long sitting; but I have never noticed even this in the Ring-Ouzel.

Song.—Perhaps its song is inspiring rather on account of what it suggests than because of its intrinsic beauty. It is not very varied, but its few rich notes ring out on the silent moor, or echo from rock to rock in the deserted dales. It is perfectly easy to distinguish it from the song of any other bird. And this is true also of its call. How the loud "tac tac tac" of the Ring-Ouzel can be mistaken by a naturalist for the metallic cry of the Blackbird, I cannot conceive. I once (April 11th, 1895) heard a Ring-Ouzel make a low sound like the scolding of a Whitethroat; but this is unusual. Also on one occasion only have I known it sing when flying.

Date of Nesting.—On April 29th, 1895, I found a Ring-Ouzel's nest containing two eggs, but that was ten days or a fortnight earlier than I usually see them. June 28th (1888) is the latest date on which I have found them. These were at an advanced stage of incubation, and I have not known of young birds in the nest at a later date. But I must confess that I do not look much for eggs after June, so that it might be possible to

meet with them much later. Whitlock ('Birds of Derbyshire,' p. 31) records the finding of a nest on Aug. 2nd, 1885.

Materials of the Nest.—According to my experience, the typical Ring-Ouzel's nest has its foundation and outer walls constructed of bracken-stalks, with a stem or two of heather sometimes interwoven. In all the nests which I have examined there has been a layer of mud, and without exception they have been lined with fine bents. At times, however, the outer structure varies. A nest which I found in 1894 on the moors had this part composed of grass, moss, bracken, a leaf, a heather-stalk, and a rootlet. Another, which was placed in a crevice of rock in one of our dales, had a sort of loose foundation (probably intended to tilt it up on the outer side) of grass and moss. Upon this was an irregular cup of mud and moss, encircled round the top with a wreath of dry grass and dead stalks of some herbaceous plant (probably one of the *Umbelliferae*). The lining, which was a quite separate structure, was of fine bents, with here and there a piece of leaf or of stonecrop (*Sedum acre*). The first spring which I spent within reach of the Peak district was that of 1887. It was not till then that I searched for Ring-Ouzels' nests; but during that season I found eighteen. Of these the seventh, containing eggs, quite deceived me at first. The outside was entirely made of moss, and I mistook it for a Blackbird's nest. There were five eggs in it, and I took two of them, as they were very beautifully marked. A day or two later I showed these to a friend, who at once said that he was convinced that they were Ring-Ouzel's eggs. Accordingly I revisited the nest on three occasions, and eventually had the satisfaction not only of seeing the old birds near it, but also of identifying the three young birds as Ring-Ouzels; for there is no difficulty in distinguishing a Ring-Ouzel from a Blackbird during their nestling plumage.

This shows conclusively that the nests of these two species are occasionally very similar; but I cannot agree with Seebohm when he says that "it would be almost impossible to discriminate between them were we not aware that *the Blackbird does not haunt the wide open moor*" ('British Birds,' vol. i. p. 247; the same words are used in his 'Eggs of British Birds,' p. 182). The range of the Blackbird overlaps that of the Ring-Ouzel. Only last year (1898) I saw a Ring-Ouzel fly from a likely place, and,

on examining it, I discovered the beginnings of a nest. When, however, I next visited the place, the nest was completed, but a hen Blackbird was sitting on it. I am convinced that there are only two ways of identifying Ring-Ouzels' eggs, and one is by seeing the parent bird leave the nest, or anxiously hanging around in its proximity. If this fails, and an egg is taken from a nest, the only other plan is to visit it again when the young birds are feathered. In 1890 I found a Blackbird's nest containing three eggs in the middle of Glossop Moor. Its situation and the materials of which it was built would have naturally led me to take for granted that it belonged to a Ring-Ouzel, but I saw a hen Blackbird leave it, and I heard her well-known cry.

Before leaving this part of my subject I must quote a curious incident from my notes for May 11th, 1895 :—“ On the moorland path between Ramsley Lodge and Curbar I met Mr. Peat. Just where we met was a Grouse's nest close to the path. It was peculiar-looking, being partly made of mud ; and he told me its history as follows : A Ring-Ouzel built the nest, and began to lay in it. To his surprise he one day found a Grouse's egg in the nest, and thought that someone had put it in for amusement ; but the Grouse continued to lay in it, so he removed the Ring-Ouzel's eggs. To-day there were six Grouse's eggs in the somewhat flattened-out Ouzel's nest.”

Situation of Nest.—On the moors the usual place for the nest is on a sloping heathery bank, the nest being well concealed among the heather. It is often found near a brook, not because the birds prefer to be near water, but the brook has cut deep down into the peat, and thus has furnished a convenient slope. Banks by a moorland roadside, the sides of hollows, the steep and rugged declivities which always occur below the “ edges,”—all these are taken advantage of. Once, when looking for Sand-Martins' nests, I found that of a Ring-Ouzel in a sand-pit. Mr. Peat has never come across the nest in a tree or bush, but in 1887 I chanced on one which was placed in a fir tree a few feet from the ground ; and in 1895, in the same locality, my friend Mr. Allan R. Wilson saw one in a similar situation. He has kindly sent me a copy of the entry in his notes, which runs as follows :—“ In one of the stunted trees, just the Sheffield side of Stanedge Pole, I found a Ring-Ouzel's nest with four eggs about

ten feet from the ground. The bird stayed about, so that I had no difficulty in identification." I have never known of a nest of this species in a bush, but St. John mentions a "low bush" as its ordinary site ('Sport in Moray,' p. 103); and I gather that the Rev. H. A. Macpherson regards a "stunted whin bush" as a not uncommon position ('Birds of Cumberland,' p. 3); and Mr. Howard Saunders says that "stunted bushes" are occasionally chosen. In our dales the Ring-Ouzel generally chooses as a nesting-site a corner in a precipitous rock, sometimes in an old quarry. It is usually impossible to see any vestige of the nest from below, and above it is generally screened from view by overhanging herbage.

Colour of Eggs.—As on one occasion I mistook a typical boldly marked egg of a Ring-Ouzel for that of a Blackbird, being misled by the nest (which was built of moss and placed on the top of a patch of bilberry), I can hardly object to Lord Lilford's statement ('Birds of Northamptonshire,' vol. i. p. 101) that the eggs of the Ring-Ouzel "very closely resemble some varieties of the Blackbird." It is quite true that eggs of the former bird may be found which are hardly distinguishable from those of the latter, and less rarely from those of the Missel-Thrush. I also possess eggs of the Song-Thrush which are very like a variety of Ring-Ouzel's. Altogether there are in my collection some two dozen varieties of these eggs, but in some cases they are not very distinct from one another. The typical egg has a ground colour of slightly greenish blue, rather paler than is usual in the Song-Thrush's egg. It is boldly marked with blotches of chestnut-red, and fainter ones of a dull purplish colour. A distinct variety has the ground colour evenly tinted with very pale reddish brown, marked similarly to the typical egg. In some varieties the ground colour is greener than in the typical egg; in some it is very pale indeed. In some the markings are very large and bold, in others they are reduced to small irregular spots or freckles, the underlying marks often being a pale shade of chestnut-red, and not purplish at all. One variety is very curious. Apparently the ground colour is dirty white, but the whole surface of the egg is thickly covered with very fine freckles of rusty brown. In shape they are either sharply pointed at one end, long and bluntly pointed, perfectly oval, or almost spherical.

Number of Eggs.— This is given variously by authors as “four, seldom five” (Howard Saunders’s ‘Manual,’ p. 16); “from four to six” (Macgillivray’s ‘British Birds,’ vol. ii. p. 103); “five or six” (Lilford’s ‘Birds of Northamptonshire,’ vol. i. p. 101). My own experience leads to the conclusion that three, four, or five make up a full clutch. Of nests which I have found three have contained two eggs each; five, three each; fourteen, four each; and two, five each. There is no doubt that in the case of those with two eggs each the hen had not ceased laying. With regard to those with three eggs each, at least one lot was partly incubated. Unfortunately, on several occasions when I found young birds in nests I omitted to note down their numbers; but I have records of three nests each containing three young birds, and of two nests each with four. Ring-Ouzels’ nests are usually beyond the beat of the ordinary birdsnesting boy, and they are, moreover, as a rule, on strictly preserved land; so that it seems to me that three eggs may be fairly regarded as a normal clutch.

In conclusion, I should like to raise my protest against the collecting of eggs in clutches. It may satisfy the cravings of mere greed, but I cannot conceive what scientific purpose is gained thereby. I believe that I have as good a series of Ring-Ouzels’ eggs as anyone can wish to possess, but it would be no better scientifically if I had carried off every clutch which I have found. It sometimes happens that two varieties are to be found in one nest. Even then it is needless to take more than two eggs. My notes tell me how many eggs each nest contained, and they do this more satisfactorily than can be done by the keeping of clutches, individual eggs of which may get broken. In a public museum it may be desirable to show one clutch of each species, but this can hardly be necessary in a private collection.

NOTES ON THE ORNITHOLOGY OF OXFORDSHIRE,
1896-1898.

BY O. V. APLIN, F.L.S.

(Concluded from vol. iii. p. 442.)

WHERE no other locality is mentioned, the notes refer to the parish of Bloxham.

1897.

January 12th.—Fieldfares and Redwings only just beginning the large crop of haws, which, almost untouched, simply redden the hedges.

15th.—Flock of from two to three hundred Ring and Stock Doves.

20th.—Some snow; sharp frosts lately.

21st.—Two Redpolls.

22nd.—Snow on ground. Large flock of Fieldfares and many Redwings. Large flock of Larks.

23rd.—Very hard frost, and snow on ground. A Great Crested Grebe shot on the Thames at Cassington ('Oxford Times').

29th.—Thaw. Three hundred and fifty brace of Partridges killed this season on a beat of about 4000 acres of rough ground, in the parishes of South Newington, Swerford, and Rollright. This season and last have been very good ones here; hot and dry summers.

February 1st.—A vast flock of Skylarks on a stubble. News from Mr. Darbey of eight or ten Sheldrakes seen on floods at Charleton-on-Otmoor. They were very wild, but one was shot and sent for preservation.

20th.—Blackbird singing well.

23rd.—Large flock of Fieldfares.

A Great Crested Grebe, recently shot on Port Meadow, reported in the 'Oxford Times,' 5th March.

Writing to me on February 6th, Mr. R. W. Calvert, of Ascott-under-Wychwood, says:—"At the present time I am acquainted with about half a dozen nesting sites of both the Barn and Long-eared Owl, all within a radius of about seven

miles of this place. . . . On March 21st [1896] I went to one, a spruce plantation about two miles away from here, and saw a Long-eared Owl fly off her six hard-sat eggs on the top of a Squirrel's nest. On April 3rd I discovered another Long-eared Owl's nest with four eggs in a plantation close here." These eggs and the next two clutches were taken by Rooks; from the fourth clutch four young were reared. Writing again on May 29th, the same observer mentions having seen, up to that date of the present season, three pairs of Long-eared Owls nesting. And on June 15th he wrote that he had recently seen four lots of young.

March 6th.—News from Mr. Fowler that he saw a Buzzard at Kingham on this day. It flew in a south-easterly direction towards Bruern Wood, after coming nearly over his head. Although very high up, its flight and shape were unmistakable.

13th.—Rooks built one nest.

20th.—Song-Thrush's nest with two eggs in shrubbery. Eighteen Rooks' nests in the far rookery.

26th.—Chiffchaff in song.

One day this spring (exact date not preserved) I saw in my brother-in-law's garden here a Missel-Thrush's nest with eggs, placed, not more than seven feet from the ground, on and near the end of a slender, nearly horizontal bough of a yew tree which stretched to the edge of the tennis lawn. The way the Missel Thrush has of putting away some of its shyness in the breeding season and approaching our dwelling-houses to breed is well known. Possibly in this case the slender bough was chosen as being difficult of access by cats, which are the greatest curse that the birds of Bloxham gardens suffer from. It is absolutely useless to pass (and even to enforce) laws for the protection of small birds while no restraint is imposed upon the keeping of cats. Curiously enough, when I was at Rainworth the same year in July, Mr. Whitaker showed me a Missel-Thrush's nest from which young had flown, also placed at the end of a yew bough extending to the edge of the croquet-ground, and only about four feet from the ground. Nests at these low elevations are, I should think, not common.

April 11th.—Blackcap in song in shrubbery. Several Red-starts by the brook,

13th.—A Swallow seen at Bloxham Grove.

15th.—A good many Willow Wrens.

18th.—Swallows pretty common about the village. Cuckoo noisy. Mr. H. G. Thomson watched, through glasses, two immature Golden Eyes in the middle of a large field on Otmoor, and within a hundred yards of him. Stormy weather had then recently prevailed (*in litt.*).

20th.—The same observer saw two Spotted Woodpeckers at Woodperry; he has also seen this bird in the garden there (*in litt.*).

24th.—Otter hunting in the Cherwell Valley (when we killed a bitch of 17 lb.), and saw Lesser and Common Whitethroats, Sand Martin, and Tree Pipit.

25th.—Ray's Wagtail and House Martin.

27th.—Whinchat.

May 2nd.—Garden Warbler.

4th.—Sedge Warbler.

7th.—Swift and Spotted Flycatcher.

9th.—Turtle Dove.

17th.—Carrion Crow's nest with four young with feathers just showing.

June 4th.—Heard Corncrake; getting scarce in recent years.

8th.—Pair of Red-backed Shrikes established at Wickham.

13th.—A young Cuckoo in Redstart's nest in a hole under the thatch coping of garden wall. Being now too large for the hole, its tail sticking out attracts attention.

15th.—News from Mr. Calvert that he had up to May 10th seen twenty-seven new nests of the Hawfinch in Wychwood Forest, but all empty—the work of the Cuckoo, aided by Rooks and Jackdaws.

16th.—The above Cuckoo flown.

26th.—The Red-backed Shrikes at Wickham have a nest in a hazel bush in the roadside hedge, and young flown.

28th.—Cuckoo in the fields at the back of the house still sings the full song.

July 3rd.—Blackcap, which became quiet about the end of May, sings again now. Garden Warbler sings.

6th.—Flycatchers with brancher young, and very noisy.

10th.—A young Cuckoo in Robin's nest in hole under the

thatch coping of kitchen garden wall; feathers only just sprouting. The shells of some of the Robin's eggs lie at the foot of the wall.

17th.—A young Cuckoo (the third this year) about the garden; my man says it appeared on the 15th.

23rd.—Saw a Barred Woodpecker. The last young Cuckoo has emerged and frequents the garden.

August 3rd.—A young Cuckoo still with us.

22nd.—Many Swifts; very noisy.

23rd.—Some Swifts.

September 4th.—A big flock of Peewits.

7th.—Many Missel Thrushes about the fields, in small flocks. I shot a very heavy Red-legged Partridge at Milcomb; it was an old male, one of three very wild birds. Although in moult, and the spaniel in retrieving it (it was a runner) pulled out nearly all its tail, it weighed only a shade under 20 oz. I find that $17\frac{1}{2}$ oz. or 18 oz. is a good weight for a full-plumaged November bird.

Partridges showing a pure white horseshoe have been much more common of late than was the case ten years ago. These birds are usually (? always) females. The following examples came under my own notice this year and in the previous autumn.

Moulted young one, sex not noted down, pure white horseshoe, Sept. 15th, 1896. Three females killed at Milcomb and Barford, January 4th, 15th, and 25th, 1897, two with pure white horseshoes, and the third white just marked with a few brown spots. Female with pure white shoe, October 15th. Female with large pure white shoe, November 6th. Female with small patch of brown on white shoe, November 9th. Another the same day, sex not noted, pure white shoe. Birds with the horseshoe chestnut and white mixed are often met with.

12th.—A Grey Wagtail by the Sorbrook at Bodicote.

18th.—About 8 a.m. (the sun just coming through the mist) a cloud of Swallows flew up above the roof in a mass, and went up high in the air; distinctly fewer to be seen about the village afterwards.

21st.—Many Meadow Pipits (migrants) in the roots to-day and yesterday.

30th.—A Turtle Dove at South Newington.

October 13th.—A good many House Martins and only one Swallow.

14th.—A party of Martins high over the garden.

23rd.—Redwings.

31st.—Fieldfares.

November 12th.—A Woodcock, a rare bird here, seen at Milcomb.

16th.—Great flocks of Starlings. A farmer here recently caught a light greyish (nearly white) variety.

19th.—Examined a Peregrine Falcon—a male of this year—shot near Chipping Norton early in this month.

21st.—Missel Thrush singing lately. Grey Wagtail flew over the garden a few days ago.

24th.—A good many Redwings here, but hardly any Fieldfares.

December 23rd.—About 12.30 a.m., calm and starlight with a little haze, Grey Wild Geese very noisy, and apparently wheeling over the village, rather low down.

24th.—A few Redwings; no Fieldfares to be seen. About a dozen Siskins in some alders by the brook at South Newington. Their note on the wing at this season sounds like *tweee* or *tweeze*, thin and wheezy. When settled they utter a poor thin *twiteree* or *twitzeree*.

Marsh Warbler.—Mr. Fowler did not find a nest at Kingham this year; but he felt sure there was one (if not two), for he saw and heard the birds' as late as July 22nd—his latest date.

Jays.—A copy of a publication called 'The Gamekeeper' (December 1897) came into my hands. It contains an article by Mr. Charles Stonebridge, head gamekeeper to the Earl of Jersey, upon shooting Jays at Middleton Park. The writer states that, in one of the coverts, there is a plantation of what are locally called "Spanish Oaks," the botanical name of which he believes is *Quercus cerris*. The variety grows nowhere else on the estate, and seldom fails to bear a crop of acorns. In those years when the ordinary oak bears no fruit, Middleton is visited by a "plague of Jays." As a rule there are, he says, very few Jays about the place, but the season of 1897 being marked by the conditions stated above, a swarm of Jays then appeared to feed on the acorns. The writer continues: "The strange part about it is, that at this time the Jays appear to drop the artful, suspicious ways which are characteristic of the family, and one is able to shoot at them all day without frightening the birds away. On

heavy mornings, when the mist and smoke hang in the trees, they come just the same, and at times severely try the quickness of the breechloader. If one should happen to be winged, and falls screaming down the tree, the Jays fly in so quickly that the gun-barrels soon become hot in the hand. From about nine to ten in the morning is the time when the Jays appear to be feeding most freely, and it is then when myself and one of the under-keepers wait for them, as, having other duties to attend to, we are unable to spare more than an hour or so each day. However, in that short time we generally manage to kill a dozen or more. During one season a few years ago we bagged two hundred and fifty Jays, up till the end of October, feeding on these acorns. . . . The only injury they do now, is the manner in which their screaming annoys the Pheasants." This last is a most "gamekeeperish" remark, and it would be curious to find out what, if any, grounds Mr. Stonebridge has for making such a remarkable statement.

The tameness of the birds probably points to their connection with one of those immigrations of Jays to the east coast of England which occasionally take place, and affect Oxfordshire in some degree.

1898.

January 5th.—Many primroses and one flower of *Pyrus japonica* in bloom.

6th.—Examined at Mr. Bartlett's a Manx Shearwater captured at North End, Warwickshire, in September last. Although this bird occurred three or four miles outside our boundaries, it may not be out of place to mention it here.

10th.—While waiting for Wood Pigeons, I watched a Barred Woodpecker for nearly half an hour. It once uttered its loud *qui-qui-qui-qui-qui*, more commonly heard in spring, and also, but less so, in autumn. It is also heard in summer. The notes of this cry are so run together as to sound like *quick* rather than *qui*. This bird also once uttered the alarm cry *gik* or *gek*.

13th.—Snowdrops well out.

14th.—The "dark still dry warm weather" of Gilbert White.

15th.—Two Blackbirds, old and young, had a prolonged running fight, with occasional halts. When they faced each other, one of them (at least) sang a few high-pitched shrill notes.

19th.—A small flock of Siskins in alders at South Newington.

20th.—Had news of many Crossbills seen in a plantation of spruce and larch at Wardington.

21st.—Blackbird sang well; very early.

22nd.—Received two Crossbills which had been shot a few days ago at Wardington. They had been killed too long for preservation, or for the sex to be ascertained. Dusky birds with dark feather-centres, and the feathers of the crown and (but less so) mantle with yellow edges. Rump of one bird yellow; of the other, shot away.

23rd.—One crocus bloom out.

24th.—A pair of Starlings investigating a former nesting-hole in the roof of a thatched cottage.

30th.—Pied Wagtail singing well.

31st.—Wood Pigeons numerous. I saw two or three large flocks; one flying to the Tew Woods late in the afternoon numbered three hundred at least. Jays have been rather numerous since the end of October. With few exceptions the Jay (on account of the absence of woods, and scarcity of even small plantations) in this immediate district, is an autumn visitor for the winter.

February 19th.—Bullfinches made a heavy onslaught on the plum buds; they chose the best-flavoured plums.

21st.—Hard frost and snow.

22nd.—Thermometer down to 25° (at four feet from the ground) last night. Wind N.E. lately.

24th.—Apricot blossom expanded.

25th.—White frost, 25°.

March 2nd.—Cold and stormy for some days; daffodil in flower.

3rd.—News from Mr. Darbey, of Oxford, that he received "the other week" a particularly fine Peregrine Falcon, shot near Woodstock; also that he had been told that another frequented the same neighbourhood.

4th.—Frost and snow.

9th.—Wintry weather, and N.E. winds lately.

10th.—Sharp frost.

18th.—Milder the last few days. 55° in the day, in shade.

21st.—Frost again.

24th.—Strong N. wind and snow.

26th.—It has blown hard from N. and N.N.E. for three days; some snow. Starlings building in hole over the granary door.

27th.—Wind moderated, with rain. Much peach and apricot blossom strewn on the ground. [Yet from one apricot tree I afterwards thinned out over one hundred green fruit, and gathered one hundred and twenty ripe fruit.]

April 1st.—The first Chiffchaff appeared; in song, in the garden. I searched carefully in the most likely spots without finding one earlier.

7th.—Some (unknown) bird has in the last few days attacked my black currant bushes, biting off the fruit buds and eating them, although the leaves (many of which are strewn on the ground) are as large as a shilling. I have never known this happen before. We prevented further destruction by stretching black cotton about the trees. And I may now add, that this done early in the next season (1899) probably prevented a repetition of the damage to the bushes.

8th.—Good Friday. Saw a Swallow about the buildings at Bloxham Grove.

12th.—Several Willow Wrens in the garden. Redstart.

17th.—Cuckoo.

18th.—Swallows about the garden (the first on the 15th).

20th.—Blackcap and Lesser Whitethroat.

23rd.—Tree Pipit. Otter hunting in the Cherwell below Kings Sutton. Killed a dog and bitch of 18 lb. and 16 lb.

26th.—Sedge Warbler. As I passed in the train I saw a Coot on its nest on a piece of water on the east side of the G.W.R. near Wolvercot. Examined (and afterwards bought) a nice red Crossbill, one of four received from Buckland in December, 1897. Buckland is just inside Berkshire. Heard a Nightingale at Wolvercot.

30th.—House Martin.

May 1st.—Whinchat, Whitethroats, Wryneck, and Grass-hopper Warbler.

2nd.—Garden Warbler in shrubbery. Two or three Swifts.

A Song Thrush sang from my barn roof ridge this afternoon. Rather a wet day.

4th.—The Lesser Whitethroat sings nearly every day in a bird-cherry tree (*Prunus padus*), the branches of which come close to some of the windows. I can thus listen to the song at very close quarters. The bird sings at pretty regular intervals. His warbling notes, which precede the outburst, are sometimes really very good and rich, but low in tone and not very numerous—often hurried, so that at a distance they are often not heard. They vary a good deal, and occasionally, in style, remind one of the notes of the Orphean Warbler. In these cases they might be set down as *therut therut therut*; but this kind of prelude is rarely heard, and the notes are usually of a warbling nature.

7th.—On April 15th I set up in the shrubbery a nesting-box made out of a piece of an old pump—the fondness of Tits for a pump as a nesting site being well known. A pair of Greater Titmice had completed a nest in it by the 30th. On the morning (about 10.30 a.m.) of May 1st Mr. A. H. Macpherson and I looked into it and found it empty. On the 4th I saw the bird on the nest, and to-day the nest contained eight eggs. Even supposing an egg was laid on the 1st, after we looked into the nest, the bird must have laid two eggs in one day.

14th.—Found a Jay's nest with five eggs in a thorn bush in a small ash-pole spinney at South Newington. The Jay rarely breeds here. Turtle Dove.

15th.—Heard the resonant notes of the Wryneck, now a rare bird here, from this house. Several Spotted Flycatchers appeared in the garden for the first time this year. They were fighting and pairing. A pair of Wrens whose nest was torn by a Cat from an ivy-grown stem, are building again in the same spot. I imagine it is the same pair.

18th.—Starling feeding young.

27th.—Flycatchers have one egg in a nest built in half a cocoanut-shell fixed under the eaves of a wall. A Nightingale established at Bloxham Grove.

June 1st to 15th—In Belgium.

20th.—Mr. H. G. Thompson saw a white variety among a flock of Starlings near Headington.

23rd.—Cuckoo still sings. Examined at Mr. Bartlett's a

Shag, just beginning to moult old worn feathers, which was picked up in a very thin condition in a meadow near Banbury about the 1st of the month.

25th.—Went to Kingham to see the three Marsh Warbler's nests found by Mr. Fowler. A photograph of one of these nests (the one in which the Cuckoo's egg was afterwards found, *vide* 'Zoologist,' 1898, p. 356) is here reproduced. This example



exhibits very well the peculiar characteristic (always more or less developed, so far as I know) of the Marsh Warbler's nest. The nest has the appearance of being hung on its supporting stems by basket-like handles, somewhat similar to those of a common garden scuttle-basket. This nest is supported by three stems of meadow-sweet, two of them close together. The walls of the nest are formed of dry grass, with a very little moss and some wool. The lining consists of a fair amount of horsehair, and a very little wool is to be seen, as well as a patch of the latter as

big as a threepenny-bit in the bottom of the nest (*vide* 1898, p 357). The second nest was supported by two stems of meadow-sweet (a third stem was only attached to the nest slightly). It had very well developed "handles" coming up high above the general level of the walls. The walls were entirely of dead grass, and the lining of horsehair. The third nest was supported by two stems of meadow-sweet and one of osier. The "handles" were well defined, but slight and small. Walls of dead grass; lining of horsehair. The three sets of eggs were each of a different type, though the individual eggs in the clutches resembled one another. Mr. Fowler has presented the first nest, with the Cuckoo's egg, to the Oxford Museum.

29th.—Mr. Fowler and I saw a male Red-backed Shrike and an impaled Bumble Bee near Lower Tadmarton.

July 2nd.—Cuckoo singing full and well this morning; heard from the garden.

4th.—Two Cuckoos still in full song, one at the back of the garden, the other near South Newington.

5th.—Cuckoo still in full song. Starlings very destructive to my neighbour's ripe cherries. Weather dry.

6th.—The Lesser Whitethroat may be heard not uncommonly singing in this and other gardens in the village throughout its period of song. It is much more of a garden bird than the Greater Whitethroat, which only appears in the village and about gardens on its first arrival (and that very rarely), and again (commonly) in the bush-fruit season. Lesser Whitethroat is indeed an unfortunate and, in some respects, a misleading name. The habit of this species of frequenting gardens, rather than open spots like the Whitethroat, was remarked upon by Edward Blyth sixty years ago, as well as by Herbert at a rather earlier date.

9th.—A Cuckoo in full song all the morning in the fields at the back of this garden. The old idea locally is that the Cuckoo's voice becomes broken when it can no longer get little birds' eggs to wet its throat with; hence it changes its tune in June. An ingenious man once suggested, to account for a Cuckoo singing in July, that each bird has a certain number of cuckoos to get through, and if he had not finished them by the usual time he had to go on after the other birds had finished!

15th. — Very dry weather. Starlings, Blackbirds, Song

Thrushes, and Robins punishing the raspberries and red currants.

18th.—A young Robin caught to-day was half through its moult, and had a good patch of red on its breast. I saw another showing this a few days earlier. The heaviest hay crop for twenty-nine years; and "got well."

20th.—Saw a female Red-backed Shrike on the Lessor Farm, Milcomb.

22nd.—Chiffchaff still sings.

30th.—A good many Willow Wrens about the trees, plants, and pea rows in the garden, taking small flies, &c., during the last few days.

31st.—Several Robins singing. All those that I can see well are young birds over the moult. Spotted young are still to be seen. Great numbers have been reared this year, and I have liberated as many as three from the Sparrow-trap in a morning. Most of them will leave us in autumn. Pied Wagtail on the roof of an outbuilding with food in its mouth, and probably feeding a second brood, as there were big young on the lawn some time ago.

August 3rd.—A young Cuckoo about the garden lately. Was this the progeny of the old Cuckoo which sang so late in the season close to the garden? And was the old bird hanging about until the young one was safely launched? I did not find a Cuckoo's egg in the garden this year, but I have no doubt this young one (which had evidently only just left the nest) was hatched with us.

13th.—Many Swifts, high up and noisy, in evening. Two Red-backed Shrikes on the telegraph wires on the Lessor Farm.

14th.—No Swifts to be seen.

15th.—The drought is very severe; apples and plums falling unripe from the trees.

September 1st.—Chiffchaff singing again. The hottest September I ever knew. A bad season for Partridges here, taking into consideration the large stock left at the end of last season. Barren birds numerous, but what coveys there are being good on the average. A dry season is usually good for the birds, but apparently it can be *too* dry, and I believe that this year many young birds died from want of water. It is on the dry

hilly land this year that birds are scarcest; while the contrary is usually the case with us.

2nd.—Chiffchaff in song. Saw a Wheatear in two places near South Newington.

5th.—The cracks in the ground are larger than any I have seen since the dry summer of 1867 (or 8), which I remember being pointed out to me as the probable grave of many young Partridges. Straggling flocks of Missel Thrushes seen every day almost this month, so far. It is a curious thing that during the late autumn and winter the Missel Thrush can hardly be called a gregarious bird in England, and that we do not see flocks after early autumn. In winter the Missel Thrush is seen singly, or, at the most, three or four together, until early spring when it pairs. I think this bird was more common here when I was a boy, judging from recollections of nests found in apple orchards and the fork of forest trees—an ash for choice; judging also from the birds shot with Fieldfares in hard weather in the thorn and other berried trees. Those who were accustomed to shoot Fieldfares as they came to feed in the thorn bushes, hated the “Norman,” as it is called here; for if one arrived in a bush where the Felts were gathering, it straightway began to swear with its harsh screaming voice, and to fight, and so drove the other birds away, causing the hoped-for family shot to fade away. A Landrail bagged. Only a few seen this season; but I did not expect any, as I do not think I heard one in the summer. Mr. H. G. Thomson wrote me word that in the neighbourhood of Woodperry they had been conspicuous by their absence. In 1897 also they were rare with us. A Wheatear seen.

7th.—For the first time the oppressive heat quite overcame us this afternoon. The thermometer stood at 70° after 7 p.m.

8th.—Temperature in the shade 84° at 1 p.m.

9th.—Have shot this month Partridges with the horseshoe pure white (two females); white with a few chestnut feathers; mixed; and pure chestnut. I made this note in consequence of a suggestion in the ‘Field’ newspaper that this white shoe was a “stage” in the change of plumage. This is of course a wrong idea. But it seems likely that the pure white horseshoe is almost confined to the female Partridge, if, indeed, it is not entirely so.

11th.—Chiffchaff sings well.

13th.—Flock of Peewits on swedes.

16th.—Drought still continues. News that Mr. G. Colegrave has seen one Quail this year, and that Mr. E. Colegrave heard one in the spring at Milcomb.

17th.—My garden is nearly deserted by birds (on account of the dry weather). Caterpillars (*Pieris brassicæ*) swarm on the cabbage tribe, but the birds do not touch them. As for the Sparrows, not one is seen about my garden and the outbuildings ; they are all away in the cornfields.

21st.—Very dry ; about 75°. Still many Missel Thrushes in loose flocks.

22nd.—The bulk of the village Swallows gone.

23rd.—The caterpillars of *Pieris brassicæ* having eaten all the green from a considerable quantity of the cabbage tribe in a large garden near here (leaving an array of skeletons), went over the wall in swarms, and across the village street, the people on the other side having to shut windows and doors to keep them out of their houses. The side walk was covered with caterpillars, crushed under foot by the passers-by. I may here add that during the winter of 1898-9, green vegetables were scarcer in the village than they had been for very many years. Drought and blight partly accounted for this. My own plants were only saved from caterpillars by hand-picking. Whether it is that there are now so many more insects which are "nasty" to birds, or whether the birds have changed their habits and got into bad ways in the matter of their food, I cannot say. But it is certain that, although ordinary small birds (except Swallows and Martins) are commoner than ever, they seem year by year less able, or less willing, to cope with the insect pests of the garden. Began apple gathering in the orchard ; an early date.

26th.—Thermometer down to 35° last night. Hot sun but cold air from the E. and a slight whirlwind about midday.

27th.—Showers. Song Thrush sang in a low and subdued tone ; the notes very poor.

28th.—Country and grass fields perhaps never before in my experience so brown, dried up, and dusty.

29th.—The drought broke up and a good rain fell. We have met with only three or four Landrails this year, and I have heard of some half dozen others,

October 3rd.—A young well-grown female Partridge nearly over the moult, with white horseshoe.

5th.—A good many Jays about.

9th.—A Grey Wagtail in the brook here. Alarm note in flight is a highly-pitched sharp and very hard *itch-it* or *itch-it-tit*, uttered quickly.

10th.—Many Meadow Pipits in loose flocks and singly in swede fields. Lark sang poorly.

12th.—Redwings about hedges. Many Meadow Pipits again. Lark sang.

15th.—Some Swallows hawking flies round a big oak at Wickham. A Woodcock seen on Bloxham Grove.

29th.—The 'Field' to-day contained an announcement by Mr. W. W. Fowler that Mr. W. C. Carnegie saw a Swift at Churchill in company with a large number of House Martins on the 15th inst. This is a record late date for Oxon. Swifts were recorded as seen this month at Edinburgh, Bath, and in the Isle of Wight.

31st.—Song Thrush singing well. We have now only our (comparatively) few winter Robins. Mr. H. G. Thomson saw three Grey Crows flying over from north to south at Woodperry on the 23rd.

November 1st.—Fieldfares passed over my garden "chacking."

4th.—When pike-fishing at Byfield Reservoir, Northamptonshire, not far over the Oxfordshire boundaries, I saw no fewer than three Cormorants, which I was told had been there for about ten days. One bird was fully adult, and another quite immature. They passed most of their time sitting on the mud edge (the water being very low), occasionally hanging their wings out to dry, but I saw one busily fishing. The shots of a Snipe-shooter alarmed them considerably in the forenoon, and they took wing, circling round at a great height, and I thought they had gone for good. But they soon returned, and I afterwards learned that they were in the habit of visiting Clattercote Reservoir, in Oxon, occasionally remaining there for the night, and roosting in some tall elms on the bank. I think they remained about six weeks in the neighbourhood.

As my man was walking up the shrubbery to-day, a hawk dashed at a small bird. The latter dropped through some lilacs,

and the Hawk following hit against a bough and lay stunned on the ground for several seconds.

6th.—Weather still very mild. Twenty-eight different plants in bloom in the garden.

19th.—Heard Redwings' notes overhead, at intervals, about 9 p.m.; rather foggy, calm, with wind N.E. to E.

21st.—Many Redwings and Fieldfares; these remained in good numbers all the winter.

22nd.—A female Partridge—a bird of the year, I believe—with pure white horseshoe. Very cold. N.N.W. wind.

23rd.—A Woodcock shot out of gorse on a hillside at Milcomb. News from Mr. Fowler that he saw half a dozen Crossbills in the parks at Oxford, on the 22nd. These birds have been numerous this year in various parts of England. Deep snow on the ground this morning, and more fell in the forenoon, about five inches on the ground; but thawing.

28th.—Cold winds lately. Obtained an immature Barred Warbler (*Sylvia nisoria*) here. (*Vide* 'Ibis,' 1899, p. 160.)

December 11th.—Missel Thrush's joyous rollicking song.

19th.—Very mild again. Violets, pansies, and primroses blooming; also wallflower and alpine wallflower, to a small extent. Our tortoise has foolishly emerged from a covering of leaves and earth at the foot of a bending wall just where it faces south-west—the spot it selected to lay up in.

20th.—Frosty for a few days.

28th.—Winter aconite in full bloom.

Mr. H. G. Thomson reports Wild Ducks, Wigeon, and Teal, plentiful this winter on Otmoor, owing to large floods. But wildfowl are not so plentiful there as in former years. Mr. Surman received a Cormorant from the neighbourhood of Witney this month; and he tells me he had one from Headington Quarry in the winter of 1896-7.

The following fragments of the history of two birds once found commonly in Oxfordshire may be worth preserving.

When I was at Kingham, in 1892, I interviewed Mr. Tom Phipps, aged sixty-three, who had been postboy and postman for fifty years. He had an excellent and accurate memory, was fond of recalling the former condition of Kingham parish (then

much more wooded than it is now), and of birds and beasts. About thirty years before 1892, Tom Barnes (nephew of John Barnes, the old keeper, who would have been then over ninety if living), who afterwards went to New Zealand, saw a Kite feeding on a Crow in Bruern Wood, but failed to shoot it for Phipps. I wish now that he had succeeded, for Phipps would without doubt have preserved it to this day. This was the last that either of them heard of the Kite. But Phipps's father took a Kite's nest in Bledington Heath Wood, probably eighty years earlier, for it was when he was a boy or young man, and he would have been over a hundred years old if living then.

Mr. R. W. Calvertt was told, in 1897, by one Curtiss, of Charlbury, former gardener to the late Dowager Lady Churchill, at the Ranger's Lodge, Wychwood Forest, that Kites were quite common down to about the year 1850. Although he never took any interest in birds, yet he knew the Kite and its forked tail.

It was about fifty years since Tom Phipps saw a Raven. He was, as a little boy (of ten or twelve), "leasing" in a field on the Churchill side of Kingham, when a bird, looking like a great Crow, flew over, calling, in a deep hoarse low voice, "cork cork corrk," and the women in the field looked up and said: "Look at the Raven; there will be sure to be someone die at Kingham, for he is calling 'corpse corpse corpse.'"

Mr. George Wise told me, in 1891, that about fifty years earlier, he went with his father up to Tusmore Park in a donkey cart. While they were inspecting some sheep in a pen, a pair of "great old Ravens" came out of Tusmore Wood, and flew over the pen. They were the last he ever saw. They were, he said, bigger than Gor Crows. Mr. Wise is noted for a wonderfully good memory. He does not know the Kite, which, owing to the lack of woods, probably became extinct in this district long before it died out in the wooded parts of Oxon. But years ago I have heard ploughboys speak of the "Kite-Hawk," bestowing the name on the Sparrow-Hawk. And in the same way Mr. Wise speaks of the "Buzzard Hawk" and Sparrow Hawk, when he means the Sparrow-Hawk and Kestrel. The names, in fact, survive long after any recollection or tradition of the birds they really belong to. I once heard a man call a large female Sparrow Hawk a "Hare Harrier." The 'Hawk and

Partridge' inn, at Bloxham, has a very old signboard, painted many years ago (sixty or seventy, at least, as far as I can ascertain). It represents a very large Hawk striking at a fat Partridge standing placidly in the middle of a field. A very old keeper once described Harriers to me most accurately, and he called them "Partridge Hawks" (*vide* 'Birds of Oxon,' p. 34).

ON THE MOULT AND COLOUR CHANGES OF
THE CORNCRAKE (*CREX PRATENSIS*).

BY J. L. BONHOTE.

HAVING for several years successfully kept, and on one occasion* bred, the Corncrake (*Crex pratensis*) in confinement, and having also had several wild caught specimens through my hands during the same period, the following results of my observations on the moult and colour change of this species may prove of some interest. In common with many other birds, the Corncrake has two moults in the year, the chief one taking place in July and August, as soon as the breeding season is over, and involving a change of *every* feather; the other taking place in February, while they are still in their winter quarters, and involving a change of all the feathers except the tail and wing quills. In the autumn moult the primaries and secondaries in both sexes are thrown off *simultaneously*, and for about ten days the birds are totally incapable of flight. On two occasions I have had wild birds brought in which had been captured when in this condition.

The males can be easily distinguished from the females during the *summer* months, as the breast, neck, and sides of the head are during that time of a delicate slaty grey colour. The plumage of the female hardly differs throughout the year.

At the autumn moult, however, the males lose the slate-colour on the breast and neck, and assume a plumage similar to that of the females.

The plumage assumed after the spring moult is *precisely similar* in both sexes to that which has just been discarded; in the male, however, the feathers on the breast and head, *as soon as they are fully grown*, begin to assume, by a change of colour, the bluish tinge of the breeding-season dress, and, as summer

* See Zool., 5th ser., vol. i., p. 35.

advances, the edgings of these feathers in both sexes wear off by abrasion.

A change somewhat similar to this is found in the Great Northern Diver (*Colymbus glacialis*), and probably in other species as well. It is comparatively difficult to procure an individual of *C. glacialis* in full winter plumage (as described by Mr. Cecil Smith in his 'Birds of Somerset,' p. 540), which resembles somewhat that of the immature birds; for as soon as the feather is formed, or even while growing, it commences, by a change of colour in the feather itself, to assume the distinguishing features of the breeding plumage for the following year; it is therefore possible to find in the same individual worn feathers of last year's breeding-dress, new feathers that have not yet changed but are of a uniform bluish grey, and those which have already by change of colour assumed the white spots and dark ground of the next year's breeding dress.

Returning to the Corncrake, the similarity of the moult in both sexes, with the subsequent although practically simultaneous assumption of the breeding plumage by the male, tends to show that, in this instance, the reason of the moult is not for the assumption of the breeding dress, for in that case it ought only to be undergone by the male. The evidence before us seems to point to the fact that the moult has no connection with the colour-change, but is due to some ulterior cause of which we are at present ignorant.

The method by which this change of colour is brought about is very hard to determine, but the following notes of a microscopical examination of feathers in process of change, taken from a living bird a few minutes before examination, may be of interest.

If a feather be taken which is fully grown and in process of changing, and be microscopically examined by transmitted light, with a low power of about 66 diameters (with a higher power it was difficult to get satisfactory results by reflected light), we find that, whether the part of the feather be blue or brown, there is absolutely no difference in the arrangement of the rami or radii, and that both are opaque and show no colour. If these same parts be then examined by reflected light, the brownish part appears dull, the rami and radii being both of a light-brown

colour, but the radii considerably darker ; the rami on the bluish part appear bright and of a whitish colour, while the radii are clear and apparently colourless.

Lastly, we may briefly consider the order in which the feathers come on the nestling. The first feathers show themselves when the bird is about three days old, and are those which immediately surround the ear, about six in number on each side. Next come the two ventral tracts, beginning at their lower end and gradually stretching up the neck. These are followed by the scapulars and tracts over the thighs, which in turn are almost immediately followed by the dorsal tract. This tract arises simultaneously over the greater part of its length, and then spreads both upwards and downwards. The remainder of the small feathers on the head, legs, and vent are the next to grow, and finally, after a short interval, the primaries, secondaries, and tail quills, followed by their coverts.

The young birds are able to fly about seven weeks after hatching ; they are similar in plumage to the female, but the brown edgings to the feathers of the back are much broader ; they do not moult till the following February, when they assume the adult dress in a similar manner to their parents.

STRAY NOTES ON MIMICRY.

BY CHARLES A. WITCHELL.

PROF. NEWTON'S limitation of mimicry to the status of unconscious resemblance (*cf.* Zool. 1899, p. 529) is in accord with that prevailing tone of thought which denies to the lower animals the power of abstract reasoning so constantly evident in man. I hope that Mr. Distant will not conclude his highly interesting treatment of the mimetic faculty without some reference to vocal mimicry,* for this demonstrates (as it would seem, beyond dispute) the occurrence of a desire on the part of certain animals to do something that another animal is doing or has done, solely for the purpose of mimicking it. The Parrot is a common instance; but the Starling is, I think, a better one, since the *studies* of the latter bird are purely voluntary, and have no possible reference to the furnishing of a supply of food by a human owner. The Sedge-Warbler, with its construction of novel strains by the repetition of some notes of other birds in a set order, is another instance of a bird exhibiting a voluntarily exercised mimetic faculty. If a bird's mimicry is unconscious, then all its other actions may be unconscious, and the creature an automaton, which is absurd, except on the hypothesis that man also is one. But we must not hastily assume that similarity of action indicates mimicry; it may suggest inheritance as the governing factor. Take the case of the hissing of nesting birds. The hissing of these birds seems generally to be the ultimate expression of hate and rage,† and to have no intended reference or similarity to that great enemy of the nest—the snake; for a bird will hiss when on the nest, and at no other time, and which has yet never seen a snake, or, apparently, never heard a hiss: such is a town-bred fowl or duck. The Blue Tit, again, hisses

* This has been referred to. *Cf.* Zool. 1889, p. 476.—Ed.

I have everywhere noticed that in expressing rage birds tend to revert to generic cries. Young children, in the same mental trouble, perform some Monkey-like actions, and utter cries like those of Monkeys.

on the nest ; but, so far as I can ascertain, this bird has never yet been heard to mimic the note of even another genus, and still less would it be likely to reproduce the note of a reptile, and a note which probably it had never once heard. For Snakes do not hiss, as birds sing, for amusement or occupation. Probably they never hiss at all, except in combat. This is at least true of the Common Snake (*natrix*), and the Viper (*berus*), both of which I have had (numbers of them) in captivity. The Common Snake, even when the sexes unite, utters no audible vocal sound, and, when angry with another of its species, it only shakes or rattles its tail a little ; and the Viper seems to be equally silent. Both of these animals make much more noise by their rustling through herbage than by their vocal efforts, except on the special occasion of combat. I have seen the Common Snake feed, say, a thousand times, and never heard a hiss from it then, though sometimes there would be a slight expulsion of air, causing a sound like a little coughing, while a Newt or fish was being swallowed. The Blue Tit must therefore be as ignorant as a cockney fowl, so far as the hissing of Snakes is concerned.

The hissing of birds would therefore seem to be an inherited expression of rage, derived from a very remote ancestry.

With regard to butterflies perching in positions where they are inconspicuous (Zool. 1899, p. 230), I have often observed that the Common Blues are fond of sleeping not only on grass-stems (as recorded by Mr. Cornish), but also on the dead and dry seed-heads of plants, on which they are not noticeable. I have a note of once finding quite a number of Blues (eight or nine ; the MS. is not with me) sleeping at evening on one small dead flower-head, which they would never have noticed in the sunny hours of day.

A Peacock Butterfly (*Vanessa io*) that lived one summer in a garden where I was at Stroud, spent the day at one side of the garden amongst the flowers, and at evening, or when the weather darkened, it entered the shelter of an upper branch on the shady side of a cypress tree on the other side of the garden, and amongst the black stems the insect was wholly invisible. At other times it never alighted on a cypress. The Peacock does not always choose such a dormitory. I have generally found it prefer the overhanging ledges of banks. The Red Admiral (*V. atalanta*) I

have seen retire to the branch of a beech tree at evening, and in this case also the colour of the insect in repose was similar to that of its support.

At Ceres, South Africa, I noticed that some of the grass insects, looking like bits of grass (they were seen in March), always alighted on the stems in such a way that they seemed to form part of the plant; they never posed at right angles to the stems, in which case they would have been less obscured by their environment.

I have observed two instances of what seemed to be an accurate idea of the advantage of similarity of colouring in relation to a bird and its environment. On a warm day in winter I noticed a curious Robin-like bird in a hedge, and tried to identify it by means of the telescope; but it kept its back toward me, and this was practically inconspicuous in the hedge. The bird was quite at ease, for it occasionally flew to the ground or elsewhere to catch an insect. Soon it was clear that the bird did not wish me to see its breast. At last, after quite a quarter-hour of following and circling round it (in the most careful manner), I saw the bird's breast, and was able to identify a female Stonechat. I do not suggest that it wished to be mistaken for a Robin, but that it knew that its back, in that situation, was less noticeable than the breast, though this had sober colouring.

The other instance was much more definite and conclusive. In the garden at Stroud, in winter, we fed the birds on a small grass-plot near the house, from which a bank sloped up into the shade of two yew trees. The Thrushes, when disturbed feeding, generally ran up this bank or flew up into the trees, which spread at some six feet above the ground. One day, going out with food, I noticed a wounded Thrush which had been feeding there for some days. It ran a little way up the bank, and I carefully avoided alarming it. It only ran half-way up the bank, and then squatted down in a little hollow; not with its back toward me, but with its breast to me, and with the head raised considerably, so that the beak was almost vertical. The speckled breast and under side of the neck were practically all of it that I could see, and they were of so much the colour of the surrounding rubbly soil that for a moment I could not discover the bird when I looked for it. The tail, I could see, was pressed quite against

the steep bank, so that the bird was not in a very comfortable posture. The Thrush does not habitually turn its breast toward an observer, and in this case the reason for the behaviour of the bird hardly needs arguing. I was certainly not more than twelve feet from it.

With regard to physical mimicry generally, I would suggest (at the risk of ridicule) that there may be some occult influence causing animals to resemble things that they like, be those things mates or surrounding substances. I am aware that the sexual passion is not credited with this effect, but we know that breeders of prize poultry are careful to keep their male birds from running with birds not of the same variety, because if they do they will "throw" feathers like those of their companions. I have seen this occur in a well-bred East Indian drake that ran with a white Duck, and in a Black Hamburgh that ran with other fowls.

I have also noticed some curious evidence among people. A man who went to a colony early in life, and had control of many people of colour, and who would not be likely to be particular, afterwards married an exceedingly good-looking and quite strong Englishwoman. The first child, a son, was very like a black in all except colour, and yet he resembled his father. The next child had only a faint trace of the same odd resemblance, and the younger children were distinctly handsome. One has quite a reputation for good looks.

I am aware that this suggestion is not scientific, but if a bird throws unusual feathers after having shown a partiality for a strange bird, why should it not throw an unusual feather when it finds that a certain tree or a stone saves it from a Hawk? The dread of an enemy is a more constant sentiment than the love for a mate.

The so-called feigning of death seems to me to have no relation to mimicry, but to an exaggeration of that stillness which so many animals adopt to avoid observation. This stillness may often be seen to be directly proportionate to the imminence of the danger threatened. I used to witness a very clear demonstration of this in the Stickleback (*Gasterosteus leiurus*). When suddenly alarmed these fishes held themselves curved, the more readily to dart away; but they seemed unable to remain in this position long, and yet they would then retreat not by a slow movement, but by

sudden darts alternated with periods of stillness, as though they well knew that in movement they were the more visible, and that quick movement was the least likely to be detected. The usual mode of escaping notice when approached slowly is to remain still, lying straight. If the danger be not pressing, the fins and tail are still moved a little, in the customary way; but on the threat of greater peril these members are held motionless; and in still greater danger even the movement of the gills in respiration is so restricted as hardly to be visible, even from the distance of a foot. These gradations of stillness are successively adopted even though the aggressor be but another Stickleback; and this especially occurs when a female fish is hoping to escape the notice of an approaching pugnacious male.

The Viviparous Lizard (*Lacerta vivipara*), wild or tame, has a similar appreciation of stillness, and of the advantage of rapid movement in retreat; and this reptile, like the fish, will refrain from breathing in order to escape detection. I have had perhaps hundreds of these reptiles in captivity, and have often crept up to them while they basked on their native banks, and watched their movements. The movement of the lungs in breathing is very apparent at the shoulders.

I have seen the feigning of death by two Ringed Snakes (*Tropidonotus natrix*) only out of a hundred or more handled. These were the only two I ever recaptured after liberation—one after a fortnight's liberty in the garden, and the other after nine months' freedom in his native haunt. These, on recapture, behaved in the same manner. The whole reptile became utterly limp; the tongue protruded, and the filaments at the end united (as they never are in life), and there was no hissing or apparent breathing. I never saw a Lizard feign death, nor any Batrachian.

NOTES AND QUERIES.

AVES.

Black Redstart at Brighton.—On Dec. 11th I noticed a Black Redstart (*Ruticilla titys*) clinging to the wall behind our hospital. It remained about Kemp Town the next few days, as I saw it several times before being shot and preserved to establish the fact of its occurrence. It is a nice bird, with good feathers, very little worn.—CHARLES H. BRYANT (Sussex County Hospital, Brighton).

P.S.—I have seen this morning (Dec. 18th) another Black Redstart, probably a companion of the one I secured.—C. H. B.

“Chiffchaff building on the top of small Yew and Box Trees.”
Correction.—In my note on the nesting of the Chiffchaff and Willow-Wren in ‘The Zoologist,’ December, 1899, p. 556, please read “the Chiffchaff with us always breeds *off* the ground” instead of “*on* the ground.”—H. NOBLE (Temple Combe, Henley-on-Thames).

Rose-coloured Starling in Co. Mayo.—On the 5th of last November a fine specimen of this rare visitor (*Pastor roseus*) to Ireland was shot by Mr. James A. Knox, at Belgariff House, near Foxford, as it was feeding by itself on the lawn. It was not in very good plumage, for some feathers on the back of its neck were not fully grown, nor had the long tail-feathers attained their full length. This is the third specimen obtained in Ireland this year. Mr. D. C. Campbell, of Londonderry, noticing, in the August number of the ‘Irish Naturalist,’ 1898, a specimen having been procured on June 9th by Mr. John Hunter near Inch in that county, and Mr. Williams, of Dublin, in the ‘Irish Naturalist’ for October, 1898, records the capture of a specimen on July 20th by Mr. A. Brooke in his garden near Killybegs, Co. Donegal.—ROBERT WARREN (Moyview, Ballina).

The Rook (*Corvus frugilegus*) in Scotland.—It is well known that this species has been prominently under notice for some time, and it is believed that the birds have increased greatly within the last few years, and as a consequence that much mischief was being done to crops by them. By some at least the fact of their great economic value in eating up many pests seemed to be practically lost sight of. An article appeared in the ‘Transactions’ of the Highland Agricultural Society, by which it was demon-

strated that the Rooks which were examined were practically living by marauding grain instead of eating up noxious grubs, insects, &c. All this led to various movements for destroying a portion of these birds in various parts of the kingdom. Shooting parties went to the rookeries for many hours, keeping up one continuous fusillade both by night and day, not only to kill the greatest number, but also to keep the birds as much as possible off their nests, so as to addle the eggs or destroy the young as the case might be. The result of this is that very many were destroyed, and a sensible reduction in number has taken place. But a certain change in the habits of these birds has been observed. They have during last spring attacked the nests of Grouse and other game, and pilfered the eggs for food, this being due, it has been supposed, to the annoyance which they have endured about their rookeries. This system of destroying them therefore requires to be considered, if we do not wish to make the bird a more mischievous one than previously. Another point of general interest to ornithologists has been brought out here by Mr. Turnbull, B.Sc., who has examined dead Rooks where a rookery was being "cleared out," and found grubs and wireworms in the birds when dissected shortly after they were killed, but grain only in those examined a day or two after being destroyed, his contention being that digestion went on after death, and that this accounted for little but grain being found in those the subject of the Highland Agricultural Society's article. Thus digestion after death is worthy of attention, and tends to bring out the views most commonly held on the food of the Rook. Those forwarded to the Highland Agricultural Society were driven by rail to Edinburgh from Montrane, and time must have elapsed before they were examined.—WM. WILSON (Alford, Aberdeen).

Serrated Claws of the Common Heron.—On reading the description of the Common Heron (*Ardea cinerea*) given by Mr. Howard Saunders in his 'Manual of British Birds,' I was rather disappointed to find that he does not make mention of the serrated claws of this species, as I had hoped to gather some knowledge as to their probable use. On examining a specimen shot here a few weeks ago I find the serration is extremely similar to that of the Nightjar, situated upon the claws of the same toes, and pointing inwardly. I do not think they could be of the least use to the owner for holding or securing food, nor would they retard the bird's flight from branches of trees, &c., as the serration is not on the under part of the claw. I am of opinion that the Nightjar has a decided use for its serrated claws, and I should be pleased if ornithologists would enlighten me by giving their observations or opinions as to the use of these claws in the Common Heron.—STANLEY LEWIS (Wells, Somerset).

[Serrated claws are described in most of the handbooks where *structure*

is dealt with. Prof. Newton, in his 'Dictionary,' writes:—"The inner side of the nail of the third toe is often serrated like a fine comb, as in Cormorants, Herons (including Scopus), Ibis, Dromas, Cursorius, Glareola, also in many Nightjars." Dr. Bowdler Sharpe ('Handb. Birds Great Britain') has also referred to the combed or pectinated claw of the Heron, like the claw of the Barn-Owl or of the Nightjar. This ornithologist (*ibid.* vol. ii. p. 49) has discussed the use of this serration. He writes:—"Another puzzling character found in the Nightjar is the pectinated claw on the middle toe, and it is extremely difficult to imagine the use of this comb-like appendage. It has been suggested that it is of use to the bird in retaining a firm hold on the bark of the trees, when it sits along a bough. Another use for the comb has been suggested in the cleaning of the long rectal bristles from the *débris* of the moths and beetles on which the bird feeds. Dr. Günther, who had some young Nightjars for some time in confinement, tells me that the only use which he found the birds to make of this pectinated claw was to scratch the surface of a chair or sofa on which they were sitting. Thus it may be a useful appendage in scratching or distributing the earth for the purpose of seeking its food." Seebohm ('Brit. Birds') refers to the same or similar theories.—ED.]

Bewick's Swan in the Moy Estuary.—On Dec. 12th, 1899, a herd of twenty Bewick's Swans (*Cygnus bewicki*) visited the estuary, and rested for some hours on the Bartragh sands, opposite Moyne Abbey. One fine bird was secured; it measured 3 ft. 9 in. in length from tip of bill to end of tail-feathers, and weighed 14 lbs. All the birds appeared to be adult, for there were no grey-plumaged individuals amongst them.—ROBERT WARREN (Moyview, Ballina).

Black-game in Suffolk.—Referring to my note under this heading in 'The Zoologist' (1899, p. 557), I have just received a letter from J. D. Cobbold, Esq., Holy Wells, Ipswich, stating that he had lately turned down about twenty of these birds (*Tetrao tetrix*) on the heath to the east of Ipswich as an experiment. There is no doubt therefore that the young Blackcock shot on the Cliff Farm was one of them, and it is to be hoped now that the facts of the case are known that the remainder of these grand birds will be left unmolested until they have become thoroughly established in the district.—E. A. BUTLER (Plumton House, Bury St. Edmunds).

For many years Mr. Mackenzie has turned down large numbers of Black-game on his estate near Thetford. They have been known to breed, but do not increase. Possibly the bird mentioned by Col. Butler came from this estate. It may interest your readers to know that the same gentleman has turned Capercaillie on his property near Inverness, and that they are doing well.—HEATLEY NOBLE (Temple Combe, Henley-on-Thames).

Golden Plover and Lapwings in the Moy Estuary.—The Golden Plover (*Charadrius pluvialis*) did not visit the sands of the estuary in any numbers until the middle and towards the end of October, after which time they began to increase up to the 24th, when I saw fully two thousand birds in one large stand resting on the Scurmore sands; and since then they have continued to haunt the banks in probably large numbers, for they now have separated into two large flocks, one haunting the Moyne, and the other the Scurmore sands. The Lapwings (*Vanellus vulgaris*) appeared about the banks in their average numbers up to Nov. 20th, when they visited the sands in immense flocks, more numerous than in any year since 1878 (the "great Lapwing year"). On the morning of the 20th Mr. A. C. Kirkwood, of Bartragh, at daybreak, saw an immense flock at a great height coming from a northerly direction over the bay. On reaching the island they did not alight, but kept flying about for nearly an hour, when they lowered their flight, and pitched on the Bartragh sands opposite Moyne Abbey. To give some idea of the immense numbers of the birds about, I may mention that at the time they settled down near Moyne, equally large flocks were farther up the estuary, on the Scurmore and Castleconnor sands, and a fourth large flock was resting on the banks outside the island next the bay. Most of the birds were evidently strangers, distrusting their new quarters, and so restless and easily alarmed that it was impossible to get within shot of any of the large stands. Mr. Kirkwood was out all day with his punt and gun, and was unable to come within range of any, except a few scattered birds. I was out all day on the 21st, and was equally unsuccessful. I never met Lapwings so wild, so utterly unlike their usual unsuspecting habits on the approach of a punt. I was out again on the 22nd, and, although the birds actually swarmed on the Moyne, Bartragh, Scurmore, and Castleconnor sands, yet I was unable to get near the large flocks, only a few scattered birds allowing my punt within range. It is impossible to account for this extreme wildness of the Lapwings; the fine weather could not be the cause, for some of my best days' Plover shooting on the estuary were on mild calm days, when, owing to the mildness of the weather, the birds used to assemble on the sands at the edge of the channels to wash and bathe, and remain until driven off by the rising tide. It will be interesting to know whether a similar large influx of the birds has taken place in other parts of the country, and I trust that some of your correspondents will mention if such has come under their notice.—ROBERT WARREN (Moyview, Ballina).

PISCES.

Blue Sharks in Killala Bay, Co. Mayo.—One day towards the end of last October, as Capt. Kirkwood, of Bartragh, was walking along the sands

at the western end of the island, he found a large Blue Shark (*Charcarias glaucus*) thrown up by the surf at high-water mark. The fish was dead, but quite fresh, and was one of the largest I have ever heard of on the Irish coast, measuring between nine and ten feet in length. Another specimen of this Shark was taken in the estuary about Nov. 22nd by two persons who were out wildfowl shooting amongst the islands of the estuary. Hearing a splashing in the water some distance astern of their boat they turned, and, rowing up to where the noise proceeded from, found the fish aground, floundering in the shallow water, unable to swim away. Killing it with a couple of shots, they with great difficulty got it on board the boat, as it measured about eight feet in length, and was very heavy. — ROBERT WARREN (Moyview, Ballina).

NOTICES OF NEW BOOKS.

An Account of the Deep-Sea Brachyura, and a Descriptive Catalogue of the Indian Deep-Sea Fishes collected by the Royal Indian Marine Survey Ship 'Investigator.' By A. ALCOCK, M.B., C.M.Z.S., &c. Calcutta: Printed by order of the Trustees of the Indian Museum.

BOTH these publications relate to the good work done on board the 'Investigator,' a small paddle-steamer of 580 tons, which since 1885 has yearly contributed the results of deep-sea dredgings to the Indian Museum.

The Brachyura number fifty-three species belonging to thirty-eight genera, and, with two exceptions, have all been obtained from depths of over one hundred fathoms. Although the list furnishes no "theory of geographical distribution," yet Dr. Alcock remarks:—"If, however, we regard genera and not species, the list discloses some suggestive affinities between the Brachyuran fauna of these seas and of certain parts of the Atlantic area. These affinities may, of course, be taken as merely confirmatory of current views as to the unity of the deep-sea fauna; but seeing that the Brachyura are not generally considered to belong to the true deep-sea (abyssal) fauna, I think it equally probable that they may afford evidence of a former open connection between the seas in question." The species are very fully described, and the memoir is enriched by four good plates.

The fishes included in the 'Catalogue' were all dredged by the 'Investigator' in deep water, and, excluding a few mangled remains which cannot be identified, number one hundred and sixty-nine species. They were obtained between the meridians of 65° and 99° E., and the parallels of 5° and 24° N., while no fewer than one hundred and twenty-six species "have, so far as is known, been taken only by the 'Investigator.'"

The views of Dr. Günther as to a former direct and open

connection between the Mediterranean and Japanese Seas are supported by Dr. Alcock, who considers that the "hypothesis that appears to offer the most satisfactory explanation is, that a very considerable part of the fish fauna of the Oriental region originated from, and to a certain extent is a remnant of, the fauna of the Tertiary Mediterranean of Prof. Suess—of a Mediterranean that extended from the present Gulf of Mexico, through the present Mediterranean basin, far into the Eastern Hemisphere." Species whose distribution may be used as evidence for this hypothesis are not only pointed out among these fishes, but also have been detailed by Dr. Alcock among the deep-sea Madreporaria and Brachyura of the same region. If the number of Indian genera of marine fishes are estimated at three hundred and fifty, and of species at one thousand two hundred; "then over fifty-six per cent. of the genera and close on five per cent. of the species are also found in the Atlantic-Mediterranean region." The argument is much advanced and clearly elucidated by a large chart compiled from Plate 11 of Dr. E. Koken's 'Die Vorwelt und ihre Entwicklungsgeschichte,' showing the supposed coast-lines of the Tertiary continents and the then Great Inland Sea.

The Rainbow Trout. By CHARLES EDWARD WALKER and CHARLES S. PATTERSON. Lawrence & Bullen, Limited.

THE Rainbow Trout (*Salmo irideus* var. *Shasta*), whose natural home is the Pacific slope rivers, has been largely introduced into the waters of various portions of the world. It has succeeded wonderfully well in New Zealand, where specimens have been taken reaching nine pounds in weight; in this country one of the first authentic reports of its colonization was a capture in Warwickshire in 1892 from a lake stocked in 1890. But success in the introduction of this fish depends upon a proper knowledge of its life-history. "The natural zone of the Rainbow Trout may be roughly said to be from 35° to 45° N.—that is to say, the latitude of Spain and the South of France"; and the best developed form of the true *S. irideus* var. *Shasta* "has for its original environment water not liable to freeze, and situated in a country the mean temperature of which is not below 55° F., and

usually about 57°." Hence the Rainbow is doomed if placed in cold waters, escaping from them if possible, but if not, gradually dying off. "Probably it will never stand a chance north of Yorkshire, even if it should do well in selected waters in that county."

A bad report is given for Herons and Kingfishers who exist near rearing ponds. We read:—"I have often seen Herons fishing on Trout streams, and have seen Kingfishers catching Trout fry. There are only two courses open to the fish-culturist, to protect his ponds or kill the birds. I believe it best to protect the ponds first, and kill the birds afterwards."

This is an excellent little monograph of a fish, with directions for its acclimatization and breeding. It is thorough and yet concise, occupying but sixty-four pages, with a bibliography and sufficient illustration.

Our Rarer British Breeding Birds. By R. KEARTON, F.Z.S.
Cassell & Co., Limited.

WE now quite expect an annual volume from Mr. Kearton, with fresh revelations by the camera, for he knows not only how to photograph, but what to photograph. This little volume, we are told, is to be regarded as a supplement to a former work on "British Birds" Nests, &c.; and we scarcely require to be reminded that the journeying to and fro to photograph the nests, eggs, or breeding-places of our rarer birds entails an inroad on time and space which is far from being inconsiderable.

These volumes can be made to advocate a main thesis—the photographer rather than the collector, the camera *versus* the gun. By the aid of these illustrations, we live with the birds and see the nests *in situ*. We do not come home with a skin and a few blown eggs, but bring back nature in our portfolio. When colour photography comes into the possession of science, then indeed shall we estimate what is really assimilative colouration in nature, and not have to rely on forensic argument based on cabinet specimens. By the aid of the camera we shall in the future understand the superficial method of organic evolution, and when we are able to photograph aquatic life well beneath the surface, in colour as well as detail—which is only a matter of

time, though probably not in our own personal period—then will many brilliant theorists see the hidden things made bare. Meanwhile, as we turn over these beautiful illustrations, many questions arise as to the success in subterfuge, or the apparent absence of concealment in the arrangement of eggs and nests. Here we may rely on the whole *mise en scène*, for as we remember hearing Boucicault declaim in the ‘Octoroon’—alas! too many years ago—“the apparatus never lies.”

The present volume is equal to its predecessors in illustration, but perhaps compares less favourably by absence of narrative, the treatment being more descriptive of the birds and nests themselves. The representation of the Dabchick’s nest—covered and uncovered—at p. 39 well exhibits the conscious strategy of a bird.

Die Fledermäuse des Berliner Museums für Naturkunde : 1 Lieferung, Die Megachiroptera. By PAUL MATSCHIE. Berlin : Georg Reimer.

NATURALISTS will welcome a new catalogue of the Chiroptera, the late Dr. Dobson’s catalogue of the Bats published in 1878, naturally now requiring great revision and many additions. The inception of the present work appears to be as follows. The late Prof. Carl Peters, who presided at the Berlin Museum from 1857 to 1883, proposed to publish a monograph of the Bats, for which no fewer than seventy-five plates were prepared by the artists, F. Wagner and G. Mützel. After the death of Prof. Peters these plates remained—without text—in the hands of the publisher, and Dr. Matschie has stepped into the breach, and will provide from his own pen a descriptive synopsis of the whole order, while such additional plates will be given as are necessary to bring the work into line with present zoological knowledge.

Part I. is devoted to the Megachiroptera, or Fruit Bats, and the whole work is intended to be completed in four instalments.

We hope to give a fuller notice on the completion of the work.

EDITORIAL GLEANINGS.

THE Address delivered by the President, Dr. A. Günther, at the last Anniversary Meeting of the Linnean Society of London, refers to and describes the "Fishes from Linné's private collection, many of which have served as types or cotypes for the species enumerated in the 'Systema Naturæ,' and which have never been catalogued." We learn that the collection consists now entirely of dried half-skins of fish either loose or mounted on folio sheets of paper; many have been fixed on cardboards, but this was done at a comparatively recent period. This method of preserving fish, like specimens of a *hortus siccus*, seems to have been first employed by Johann Friederich Gronow,* who described it in the 'Philosophical Transactions,' and whose collection of similarly prepared skins is still preserved in the Natural History Museum.

"We are informed by Sir J. E. Smith himself † that Linné's private collection contained, at the time of its purchase, 158 specimens of dried fish-skins, beside some in spirits. These latter were not kept by Smith; perhaps he did not sufficiently care for them to have them sent over from Sweden with the other parts of the collection." Dr. Günther makes the number of specimens at present in the Society's possession to be rather higher, *viz.* 168, the discrepancy being probably due to the circumstance that when two small specimens of the same species were mounted on the same sheet of paper they were counted as one by the person who prepared the original inventory. At any rate there is no evidence which might lead one to suspect that any of the specimens have been lost since they came into the possession of the Society.

The collection was kept for a great many years in one of Linné's own cabinets, which, however well it may have answered its purpose in the pure air of Linné's residence, is quite unsuitable in the dust-laden atmosphere of Piccadilly; and the wonder is, how little the specimens have suffered under the accumulation of matter in the wrong place. In order to render them more secure in the future, the Council has ordered them to be transferred to dust-proof glass-topped boxes, in which they are so arranged that,

* "A Method of preparing Specimens of Fish by drying their Skins as practised by John Frederick Gronovius, M.D., at Leyden" ('Philos. Trans.' vol. xlii. 1744, p. 57).

† 'Mem. and Corresp. of the late Sir J. E. Smith,' vol. i. p. 114.

with the aid of an exhaustive catalogue appended to the Address, every specimen can be found without difficulty.

“ In looking over the specimens one is at once struck by the fact that the sources whence Linné obtained his fishes were but few in number, and therefore that his private collection represents only a fraction of the materials upon which his work on the fishes in the ‘*Systema Naturæ*’ is based. His own specimens belonged to three faunæ only, and form, in fact, three distinct sets, *viz.* :—

“ 1. Scandinavian species.

“ 2. A series of German, chiefly fresh-water, fishes.

“ 3. The fishes collected for him by Dr. Alexander Garden in South Carolina.”

THE Fishes of the Firth of Forth and its Tributaries were till quite recently detailed alone in Dr. Parnell's List, published in 1838. In this month's ‘*Annals of Scottish Natural History*,’ Mr. Wm. Eagle Clarke has added the species found and recorded since that time. Parnell's List included 112 species—as we now know them—and Mr. Eagle Clarke's contribution adds twenty-eight, making a grand total of 140 species to date.

AT a meeting of the Zoological Society on Dec. 19th last, on behalf of Mr. G. S. Mackenzie, F.Z.S., a photograph was exhibited of two remarkably large tusks of the African Elephant. They each measured, on the outside curve, 10 ft. 4 in. in length, and weighed respectively 235 lbs. and 225 lbs. These have since been illustrated in the ‘*Field*’ of Jan. 6th last.

WE are glad to see that the number of our local Natural History Societies has been increased by the formation of the “*Hampstead Astronomical and Scientific Society*,” for the encouragement of a popular interest in the practical study of astronomy, geology, microscopical research, zoology, and other branches of science. During the summer months field meetings will be organised. The Hon. Secretary is Mr. Basil W. Martin, 7, Holly Place, Hampstead, N.W.

A WELL-KNOWN traveller and naturalist has passed away in the person of Mr. E. L. Layard, who died on New Year's Day at his residence at Otterbourne, Budleigh Salterton, Devon. He was a sojourner in many lands, and interested himself in the natural history of all he visited. He will be best remembered in South Africa, where he founded the South African Museum at Cape Town, and collected the material for his well-known work on the ‘*Birds of South Africa*,’ of which there is now an

enlarged "Sharpe's" edition. Ceylon, New Zealand, Para on the Amazon, Fiji, and New Caledonia were the scenes of other governmental appointments, which covered a term of forty-seven years. He was an old and valued contributor to our contemporary the 'Field.'

IN 'Nature' for Dec. 28th last is a most useful article on "Formalin as a preservative" under the easily recognised initials "R. L." We read that "for sterilising freshly killed specimens of mammals and birds, as well as eggs, that have to be sent some distance to a museum in the flesh, there can be no doubt that formalin is invaluable. And it is no less valuable to the field collector of mammals, not only on account of the small bulk a sufficiency of the fluid occupies, but also from the marvellous preservative power of the fluid itself. According to Mr. O. Thomas (who reports very favourably of it for this purpose), commercial formalin, which is itself 40 per cent. under proof, must be diluted with no less than twenty-five times its own bulk of water before use. Moreover, whereas when mammals are preserved in spirit it is necessary to allow a very large amount of fluid to each specimen, when formalin is employed the vessel may be crammed as full as possible with specimens, which are preserved without exhibiting the slightest traces of putrefaction. When received at the British Museum all such specimens are, however, immediately transferred to alcohol, on account of their unsuitability for handling when in the original medium."

A LARGE egg of *Æpyornis maximus* was sold at auction by Messrs. Stevens on November 7th for forty-two guineas. The purchaser was Mr. T. G. Middlebrook, of Great Auk-egg notoriety.

THE late Sir James Paget, who died in London on Dec. 30th last at the age of eighty-five, beyond his renown as a surgeon, must be remembered as a naturalist. In 1834, with the assistance of his brother Charles, he published 'A Sketch of the Natural History of Yarmouth and its Neighbourhood, containing Catalogues of the Species of Mammals, Birds, Reptiles, Fishes, Insects, and Plants at present known.' Our readers will call to mind frequent reference to the same in recent communications in these pages by Mr. A. Patterson.

NEWS has reached this country of the death of America's great ornithologist, Dr. Elliott Coues, which took place at Baltimore, U.S.A., on Christmas Day. We hope to publish an obituary notice very shortly.



FIG. 1.



FIG. 2.—Foetus.



FIG. 3.—Newly born (about life-size),
and nipple.

MACROPUS GIGANTEUS.

THE ZOOLOGIST

No. 704.—February, 1900.

“HOW DOES THE NEW-BORN KANGAROO GET INTO THE MOTHER'S POUCH?”

BY D. LE SOUËF, C.M.Z.S., &c.; Asst. Dir. Zoological Gardens, Melbourne.

PLATE I.

HAVING seen an article under the above heading in a recent number of 'The Zoologist' (1899, p. 368), in which it was stated that there is evidently much confusion on this interesting question, I thought it would be a help to state what has been observed in a wild specimen of the Grey Kangaroo (*Macropus giganteus*). When the young one is ready to be born, the mother sits down on the ground, resting on the upper portion of the base of her tail, and with that appendage resting level on the ground in front of her (Plate I., fig. 1, upper figure); she then holds her pouch open with her two fore-paws, and, as the helpless mite is born, it rests on the soft fur of the under side of the tail. The mother immediately transfers it to her pouch with her lips only, and evidently with great care attaches it to the nipple. The mouth of the young one is apparently only a round hole, and it as yet has no power of suction; but the nipple is of a peculiar shape, with the point hard, and the mother is thereby enabled to insert it into the mouth of the young one. She then holds it in position while she forces the milk into the nipple, which thereby swells out and holds the young one on; but if, after being once firmly

attached, it is pulled off, it cannot be replaced, even by the mother, for the end of the nipple now being flaccid instead of hard cannot well be inserted into the mouth of the little one.

The illustrations show the fœtus about two days before birth (Plate I. fig. 2); also the young one about life-size, just as it had been born, but not transfixed to the nipple (Plate I. fig. 3); and the nipple with the hardened point just ready for the young one (Plate I. fig. 3). It will be noticed how immature the little one is, and also that its fore legs are much larger than its hind ones. I have the specimens here shown in spirits. It has not yet been proved, as far as I am aware of, how long after birth the young one is able to draw nourishment for itself—probably three months.

LAND BIRDS AT SEA.

BY SURGEON K. HURLSTONE JONES, M.B., R.N., F.L.S.

No one who has at certain seasons of the year made anything that can be called a voyage at sea can have failed to observe the remarkable fact that often, when far away from land, birds other than sea birds come on board the ship. These birds are almost all of them migrants, and it is mainly during the spring and autumn months that they are observed to frequent the hospitable refuge that a ship at sea offers them.

Most of these birds are, I believe, such as have by some accident, often doubtless stress of weather, lost their way and their companions in migration at the same time, and, wandering over the waste of water, gladly take advantage of any passing ship for the purpose of resting. Some few may perhaps have been blown out to sea by gales of wind, or even chased from the land by birds of prey. Often the wanderers have evidently lost their bearings, for they hang about the ship much longer than is actually necessary for the purpose of resting, and indeed generally, I think, until nearing the land.

In my own limited experience the birds have come on board either singly or in twos and threes. In the following notes are jotted down the occurrence on various occasions and in different localities of a few such birds. They are not very many, and, I fear, they are not very important. They were made partly whilst I was surgeon to the steamship 'Anselm,' of Liverpool, in 1897, and partly during my service in H.M.S. 'Repulse,' of the Channel Squadron. In the 'Anselm' I sailed from Liverpool to Hamburg, and thence to Havre, Lisbon, Madeira, and Brazil. In the Channel Squadron most of my time at sea has been spent cruising off the coasts of Spain and Portugal, though I have also been to Sardinia in the Mediterranean, besides much cruising in British waters. The first notes I have, however, of land birds at sea are curiously not of their actual occurrence on board the ship.

Cypselus apus.—On May 9th, whilst steaming up the English Channel in very fine weather, at about forty miles from south coast of England, I noticed several parties of Swifts. These birds were evidently migrating, for they flew straight ahead, and were obviously making a “bee-line” for the English coast. They were not, however, flying at any great height.

Hirundo rustica.—I noticed one Swallow also flying in the same way, and in the same direction.

On May 10th, whilst traversing the North Sea between Dover and the mouth of the Elbe, with coast of Holland just in sight, a Pipit (*Anthus* sp.) came on board.

Corvus cornix.—At dusk on the same day, when about midway between Heligoland and the German coast, a Hooded Crow alighted in the rigging of the foremast. After dark the third officer climbed up and caught this bird, which I should have otherwise not have been able to identify.

Saxicola œnanthe.—On May 17th, when about half-way between the mouth of the Elbe and Dover on the return journey, a Wheatear came on board of us, evidently very much tired.

Turtur communis and *Anthus pratensis*.—On May 21st, at the entrance to the Bay of Biscay, but a long way from Ushant, a Turtle-Dove, a Meadow-Pipit, and a Swallow came on board the ship, and remained all day. On May 22nd, being now about two-thirds of the way across the Bay, a second Turtle-Dove and a second Swallow joined those mentioned above, and later a Sand Martin (*Cotile riparia*) also put in an appearance. They all remained by the ship, and at dusk the hands going aloft drove the Turtle-Doves from their roosting-place on the fore main topsail-yard, and one of them, passing over the funnel, became suffocated, and was engulfed in it. On May 23rd, when we neared the Portuguese coast, all the birds left us.

The above are the few notes I was able to make of land birds coming on board the ship whilst I was in the steamship ‘Anselm.’

Whilst serving in H.M.S. ‘Repulse,’ I have, I fear, not made very many notes, and for this there are several reasons. In the first place, this ship is one of a fleet, and when there are fourteen ships together, as is generally the case, there are obviously thirteen chances to one against a bird alighting on board of us. In the second place, this is a very large ship—one of the biggest

battle-ships afloat—and consequently it is very much easier to miss a bird which alights on board so large a vessel than it is to do so in a smaller craft like the ‘Anselm.’

Upupa epops.—On March 15th, 1899, when about one hundred miles west of Cape Finisterre, at five o'clock in the evening, a Hoopoe came on board of us, but shortly dropped astern and disappeared. This happened in very fine weather.

Falco tinnunculus.—On March 23rd, 1899, when about sixty miles from the north-west coast of Spain, in dull cloudy weather, a Kestrel flew on board, and remained the rest of the day. At night it managed to get into one of the canvas steaming covers round the fore-topmast, where a boy made an ineffectual attempt to catch it.

Daulias lusciniæ.—On April 29th, being then about one hundred and sixty miles W.S.W. of the southern end of Sardinia, two Turtle-Doves, a Nightingale, and another small bird which I could not get a good view of, came on board the ship; but all shortly left us for some other member of the squadron.

Sturnus vulgaris.—On Oct. 26th, 1899, whilst proceeding towards Ushant from Scilly, and about one-third nearer the former, at 5 p.m. in foggy weather, a Starling alighted on board of us for a few minutes, and then departed in an eastwardly direction. On Oct. 27th, when about midway across the Bay of Biscay, a Swallow came and perched on our quarter-deck awning ridge rope at 9 a.m.

The above are my notes, lamentably scanty, but still a contribution to what is, I think, an interesting subject. I offer them without comment.

SOME REMARKS ON THE BIRDS SEEN IN THE
SOUTH-EAST PART OF THE MAINLAND OF
ORKNEY IN OCTOBER, 1899.

BY N. F. TICEHURST, M.A., F.Z.S., &c.

HAVING last year to take my holiday somewhat later than usual, I took advantage of a pressing invitation to spend a fortnight with some friends in the parish of St. Mary's Holm, in the south-east part of the mainland of Orkney, for purposes of sport and natural history. As this part of the British Isles was to me quite new ground, and being somewhat out of the way, an account of the birds met with there may perhaps be of interest to those readers of 'The Zoologist' who are also unacquainted with that part of the world. Of course the first fortnight in October is not altogether a favourable time for observing bird-life, the weather being anything but settled; and, again, the autumn migrants have hardly begun to arrive, while the summer birds have for the most part left. Three facts, I think, strike one who comes here for the first time from the south, *viz.* the very few passerine birds seen; the number of species, and the quantity, of Waders, Gulls, and Wildfowl; and the tameness of almost all the birds. The last fact, I think, is accounted for by the careful preservation by the large landowners, under the Wild Birds Protection Acts, and the comparatively small number of people who shoot. In fact, the Gulls, &c., have increased so much of late years that the people are beginning to complain.

The ground for the most part is low and undulating, the higher parts being all moorland, the low ground being either grass or under cultivation; the crops grown being principally oats, potatoes, and roots. The coast is mostly low and rocky, rising to twenty or forty feet in places, with here and there a sandy or gravelly bay where a small burn enters the sea. At the south-eastern extremity is the rather higher point of Roseness, the cliffs of the east coast gradually rising in height from here, till

they reach their highest point in the fine cliffs of Galtic. The east coast is practically open to the North Sea, the only island beyond it being Coppinshay, which is several miles away.

To the south are the two small islands of Lambholm and Glimsholm,—the former only of which is inhabited,—separated from the mainland by a sound of about a mile in width, through which the tide ebbs and flows at a rate of six or seven knots. Beyond these two is a rather larger and higher island, which almost shuts the great island of South Ronaldshay from view. On a fine clear day the Pentland Skerries can be seen away to the south-east, and to the south-west some of the fine tops of the Caithness mountains are visible. On the north and north-west the near view is shut in by the rolling moorland of the mainland itself, the tops of the Harray hills and Orphir in the west mainland only being seen; while to the west the fine tops of Hoy are visible in the distance, when they are not wreathed in cloud and mist, which seems to be their usual condition at this time of the year.

BLACKBIRD (*Turdus merula*).—Several young birds were seen about the garden at Grømeshall, probably the members of a brood reared there, as none were seen elsewhere.

REDWING (*Turdus iliacus*).—A single bird was seen feeding among the rocks along the shore on Oct. 16th, and several others were noticed later on the same day on the moorland; they seemed to have just arrived, and to have come with the Jack-Snipes. Wind S.E.; north-west gales the two previous days.

FIELDFARE (*Turdus pilaris*).—One single bird was seen flying over on Oct. 14th, but the main flocks had not arrived by the 18th. They are said to come with the Woodcocks.

PIED WAGTAIL (*Motacilla lugubris*).—A pair of these birds had taken up their abode about the farm-buildings at Grømeshall, and were always to be seen there or along the loch-side; no others were observed.

MEADOW-PIPIT (*Anthus pratensis*).—Fairly common in the oat-stubbles, and small flocks of eight or ten were seen several times on the moors.

ROCK PIPIT (*Anthus obscurus*).—These birds appeared to be more numerous than the preceding; they were always to be seen along the shore, coming right up to the houses, but not penetrating far inland.

HOUSE-SPARROW (*Passer domesticus*).—Common about the houses and in the oat-stubbles near the farms; not going far from human habitations, and nowhere in large flocks.

TWITE (*Linota flavirostris*).—Small flocks of five to twelve were seen every day feeding on the stubbles, while occasionally a few were observed on the heather. I am not sufficiently acquainted with the note of this bird to distinguish it from that of the Linnet, but the slimness and greater comparative length of tail were conspicuous points of difference, while, with the glasses, the yellow beak could be made out. They were always very restless, and not nearly so tame as most of the other birds.

SNOW BUNTING (*Plectrophenax nivalis*).—A single bird of this species was seen on the moors on Oct. 10th; the main flocks had not arrived by the 18th.

SKY-LARK (*Alauda arvensis*).—Not very numerous; a few were generally to be seen in the grassy meadows, and around the edges of the loch; they seemed to prefer places that were somewhat wet and boggy to the drier parts of the meadows. A few were also seen on the “brakes” (pieces of enclosed moorland not yet cultivated), but none were noticed on the moorland itself.

STARLING (*Sturnus vulgaris*).—Every evening a vast flock of some thousands assembled at sunset on the few small trees in the garden at Græmeshall, quite blackening the almost bare branches. At the same time the ridges of the roofs and “crow-steps” of the gables would be similarly occupied, while a ring of birds were seated round the edge of every chimney-pot. A little later on, and apparently by signal, they would all rise in a great cloud, and go off to roost on the reeds in the loch. During the day there were comparatively few to be seen; one or two small flocks were always feeding round the loch edge, and a few were constantly about the farm-buildings, but where the vast numbers that assembled at evening came from was a mystery. The tameness of those about the house was absurd; when disturbed from the chicken-run they would fly on to the wall, and sit chattering within six or eight feet of one. The majority of the birds were immature, in a plumage that I had not noticed before, the head and neck being a dull russet-brown, while the rest of the body was in the speckled glossy plumage.

JACKDAW (*Corvus monedula*).—A large colony inhabited the

cliffs of Galtic at the east end of the island, feeding in the adjacent fields during the day, and returning to roost on the cliffs at sundown.

ROOK (*Corvus frugilegus*).—A few single birds were seen feeding in the meadows, and a few with the Jackdaws at Galtic. I was told that they breed here in the sea-cliffs, which seems probable, as there are practically no trees of any size in the island.

HOODED CROW (*Corvus cornix*).—A few pairs were seen about the shore and loch from time to time, but they were by no means numerous, and at the most I never saw more than three pairs in a day.

PEREGRINE (*Falco peregrinus*).—One bird was seen to leave the cliffs at Galtic on Oct. 6th; it was raining and misty at the time, and we lost sight of it out at sea. I could not find out definitely whether these birds bred in those particular cliffs or not, but was shown a very beautiful and deeply marked clutch taken on Hoy in 1897.

MERLIN (*Falco æsalon*).—A Merlin was seen pursuing a flock of Starlings over the Grøemeshall loch on Oct. 4th, but, so long as we were able to watch it, was not successful in striking one; when it stooped they immediately bunched together, and twisted to one side. On Oct. 14th, when after Golden Plover, a Merlin appeared, and successfully struck down one of them, not thirty yards from where we were standing. On putting it up, it carried its prey off to a neighbouring stubble, and began to devour it there, the Plover weighing it down so much on its way that it was unable to rise more than a yard from the ground. One or two other birds were seen.

KESTREL (*Falco tinnunculus*).—Only four birds were seen altogether, two of which were adult males.

COMMON CORMORANT (*Phalacrocorax carbo*).—Quite a rare bird; one was put up from the shore on Oct. 14th, and one flew over the boat on Oct. 12th while we were fishing in the bay at St. Mary's Holm.

SHAG (*Phalacrocorax graculus*).—Very numerous, adult and immature birds being in almost equal numbers. Every morning, about 7.30, large numbers were fishing in the sound, forming in the distance a thick black line on the water. By 8.30 the

majority had left the water, and were digesting their meal and preening their feathers on the rocky point at the east end of the opposite island of Lambholm, which for the rest of the day would be black with them. Some were always to be seen close in shore, diving and fishing in quite shallow water, and allowing a near approach. On the cliffs at Galtic large numbers were sitting on the whitewashed ledges, from which the nests had already been blown away. On approaching in a boat we came close to them before they threw themselves from the ledges, and, flying close over our heads, flopped into the water within a few yards of us, there to dive away out of reach of the boat. On Oct. 14th the sound was black with Shags, all busy fishing over an area of several acres; they were coming and going all the morning from this particular area, and probably there was an unusually large shoal of Sillocks (yearling Coalfish) there; several thousand Shags must have been fishing at once. The natives are complaining that the supply of fish is falling off since the Wild Birds Protection Act came into force.

COMMON HERON (*Ardea cinerea*).—One or two were seen every day in the rocky pools along the shore at low tide.

BRENT GOOSE (*Bernicla brenta*).—Three Brent Geese were put up from a sheltered cove on Oct. 13th, while a north-west gale, which had lasted all the 12th, was still at its height. No Geese had been seen passing over this year up to Oct. 18th.

WILD DUCK (*Anas boscas*).—A few pairs inhabited the loch at Grømeshall, spending most of their time in the thick reeds, and flying out to sea when disturbed. On Oct. 13th, during the gale, a pair was seen in a sheltered pool on the shore.

WIGEON (*Mareca penelope*).—Not identified with certainty, but a pair of birds put up at dusk from a milldam on Oct. 16th were nearly certainly of this species.

POCHARD (*Fuligula ferina*).—Several small flocks were often seen off the reeds in the Grømeshall loch.

TUFTED DUCK (*Fuligula cristata*).—One Tufted drake was identified with certainty on the Grømeshall loch on Oct. 9th, and eight other birds with it were almost certainly immature birds of the same species.

SCAUP (*Fuligula marila*).—A pair of Scaup were on the loch at St. Mary's Holm the whole time I was there; they were very

tame, and I frequently watched them through the glasses sleeping on the water not twenty yards away. The drake had not yet attained full plumage, being still brown on the back, and with the white forehead, though its head and neck were nearly black.

EIDER (*Somateria mollissima*).—The Eider was by far the commonest Duck. Single pairs and small flocks of eight to fifteen could be seen at any time among the rocks busily feeding, and they were often noticed fighting and chasing one another, when some choice morsel was secured by one of them. So tame were they that when one went out on to the rocks close to them they only swam off a few yards into deeper water. All the drakes but one seen were fully adult birds in winter plumage, the exception being in partial eclipse, though evidently fast getting his full winter dress.

COMMON SCOTER (*Ædemia nigra*).—One pair only was seen off St. Mary's Holm on Oct. 4th.

VELVET SCOTER (*Ædemia fusca*).—Not seen on the mainland, but five birds of this species rose in front of the steamer on Oct. 18th, off Hoxa, in South Ronaldshay.

RED-BREASTED MERGANSER (*Mergus serrator*).—Two birds of this species were seen in the sound off Grømeshall on Oct. 6th, three more farther east on Oct. 13th, and four more in the bay at St. Mary's Holm on Oct. 17th, near which place there was a nest this year. All were in the immature plumage, and, though I went quite close to them on the 13th and 17th, I could see no signs of any dark feathers coming on the necks of any.

ROCK-DOVE (*Columba livia*).—The Rock-Doves breed in considerable numbers in the caves at the east end of the mainland, and, though they are said to be less numerous than they were twenty years ago, there does not appear to be much danger of their extermination, the coast being very exposed, and quite unapproachable except in a flat calm, and even then they are by no means easy to shoot. The majority seemed to be pure bred birds, but it is evident that the tame birds interbreed with them in the caves, and the wild birds are said to visit the dovecots in the winter. One bird seen was nearly white, while another had many brown feathers in the wings and scapulars; and two others had white heads. At this time of the year they feed almost entirely on the stubbles, returning to the cliffs as soon as their crops are full.

RED GROUSE (*Lagopus scoticus*).—There are a very fair number of Grouse in the east mainland, and owing to efficient protection they are on the increase. Bags of fifteen to twenty-five brace are made over dogs in the early part of the season. Later on they become wilder, and after rough weather such as prevailed during the second week in October they pack, and are then practically unapproachable; the old cocks, which generally remain solitary, are very difficult to get near at any time, running in front of the dogs for hundreds of yards. At this time of the year, when the crops are being got in, the birds are mostly to be found on the fringe of the moor, not more than a hundred yards from the cultivated land, on to which they move at night to feed.

MOOR-HEN (*Gallinula chloropus*).—Only one was seen, *viz.* on the Grømeshall loch on Oct. 3rd.

COOT (*Fulica atra*).—A flock of twenty to twenty-five Coots live on the loch at Grømeshall, nesting in the reeds, and apparently staying there all the year round. One pair was seen on the loch at St. Mary's Holm.

GOLDEN PLOVER (*Charadrius pluvialis*).—Several flocks of from twenty to more than a hundred and fifty individuals were always to be found at particular places. At high water they were generally to be seen in the "parks" (meadows enclosed by stone walls), for certain of which they had a special predilection. At low water two or three special places on the ebb were sure finds for them, where they were almost invisible when standing still, so well did their golden plumage harmonise with the yellow seaweed and rocks. Several times I have crawled up to a particular piece of ebb, and carefully examined every part of it with glasses, without seeing anything, till presently a bird would stretch up a wing, and then suddenly some fifty or sixty birds would become visible. In calm weather they were remarkably tame, allowing a near approach in the open, if one did not walk directly at them; but in a gale of wind they were much wilder and very uneasy, continually flying up and settling again at some other spot for apparently no reason at all. At night the flocks appeared to split up, the birds going off in twos and threes to the "parks." Round the margin of the loch they associated with the Green Plover, and to a smaller degree with the Gulls.

LAPWING (*Vanellus vulgaris*).—Very common; they are never shot at, and are consequently very tame.

RINGED PLOVER (*Ægialitis hiaticula*).—These delightful little birds were extremely numerous, and very tame. They were always to be seen feeding along the ebb in lots of a few individuals up to quite large flocks, very often associating with the Turnstones and Golden Plover. Had the weather been more propitious some very good photographs might have been obtained, as they never thought of flying away till one approached to within about four or five yards of them.

TURNSTONE (*Streptilas interpres*).—Also very common, and almost as tame as the preceding. In the first week of October only ones and twos were seen, generally with a few Ringed Plover; but as the month drew on they increased in numbers, and flocks of twenty or more individuals were quite common. They seem to be very active little birds, and there is no prettier sight than to have four or five of them within a few yards of you, busily turning over the seaweed, and literally throwing the pebbles about in their search for food. Several birds were seen with a few chestnut feathers on the shoulders, but most of them seemed to be immature.

OYSTERCATCHER (*Hæmatopus ostralegus*).—Common, in single pairs and small flocks, associating only with the Curlew, and almost as wild and wary as they; whereas all the smaller shore birds were to be found close in shore, the Oystercatchers always kept well out on the rocks, where the sea was breaking, the spray often flying right over them. I noticed that they always stood head to wind.

COMMON SNIPE (*Gallinago cælestis*).—Very common on the moors, and, up till Oct. 10th, round the loch also, where large bags are sometimes made. After that date there were continuous gales from the north-west, with rain, and the birds all left the loch-side, probably passing on south, the numbers on the moors perhaps decreasing slightly about the same time; but this is difficult to say.

JACK-SNIPE (*Gallinago gallinula*).—A solitary specimen was seen by the Grømeshall loch on Oct. 9th, and two others on the moors on Oct. 16th. It is probable that on this latter date there had been a small migration of these birds, for the dog picked up

one which was too exhausted to fly; the Redwings also were first noticed on that day. The wind had been blowing a gale from the north-west for the two previous days, and had shifted that morning to the south-west.

REDSHANK (*Totanus calidris*).—I have never before, except in the breeding season, seen Redshanks so tame as they were here. My previous experience of the Redshank as a shore bird had been that he was one of the wariest, not only keeping well out of harm's way himself, but letting every other bird know when there was any danger near. True, here they *did* fly off shrieking, and making a great noise if you came on them suddenly round a corner or over a rock; but if you approached quietly, or sat down and kept still, they took hardly any more notice of you than the Ring Plover. They went about almost entirely in single pairs, and kept pretty much to themselves.

CURLEW (*Numenius arquata*).—I suppose it is partly its innate wariness, and partly the fact that it is the only shore bird, besides the Golden Plover, that anyone up here thinks of shooting, that causes the Curlew to be just as wild as anywhere else. I never saw more than about fifteen together, and they were always well out on the edge of the tide, with a sentinel posted on the highest piece of rock. Once or twice a small flock was seen on the meadow-land, but always well out of shot of the nearest stone wall or other cover. It is only by lying up in their line of flight and trusting to luck that a shot can be got at all.

GULLS (*Larinae*).—The great feature of the bird-life of this part of the British Isles is of course found in the Gulls; they are present everywhere, along the shore, by the loch-side, in the "parks," on the stubbles, on the dust-heaps, the house-roofs, and even on the chimney-pots; in fact, except perhaps in the middle of the moor, you cannot get away from them. The flocks were always mixed, consisting for the most part of Common and Herring Gulls, with a fair sprinkling of Kittiwakes and Black-headed Gulls, and either one or two pairs of Lesser Black-backs. Of the latter I never saw more than two or three pairs along the shore, and of Great Black-backs, I do not think there is more than one pair in this particular part of the coast. The Gulls were always absolutely fearless, and you could walk up to within a few yards of them before they rose. Two, an immature Lesser Black-back

and an adult Black-headed, had taken possession of a particular dust-bin, and they were to be seen there all day and every day, standing on an adjacent wall, or sitting asleep in the field a few yards off. Every morning, directly it was light, some twenty Black-headed Gulls came on to the lawn in front of the house, and were very busy for an hour and a half picking up worms; I never saw any other species there. In the evening large flocks used to assemble on the loch from the fields, and, after staying there a few minutes, fly off to sea for the night.

It was a very pretty sight watching the Kittiwakes fishing; on some days the sound was full of them. They reminded me very much of the Terns in their methods. A strong north-west wind was blowing, and the Kittiwakes would be swooping and wheeling about; when now and then one would mount to about twenty feet, and turn head to wind; then, after remaining stationary on outspread wings for a second, would drop like a stone on to its prey, sending the water up all round it, and completely disappearing for a couple of seconds in the spray; then, after about half a minute, it would rise again, and resume its wheeling flight.

On Oct. 5th I saw a Little Gull on a rock by the shore, and on the next day two more pairs. On the 8th I saw ten together, at the same place as I saw the one on the 5th. They were evidently on migration, as I did not see them again, and they were not so tame as the other Gulls. They were all in the adult winter plumage.

RICHARDSON'S SKUA (*Stercorarius crepidatus*).—I twice watched a pair of Arctic Skuas harrying the Kittiwakes, in the sound between Lambholm and the mainland. When hunting they always seem to work in pairs, one bird dashing at the Gull while the other hovers near to pick up the fish as soon as it is dropped. Both pairs belonged to the dark form. A single bird I saw on the 13th, close in shore, was very dark, with a somewhat lighter patch on each wing; in the dull light it looked quite black.

COMMON GUILLEMOT (*Uria troile*).—It is curious that I never once saw the Common Guillemot off the south-east mainland, whereas a few miles farther west in Scapa flow, and from there south to South Ronaldshay, they were very common.

BLACK GUILLEMOT (*Uria grylle*).—Very numerous in the sound

between Lambholm and the mainland, where they could always be seen, if it was calm enough, floating with the tide east or west, according to whether it was ebbing or flowing. A good many were also seen off the east coast. They were all in the speckled black and white plumage, no wholly black ones being seen. The stomachs of the two examined contained the remains of small crabs.

SLAVONIAN GREBE? (*Podiceps auritus*).—Two Grebes were seen on the loch at St. Mary's Holm on Oct. 15th; they were too large for Dabchicks, and so were probably of this species. They did not come near enough the shore to enable me to see the shape of the bill.

LITTLE GREBE (*Podiceps fluviatilis*).— There were two pairs of these birds on the loch at St. Mary's Holm.

NOTES ON THE SEAL AND WHALE FISHERY, 1899.

BY THOMAS SOUTHWELL, F.Z.S.

THE event of the year at St. John's is the starting of the sealing fleet, which this year (1899) took place under very favourable circumstances, the weather being fine and the harbour free from ice. As the clock struck eight on the morning of the 10th of March, those present witnessed the departure of twelve fine vessels, all making for the offing, their crews full of hope as to the result of the unknown future. The painful memory of the disasters which threw so deep a gloom over the voyage of the previous season could not fail to be present in the minds of the spectators, whose cheers, added to the salutes from the steam-whistles of the vessels, made the hills re-echo as the fleet steamed out to brave the hardships and dangers of the ice-fields. Happily no such disaster has to be recorded as resulting from the voyage thus so auspiciously commenced.

Of the eighteen steamers present at the Newfoundland fishery fourteen made for the ice off the east coast, and four left channel for the Gulf fishery; the latter, as will be seen, meeting with only partial success. All those which fished off the east coast did well, and the young Harps (few old Seals were killed) were in exceptionally fine condition; at the whelping time severe frosts prevailed, and experience shows that in such weather the young Seals thrive and rapidly become fat.

The first to strike the "Whitecoats" was the 'Neptune,' which met with a small and isolated patch near the Funk Islands, on the 11th of March; later on they were found in great numbers, and by the 29th of the same month three of the vessels were back again at St. John's with full cargoes—a most expeditious voyage, notwithstanding some delays arising from bad weather.

As the most successful vessel of the fleet, it will be sufficient

to give a brief outline of the voyage of the 'Neptune,' Capt. S. Blandford, which is typical of all the rest. As already mentioned, on the 11th of March, some twenty-five miles N.E. of the Funk Islands, the 'Neptune' met with the first young Seals, but, judging that the main body of the breeding pack was to be found farther to the northward, Capt. Blandford, steamed thirty or forty miles in that direction in search of them, but on the 13th bad weather came on, and the vessel barely escaped being driven ashore on the Funks. From the 14th to the 18th the hurricane continued, and during the detention many old Seals were seen passing; they were, as their custom is, south of their young, and doubtless in search of food. Capt. Blandford estimates that some seventy miles of practically barren ice drifted past in a south-westerly direction before the whelping ice with the "Whitecoats" upon it appeared. This drift caused the pans bearing the young Seals to pass inside the Funks, although at the time he met the small patch, on the 11th of March before mentioned, the main body was seventy miles away in a northerly direction. The storm which thus brought the young Seals so conveniently within easy reach having somewhat abated, on the 18th March the 'Neptune,' with the 'Newfoundland' in company, headed in a westerly direction, and at once came up with them. By Monday, the 20th, 16,000 Seals were panned; the next day 15,000 more were added; and by Wednesday the total was made up to 41,000. Then came the usual waste: "the elements were unpropitious, and three pans were driven on the Funks and ground to pieces, two more went over Brenton's Rock to destruction, while on Sunday three pans were smashed on the Cabots, leaving only 32,000." As the bulk of the Seals were obtained by the other vessels in about the same locality and under the same conditions as to weather, it is probable that a similar loss of panned Seals was also experienced by them; but Capt. Blandford says that he was probably the greatest sufferer in this respect. I have said that very few old Seals were killed, in proof of which it may be mentioned that out of 17,286 Harps killed by the 'Newfoundland,' only fifty-three were old ones.

Four vessels—the 'Hope,' the 'Kite,' the 'Harlaw,' and the 'Nimrod'—went to the Gulf fishery. None of these was very successful, with the exception of the 'Hope,' which fell in with

the western Harps towards the end of March, about twenty miles north-west of Grindstone Islands, where, reaching them with difficulty, she secured 26,586. The 'Kite' struck the Seals in the same locality somewhat later, with every prospect of securing a good cargo, but in answer to signals of distress from the s.s. 'Gaspia,' a trader which was fast in the ice, left the sealing to go to her assistance, eventually convoying her safely into St. John's, but having captured only 699 Seals. The 'Harlaw' and the 'Nimrod' hunted in company in the neighbourhood of Cape St. George, the former capturing 1570 old and 2476 young Hoods (equal in weight to about 9000 young Harps), and the latter 3711 of the same species. These Hooded Seals are said to have been of an enormous size, but their capture was attended with considerable danger and labour, as the vessels could not get within three miles of the sheet on which they were, and the intervening ice was much broken and rafted.

Mr. Thorburn tells me that, owing to the severity of the frost in the month of February, the ice in the Gulf was unusually heavy, in consequence of which the eastern Harps were not seen at all, and the schooners fishing there made a very bad season; he estimates that the number of Seals which fell to these schooners, and to the shore fishers in Bonavista Bay, did not much exceed 20,000.

The total number of Seals captured by the eighteen steamers, of the aggregate capacity of 5500 tons, and manned by some 3500 seamen, was 268,787 (against 241,708 in the previous season), of a net value of £68,527, the price of produce being very disappointing. The bulk of the vessels were fairly fished, nine having more than 15,000: the 'Neptune' taking the lead with 32,129; five others had above 10,000, and the remaining four from three to four thousand each, with the exception of the 'Kite,' which, as already explained, was otherwise occupied, and killed only 699 Seals. The average of the whole was 14,932. The fishing in the past season, although the ice had been heavy and the weather rough, has been singularly free from disaster, and had prices ruled better would have been highly successful.

The Norwegian sealers, I have been informed, did very badly, and they are gradually being sold out of the trade; the Bottle-nose fishery also produced about one-third less than in the

previous season, the scarcity causing oil of this class to advance to £28 per ton.

With reference to the Fin-Whale fishery recently established by the "Cabot Whale-fishing Company" (see Notes for 1898, p. 107), Mr. Thorburn has been kind enough to obtain for me the following particulars:—The 'Cabot' fished in Hermitage Bay in the end of February and during the month of March, killing eleven Whales, all "Sulphur-bottoms." This species was found in plenty in the locality named until the middle of July, and any number could have been taken had the Company been in a position to deal with them. Mr. Thorburn's informant states that these immense Whales appear nearly always to be in good condition, and he believes they reproduce only once in three years. From the middle of July until the first week in October the 'Cabot' fished in Notre Dame Bay, killing ninety-eight Whales, nine of them "Humpbacks," the remainder being "Finbacks." In October these Whales become scarce and poor in condition, owing it is believed to their reproducing some time previous to that date, and being engaged suckling their young; they then leave the coast, probably following their food supply. The ninety-eight Whales yielded 286 tons of oil and six tons of bone; the oil produced about £17 per ton; the "Whale-bone," I imagine, would be of little value. It will be observed that, in speaking of the Whales killed by the Cabot Company, I have used only the popular names applied to them by their captors; this I have done advisedly, for, in addition to the uncertainty with regard to their true species, and the unsettled state of the nomenclature of the group, it was impossible to speak with authority without opportunities of personal investigation, and might only add to the existing confusion; it is therefore with pleasure that I hear from Dr. F. W. True, of the United States National Museum, that he spent a month at the station last summer, and that he hopes to do for the Newfoundland Fin-Whales what Mr. A. H. Cocks and Prof. Robert Collett have already done for a similar fishery on the coast of Lapland. It is Dr. True's intention shortly to make known the general result of his investigations, which will eventually be embodied in a contemplated monograph of the Finbacks of the American waters. Dr. True has already published in the 'Pro-

ceedings of the United States National Museum' (xxi. pp. 617-635) an exhaustive paper on the nomenclature of the Whalebone Whales of the European waters, treated with his usual thoroughness; and, whether or not European cetologists finally accept the somewhat startling changes he advocates, they cannot but be grateful for the analysis of the evidence on which he bases his conclusions. It is rather out of place in this paper to discuss the much-vexed question of the revision of nomenclature, but the well-defined and not too numerous group of Cetacea seems readily to lend itself for treatment in this respect, and surely by a little forbearance and the sacrifice of some degree of sentiment, cetologists might be able to arrive at an arrangement by which this section at least of the Mammalia might be cleared of the nomenclatorial fog which surrounds it, and be settled once for all on a firm and universal basis.

The Whale fishery in the past season has on the whole been fairly successful, but its most remarkable feature has been the continued apparent absence of Right Whales in the Greenland Seas, whereas in Davis Strait and in the adjoining waters they have been seen in abundance. The 'Balæna' cruised for three months in the Greenland waters, during which time she saw only one Whale; this she captured on the 19th of May, on the north-west fishing-grounds. It is difficult to account for this absence of Whales from their former resorts, but it is doubtless due in part to overfishing, and perhaps even more to the present unsuitable condition of their feeding grounds owing to the continued absence of ice, a state of things which has continued for a most unusual length of time, and is quite contrary to precedent (see Zool. 1898, p. 73). In Davis Strait, on the other hand, Whales were in plenty in all their usual resorts, but from the many "escapes" it is probable they were very shy. There appears also to be a fair proportion of old and young fish, which promises well for the continuance of the species. The 'Diana' killed a mother and sucker in Lancaster Sound, early in July; also two other small Whales in the same locality. The 'Eclipse' also killed a very small Whale of four-foot bone, in Pond's Bay, where young fish are rarely met with. In the same locality the 'Diana' met with a fighting fish which gave them some trouble; but although it attacked several of the boats, it was eventually

killed without injury to the crews. The bulk of the Whales seen or captured were of good size, some of them very large.

The 'Balæna,' as already mentioned, was the only whaler in the Greenland Seas. After cruising in the usual resorts of the Whales and seeing only one, which she captured, Capt. Robertson made for the east coast of Greenland in search of Walruses, and there he twice met with the Swedish expedition under Dr. Nathrost, rendering what aid he was able in the fruitless search for Andréé. Here ten Musk Oxen were killed, and some valuable explorations made, which will be duly reported by Dr. Nathrost. Finally the 'Balæna' went round to Davis Strait, where she killed two other fine Whales off Coutts Inlet, making her cargo three Whales, ten Musk Oxen, eleven Bears, three Narwhals, and seven Walrus.

The 'Diana' was very successful, killing ten Whales, mostly in Lancaster Sound and Coutts Inlet. There was nothing remarkable in her voyage except her success, her cargo consisting of ten Whales, seventy-one Walrus, fourteen Bears, twenty-two Seals, and three Narwhals.

The 'Nova Zembla' also did well at the Davis Strait fishery, returning with eight Whales and nine Bears.

The 'Eclipse' left Dundee at the end of April, and killed her first Whale off Disco on the 19th of May. North of Melville Bay Capt. Milne visited an Esquimaux settlement—Tiganrock—obtaining news of Lieut. Peary; thence she crossed over to Eclipse Sound, which she navigated to its extremity, finding traces of Esquimaux and killing fifteen Reindeer; but, although she saw a considerable number of Whales, fortune went against her, and she only succeeded in capturing three (one very small), as already mentioned, and reached Dundee on November 14th, experiencing very wild weather on her homeward voyage.

The 'Esquimaux' also went to Davis Strait, but I am informed that her voyage was not entirely of a business character; as, however, she brought home two Whales, yielding 23 tons of oil and 21 cwt. of bone, in addition to forty Walruses, twenty-three Bears, and sundry seals, worth some £2000, the produce would go a long way towards paying the expenses of the trip.

Two other vessels left Dundee, the 'Active' and the 'Polar

Star,' bound for Hudson Strait, the former repeating her voyage of the previous season. The entrance to Hudson Strait, always very unapproachable in the spring owing to the accumulation of ice and the boisterous weather experienced at that season,* was more than usually blocked by the drift of ice from Davis Strait, and the two vessels were twenty-eight days later in entering the Strait than they anticipated, even then they forced a passage with difficulty. The terrible squeezing and buffeting they experienced told severely on the 'Polar Star,' a vessel thirty years old, which, after being frequently beset, had finally to be abandoned in a sinking condition early in October, the 'Active,' which had been standing by her companion for some time taking on board her crew and saving one hundred and thirty-two Walrus hides and four Bears. The 'Active' saw very few Whales, and did not succeed in catching any, the result of her voyage being one hundred and seventy-three Walruses, thirty-four Bears, and fifty-eight Musk Ox skins, the latter obtained from the natives on the mainland to the west of Rowe's Welcome. Late in the season the weather was very wild, and on two occasions seventy-three in the one case and one hundred and nine Walruses in the other, which had been killed and left on the shore, were washed away and lost during terrific gales. An American vessel which wintered in the Strait secured eight Whales in June and July, before the 'Active' got upon the fishing ground, and when spoken had the produce of sixteen Whales on board. As it is evident the vessels despatched from Scotland must arrive too late to take full advantage of the fishery in this locality, Mr. Kinnes resolved to establish a station in Fisher Strait, on the shore of Southampton Island. For this purpose the first mate of the 'Active,' Mr. J. W. Murray, with two others, were landed, a large wooden dwelling-house and boat-shed having been taken out in sections for their use; here they contemplate remaining for three years, Whale hunting, assisted by five boats' crews of natives.

The only other vessel bringing produce from the Arctic was the carrying ship 'Alert,' of Peterhead, which brought home the produce of two Whales, 150 Walruses, and 2900 Seals, from the Cumberland Gulf stations.

Seven vessels left Dundee in the past season; one of these,

the 'Polar Star,' was lost, and the 'Alert' returned from Cumberland Gulf. The total produce of these eight vessels was 28 Whales, 609 Walruses, 16 Narwhals, 3036 Seals, 128 Bears, and 68 Musk Oxen; the oil yielded was 385 tons, and the bone 350 cwt.—a very mixed cargo; but, except for the Hudson Bay section of the fleet, apparently a fairly successful voyage commercially. There has been no very recent sale of whalebone, but I am informed that the last sale effected produced £1400 per ton; more is being asked for it now. Whale oil is producing from £18 to £19, and Seal oil from £18 to £21 per ton. Walrus hides, if heavy, bring as high as £40 each. They are used for polishing wheels for bicycle work, and therefore should be very thick; light hides are of little use, and not in request, therefore of little value. The total value of the produce of the season, estimating the bone at the last selling price, and allowing for undersize, would probably be about £38,000.

As part of the produce of the late voyage, sixty-eight Musk Oxen will be noticed; ten of these were from East Greenland, the remainder from the mainland of Arctic America in the form of skins procured from the natives. This is sad reading, for not only does it threaten the extinction of this most interesting animal, but also of one of the food supplies of the Indians and Esquimaux of this sterile land, who maintain at the best a very precarious existence on the flesh of the Reindeer, the Walrus, and the Musk Ox; should these supplies fail the natives will undoubtedly perish, a fate which has already to a great extent befallen their brethren to the west of Bering's Strait. Before the natives became possessed of firearms they could by their primitive methods obtain sufficient food for their wants, and skins for their tents and winter clothing, without undue sacrifice of life; but their capacity for destruction was limited. Since however they have been supplied with modern weapons they still destroy life to the utmost of their ability, without thought for the future, and, forgetful of their own wants, exchange the skins with white traders to an extent only limited by their capacity for slaughter,*

* My friend Mr. Kinnes, I am glad to say, tells me that this does not apply to the Walrus, for on enquiry by the captain of the 'Active' for skins of these animals, the natives told them that they only killed what they wanted for themselves, which they considered quite enough.

not for necessities only, but for luxuries they did better without in the past. The Musk Ox is one of the easiest of wild animals to approach, and as the demand for their skins is unlimited and the supply very much the reverse, it is by no means unlikely that the species will be exterminated before its life-history is fully studied by naturalists. Although not difficult to capture, and easy to manage when young,* the only living examples which have hitherto been brought to this country are two young ones, unfortunately both males, recently added to the Duke of Bedford's collections at Woburn.

The above are not the whole of these animals which have been captured during the past year; fortunately those I am about to mention were made a better use of. Dr. Nathroström, writing of his recent expedition to East Greenland (*Geo. Jour.* Nov. 1899, vol. xiv. pp. 534-37), and referring to the zoological results of the voyage, says, "We have secured twenty-eight Musk Oxen, all of which were prepared in some way or other, so that we had skeletons, skins, all the interior parts, brains, &c., brought home." This is well so far, but he also mentions "the fact that the White Polar Wolves have made an invasion around the northern part of Greenland along the whole coast, at least to Scoresby Sound," and that "the Reindeer are now very scanty in consequence of their having been killed by the Wolves," a fate too likely to be shared by the Musk Oxen.

My thanks, as on former occasions, are especially due to Mr. Michael Thorburn, of St. John's, Newfoundland, and Mr. Robert Kinnes, of Dundee, for their kindness in supplying me with much valuable information.

* See Buffalo Jones's 'Forty Years of Adventure,' p. 382, *et seq.*, for an account of lassoing young Musk Oxen near Chesterfield Inlet.

ON SEXUAL DIFFERENCES IN THE WING OF THE HOUSE-SPARROW (*PASSER DOMESTICUS*).

BY ARTHUR G. BUTLER, Ph.D., &c.

IN a short article on the wing of the Sky-Lark, which I published in 'The Zoologist' for 1898, I expressed my intention of noting the sexual differences in wing-structure of other species. Mr. C. H. B. Grant again assisted me with wings of three male and three female specimens of the domestic Sparrow; I already possessed five others, and subsequently Mr. F. W. Frohawk added to my collection. I therefore thought I could not do better than select this as an additional example in proof of the fact that, as a rule, the wings of male birds are better adapted to swift flight than those of their mates, thus enabling the former to overtake the latter when courting.

Of the six wings which Mr. Grant secured for me, all are carefully labelled, but in five of them the important note is added of the actual length of the bird in the flesh from which the wing was removed. As will at once be seen, this is a point of considerable importance, as it proves that, although individuals vary slightly in size, there is no great discrepancy in the total length of the sexes in the flesh. The following are measurements of three males:—

1.	Total length	. . .	$6\frac{3}{8}$	inches.
2.	„ „	. . .	$6\frac{1}{4}$	„
3.	„ „	. . .	$6\frac{1}{8}$	„

Of two females the measurements are:—

1.	Total length	. . .	$6\frac{1}{2}$	inches.
2.	„ „	. . .	$6\frac{1}{8}$	„

Comparing the expanded wings of the sexes in the same specimens, we get the following interesting results:—

Males	{	1.	Total length	. . .	4	inches.
		2.	„ „	. . .	$3\frac{3}{4}$	„
		3.	„ „	. . .	$3\frac{5}{8}$	„
Females	{	Total length	. . .	$3\frac{1}{2}$	„	
		„ „	. . .	$3\frac{7}{16}$	„	

Thus the largest hen, although a bigger bird than the largest cock, measures half an inch less in entire length of wing, this difference being due entirely to the lengthening of the second to the fifth primaries, with their coverts, in the male birds. These same feathers are often, though by no means invariably, narrower in the females than in the males, and when this is the case the resisting power of the wing must be considerably weakened.

The width of the wing from back to front shows little, if any, sexual difference, the secondaries being about of equal length in male and female; the natural effect of breadth without correspondingly developed length would be to produce a somewhat heavier and slower flight, so that in every respect the male bird has the advantage.

ORNITHOLOGICAL NOTES FROM MID-WALES.

BY J. H. SALTER, University College, Aberystwyth.

THE following notes, referring to the past two years, are in continuation of those which appeared in 'The Zoologist' (1898, pp. 198-201):—

A Cirl Bunting was singing upon Jan. 8th, 1898. This species with us appears to sing much more freely in winter than the Yellowhammer does. A visit paid to a small Heronry upon March 28th showed that these birds vie with the Raven in the matter of early breeding. In one nest young birds were calling loudly. There were egg-shells under two other nests, while a fourth contained three small young ones, and an egg which was hatching. On April 7th the young birds of the first mentioned brood were flying from tree to tree. At Craig-y-Pistyll, on March 28th, a pair of Ravens had a nest with five fresh eggs. It was found with difficulty, being inconspicuous amongst the heather and brambles which grew from the ledges of the crag.

While staying at Abergwesyn, in the extreme west of Breconshire, I noticed with interest the Nuthatch upon the trees—almost the last in this direction—close to the hotel. It does not cross the mountains, and hence only occurs very exceptionally upon their western or Cardiganshire side.

On April 9th I visited one of the few remaining breeding haunts of the Kite, an oak wood covering the slopes of a rocky hill. The pair of birds soon appeared, and, as they soared, showed their graceful flight to perfection. In turning, one or the other would often "throw over" almost on to its back against the stiff breeze. The nest, about thirty feet from the ground in an oak, being a new one, was small as compared with the size attained when utilized year after year. It contained two eggs, indicating that in this district the Kite breeds about a fortnight earlier than the Buzzard. A very large nest, from which, to my knowledge, Kites' eggs were taken in 1893, proved to be grass-

grown and untenanted. The Common Buzzard, though the fate of the Kite inevitably awaits it, is still fairly numerous, and eleven pairs were found breeding within a radius of perhaps five miles from our headquarters. Two presumably young and inexperienced birds had built about twenty feet from the ground in a small sycamore, one of the few trees surrounding a ruined sheep-fold upon the open moor.

On April 30th newly-arrived Pied Flycatchers, all of them males, were singing amongst the birches. A pair of Ravens, in the Nant Brenig, had three fully-fledged young ones just ready to leave the nest. A pair of White Wagtails upon Borth golf-links on May 13th were evidently on passage. There were three or four Turnstones on the strand, and an Oystercatcher's nest contained four eggs; I have never previously found more than three. On the 16th many Wheatears at Clarach were still on migration. A Wood Wren's nest was almost entirely composed of fir-needles. A Whinchat, singing with strange unfamiliar variations, so that I at first took it to be a Sedge Warbler, recalled the suggestions which have lately been made as to the power of mimicry in this species.

On June 4th I visited a colony of Lesser Terns near Towyn, and found the birds in about their usual numbers. Walking over the moors from the Teifi Pools to Cwm Ystwyth, on June 8th, I met with one pair of Golden Plover and several Dunlin, which were evidently breeding. The note of the latter bird, in the nesting season, is like the shrill rattle of a pea-whistle. Capt. Cosens informed me that a pair of Turtle-Doves bred in his grounds at Bronpadarn. On June 20th I heard the Manx Shearwater's note about 11.30 p.m.

During a few days spent in Snowdonia at the end of June several pairs of Choughs were seen. In company with Ravens, they frequent the cliffs of Clogwyn du'r Arddu. In the Nant Francon a nest of young Ring-Ouzels in the loose stone wall by the roadside was most conspicuous. Revisiting the same neighbourhood three months later, I found the Wheatear and Ring-Ouzel, on Sept. 23rd, still lingering near the summit of Carnedd Llewelyn. Four Ravens frequented the Glyders. Stonechats were numerous at Pen-y-gwryd, where they came into the hotel garden. A pair of Buzzards, the only ones met with, were seen

in Cwm Dyli, on the flanks of Snowdon, and during an ascent of that mountain I noticed a Fox crossing the ridge of Crib-y-Ddysgyl just below the summit.

At Aberystwyth, on Oct. 4th, a Stonechat sang a few strains at dusk; I had not previously known this species as an autumn songster. On the 15th Mr. Hutchings showed me a Spotted Crake just set up. In November Bramblings appeared under the beech trees. They seem to visit us biennially, missing the alternate years when there is no beech-mast. On Nov. 12th I received a Polecat from Nanteos.

The rest of my notes refer to the past year.

On Jan. 18th Mr. Hutchings showed me an immature specimen of the Little Gull. It was obtained during rough weather about nine days previously. A few bright warm days about Feb. 20th brought the Stonechats into song. On the 28th I received a very large male Polecat from the same locality as the previous one.

Upon March 1st, St. David's Day, visiting a nesting site of the Raven upon the coast about six miles south of this town, I found, as the glass showed, that the birds had refitted their old nest, which already contained an egg or eggs. About this date Curlew were constantly on the move, passing inland to their breeding quarters; they were to be heard at all hours of the day and night. On March 11th Herons were already sitting. A small party of Lesser Redpolls in alders at Llanilar were, with one exception, the first that I have met with in this county. On March 28th a Raven's nest in the Nant Berwyn, near Tregaron, contained three incubated eggs. The birds were furious, and came within ten yards of us, the cock tearing up soil and grass with his bill. Two days later I saw four Wood Larks on the wing at Llanbadarn. About two hundred and fifty Golden Plover were resting on the sands at the mouth of the Dovey on April 19th. On the 23rd a Wheatear was singing well at 11.45 p.m., a fair moonlight night. On April 26th, and again three days later, I heard the note of the Nutnatch in Cwm Woods. I have never previously identified this bird at Aberystwyth, though always on the look-out for it during the past eight years. A Pied Flycatcher was singing amongst the oaks at Nanteos on May 7th.

Birds were never in better voice than during the first half of

the month, the wet evidently suiting them. I found the pair of Kites again attempting to breed in the same locality as last year. On May 23rd they were lining a newly-built nest, situated in the same tree and in the same fork as five years ago. This was evidently the second attempt of the season. An old nest was lined with *rolls* of sheep's wool. A pair of Buzzards had a nest with a single young one, resting against a shrub of birch on the steep hillside, with scarcely anything of a fall below it. A pair of Ravens, which had three young nearly ready to fly, did not venture within a quarter of a mile of us, their behaviour being thus strikingly different from that of the above-mentioned pair. Pied Flycatchers were breeding freely, often in disused nesting-holes of the Green or Greater Spotted Woodpecker. Examining a number of Jackdaws' nests in the cliff, I found in many cases the whole brood dead, as the result of the cold wet weather at Whitsuntide. In June I heard the note of the Quail in two localities some six miles apart.

On Sept. 7th I noted a pair of Choughs passing over the hill at the northern end of the town. A Black Redstart frequented the College roof for at least a fortnight, basking upon the leads every fine day, and hawking for flies from the lightning-conductors. I last saw it on Nov. 6th. On Nov. 1st Thrushes and Blackbirds on migration were beating against the College windows after dark. Mr. Hutchings showed me a curious light-coloured variety of the Polecat on Dec. 29th, and reported three or four Bitterns obtained during the frost.

OBITUARY.

DR. ELLIOTT COUES.

ANOTHER first-rate ornithologist has, we regret to say, gone home to his last resting-place, and will be sorely missed, not only in America, but also in Europe, and especially in England, where he was personally known to so many of us.

Dr. Elliott Coues, who passed away on Christmas Day last at the comparatively early age of fifty-seven, was not only a most painstaking and hard-working cabinet naturalist, but equally good as a field naturalist, as shown by the good field-work he did during the many years he served as assistant-surgeon in the U.S. army. Not only was he one of the first authorities on North American ornithology, but he also did excellent work, in conjunction with Mr. J. A. Allen, in the study of North American mammals, and especially in the publication of their work on the 'Fur-bearing Animals.' His separately published works, by which his name is best known, are the 'Key to North American Birds,' 'The Birds of the North-West,' 'The Birds of the Colorado Valley,' and 'Check-List of North American Birds'; but besides these, his various articles in periodicals are numerous, and of considerable value.

Dr. Coues was an unusually hard worker, as no trouble was too great for him when working out a difficult problem; and he was also enthusiastic to a degree. On whatever subject he wrote he displayed great originality of thought, and his pen was verily that of a ready writer. A firm friend and an excellent companion, he was also, as so often is the case, a somewhat bitter enemy.

The writer and he have been on friendly terms during the past thirty years, and when he was in England he stayed with him, and many and pleasant were the discussions on ornithology that took place, especially those on trinomial nomenclature, on which each held very different views.

Dr. Coues, who was one of the founders of the American Ornithologists' Union, and at one time its President, became Professor of Zoology and Comparative Anatomy at Norwich University, Vermont, in 1869, and held the chair of Anatomy in the National Medical College from 1877 to 1883. For some months prior to his death he had been in bad health, and on the 6th of December underwent a serious surgical operation; his death, which took place at the Johns Hopkins Hospital, Baltimore, resulting from the same.

H. E. D.

DR. KARL RUSS.

DR. KARL RUSS, the eminent German student of bird-life, died on Sept. 29th, 1899. By his death both scientific aviculture and ornithology have sustained a severe loss.

Dr. Russ was always careful either personally to describe, or to obtain accurate descriptions of, the young plumage of all birds bred in captivity, from the egg until the change to the adult plumage; he noted the character and number of eggs, the duration of incubation, the age at which the young left the nest, and that at which their adult plumage was attained. Lastly, he carefully noted the colouring and variation in the soft parts in every adult bird which he described.

Russ was the son of an apothecary, and was born on Jan. 14th, 1833; he was therefore only in his sixty-seventh year when he died; yet he lived to complete the last volume of what he himself calls "the principal work" of his life in 1898, and saw it published in 1899.

'Die Fremdländischen Stubenvögel,' in four volumes, with effective (though hardly scientific) chromo-lithographic plates, is well worth the consideration of the most exclusive ornithologists; they may find much therein which will be new to them—facts as to seasonal changes of plumage, which some have hesitated to believe in, are proved by actual experience; several differences in the colouring of soft parts are indicated; with many other details of importance.

A. G. B.

NOTES AND QUERIES.

AVES.

Early Appearance of Chiffchaff.—On Dec. 31st I saw and watched for some time, with a field-glass in my garden here, a specimen of the Chiffchaff (*Phylloscopus rufus*); it appeared quite lively, and was busily engaged searching for insects among some evergreen shrubs. I consider this a very late appearance for this well-known Warbler.—W. J. WILLIAMS (Garville Road, Rathgar).

Nesting Habits of Great Tit.—Referring to Mr. Aplin's note on the Great Tit (*Parus major*) (*ante*, p. 19), he may not be aware that this bird is in the habit of covering its eggs till it has laid the full clutch, or nearly so. For some years past Great Tits have nested in our boxes here, frequently six or eight pairs in a season, and often the removal of the lid has revealed an apparently unfinished nest, which has contained three or four eggs covered with fur or wool. Perhaps I may add that we have had as tenants of our nest-boxes here the Redstart, Great Tit, Blue Tit, Cole Tit, Marsh Tit, Nuthatch, House-Sparrow, Starling, and Wryneck; and a neighbour who lives in an adjoining village has repeatedly had Tree-Sparrows nesting in his boxes.—JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds, Suffolk).

Great Grey Shrike in Suffolk.—A very perfect example of the race (or species) of Great Grey Shrike (*Lanius excubitor*), with one spot on the wing, was shot at Risby, near Bury St. Edmunds, about Nov. 20th. By the delicate pale grey of the back, and the very slight indications of markings on the breast, it appears to be a fully adult bird.—JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds, Suffolk).

Red-billed Chough.—At the last meeting of the Hampstead Scientific Society, I was enabled to exhibit a very fine mounted specimen of the Red-billed Chough (*Pyrrhonorax graculus*), which was shot from among a flock of Rooks near Hendon during last summer (1899). The bird was brought in the flesh to Mr. J. E. Whiting, of Heath Street, for preservation.—BASIL W. MARTIN (6, Holly Place, Hampstead).

Hoopoe in Anglesea.—Whilst engaged in investigating the occurrence of rare birds in Cheshire, I recently came across a specimen of the Hoopoe

(*Upupa epops*) in a keeper's cottage at Carden, which had been shot by the gamekeeper at Bodyor, near Holyhead, "about twenty-two years ago."—T. A. COWARD (Bowdon, Cheshire).

Peregrine in Suffolk.—On Jan. 17th I saw in the flesh, at Bury St. Edmunds, one of the finest adult female Peregrines (*Falco peregrinus*) which has ever come under my notice, shot by a keeper within an hour's walk of Bury Station. Females of this species very much outnumber males, both in the adult and immature plumage, and I only know of two adult male Peregrines obtained in Suffolk—one shot at Ickworth about 1860, which my father purchased at the time; and one (now in the Hele Collection in the Ipswich Museum), which struck the telegraph-wires near Aldeburgh in March, 1865.—JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds, Suffolk).

Bittern near Scarborough.—Last Friday (Dec. 29th) Mr. Challinor, farmer, Scalby Lodge, noticed and shot a rare bird in one of his fields which was flooded with water. The bird proved to be a beautiful specimen of the Common Bittern (*Botaurus stellaris*), or rather it should be called uncommon, seeing that it is about fifteen years since the last one was captured on Scalby Road, and which is now in the possession of Sir Wm. Fielding, Bart., South Cliff. It was brought to me to be preserved. The Osprey which was shot near here a few weeks ago, and which was recorded in the papers, also goes into Mr. Challinor's collection. — JOHN MORLEY (King Street, Scarborough).

Little Gull (*Larus minutus*) on the Thames.—I have recently added to my collection a female example of *L. minutus* in immature plumage. It was shot by Mr. E. Goodman, of Southend, who kindly gave it me shortly after securing it, and informed me its flight exactly resembled that of a small Tern. I found its gizzard contained some very small fishes' bones. The occurrence of this species at the end of December is, I believe, very unusual, as the majority of specimens that have been observed off the British coasts have been in the autumn and spring migrations. As I have often found that the lengths of birds given in various works on ornithology are not very reliable—due, I fancy, to the measurements being taken from skins and not from birds in the flesh—it may therefore be interesting to note that this bird in the flesh measured in length, from tip of bill to end of tail, $10\frac{1}{4}$ in.; wing, from carpal joint to end of longest primary, $8\frac{1}{2}$ in.; expanse of wings, 25 in.; and weight only $3\frac{1}{3}$ oz., although the bird was in excellent condition.—F. W. FROHAWK.

Winter Notes from Haddiscoe.—During the past few months sportsmen have had little to complain of in the way of sport on the Norfolk

marshes and waterways. During the month of September three Solitary Snipes fell victims to the Partridge guns in the locality of Haddiscoe. October witnessed the arrival of many Woodcocks, more than the usual complement. Individuals are being shot even now (January) almost daily; two were killed quite close to my door at Christmas, and another caught in a Rabbit-trap. In November the migration of Snipe exceeded that of many previous years, especially the Jacks, which I found in plenty at favourite haunts, and those I shot were in fine condition, being very fat and plump. Golden Plover have been exceedingly scarce. With December came the cream of wildfowl shooting; the short snap of winter weather in the shape of a snow-fall and a few sharp frosts filled the district with all kinds of wildfowl. Some of the gunners who went out with a shoulder-gun grumbled at bad luck after having bagged half a score of Duck in the space of a few hours by the river-side! The numbers slaughtered must have been enormous, the price of Wild Duck coming down as low as a shilling each. From an old Breydon gunner of many years' standing I learnt he had never seen the like before. Such unusual numbers of wild birds brought out sportsmen of all ages with various firearms, and most made good bags. For a few days Snipe-shooting was excellent, and so many killed that local game-dealers only paid fourpence each for them. As regards Coots and Moor-hens, dealers would not be troubled with them, owing to the great number of slain. On Dec. 18th, whilst walking by the side of Breydon, I observed fully three thousand Coots disporting themselves on the still water. On the approach of a gun-punt the whole host, with a mighty roar, took wing, alighting farther afield, only to receive more molestation from some other knight of the trigger. I counted eight punts containing swivel-guns of large calibre, with owners anxiously looking out with field-glasses for a shot, but the best part of the Duck-shooting was over at this date. I shot a specimen of the Great-crested Grebe on the Waveney. Three Goosanders were also procured on the same river, beside a quantity of Tufted Duck and three Smew. I saw several flocks of Geese; one flock numbered thirty-four. A large flock of Barnacle-Geese visited Breydon; one gunner shooting five. Mr. Walter Lowne, taxidermist, of Great Yarmouth, informs me that during the past six months he has received for preserving a beautiful specimen of the Purple Heron, shot in Suffolk; two Bitterns of the common species, one shot in the parish of Martham, the other by the river Bure; a Grey Phalarope, shot on Breydon; and other species which need little attention. From what I have seen, and through information received from reliable sources, I find, in spite of appeals, the slaughter amongst Kingfishers of late has been terrible; I have seen several Kingfishers during the winter.—LAST FARMAN (Haddiscoe, Norfolk).

Serrated Claws of the Common Heron.—In ‘The Zoologist’ for January (p. 38), Mr. Stanley Lewis expresses disappointment at his inability to find in my ‘Manual of British Birds’ any “mention of the serrated claws of this species.” If he turns to the Introduction, p. xxv, he may read that one of the distinctions of the genus *Ardea*—and, indeed, of the whole family *Ardeida*—is: “Middle claw pectinated on the inner edge.” In a condensed work, in which every line and almost every word had to be counted, it would have been a waste of space to repeat this in the description of each of the ten species of Herons and Bitterns which find a place in the British list. As for the use of this pectination, upon which Mr. Lewis invites an expression of opinion, I can only say that “the bearing—of the small-toothed comb—lies in its application.”—HOWARD SAUNDERS.

ORGANIC EVOLUTION.

Remarks relating to Mimicry.—In Mr. C. A. Witchell’s interesting “Stray Notes on Mimicry” (*ante*, p. 32), one or two of the facts cited in illustration of his views seem hardly to meet the case, or at least to be open to comment. For instance, referring to a suggested tendency with animals “to resemble things that they like, be those things mates or surrounding substances,” the writer proceeds as follows:—“I am aware that the sexual passion is not credited with this effect, but we know that breeders of prize poultry are careful to keep their male birds from running with birds not of the same variety, because if they do they will ‘throw’ feathers like those of their companions. *I have seen this occur in a well-bred East Indian drake that ran with a white Duck.*”* It is not at all unusual for black Ducks, whatever their companions or surroundings may be, to become, after their first or second year, more or less speckled with white. On a farm where black Ducks only (a cross between Cayuga and East Indian) were kept for many years in succession, this was a common occurrence. The process is a very gradual one. After about the second or third moult a white feather or two is noticed about the head, and at each succeeding moult more white appears, this speckling or splashing gradually increasing and spreading itself over the whole of the bird’s plumage. No other Ducks were kept on the farm, nor were there any white fowls. Again, with respect to the Snake-like hissing noise made by certain nesting birds, the following remarks occur:—“For a bird will hiss when on the nest, and at no other time, and which has yet never seen a Snake, or apparently never heard it hiss; such is a town-bred *fowl* or duck.” Sitting Ducks certainly hiss in an unmistakable manner at an intruder, but, extensive as is the vocabulary of the domestic fowl, I do not remember ever hearing either a town or

* The italics are mine.

country hen under any circumstance make a sound which could be likened to a "hiss." Farther on we find the following sentence:—"The so-called feigning of death seems to me to have no relation to mimicry, but to an exaggeration of that stillness which so many animals adopt to avoid observation." I think, notwithstanding that, in some instances at least, the ruse is carried so far as to justify its being called a feigning (or mimicry) of death or sleep; otherwise, in the case of the Landrail, for instance, why should the bird close its eyes when engaged in this piece of deception? As to reptiles and batrachians feigning death, one of the latter (*Bombinator igneus*) almost goes farther than this. Its aim seems to be to simulate the unattractive appearance of a dead Toad or Frog which has been shrivelled and dried up by the heat of the sun's rays. I have seen and handled one in this state. It had just been taken from a roadside pond in Normandy, and at once went through this singular performance. Flattening and depressing its body in a wonderful manner, at the same time closing the eyes and throwing up the head and all four limbs into the air, it thus formed its whole body into a cup-like shape, of which the middle of the back was the deepest part.

—G. T. ROPE.

NOTICES OF NEW BOOKS.

A First Book in Organic Evolution. By D. KERFOOT SHUTE, A.B., M.D. Kegan Paul, Trench, Trübner & Co. Ltd.

THE recognition of organic evolution is well pronounced among American biologists, and as a rule possesses a marked characteristic, which by some thinkers in this country is stated to exhibit the traces of what is considered the Neo-Lamarckian heresy. The present volume may, or may not, be tainted with an unpopular or heretical consideration of the inheritance of acquired characters, but there is much more profitable subject-matter to be found in its pages than the search for soundness of view as regards this dogma, while probably the author may be pronounced orthodox on the point. The book "has been written chiefly for the use of students in the medical department of the Columbian University," and by the ophthalmic surgeon to the University Hospital, while its author states that its production has been materially assisted by the advice of Prof. Gill, the eminent ichthyologist. We have thus an American survey of the subject by a surgeon, with the suggestions of a good zoologist, and on the subject of evolution the special standpoint of the author should always be understood.

Dr. Shute's special knowledge thus enables him to point out the confusion of thought which often fails to discriminate between *heredity* and *pseudo-heredity*, even physicians frequently writing of certain diseases as hereditary, whereas *congenital bacterial infection*, or the transmission of a microbe of the disease through the germ-cells of the parents is the correct explanation. That variation may be influenced by environment seems to be proved by several facts adduced by the author, and the following may be taken as an example:—"A certain species of Snail was introduced into Lexington, Virginia, a few years ago from Europe. In its new habitat it varied very much. One

hundred and twenty-five varieties have been discovered there, sixty-seven of which are new and unknown in Europe, the native home of the species."

Perhaps, however, the most debatable proposition advanced is that human customs, morals, and religions have, "as yet, very slightly, if at all, influenced the germ-cells," and are to be considered as "acquired (somatic) characteristics," and "pre-eminently the creations of environment." As an illustration we are told—what most would explain by a totally different reason—that if "infants of a Catholic family which is descended from a long line of Catholic ancestors were to be placed and retained in a purely Mohammedan environment, heredity would carry no Christian customs, morals or religion into that environment," but that Mohammedanism would replace and prevail. We think this is a wider question than can be decided by the influence of germ-cells, and does not appertain to *organic* evolution at all.

The chapter on "Natural Selection" is a good *résumé* of the most advanced theories on the question; that on the evolution of Man required more space to bring it sufficiently in line with recent anthropology; but in all the discussions on the different phases of organic evolution many new or little-known facts are introduced.

This small volume is always suggestive, and when we cannot see our way to agree with its writer, we are at least stimulated to fresh fields of thought. In the list of "Works of Reference" which forms "Section VIII." we have been unable to find among the names of authors that of Ernst Haeckel.

Fifteen Years' Sport and Life in the Hunting Grounds of Western America and British Columbia. By W. A. BAILLIE-GROHMAN. Horace Cox.

THIS is a book primarily for the sportsman who has the strength, and possesses the opportunities, to visit the wildest parts of a now unfashionable continent, for Africa and not North America is at present considered the hunter's paradise. And yet this need not be a rule made too absolute, for we read:—"There are even to-day countries, the size of small kingdoms, in British

North America, into which no hunting party has ever penetrated, and where the frying pan's capacity of a few isolated prospectors has, so far, measured the destruction of game; countries where Moose, Caribou, and Antelope-Goat are still unfamiliar with the sight of white-skinned human beings."

The zoologist will find much worth reading and remembering in the chapters—amongst others—devoted to the Wapiti and the Antelope-Goat (*Haplocerus montanus*), though he will wish there were even more facts relating to the life-histories of these animals, and less discussion of record heads and antlers, which, after all, pertain more to the fame of the trophies of a hall than to the real treasure of a zoological museum. In fact, these monster heads seem to provoke too much emulation and apparent heart-burnings among their fortunate possessors, and the zoological reader may well skip the results of the measuring-tape and enjoy and profit by the beautiful illustrations of the heads themselves.

This book cannot be pronounced a genial production: there is too much criticism; scarcely any authority quoted seems free from error of commission or omission, so that we frequently—too frequently—are transported from the beauties of nature to the more confined area of the forum for the purpose of critical discussion.

The chapter devoted to "The Salmon of the Pacific Slope" contains much information apart from the correction of Dr. Günther. The reproduction of the instantaneous photograph of a Salmon leaping an eighteen-feet-high fall in Labrador is a charming contribution to art and zoology.

British Dragonflies (Odonata). By W. J. LUCAS, B.A., F.E.S.,
L. Upcott Gill.

MR. LUCAS has found the subject for a much-needed book in British Entomology. The Dragonflies were certainly collected by some, and known to a few, but to the general British zoologist they were little understood, identified with difficulty, and hence—apart from specialists—received scant attention. Their life-histories can only be unravelled by skill and patience; for the

breeding of Odonata is attended with more difficulty than that of Lepidoptera, and a volume like the present is an incentive to that task, and is also provocative to observation.

“Of recent Dragonflies Linnæus knew only fifty-six species in the middle of last century, Baron de Selys Longchamps gave 1344 as the total in 1871. In 1890 Kirby could bring the list up to 1800, and thought that the number might be quadrupled, if only the group were more thoroughly worked. The total for Europe is just over a hundred, while in Britain there are forty.” Of these last Mr. Lucas considers two as being synonymic, and this brings the number—including occasional visitors—to thirty-nine.

Many modern authorities now either treat the Odonata as a distinct order, or as a section of the Orthoptera; Mr. Lucas decides still to regard the Dragonflies as part of the Neuroptera. Without being a specialist in the study of these insects, he seems to have read up the literature with trouble and care, and to have consulted the records of captures sufficiently to give a good account of the distribution of each species in Britain. The illustrations leave little to be desired; the sexes of each species are portrayed in coloured plates, while many good figures ornament the text. In a purely entomological publication—which this Journal is not—many points might be discussed which are dealt with in the volume; it sufficeth us to regard it as a contribution to British Zoology which was wanted, which will be welcomed by most naturalists, and which has been produced in a handsome and thorough manner.

Recent Foraminifera: a Descriptive Catalogue of Specimens dredged by the U.S. Fish Com. Steamer 'Albatross.' By JAMES N. FLINT, M.D., U.S.N. Washington; Government Printing Office.

THIS publication is the zoological strength of the Report of the U.S. National Museum for the year ending June 30th, 1897, and which has just been printed and received.

We read that material from above one hundred and twenty-five stations has been carefully studied, and specimens from more than a hundred localities have been preserved and identified. Of these localities, fifty-eight are in the North Atlantic

Ocean, twenty-one in the Gulf of Mexico, seven in the Caribbean Sea, one in the South Pacific, and five in the North Pacific. The depths at these stations vary from 7 to 2512 fathoms. The classification followed is that of Mr. Brady in the 'Challenger' reports.

Zoologists seem sometimes to forget these primitive forms of animal life, and yet how little we know of their life-histories! "How the function of nutrition is accomplished, and the nature and condition of the organic material used as food by these minute animals is not yet determined." "Of the process of reproduction little is known beyond the fact of multiplication by gemmation and fission." The Foraminifera are therefore still in search of their interpreter. Their iconographer has not been undiscoverable. This most interesting memoir is illustrated by no fewer than eighty beautiful plates.

Most English readers will remember these animals as having formed the pabulum of Huxley's classical lecture "On a Piece of Chalk."

The Mycetozoa, and some Questions which they Suggest. By the Right Hon. Sir EDWARD FRY, D.C.L., &c. and AGNES FRY. 'Knowledge' Office.

THIS is a reprint from the columns of our contemporary 'Knowledge,' and is devoted to the consideration of a form of life whose position in classification is still *sub judice*, being claimed alike by botanists and zoologists. We recently ('Zoologist,' 1899, p. 524) drew attention to a volume on the same subject by Prof. Macbride. It is owing to these diverse claims that the subject becomes matter for our pages. The present authors, in discussing the affinities of the Mycetozoa = Myxomycetes of Macbride, and the question as to whether they belong to the vegetable or animal domains—which, after all, reduced to their primitive conditions, are practically convertible terms—pronounce a qualified decision. "It almost seems as if the Myxies were a vagrant tribe that wander sometimes on the one side, and sometimes on the other side of the border-line—like nomads wandering across the frontier of two settled and adjoining states, to neither of which they belong. They would seem to begin life as animals, and end it as vegetables."

It is in these difficulties to enclose nature in the different "kraals" of systematic natural history that the true biological evidence for organic evolution is to be found.

Biologia Animale (Zoologia Generale e Speciale) per Naturalisti, Medici, e Veterinari. Del Dott. GEDEONE COLLAMARINI.
Milan: Ulrico Hoepli.

THIS is one of the latest publications in the 'Manuali Hoepli,' and, as will be understood by the title, is an attempt in a small volume to condense the information which is distributed over a very wide field. Thus, in the introduction, we find the subject of Zoological Nomenclature, with a considerable number of rules or axioms respecting the Law of Priority. A chapter is devoted to Anthropology, another to Medical Zoology, and a third to Agricultural Zoology. These, in addition to sections on Anatomy, Embryology, Physiology, and Systematic Zoology, comprised in a small volume of 426 pages, sufficiently proclaim that the subject is necessarily treated in a most restricted sense. As the book is written in the Italian language, it is unlikely to be much in vogue among English readers, but is worthy of record as showing a widening of horizon as to *special subjects*, though distinctly peculiar in ignoring the claims of Palæontology to be included in its purview. It is probably intended for the use of schools.

Faune de France: Les Oiseaux. Par A. ACLOQUE. Paris: Baillièrè et Fils.

THE last publication of this series—of which we have already noticed some other volumes—is devoted to Birds, and is written on precisely the same method as pursued in the treatment of other animals. The facilities of a synoptical classification and a profuse illustration are again presented to the student; and if the first does not always secure its object—as few of these attempts do—and the second are somewhat coarse, we have at least a manual which is inexpensive, and one which will no doubt prove helpful to many a young ornithologist. Over six hundred figures are given in the comparatively short space of 252 pages.

EDITORIAL GLEANINGS.

IN this month's 'Avicultural Magazine' will be found the first part of "A Naturalist's Notes in Ecuador," by Mr. Walter Goodfellow, who, with Mr. Claud Hamilton, has spent two years in that interesting region. We extract the following remarks anent Humming-birds, which, the writer remarks, would be generally associated with sunny flower-bedecked glades:—"It is true that numbers of them are found (and some beautiful ones too) in the hot forests of Tropical America, but they are much more numerous, and far more beautiful in the higher Andes; some of the loveliest of all being found at altitudes of between eight and thirteen thousand feet; whilst the little Black Hummer with a sapphire throat, known as Jameson's Humming-bird, I have seen, when camping out on the volcano of Pichincha, Condor-shooting, flying past our tent in a heavy snowstorm, with its mournful *twit twit*, at an altitude of over fourteen thousand feet. I have noticed others of the same family sitting on the telegraph-wires (apparently a favourite post of theirs) along the dusty roads in the central highlands, in the most prosaic manner possible, watching, perchance, for passing insects, darting into the air to seize their prey on the wing, and always returning to the same spot. It seems to be almost a general rule in Ecuador that Humming-birds which make their home in the dense forests lack almost entirely the beautiful iridescence peculiar to most members of the family. But, if they lack colour, many of them have peculiarities of form—as, for instance, the wonderful curved bill of the *Eutoxeres aquila*, the saw-bill of the *Androdon æquatorialis*, and the elongated tail-feathers of the *Phæthornis symratorphorus*. In showing Humming-birds' skins to friends at home one always hears the remark, 'How lovely they must look flying about!' It is true they do look pretty with their graceful poses, but their wonderful colouring is generally then almost entirely invisible, and certainly not seen to proper advantage, many species looking much the same as one another in freedom, but vastly different when held in the hand and turned to the right light."

IN the 'American Naturalist' for December last there has been published the account of a most instructive observation by Florence Wells

Slater on the egg-carrying habit of a water-hemipteron. It is a well-known fact that certain bugs of the family *Belostomatidæ* carry their eggs on their back until they are hatched. This has been frequently observed in the case of *Zaitha fluminea*, common in the Atlantic States. It has been taken for granted by all who have described this habit that it is the female that carries the eggs, and it has been authoritatively stated that she places them on her back by the aid of her ovipositor. Miss Slater, by dissection, has found that all the egg-carrying specimens belonged to the male sex, and from observations made by the aid of an aquarium found that the male was frequently a most unwilling bearer of these burdens of reproduction. Her observations "indicate that the female is obliged to capture the male in order to deposit the eggs. Upon visiting the aquarium one afternoon a male was found to have a few eggs upon the caudal end of the wings. There was a marked difference in the colour of these, those nearest the head being yellow, while those nearest the caudal end were dark grey. The small number of the eggs indicated that the female had been interrupted in her egg-laying, and the difference in colour of the eggs that the process must be a slow one. For five hours I watched a silent unremitting struggle between the male and the female. Her desire was evidently to capture him uninjured. She crept quietly to within a few inches of him, and there remained immovable for half an hour. Suddenly she sprang towards him; but he was on the look-out, and fought so vigorously that she was obliged to retreat. After this repulse she swam about carelessly for a time, as if searching for food was her only thought. But in ten or fifteen minutes she was back in her first position in front of him. Again there was the attack, and again the repulse. The same tactics were continued until midnight, when, despairing of her success, I left them. At six o'clock the next morning the entire abdomen of the male and half of the thorax were covered with eggs. Those nearest the head were quite yellow, showing that the struggle had just ended."

THE Marquis of Lorne has imported some Wild Turkeys from Canada, and turned them loose in Argyllshire. They are doing well, and Turkey-shooting may become an attraction of the Highlands.—*Sun*.

THE Secretary of State for the Home Department has made the following Order under the Wild Birds Protection Acts, 1880-1896, for the Protection of Wild Birds and Wild Birds' Eggs within the County of London.

THE WILD BIRDS PROTECTION (COUNTY OF LONDON) ORDER,
JANUARY, 1900. Dated Jan. 10th, 1900.

Close Time Extended.

II. The time during which the killing and taking of wild birds is prohibited by the Act of 1880 shall be extended, so far as concerns the county of London, so as to be from the 1st day of February to the 31st day of August in each year.

Certain Birds protected during the whole of the Year.

III. During the period from the 1st day of September in any year to the 31st day of January following, both days inclusive, the taking or killing of any of the following kinds of wild birds is prohibited throughout the county of London :—

Bearded Tit (Reedling or Reed Pheasant), Blackbird, Blackcap, Blue Tit, Buntings, Buzzard, Chaffinch, Chiffchaff, Cole Tit, Coot, Cuckoo, Flycatchers, Garden Warbler, Golden-crested Wren, Goldfinch, Great Tit, Gulls, Hedge-Sparrow (or Dunnock), Hobby, Honey Buzzard, Kestrel, Kingfisher, Landrail (or Corncrake), Lark, Lesser Whitethroat, Linnet, Long-tailed Tit, Magpie, Martins, Merlin, Nightingale, Nightjar, Nuthatch, Osprey, Owls, Redstart, Reed Warbler, Robin (or Redbreast), Sedge Warbler, Shrikes, Starling, Stonechat, Swallow, Swift, Thrushes, Wagtails, Wheatear, Whinchat, Whitethroat, Willow Warbler, Woodpeckers, Wood Warbler, Wren, Wryneck (Cuckoo's-mate or Snake-bird).

All Birds protected on Sundays in certain Parishes.

IV. During the period from the 1st day of September in any year to the 31st day of January following, both days inclusive, the taking or killing of wild birds on Sundays is prohibited in the following parishes in the county of London. [Here follows list of parishes.]

Additions to the Schedule of the Act of 1880.

V. The Wild Birds Protection Act, 1880, shall apply within the county of London to the Bearded Tit (Reedling or Reed Pheasant), Buzzard, Chaffinch, Hobby, Honey Buzzard, Kestrel, Magpie, Martins, Merlin, Osprey, Shrikes, Swallow, Swift, and Wryneck (Cuckoo's-mate or Snake-bird), as if those species were included in the schedule to the said Act.

EGGS.

Certain Eggs protected throughout the County.

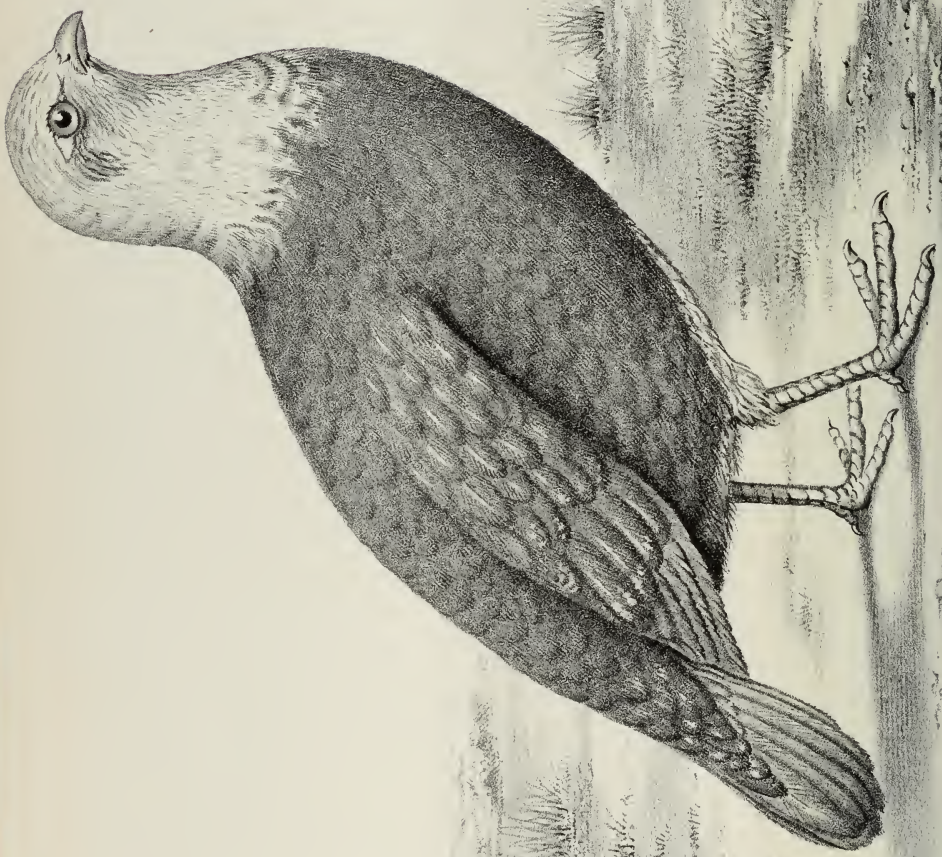
VI. The taking or destroying of the eggs of the following wild birds is prohibited throughout the county of London for a period of five years from the date of this Order :—

Bearded Tit (Reedling or Reed Pheasant), Blackbird, Blackcap, Blue Tit, Buntings, Buzzard, Chiffchaff, Cole Tit, Coot, Cuckoo, Flycatchers,

Garden Warbler, Golden-crested Wren, Goldfinch, Great Tit, Hawfinch, Hedge-Sparrow (or Dunnock), Hobby, Honey Buzzard, Kestrel, Kingfisher, Landrail (or Corncrake), Lark, Lesser Whitethroat, Linnet, Long-tailed Tit, Magpie, Martins, Merlin, Nightingale, Nightjar, Nuthatch, Osprey, Owls, Plover (Lapwing or Peewit), Redstart, Reed Warbler, Robin (or Redbreast), Sedge Warbler, Shrikes, Starling, Stonechat, Swallow, Swift, Thrushes, Wagtails, Wheatear, Whinchat, Whitethroat, Willow Warbler, Woodpecker, Wood Warbler, Wren, Wryneck (Cuckoo's-mate or Snake-bird).

Any person infringing this Order is liable on conviction to penalties not exceeding £1 for every bird or egg taken or destroyed.

FEW hard-and-fast characters used in zoological classification attain to the legal definitions of the Medes and Persians. Thus we have "Salamanders with and without Lungs," the subject of a valuable communication by Dr. Lönnberg in the 'Zoologischer Anzeiger' of December last (No. 604, p. 545). It had been proved by Wilder, Camerano, and Moore, as well as by the writer of the article, that many Salamanders are normally deprived of lungs. To these Dr. Lönnberg adds two more species, and gives a list of those known to be without lungs, or to have these organs reduced. There are also a number of species which possess well although differently developed lungs. These Dr. Lönnberg proposes to divide into two classes, *viz.* (1) such in which the lungs extend to the groin, and are about 60 per cent. of the length of head and body, and (2) such in which the lungs extend only about half-way between axilla and groin, and measure only from 45 to 38 per cent. of the length of the head and body. "Camerano has rightly pointed out the importance of the lungs as an hydrostatic organ, and it seems quite probable that the great length of the lungs in many forms is an adaptation to aquatic life. But the lungless Salamanders are not necessarily obliged to lead a terrestrial life, even if many of them do so; on the contrary, some of them are very positively aquatic in their habits. In the latter case, however, they do not swim suspended in the middle of the water, as the species of *Molge*, but crawl or wriggle at the bottom."



West. Newman Lith.

THE ZOOLOGIST

No. 705.—*March, 1900.*

ORNITHOLOGICAL NOTES FROM NORFOLK FOR 1899.

BY J. H. GURNEY, F.Z.S.

(ASSISTED BY SEVERAL OTHER NATURALISTS.)

PLATE II.

THE rarities for the year have not been many, and one cannot but be impressed with the growing scarcity of the Hobby, Kestrel, Magpie, Quail, Woodcock, Ruff, Spotted Crake, Bittern, Teal, Garganey, and Wild Duck. 1899 seems to have passed without the record of a single Waxwing, Black-tailed Godwit, Spotted Crake, Eider Duck, Glaucous Gull (last visitation 1895), Great Northern Diver, or Fulmar Petrel, and with very few raptorial visitants. The Rev. M. C. Bird tells me of one male Hen-Harrier seen in November among the Broads, and he saw or heard of an Osprey in May; other correspondents record two of these splendid Eaglefishers in October. Hardly any Buzzards came over, and since the Buzzard years of 1881 and 1896 they have been conspicuous by their absence; it is also a good many years since a Goshawk has appeared.

On Jan. 13th, after a gale in the night, I picked up a Mistle-Thrush which had been dashed against the keep of Norwich Castle, and a Hawfinch at Kirby Bedon met its death in a somewhat similar way. Some young Grey-headed Wagtails passed about Sept. 1st; Crossbills have been reported here and there,

and Grey Wagtails as usual. There were no Bluethroats, and Snow-Buntings were scarce (H. N. Pashley); but my correspondent speaks of "foreign Blackbirds," and hundreds of small dark Thrushes in October, an appearance perhaps more due to the locality than the size of the birds themselves. A Black Redstart was identified in October, and another in November (Pashley), and on Nov. 7th Mr. Ramm feels certain of having seen an Ortolan Bunting. Whether this identification can be trusted I cannot say, but the wind the day before had changed to the north-west.

The only Lapland Buntings were two in October, but many Long-tailed Tits were observed, and in one place they were even seen coming off the sea. November was rainy and unsettled up to the 11th, but it was too late then to much affect migration, as most of the species had passed, though flocks of Little Auks and other *Alcidæ* were seen at sea. Three or four Grey Shrikes paid their customary autumnal visit, and Mr. Arthur Patterson had two Quails to announce in that month.

Although I have diligently written down the direction of the wind in my journal nearly every day, there was so little autumnal migration that no results have been gained. The principal movement was during the first week in October, when there were so many Grey Plovers; and at the same time, *viz.* on the 4th of that month, something like a rush was observed in North Lincolnshire by Mr. Caton Haigh (*cf.* p. 112).

On Dec. 10th the first snow came with a light west wind, and so rapid was the drop that night that the thermometer in my parish marked two degrees above zero. A profusion of Ducks, Snipe, Water-Rails, Water-hens, &c., immediately appeared on the meadows adjacent to the Norwich rivers, and every gunner sallied forth bent on destruction. Half-starved Mistle-Thrushes flocked to the yew trees in my garden, as many as nine of these great birds hanging on or around one small Irish yew; but already the red berries (which were in masses a week before) were falling off. Barn-Owls, persecuted at all times, suffered more than ever, and a good many Kingfishers were slaughtered; but our Norwich birdstuffers have the good sense to refuse to buy either the one or the other. On the 12th two guns shot forty Snipe in an afternoon at Carrow, and the next day, on the same

ground, made up a bag of ninety-one Snipe, thirty Plover, and four Duck. News came to hand of many flocks of Ducks passing high overhead in different parts, but especially near the coast, beyond the reach of guns. Fowl of all kinds came to Norwich, and a basket of Mallard which I saw unpacked contained a nice pair of Gadwall† from Lynn, and in another lot two Shovelers† from Ranworth. These Gadwall are the first I remember to have met with in Norwich Market, while a few days afterwards two more were shot near Salthouse, and some Pintails (Ramm). In Lubbock's time Gadwall came to Norwich Market every winter. A few fine Goosanders appeared about the 20th (E. Saunders), but only two Smews.

Mr. Arthur Patterson, writing from Yarmouth, and giving a description of the hard weather and its effects, says:—"Dec. 14th, birds are plentiful; yesterday crowds on Breydon Broad. Snipe rushed in after the snow; on the 10th they invaded the marshes, and on the 11th began to appear in Yarmouth Market," where the chief salesman, Mr. Durrant, gave Mr. Patterson the following particulars from his week-book of birds bought. This table could be compared with that given by Mr. Stevenson in 'The Zoologist' for 1880, p. 326, which is equally interesting.

	Dec. 11	Dec. 12	Dec. 13	Dec. 14	Dec. 15	Dec. 16	
Snipe	47	40	120	43	60	310	} Jack-Snipes } not separated.
Jack-Snipe.....	17	12	20	—	—	—	
Lapwing.....	14	6	—	6	12	20	
Golden Plover ...	10	1	—	—	4	3	
Coot	—	13	40	—	6	20	
Moor-hen	—	—	—	—	9	10	
Water-Rail.....	—	—	—	—	3	—	
Spotted Crake ...	—	—	2	—	—	—	
Heron.....	—	—	—	—	1	1	
Goosander	—	—	—	—	—	1	
Mallard	4	4	14	—	30	32	
Wigeon	5	5	9	4	14	35	
Pochard	—	—	1	—	7	15	
Teal.....	—	—	—	—	1	3	
Golden-Eye	—	—	—	—	—	3	
Tufted Duck	—	—	—	—	—	17	
Shoveler	—	1	—	—	3	—	
Woodcock	—	—	8	—	1	—	
Curlew	—	—	—	—	1	1	
Dunlin	23	—	40	60	179	336	
Dabchick	—	—	—	—	—	6	

Again, writing on the 16th, Mr. Patterson says:—"To-day's [Yarmouth] market reminded me of the old-fashioned times. There was scarcely a stall without its odd Lapwing, or its bunch of Starlings or Blackbirds. There were scores of Redwings, Fieldfares, and Thrushes; one person had a bunch of Sparrows, and another of Greenfinches. . . . On one stall, with the Scaup I sent you (the "white-nosed day-fowl" of our old gunners), were a half-score Pochards. Last night guns were banging on Breydon Broad all night. Dunlins smothered the flats, I am told. One old lady had a Shoveler. There were two Long-eared Owls up to-day, two Stock-Doves, and some very juvenile Wood-Pigeons. This morning some Coots were swimming about in the lower river, and boys were stoning them. Seven [Whooper?] Swans have been seen on Breydon."

Similar accounts were received from Mr. Dye, who mentions that numbers of wildfowl passed over Yarmouth going south, and that the cries of Golden Plover were heard at night, as is often the case when they are attracted by the street-lamps.

The rainfall for the year, as taken in my garden, was 24·43, the driest months being June (1·20) and August (·37); while the wettest, July (3·38), was almost entirely owing to one tremendous downpour on July 23rd. In 1898 the rainfall at Keswick was 23·45, both years being below the average; and our wells, which have been quite dry, still want water.

As it is sometimes convenient to know afterwards what specimens were examined by the recorder, a dagger (†) in the following notes indicate such as were so inspected.

JANUARY.

1st.—A few Golden Plover at the poulterer's. A Shag † allowed itself to be captured while fishing in Blakenny cut, and, though exhibiting no apparent injury, did not live many days; it had strength, however, to chase and kill some Goldfish in a pond. Although in adult winter plumage it already had a few of the glossy spring feathers showing in places. Four Shags were recorded in last year's "Notes," and they certainly are not the rarity in Norfolk they used to be; it would be interesting to know to what British colony we are indebted for them, as they

no longer breed in Yorkshire, and may perhaps come to us from Norway.

14th.—A young male Iceland Gull on Breydon, so tame that Mr. Patterson crept to within ten paces; and of course next day it found its way to Mr. Lowne's shop. Length, 21·5; culmen, 1·3; tarsus, 1·8. I have not seen it, but these measurements are sufficient to establish its identity; and it is the fifth for our county, the Glaucous Gull being much commoner.

18th.—One of the chestnut-coloured Partridges killed at Bylaugh, near Dereham, by Col. Custance. These birds are quite different in colour from the melanistic race which was met with at Campsea Ash in 1891 and 1892, with which they cannot be confounded. They are simply an erythrisms, an abnormal replacement of the natural colour by red, as has occasionally happened in the Bullfinch, House-Sparrow, Green Woodpecker, Rose-coloured Pastor, &c. This month a variety of the Hooded Crow speckled with white was taken near Thetford.

19th.—Black-throated Diver shot at the mouth of the river Bure by Mr. E. C. Saunders, who describes it as largely spotted on the wings, and becoming barred with white on its back.

26th.—A hundred Tufted Ducks and several small lots of Gadwall and Wigeon seen on the Ouse near Thetford (T. Southwell). Many Wild Ducks already paired.

31st.—Thousands of Lapwings at Hickling (S. Harmer).

FEBRUARY.

1st.—A flock of about fifty Siskins by our river searching the alders in their usual engaging way.

2nd.—Mr. Caton Haigh met with seven Shore-Larks at Cley, soon after with a flock of about thirty, and farther along the coast saw other small parties and single birds; also twenty Chaffinches on the shingle, which he presumed had just come over, though we do not expect them after Christmas.

9th.—Coots and Redshanks paired (Bird).

11th.—The weather is now extraordinarily mild for the time of year, and the large flights of Wood-Pigeons which were in all our woods in January have gone, probably northwards. Lambs are becoming general, and the young wheat, which is two inches above the ground, is about safe from the depredations of Rooks,

which have an appetite for the kernel long after it has sprouted. Seed-corn must be drilled very deep to be safe from their long beaks, on account of which and other misdeeds very few Norfolk farmers give the Rook a good character. Assisted by the Jackdaws—an increasing species in the eastern counties—the rascals have also, in spite of shooting, been doing their best to let “the weather” into the farmers’ barley-stacks by persistently pulling out great quantities of the top straw and much of the thatch for the sake of the grain underneath, which they contrive to do with the greatest skill, but more easily where a stack is made up of short rakings. Two or three defunct Rooks hoisted on sticks make a fairly efficient scarecrow, but occasionally a very hungry Rook will not be deterred from making a regular burrow into a stack, protruding from which may be seen the black tip of his tail. More than this, Rooks will actually attack the roof of a barn, which must be pure mischief, as there can be nothing to eat there, except it be a few grubs in the thatch. Everyone knows their unfortunate partiality for swede-turnips at this time of the year, and that in itself is a strong indictment against large Rookeries. By pecking holes they soon make the roots rot; and in such a winter as 1898–9 this is no joke. But perhaps what most annoys the farmer is to see Rooks on a turnip-field when the plant is just coming up, for, although in some cases the birds are after the wireworm, the result is the same;—a crop of barren spaces appear in the field instead of swedes and mangolds, just as if a portion of the field had not been sown at all. Mr. Holmes informs me that at Winfarthing, Rooks have for some years nested on nut-bushes, where they will not be safe from the enraged Norfolk farmer, who seldom has a good word for these sable thieves.

14th.—Two Ruffs,† just commencing the spring change, shot in a field of young wheat with some Lapwings at Postwick (W. Spelman), which occurrence so very early in the year must have been due to the open weather. Plovers at this season are very fond of young wheat, and there have been a great many on the uplands, and in this instance their presence no doubt acted as a decoy to the Ruffs. Weather wet, but days very fine in spite of it.

23rd.—A pair of Shoveler Ducks on our largest broad (Bird).

The repeated occurrence of Shovelers in the winter has been already remarked. Mr. Southwell thinks they are increasing in summer, and certainly the number of egg-shells in a nest testify to their prolificacy. Of the seven Ducks which commonly breed in Norfolk, the Garganey Teal is the only one which is never seen in winter; yet Norfolk is far from being its northern breeding limit. I have seen as many as nine eggs in a Garganey Teal's nest, and eleven in a Shoveler's.

27th.—A very early Thrush's nest at Keswick with three eggs, and another nest with one—undersized eggs in both cases; and a Robin's nest quite ready, in spite of slight frosts every night sufficient to brown the wheat. A Wild Duck reported to be already sitting at Shottesham, many Siskins in our "Rookery," and a Redpoll apparently searching for a nesting-place; Rooks also examining trees, and quantities of Thrushes on the fields. Partridges and Wood-Pigeons proved the unprecedented mildness of the weather by being paired long ago, although there was snow not far away. Five Shovelers at Hickling (Bird); not safe from the gunners yet.

MARCH.

My correspondent, Mr. Bird, writes from the Broads:—"An old male Golden-Eye still about, four pairs of Bearded Tits (good news), one Coot's nest half-built, and two others commenced; Water-Rails very noisy all day." Four days later came the snowstorm which wrought such destruction among the Lapwings in Scotland (*Zool.* 1899, p. 225). At once all work on my farm was stopped, and the wretched Thrushes, some of which had only just come northwards, crowded on to the few bits of grass still uncovered by the snow. In spite of this the Wheatear appeared at Beachamwell on the 22nd (R. C. Nightingale), a day later than Mr. Haigh first saw it in Lincolnshire.

23rd.—Mr. Bird found a Long-eared Owl sitting on five eggs among some brakes, which was remarkable after such a downfall of sleet and snow, much of which was still on the ground, and also from the circumstance of the nest being on the ground, the nests of this species which I have seen having always been in a tree, the silver-fir by preference.

28th.—Two Bramblings with black chins recently taken at Yarmouth; Mr. Lowne, who kept one of them, found that the

amount of black diminished in the moult; these black-chinned Bramblings are not a very uncommon variety, and are the exact reverse of the white-chinned Goldfinch, which is sometimes called a "cheverel," and was described by Madarász as *Carduelis albogularis*. The black-chinned Brambling does not seem to have yet received a name in science.

APRIL.

4th.—A pair of Garganey Teal seen (A. Nudd). Now uncommon anywhere, and practically extinct in West Norfolk.

8th.—Another pair of Garganey (Bird), evidently going to nest, if they had not already begun on a rush-tuft.

11th.—A Sheldrake seen on Saham Mere, which is twenty-four miles from the sea (A. W. Partridge).

12th.—First Ruff; three Water-Rails' nests (Bird).

16th.—Hoopoe at Morston (R. Wood). Two Spoonbills on Breydon (B. Dye).

18th.—A few Gadwall, and one Tufted Duck only at the meres on Wretham Heath, where, owing to the drought, there is very little water (T. Southwell).

19th.—First Grasshopper Warblers heard (Bird).

MAY.

3rd.—Mr. Patterson saw an Iceland Gull being mobbed by other Gulls at Breydon "Knowle." Thirteen Whimbrel at Hickling; and immediately afterwards two Garganeys (Bird).

8th.—Six or seven Spoonbills to be seen on Breydon muds, where they allowed themselves to be viewed by several people; and again, a few days afterwards, by Mr. Patterson and Mr. Dye, with the Iceland [or Glaucous] Gull mentioned above; and nineteen Bar-tailed Godwits. These are the same Spoonbills alluded to by Mr. Farman (*Zool.* 1899, p. 366), and three of them afterwards moved on to Cley (Pashley); while the Gull moved its quarters to Horsey Broad, where it was seen by Mr. Bird. Mr. Patterson has already described the manner in which these Spoonbills walked (*Zool.* 1899, p. 270); and, again, it was his opinion that Spoonbills are incapable of uttering any sound. I was quite of the same opinion until a short time ago, when two Spoonbills in confinement, which had been dumb for a long time, suddenly, under the

influence of a warm day, began a rather feeble duet, accompanied by an up and down movement of the neck, but sufficient to prove them not speechless.

9th.—A Pied Chaffinch at Northrepps.

10th.—Four Pied Flycatchers in Mr. Pashley's garden.

11th.—A Marsh-Harrier's nest† quite ready for eggs, but not containing any, found about two miles from the sea by a naturalist who saw the female rise and quit it at twenty yards, there being four other Harriers on the wing at the same time, a sight not often enjoyed in England nowadays. Unfortunately the two old Harriers brought themselves under the gamekeeper's fatal ban by killing some leverets, and their identity, which had been questioned, was only too well established shortly afterwards, as this obnoxious individual trapped them both. The cock was quite the finest old male that has been seen in Norfolk for many a year, with grey wing-coverts, and a light tail and crown. The Marsh-Harrier's nest was nine inches in diameter and raised fourteen from the ground, but, as Mr. Bird remarked, as the rushes grew the nest would naturally continue to rise a little with them. It was composed of pieces of the "gladden" which grows all round (*Carex* or *Juncus*), and a few dead hemlock stems from the marsh wall, with one large bramble, and a bit of rotten wood the thickness of a man's finger. A few yards off lay the remains of a small leveret, the fatal appetite for which had brought down the keeper's wrath. The marsh is what would be called here a dry marsh, of large extent, a capital place at this time of the year for Swallow-tailed Butterflies and Cuckoos, one of which birds was seen by the marshman with an egg in its mouth or else a young bird. Of this nest Mr. Kearton obtained a good photograph, which is excellently reproduced in 'Our Rarer British Breeding Birds.' It is supposed to be twenty years since any Marsh Harriers have been hatched off in Norfolk, the last attempt, known to Mr. Bird, prior to this, being in 1894, when two eggs are believed to have been laid and two Bantam's eggs substituted for them, on which Mr. Bird ascertained the old female Harrier sat. Probably she shared the usual fate of all "Hawks" in a game-preserving county long before she had time to find out the ruse which was practised upon her. Mr. Stevenson considered that the Marsh

Harrier nested at Ranworth Broad in 1878; and in May, 1881, I saw one at Barton, which, from its tameness and the time of the year, I supposed might be nesting. The boldness of the Tawny Owl when it has young is well known, and one which had a nest in an old tree at Buckenham maintained this savage character, and frightened so many people that it had to be got rid of. First a signalman received a buffet, and lost his hat; then the rector of the parish was attacked; after this a man named George lost his hat, which was picked up in a field some distance away. A young lady was next attacked; and another person had to act on the defensive against this formidable aggressor three times, the Owl seeming determined to fight him somehow. It is extraordinary that the Tawny Owl still holds its own in small numbers in this county in spite of the systematic persecution it receives. I have lost two of my Teal; but am glad to say the Owls remain unmolested. I have never heard of either the Short-eared or the Long-eared Owl showing such boldness in the defence of their young; but there are few more savage birds than the Eagle Owl in confinement at such times; and some years ago my man was near losing his eye, since when I have had a basket helmet made for him. For a week in the early part of May a Nutcracker frequented a plantation of tall dark fir trees near Thetford, Mr. Thomas Baring's attention being first drawn by its unusual croaking note; but after a week the bird disappeared, and was not seen again, fortunately escaping the prowling gunners. The last occurred in 1888; but we have never had one in the spring before, and only four altogether; and, for Lincolnshire, Mr. Cordeaux only mentions two.

12th.—My nephew saw a Cuckoo fly past him in Northrepps Avenue with what he distinctly perceived to be an egg in its mouth, and close to where I had seen one searching for a nest two days before. It is not often one has an opportunity of verifying the habit now so well known.

13th.—Mr. Pashley saw a Black Redstart. A pair of Common Redstarts have built in a tub put up for Owls at a considerable height from the ground.

16th.—A pair of Bearded Tits on the same pond near Holt where three were recorded last September, and where the reeds have been allowed to grow up, which no doubt attracts them, as

they were again seen there in December. Two or three were also lately noticed by Mr. Buxton in a small "bay" on the north side of Fritton lake, where it was believed they were extinct (*cf.* Norwich N. Tr. vi. p. 436). A nest, found by Mr. Bird, on the 1st, contained eight eggs on the 6th, a large clutch, six being the usual complement. Very few eggs are taken now, there being a general desire on all hands to protect this charming bird before it is too late.

24th.—Four or five Gadwall on Scoulton Mere, evidently nesting; and about one thousand Black-headed Gulls; but no Black Terns there this year. One Gadwall was feeding in the water, as if she had left her nest and was hungry; while the drake kept guard over his consort until the boat was within thirty yards of her. I never identified Gadwall on Scoulton Mere before; but the keeper says they have been there all the winter; so perhaps these birds' limited area is spreading. I also received some from a small lake at Watton, where they do not breed, but regularly appear as visitors. They are tolerably common in West Norfolk, probably more than a hundred pair of them; and fifteen years ago there were even more, but never fifteen hundred on one property as has been said. They have never been known to nest on the Broads.

25th.—Lesser Spotted Woodpecker's nest, with three eggs, at Spixworth; and another nest at Rollesby (Cole); this bird probably also bred at Frammingham Earl.

30th.—Lesser Redpoll's nest at Ingham; about two hundred nests of the Black-headed Gull at Somerton Broad; and a pair of Garganey at Horsey (Bird). An Aylesbury Duck, belonging to Mrs. Blythe, has laid an egg measuring eleven and a quarter inches in circumference; a monstrosity indeed!

JUNE.

3rd.—A Little Bittern at Hickling (Bird).

7th.—Two pairs of Norfolk Plovers,† probably nesting. One had a very yellow bill, and from its general tameness and running in front of us, must, we thought, have young; but a careful search failed to find them. Mr. Norgate tells me that the Ringed Plover will occasionally lay to the eggs of this species; and at Harling both are common, proprietors for the most part protecting them.

15th.—Grey Plover at Breydon (Patterson); a late bird to be still here in June.

20th.—A Greater Spotted Woodpecker's nest† in an alder tree, containing young ready to fly, and close to a house near Keswick. There may also have been a nest at Northrepps, as a female, accidentally trapped, had the bare belly spot.

29th.—A mealy Hedge Sparrow reported seen at Keswick; and a white one at Mousehold.

JULY.

2nd.—Six Curlews at Keswick.

25th.—A very early Greenshank on Breydon muds (Patterson); and about the same time a Golden Plover at Waxham (Bird).

31st.—A fine Demoiselle Crane (*Grus virgo*), with two primary quills severed, shot at Brancaster, by the sea (R. Clarke); but, from enquiries made by the Rev. J. Tuck, it is possible that this, as well as three others shot at Lavenham, in Suffolk, had been turned out by the Duke of Bedford's orders at Woburn Park. Another, with a portion of the carpal joint cut away, was sent to Mr. Cole, of Norwich, on October 6th; and altogether twenty are reported to have got away from Woburn in spite of several being pinioned to the first joint.

AUGUST.

2nd.—Two Wood-Sandpipers at Hickling (Bird), a species which generally comes—true to date—at the beginning of harvest; but no Garganeys, though looked for; though Mr. Bird hears that a keeper has some young ones hatched from gathered eggs.

9th.—Five Wood-Sandpipers seen in a marsh at Cley (F. D. Power); also a small Wader, which the authorities there, who are now very clever in detecting novelties, considered to be a Broad-billed Sandpiper (Pashley).

18th.—Two Corncrakes, flushed by my nephew in a barley field, did a very unusual thing in immediately perching on some elm-trees. Later in the autumn two were "telegraphed" at Keswick; and I heard of two caught by hand elsewhere. Mr. Bird remarks that it has been quite a Landrail year, in confirmation of which he sends me dates of seventeen shot or seen by

himself between August 25th and October 10th, adding that he had heard of many others; and several were seen at Northrepps about that time.

29th.—W. A Green Woodpecker seen on the sea-wall at Cley by Mr. F. D. Power, not the first indication we have of this being an over-sea migrant; for, as Mr. Pashley reminds me, they are often seen on the brackish marshes, and he has himself flushed them from the creeks by the beach. Mr. Bird remarks that if Green Woodpeckers do not migrate they move about much more in Norfolk in autumn and winter than in spring and summer; and between September 2nd and November 29th he saw nine, all within four miles of the coast, and in places where they certainly do not breed. They are, however, like the Lesser Spotted Woodpecker, very susceptible to frost, which means starvation for them. At the beginning of the year Mr. Lowne had a Green Woodpecker with a beak like a Crossbill, and not only was it crossed, but the longest mandible had attained the length of two and a half inches, and it is extraordinary how it maintained its existence.

31st.—S.S.W. Five Great Skuas seen on the coast by Mr. Long; and one of them, again, a few days afterwards, by Mr. Gunn. October is the usual month in which this fine Skua has visited Norfolk, and only one has been seen before in August. Mr. Connop has a splendid melanism of this species, quite equal to the one figured in Dresser's 'Birds of Europe.'

SEPTEMBER.

Wind west, thirteen days; wind north, twelve days; wind south, two days; wind east, two days.

4th.—W., light. A hybrid† between a Goldfinch and a Linnet, netted at Acle by a birdcatcher named George, has the wings of a Goldfinch, but the Linnet's plumage predominates in the breast, back, throat, and tail, and its note partakes of both (W. Lowne). It is a hybrid which has been several times bred in confinement, but the present one we are assured is a wild caught bird, and agrees fairly with the description in Macpherson's "Hybrid Finches" (Norw. N. Tr. iv. p. 368).

5th.—N.W., first frost. An immature Icterine Warbler † (*Hypolais icterina*)—the fourth that has been taken in Norfolk—

shot on our coast by Mr. E. C. Arnold (Zool., 1899, p. 475), is exactly similar in size and tint to one shot in 1896 by Mr. Robert Gurney, and presented to the museum. Mr. Cordeaux, in his List, is only able to give one Lincolnshire occurrence of this species, and two of the Great Reed Warbler, which Mr. Howard Saunders thinks may be also added to the Norfolk list (Manual B. B., 1st ed.).

6th.—W.S.W. A Manx Shearwater picked up at St. Faith's, a species which always turns up at this time of the year, either off the coast or inland.

7th.—E. A young female Wheatear, shot by Mr. F. E. Gunn on the coast, has the central rectrices black to the base, and the other rectrices also much smudged with black, and some speckling of the same on the belly; at first thought to be an Isabelline Wheatear, but it seems rather to be a slightly melanistic *Saxicola œnanthe*.

8th.—W. A beautiful young male Buff-breasted Sandpiper (*Tryngites rufescens*), shot on shingle at Cley by Mr. Arnold. Its nicely mottled upper parts are very different from the dark back of our old Museum specimen, said to have been shot in July, a few miles east of where the present one was procured. The species has a more rounded head than most of its kin, which feature was well shown in Mr. Arnold's freshly mounted example, and also the distinctive freckles under the wing. Mr. Cordeaux does not include this American species in his List, but it has been shot five times in Norfolk. Whether the present example came with a west, or an east wind, seems doubtful.

9th.—N.W. Two Velvet Scoters seen, several Richardson's Skuas; also Great Crested Grebes, young Ruffs, two Dusky Redshanks, and a Red-necked Phalarope,—all on the coast (Pashley).

14th.—N.E. Great Snipe at Southwold ('The Field'). Between this date and the 27th Great Snipes were shot at Yarmouth (Dye), Haddiscoe, Pensthorpe (Davey), and two at Ellingham (Toyser); while later on at Stuston (Southwell), and two at Morston (Pashley). It is many years since Norfolk has had any number of Solitary Snipe, though there were several in September, 1880.

18th.—N.W. Hoopoe at Skeyton (Cole).

21st.—N.W. Four Cormorants at Hunstanton (Tuck).

29th.—Another of the chestnut Partridges, † an adult of a dark Grouse-like colour, killed at Elsing (T. E. Gunn), which is near where the others have all been taken, and where a race has really been perpetuated, this being the fourth year in which they have turned up, and the present the twelfth example. It would be interesting to see what a young one, about half-grown, would be like, as no doubt the dark plumage would show. As so much has been said in these “Notes” about this singular variety, the accompanying reproduction of a sketch by Mr. Herd may be acceptable (Plate II.), representing one of our best specimens (killed last November), a typical *Perdix montana*, Briss.; and very like Brisson’s plate, with just the same light head and neck. Even in his time it was known to cross with the Common Partridge, from which the French ornithologists supposed it to be distinct.

30th.—S. The bushes by the sea full of small birds, including a Nightingale and some Pied Flycatchers, the wind, which had been westerly, having suddenly veered round to S.E. (Pashley). A good many Sky-Larks were found dead under the telephone-wires at Cley (Pashley), and a Dunlin was shot in a turnip-field at Trimmingham (Buxton); but this was before the movement noticed by Mr. Haigh in Lincolnshire.

OCTOBER.

Wind west, ten days; south, eight days; north, six days; east, four days.

1st.—S. veering to S.S.E. Hundreds of Long-tailed Tits seen in St. George’s Park, Yarmouth, by Mr. Patterson; but the true *Acredula caudata* was not detected among them, though, according to the late Mr. Churchill Babington, it has been met with in Norfolk. It seems to have been a great Tit year, as Mr. Bligh counted twenty-seven Long-tailed Tits in one flock in August, and I noticed several. Mr. Caton Haigh reports that it is many autumns since he noticed so many Great and Blue Tits in Lincolnshire. 1882 was also a Tit year in Norfolk, and in October, 1880, there were troops of them near Cromer—distinguishable by the white on the head being restricted to the crown—which had presumably crossed the sea. Great Tits have been taken at Norfolk light-vessels several times, but the Long-tailed Tit only once. About this time four Grey Phalaropes were

announced in different places (Lowne and Clark), and an Eagle, doubtless a young White-tailed Eagle, was shot at Babingley, near Lynn. This is the seventh Eagle in the last twelve years, the others occurring in November or December.

2nd.—S.W. Thirty-three Grey Plovers on Mr. Durrant's stall in Yarmouth Market (the dealer alluded to in the preface), and three Greenshanks (Patterson).

12th.—S.S.W. One hundred and twenty Grey Plovers offered by different Breydon gunners to Mr. Durrant, the salesman, who says that during the ten days the migration lasted he had about two hundred and seventy altogether (Patterson). The wind had been west or some point of west every day except on the 6th, 8th, and 9th, and in the face of a west wind they came, which was very strong on the 3rd, when perhaps most of them touched shore. A good many came to Cley and Blakeney (Pashley), and Mr. Haigh fell in with them as far north as Lincolnshire. This year has produced a greater number of Grey Plovers than has occurred since the autumn of 1877; but they are at all times rather a common Norfolk bird, and I have always considered them essentially a bird of the coast, and at Blakeney much more abundant than the Golden Plover.

16th.—S.E., strong. Mr. Bird, who lives near the coast, put up three Snipe in a dry turnip-field, and at the same time remarked Rooks, Grey Crows, and Jackdaws streaming overhead; while flocks of Grey Crows were to be seen passing Fritton Lake, indicating that the movement had an extended front. I saw a Ring-Ouzel, and "very many Ring-Ouzels" turned up at Cley (Pashley). Four days after that, flock after flock of Long-tailed Tits arrived, and I am assured by Mr. Pashley, whose "garden was full of them," that they were actually seen coming off the sea (*cf.* note on Oct. 1st).

25th.—N.N.W. Mr. Lowne received an immature female Purple Heron from Blyth, near Lowestoft, where it was shot by Mr. Roberts, as notified in the 'Field,' and may possibly have been the bird which was seen at Easton Broad on the 18th, and thought to be a Glossy Ibis ('Field,' Oct. 28th). The last occurrence was in 1882, and, like nearly all the others, an immature example. The wind on the 24th was N.N.E.; Grey Crows going N.W. On the 23rd and 22nd there was practically no wind.

NOVEMBER.

8th.—S. A gamekeeper named Platten, about six o'clock in the evening, shot a large bird which he noticed pass twice under the arch of Rollesby Bridge, where there is a small stream about four inches deep. When taken to Mr. Connop it proved to be an adult Night-Heron † without any occipital plumes, and in somewhat rusty plumage, and was no doubt after fish. It is supposed to have been some days on the broad when shot. Curiously enough, Nov. 8th is exactly the same day on which one was shot at Caister in 1860. It is twelve years since there has been a capture of the Night Heron, the two seen at Beeston being doubtful; and the last two were shot respectively on the sail of a mill and the roof of a house.

11th.—A Shag caught on the beach (Patterson), but it may have been shot at.

15th.—Two Egyptian Geese shot at Morston (Pashley), almost the only Geese killed this winter, except two Pink-footed, which were winged (Pashley), of which one got well and escaped; but the other is in a garden where there are some Bean Geese, with which it will possibly pair.

17th.—Mr. Pashley writes that flocks of Little Auks were seen passing at sea, and that two of them came near enough to strike the rigging of a steamer which a short time before had come ashore. No more that I know of were captured; and, as I was away, I did not note the direction of the wind, but it was immediately after the great meteoric shower. Two were also picked up in October.

DECEMBER.

8th.—Received from Saham a drake Shoveler † beginning to assume plumage, caught there on the 6th, and a few days afterwards one was taken at Yarmouth (Patterson).

9th.—Received a Storm Petrel † from Winterton Lighthouse, which, I believe, was found on the shore with three Gannets and some Kittiwake Gulls (Patterson).

21st.—Three Barnacle-Geese shot out of a flock of ten at Breydon (Patterson), and about the same time three at Morston and two at Cley (Pashley), where altogether fifteen were seen. The last I remember in that district was a single bird shot from

the shore in October, 1890, and so many as fifteen is quite unusual on any part of the east coast.

AVICULTURAL NOTES.

Black-tailed Godwit.—Two pairs of Black-tailed Godwits from Leadenhall Market, turned into an open-air cage in May, soon became tame enough to be amusing, and, being pinioned, were allowed their run every day. No matter how dry the grass was these Godwits were continually boring for worms, but it is difficult to see when they get anything, the action of swallowing is so quick. They frequently stood on one leg, sometimes scratching themselves with the other; sometimes motionless, and in that attitude appeared to sleep. They did not care for water so long as they had sopped bread and finely chopped meat, which they eat voraciously. Very vociferous over this food, it was most comical to see them sparring like Ruffs, seizing one another by the beak, and screaming with rage if one was thought to get more than its share, which the females generally did. But the prettiest action (when I longed to photograph them) was when, with spread tail, lowered head, and scapular feathers raised, and the beak used as a weapon, they menaced one another; but no harm ever came of it. One lived eight months, but the cold was too much, and they are evidently not such hardy cage-birds as the Knots, which stand frost well. After three months' diligent boring they concluded there were no more worms in my enclosed garden, and gave up boring, and never tried again, thus showing an amount of instinct very near to reason.

Common Crossbill.—The following are a few experiences with caged Crossbills, which, unlike the shy Hawfinch, feed fearlessly in the presence of anybody, and are consequently amusing to keep and easy to watch. Restless and Parrot-like in action, they climb about the wires of a large cage, never tired of testing its strength and durability with their strong jaws. Cones are their natural food, and they most dexterously push aside the scales by a sideways lever-like motion of the mandibles in order to get at the seed beneath, first bringing the points of the upper and lower mandibles from their crossed position to be almost over each other, an action which requires to be seen to be duly appreciated.

In this way they prise off the scales, but unless there be a seed they know too well to do it in useless search. It may be presumed that they would generally push the scales of a cone to the right or the left, according to the way their mandibles cross one another. In fifteen recently examined the upper mandible turned to the right, and in eight to the left. In one I had alive the mandibles grew to the unnatural length of an inch. My Crossbills never manifested any interest in old brown fir-cones, but they liked the new ones in September, and were very fond of the big cones of *Picea nobilis*. We read of great destruction caused by them to apple crops, but they do not seem able to work their way into an apple which is not on a bough, though they relish it if cut into small pieces, evidently liking the fruit part quite as much as the pips. Their power of sudden concealment in the tops of the fir trees, remarkable at first sight, is entirely due to their instinct in remaining quite still. A Crossbill can fly with a fir-cone in its mouth, which is one proof of the strength of those powerful mandibles, if, indeed, proof were wanted. My Crossbills favoured me with no music until Christmas Day, when for the first time one of them was heard to utter a loud chirp. When bought on July 6th they were in red male plumage; by Christmas Day one of them had become quite yellow, but the other two cocks had changed but little, though the brightness of their red had diminished since October. Bechstein says many are bred in aviaries in Thuringia, but never acquire the red colour in confinement.

Erratum in Notes for 1898.—I learn from Mr. Howard Bunn that the correct date when the Little Bustard was shot at Kessingland, as recorded in last year's "Notes," was not May 30th, but May 3rd, 1898, an error on my part.

BIOLOGICAL SUGGESTIONS.
MIMICRY.

BY W. L. DISTANT.

(Concluded from vol. iii. p. 553.)

ACTIVE MIMICRY naturally predicates intelligence, and is not equivalent to what is generally described as instinct,* so universally applied to any other animal than man. Prof. Lloyd Morgan remarks on the many who believe that instinct is neither more nor less than inherited habit, but concludes that, "while still believing that there is some connection between habit and instinct, admit that the connection is indirect and permissive rather than direct and transmissive."† Every attempt is made to minimise this faculty. In birds, Mr. Orr has warned us not to overrate the intelligence implied by nest-building "of an animal which has not sufficient intelligence to loosen a slip-knot tied around its leg."‡ But man himself has very slowly and laboriously acquired—and has not yet altogether the desire to possess—the intelligence to loosen the artificial slip-knots that bind him to many errors and much superstition. If, however, some would minimise animal intelligence, there are others who maintain the purposive acts of plants. Thus Mr. Grant Allen, in describing the wonderful life-history of the common gorse, and allowing that "the intelligence is here no doubt unconscious and inherited," still remarks: "Gorse, in short, may fairly be called a clever and successful plant, just as the Bee may be called a clever and successful insect, because it works out its own way through life with such conspicuous wisdom."§ The

* The true teleological definition of the term was defined by Paley: "An instinct is a propensity, prior to experience, and independent of instruction" ('Natural Theology').

† 'Habit and Instinct,' p. 322.

‡ 'A Theory of Development and Heredity,' p. 19.

§ 'Flashlights on Nature,' pp. 282-3.

same spirit runs throughout Dr. J. E. Taylor's 'Sagacity and Morality of Plants.'

Animal intelligence has been opposed by two great factors—the philosophy of Descartes * and theological dogma. The first

* In discussing a philosophy like that of Descartes one must not trust alone to his own impressions and reading of the philosopher, or a critic may soon be found to prove that either he has not such an intimate acquaintance with the language in which it was written as to prevent misunderstanding, or that his mind is not sufficiently attuned to escape misconception. I will therefore quote some authorities to whom these objections do not, or should not, apply. According to Dr. Martineau, Descartes taught that "the soul, *i. e.* the thinking principle, though united with the whole body, exercises its chief functions in the brain." "But the soul he pronounced to be exclusively human, and, in the human being, a substance entirely distinct from the body." Hence animals are automata. "All the things that you make Dogs or Horses or Monkeys do are only movements of their fear, their hope, or their joy, which can be made without any thought" ('Types of Ethical Theory,' 2nd edit. vol. i. pp. 141, 144, 145).—Prof. Mahaffy, describing Descartes' opinion on the point, and in respect to the supposition that other animals, from the likeness of their organs to ours, may have some thought, though less perfect than our own, makes him, in rejoinder, to say:—"To this I have nothing to reply, except that, if they thought as we do, they must have an immortal soul, which is not likely, as we have no reason to extend it to some animals without extending it to all, such as Worms, Oysters, Sponges, &c." Thus, as Prof. Mahaffy further remarks:—"The difficulty which the opponents of Descartes felt most strongly was the possible extension of souls to Oysters and Worms. Thus theological questions determined the questions on both sides" ('Descartes,' pp. 180 and 182). It is a relief to turn to Renan, who describes Francis of Assisi as "far removed from the brutality of the false spiritualism of the Cartesians; he only acknowledged one sort of life; he recognized degrees in the scale of being, but no sudden interruption; like the sages of India, he could not admit that false classification which places man on one side, and, on the other, those thousand forms of life of which we only see the outside, and in which, though our eyes detect only uniformity, there may lie infinite diversity. For Francis, nature had but one voice" ('Studies in Religious History,' p. 313).

Even Weismann may be considered no supporter of the view of animal intelligence, judging from the following remarks:—"It is usually considered that the origin and variation of instincts are also dependent upon the exercise of certain groups of muscles and nerves during a single life-time, and that the gradual improvement which is thus caused by practice is accumulated by hereditary transmission. I believe that this is an entirely erroneous view, and I hold that all instinct is entirely due to the operation of natural selection, and has its foundation, not upon inherited experiences, but upon the variations of the germ" ('Lectures on Heredity,' &c., Eng. transl., 2nd edit. vol. i. p. 92).

is clearly intelligible and ably stated; the second is more of an implication, but both are based on the belief of man's special immortality; and, although divines are found* who are willing to extend the promise of a future life to the whole animal kingdom, and have discovered texts to advocate that view, the Hebrew Scriptures can scarcely be said to strongly support it. Even the poor untutored Todas of India, who are alone valued as an ethnological study, have at least a kinder and more sympathetic heart for their cattle. The sum of their belief is, that they were born—they and their cattle somehow rose out of the earth. When they die they go to Amnôr (the next world), which is a world exactly like this, whither their Buffaloes join them, to supply milk as in this state.† Sir Herbert Maxwell, in discussing our obligations to wild animals, states, as a “remarkable and perplexing fact, that neither the chosen people nor Christians are bound by their religion to pay the slightest regard to the feelings of animals. . . . There is not a word about mercy towards dumb animals in the Sermon on the Mount; not a word in all the writings of the Fathers (so far as known to me); not a word, apparently, from all the teachers of Christianity until we reach the dawn of rationalism in the eighteenth century, when an English country clergyman—the Rev. Mr. Grainger—scandalized his congregation and jeopardized his reputation for orthodoxy by preaching the duty of humane treatment of beasts and birds.”‡ But if evolution is not a farce, and man has been derived from more lowly ancestors, then the possession of a soul—using the

* “Bishop Butler urges that every argument by which we maintain the immortality of man is of equal validity to maintain the immortality of the lower animals” (Canon Wilberforce).

† W. E. Marshall, ‘A Phrenologist among the Todas,’ p. 125. — It is a long flight from a Toda to an Agassiz, but we may quote the opinion of that eminent and not undevout zoologist:—“Most of the arguments of philosophy in favour of the immortality of man apply equally to the permanency of this principle in other living beings. May I not add that a future life in which man would be deprived of that great source of enjoyment and intellectual and moral improvement which result from the contemplation of the harmonies of the organic world would involve a lamentable loss; and may we not look to a spiritual concert of the combined worlds and all their inhabitants in presence of their Creator as the highest conception of paradise?” (‘An Essay on Classification,’ p. 99).

‡ ‘Blackwood’s Magazine,’ August, 1899, p. 228.

term in the ordinary signification as taught to ordinary people—must imply either its existence in the whole animal world, or its gradual evolution* with the specialization of type, both of which premises are outside scientific reasoning, and therefore quite beyond the cognizance of plain folk. To deny conscious intelligence is a corollary to denying immortality to animals, and it is often the desire to monopolise the last that so frequently ensures the denial of the first.† The writer of ‘Ecclesiastes’ had nursed the thought—“Who knoweth the spirit of man whether it goeth upward, and the spirit of the beast whether it goeth downward to the earth.”

That animal intelligence is sufficient to prove much mimicry of an active and not of a merely passive character, is abundantly advocated by facts. That an insect or bird should seek and obtain concealment by its own volition, and by a sense of adaptation in bringing into juxtaposition its own peculiarly-coloured body with some material object with which it closely assimilates, is an exemplification of intellect, though inferior to that shown in the general psychology of Bees, Wasps, and Ants. In Birds it would rank lower than the acquired and more complicated knowledge of the African Honey-bird, which is able to associate the appearance of Man with that of a honey-seeking creature, and to lure and lead him to the nest of the Bee, in order that his assistance and strength may wreck the nest and leave the bird

* “I believe that the spirit of man *was* developed out of the *anima* or conscious principle of animals, and that this, again, was developed out of the lower forms of life-force, and that this in its turn out of the chemical and physical forces of nature; and that at a certain stage in this gradual development, *viz.* with man, it *acquired* the property of immortality precisely as it now, in the individual history of each man at a certain stage, acquires the capacity of abstract thought” (Josh. Le Conte, ‘Evolution and its Relation to Religious Thought,’ p. 295).

† The Hon. L. A. Tollemache has contributed some original remarks on this subject:—“I sometimes think that the lower animals bear the same sort of relation to man that the Apocrypha bears to the Bible. Theologians are apt to regard the human soul and the Bible as having a right (so to speak), each in its own way, to say ‘Noli me tangere’ to science. The lower animals and (though in a very different manner) the Apocrypha bar such exorbitant claims. They serve as intermediate links, and thus tend to *evolutionize* Religion. In other words, the lower animals are half-human, just as the Apocrypha is half-Biblical” (‘Benjamin Jowett,’ p. 37, *note*).

what it requires in the *débris* that remains after the auxiliary's wants are satisfied. "A Green Frog will with predilection rest on green leaves. The advantages of concealment are obvious, and in this case he 'adapts himself' to the surroundings by making for green localities; if he did not he would be eaten up sooner than his more circumspect comrades. But this making for, and sitting in, the green has not *necessarily* made him of that colour."* As Dr. Reid forcibly enquires, "By what term shall we designate the action of the Spider when he builds his web? Does the animal not know for what purpose he constructs it? Was there ever a web-building in which there were not circumstances novel alike to the experience of the individual and to that of the species? Or, when he runs along a thread to capture his prey, or cuts loose a dangerous captive, does he not consciously adapt means to ends, just as much as a man who runs to secure a snared bird, or who builds a 'golden bridge' for a flying enemy?"† What angler does not know the greater difficulty in filling a basket from a stream much fished, than from one little visited by anglers, and how the greater skill required is not an incident of fewer fish, but of the greater caution acquired by the same? The Marquess of Granby truly observes: "Of course, at the date when Canon Kingsley went a-fishing, Trout were easy to catch compared with what they are now, at any rate in the best known English rivers." . . . "Trout, being very much fished over," in many cases from over-weed-cutting, &c., "are highly educated and more difficult to kill than ever they were before."‡ A recent writer has illustrated this fact. Mr. Basil Field, describing his experience in fly-fishing, states:—"If a fly be cast in one of Mr. Andrew's stock-ponds at Guildford, there is a rush and fight for it among all the Trout within whose range of vision it falls. If it be cast again a few minutes after a Trout has been caught and returned to the water, two or three fish only will compete for it. Repeat the process, and perhaps one may come, slowly, shyly, and in a half-hearted manner. But when several have been taken and returned—although the pond is large and crowded with fish—cast the fly where you will, the Trout are shy, suspicious, and

* Haeckel and Gadow, 'The Last Link,' pp. 125-6,

† 'The Present Evolution of Man,' p. 138.

‡ 'The Trout' (Fur, Feather, and Fin Series), pp. 87-8.

hard to catch.”* Prof. McIntosh, with reference to the absence of the cortex of the brain in fishes, observes, “Who has proved that the function of memory depends on the brain-cortex of the human subject? I have seen many a curious case in the pathological room, the history of which would not have led us to this conclusion.”† According to Livingstone, the Hippopotamuses in the rivers of Londa, where they are much in danger of being shot, gain wit by experience; for while those in the Zambesi put up their heads openly to blow, those referred to keep their noses among water-plants, and breathe so quietly that one would not dream of their existence in the river, except by footprints on the banks.”‡ In the Leeba, Crocodiles possess more of the fear of man than in the Leeambye. The Balonda have taught them by their poisoned arrows to keep out of sight. “We did not see one basking in the sun.”§ Nansen remarks:—“Curiously enough, one can, as a rule, get nearer to the Seal with the larger vessel than with the boats. They have learned to fear the latter, and often take to the water quite out of range, while one can sometimes bring the ship right up to the floe on which they lie before they decamp.”|| On the solitary St. Paul’s Rocks, situated between the equatorial coasts of Africa and South America, Sir C. Wyville Thomson, at the visit of the ‘Challenger,’ writes: “In the morning both the Booby and the Noddy were quite tame, but towards afternoon even these few hours’ contact with humanity had rendered them more wary, and it was now no longer possible to knock them down with sticks or stones.”¶ Semon had a similar experience in Queensland. “On removing my camp to new hunting-grounds,

* ‘Fortnightly Review,’ April, 1894.—A curious instance of intelligence in fish is given by Frank Buckland. He was told, on good authority, that the Salmon in the Seame always jump at the weir at 11 o’clock on Sunday morning when they hear the church bells ring. Of course that is not the cause of their activity, “but it so happens that on Sunday morning, the mills being shut down, the water comes down over the weirs in greater abundance than on any other day of the week; the Salmon find this out, and, like wise fish, make the best of their time in endeavouring to get over the weir” (‘Life of Frank Buckland,’ by Bompas, 2nd edit., pp. 156-7).

† ‘Journ. Mental Science,’ April, 1898.

‡ ‘Mission. Travels and Researches in S. Africa,’ p. 242.

§ *Ibid.* p. 273.

|| ‘First Crossing of Greenland,’ Eng. transl., new edit., p. 85.

¶ ‘Voyage of the Challenger.’—The Atlantic, vol. ii. p. 103.

I used to have no difficulty during the first days in stealing up to the water-birds so as to get within shooting range. In an incredibly short time, however, they became shy, and then they were by no means inferior to their European relations in prudence and caution."* Sir Joseph Banks, when in New South Wales with Capt. Cook, found most of the birds "extremely shy, so that it was with difficulty that we shot any of them."† The few travellers who have had the great good fortune to visit a little known and unfrequented island have told us what small fear other animals have for their colleague Man, till they have experienced his destructive propensities, and then how quickly reserve, shyness, caution, and fear rapidly become dominant factors in a hitherto peaceful existence.

Of course there are exceptions to this rule, especially among birds. According to Mr. Macpherson, the tameness of the Ortolan Bunting as observed by him in Spain "is almost ludicrous. So little do they apprehend injury, that they will allow visitors to lie on the grass while they forage round for earthworms."‡ The writer's own experience in the Transvaal is precisely similar with respect to the Pied Babbling-Thrush (*Crateropus bicolor*). If I lay down at the edge of bush and kept quiet, these birds would not only come close to me, but remain there. Again, Curlews and Golden Pheasants are wild in whatever part of the world they are found, even where the report of a gun has never been heard.§ According to Dr. Leith Adams, in Canada "the Purple Swallow has now such a predilection for man's society, on account of the preponderance of insect life which invariably surrounds him wherever he goes, that he has only to construct a small cot with several chambers, and place it on a pole at the door of any solitary shanty in the wild wilderness, when year after year, with the certainty of the seasons, it will be tenanted by these birds in preference to any other situation."|| The sound of firearms does not at first universally create terror in birds. D'Albertis relates that, when "fishing with dynamite,"

* 'In the Australian Bush,' p. 53.

† 'Journal,' edited by Sir J. Hooker, p. 302.

‡ 'Roy. Nat. Hist.' vol. iii. p. 414.

§ Sir S. Baker, 'Wild Beasts and their Ways,' vol. i. p. 180.

|| 'Field and Forest Rambles,' p. 150.

“an *Haliastur sphenurus*, with its female, and a young one already able to fly, were perched on the branch of a tree, interested at this novel method of fishing, and not in the least alarmed by the detonation. When I had finished, the male and female picked up the little fishes which I left, and took them to their young one.”* Eimer, when staying in the Dutch island of Rottum, in West Friesland, found the Water-Rail (*Rallus aquaticus*), “which is usually so shy, ran about close to me in the ditches so fearlessly that I could almost have caught it with my hands. This island is let by the Dutch Government to an egg-bailiff, whose duty consists in collecting birds’ eggs, and therefore no bird is allowed to be hunted there; it is especially forbidden to shoot at them.”†

On the other hand, wild animals have chosen to seek the protection of man when pursued by their enemies. The African traveller Anderson once had a Blesbok take refuge at his camp-fire when pursued by Wild Dogs. He also states:—“I have known small birds fly to my waggon and into it, on several occasions, when pursued by Hawks.”‡ Andrew Steedman once witnessed a herd of Gnus pursued by a Lion. “The affrighted animals seemed to seek the vicinity of our waggon as a protection from their formidable enemy.”§ A lady, describing a great grass and forest fire which took place in South Africa in February, 1869, writes: “The poor Hares and Wild Bucks came to the houses for protection from the flames.”|| Another narrator elsewhere states: “Wild Bucks from the surrounding bush came and crouched about, terror-stricken, and one, half scorched to death, took refuge on the stoop of the building.”¶ Col. Ward, describing the “hawking” of Jackdaws in the Peshawur Valley, says that a Jackdaw, when closely pressed, “would make straight for the nearest human beings he saw, fly round the men, under the horses’ girths, into a dog-cart or buggy, if there was one, and do his utmost to dodge his pursuer, often causing a regular stampede among the horses,

* ‘New Guinea,’ vol. ii. p. 329.

† ‘Organic Evolution,’ Engl. transl. p. 227.

‡ ‘Twenty-five Years in a Waggon,’ pp. 88–9.

§ ‘Wanderings and Adventures in Int. S. Africa,’ vol. i. p. 154.

|| Quoted by J. Croumbie Brown, ‘Hydrology of S. Africa,’ p. 184.

¶ *Ibid.* p. 186.

for they could not at all understand the two birds flying about among them in this way."* According to the Comte de Canteleu, Stags nearly always make for the abodes of men when they are sinking. †

On the other hand, "the Cattle-Heron (*Ardea russata*), in Egypt, when fleeing before the sportsman, shelters itself under the Oxen and Buffaloes, because it knows that it is there protected from his gun." ‡ Bonitos and Albicores may be often observed to congregate about the stern of a ship to escape the attacks of Sword-fish. §

Audubon relates that in the Missouri region of North America, while a number of Indian chiefs were conferring with, and angrily talking to, Mr. Chardon, "he sitting with his arms on a table between them, a Dove, being pursued by a Hawk, flew in through the open door, and sat panting and worn out on Mr. Chardon's arm for more than a minute, when it flew off." || Baldwin saw a broken-winged Golden-Goose chased by three Crocodiles. Eventually the bird took to the bank, and the poor thing "allowed me to catch him on land sooner than face his enemies in the water again." ¶

To fully understand mimicry we must appreciate general animal intelligence, and then we shall probably comprehend how much activity has been displayed by animals seeking protection

* 'Badminton Mag.' vol. ii. p. 582.

† Cf. Viscount Ebrington, in 'Red Deer' (Fur and Feath. Ser.), p. 245.

‡ Cf. Eimer, 'Organic Evolution,' Engl. transl., p. 237.

§ Bennett, 'Gatherings of a Naturalist in Australia,' p. 23.

|| 'Audubon and His Journals,' vol. ii. p. 44.—A delightful legend is related by Renan on this subject:—"One of the early Buddhas who preceded Sakya-Mouni obtained the *nirvana* in a singular way. He saw one day a Falcon chasing a little bird. 'I beseech thee,' he said to the bird of prey, 'leave this little creature in peace: I will give thee its weight from my own flesh.' A small pair of scales descended from the heavens, and the transaction was carried out. The little bird settled upon one side of the scales, and the saint placed in the other platter a good slice of his flesh, but the beam did not move. Bit by bit the whole of his body went into the scales, but still the scales were motionless. Just as the last shred of the holy man's body touched the scale the beam fell, the little bird flew away, and the saint entered into *nirvana*" ('Recollections of my Youth,' Engl. transl., p. 116).

¶ 'African Hunting and Adventures,' 3rd edit. p. 15.

by adaptive and assimilative efforts. This in no way contradicts, but supports, the doctrine of Natural Selection. The animal survives that can best hide from its enemies,* and this implies that the variations that tend to adaptive and assimilative efforts not only succeed in the battle of life, but by the selective process become dominant, and more and more accentuated with a greater need. Mimicry in the lower animals finds its equivalent in what is described as "tact" among men. Few possess it strongly, many slightly, and more not at all; while others in the struggle for existence depend on different means, and use more varied stratagems. Tact is often a silence which mimics the modest reticence of a learned man and thus conceals the ignorant. It appears as the bluster of the psychological moment when the coward receives an immunity from his protective resemblance to the brave; the rogue often succeeds by mimicking the devout; the sneak assumes the garb of frankness; the lie only triumphs when it simulates the truth.† On the other hand, we must not

* A British lepidopterist has recently remarked: "It is well known how different species of Lepidoptera differ in their habits adopted for protection, some relying on very acute vision, others on their resemblance to their surroundings" ('Entomologist,' vol. xxviii. p. 278).

† An observation made by that keen political and social notist, Greville, illustrates what is here meant:—"I could not help reflecting what an extraordinary thing success is in the world, when a man so gifted as Mackintosh has failed completely in public life, never having attained honours, reputation, or wealth, while so many ordinary men have reaped an abundant harvest of all. What a consolation this affords to mediocrity! None can approach Mackintosh without admiring his extraordinary powers, and at the same time wondering why they have not produced greater effects in the world, either of literature or politics. His virtues are obstacles to his success; he has not the art of pushing or of making himself feared; he is too *doucereux* and complimentary; and from some accident or defect in the composition of his character, and in the course of events which have influenced his circumstances, he has always been civilly neglected" ('Greville Memoirs,' 2nd edit., vol. i. p. 242). Ruskin places tact in a purer and higher plane when he describes it as "sympathy,—of quick understanding,—of all that, in deep insistence on the common but most accurate term, may be called the 'tact' or 'touch-faculty,' of body and soul: that tact which the mimosa has in trees, which the pure woman has above all creatures,—fineness and fulness of sensation, beyond reason,—the guide and sanctifier of reason itself" ('Sesame and Lilies,' edit. 1893, p. 43). Nor must we forget the advice of the old Roman courtier to Sir Henry Wotton, as related by him to Milton,—*pensieri stretti, ed il viso sciolto* (thoughts close, countenance open).

overvalue the efficacy of all these attempted concealments. They are not all successful,—nothing is, absolutely,—but are still means to an end. We are too apt to consider a disguise perfect because we have only accidentally discovered it, while at the same time our existence does not depend upon the result of the search. An amateur or an arm-chair naturalist is speechless with wonder at the least exhibition of wood-craft, a common attribute of many agricultural labourers and gypsies. Jefferies has accurately diagnosed the sense perceptions of a young gamekeeper:—"He will decide at once, as if by a kind of instinct, where any particular bird or animal will be found at that hour." And in a similar manner, but in a greater degree, will be formed the destructive experience of the bird or mammal whose life depends upon the discovery of its prey. Mimicry makes the successful search more difficult, the accidental escape more frequent, and actual extermination by such means alone, impossible. The enemy in his close pursuit finds other prey to satisfy his hunger, like the gold prospector who in his quest may come across non-auriferous minerals which tend to assuage his financial longings; and so an average of destruction is reached, and none alone are compelled to be "confessors" to nature's inexorable rule.

It is probable that highly protected or mimicking species are only destroyed by their most acutely sense-organized enemies, and have a general immunity from the attacks of the ordinary animal pirates. We have no more reason to predicate a dead level in the intelligence of a single species or genus of animals than we have to believe that the same character exists in *Homo sapiens* himself. For in nature, *pace* Ecclesiastes, the race is to the swift, and the battle is to the strong, though the exceptions of "time and chance" may prove the rule. Stroll along a trout stream when anglers are at work, and notice how empty baskets reward the majority, or those who perceive not. Now observe the skilled killer of Trout, how he will detect a hidden fish under the opposite bank, and soon possess the same.* Know-

* Some persons' eyes seem to have an extraordinary power of seeing through water, and of distinguishing at a glance a fish from a long swaying strip of dead brown flag, or the rotting pieces of wood which lie at the bottom. The ripple of the breeze, the eddy at the curve, or the sparkle of the sunshine cannot deceive them; while others, and by far the greater number, are dazzled and see nothing."—(Jefferies, 'Gamekeeper at Home.').

ledge of habits combined with power of eye and hand are successful, and command the intense respect of the ordinary floggers of the stream. We may possess the most accurate knowledge of whist, and play according to the strictest rules, but one of the quartette is a Napoleon in the game, he judges and acts with an instinctive finesse, and the odd trick is won. Or take the boys in a large stable who are trained to ride racehorses at exercise: how few become jockeys; to possess "hands," judgment, nerve, and a knowledge of pace is only an occasional gift of the gods. And so in nature at large; all are not masters of the game, and the mimicking species have a general immunity from attack, save from those incontestable creatures who amongst all animal life, including our own, levy their own rates, successfully collect their own tithe, and command the attention, if not always the love, of their fellows. Animal disguise and mimicry serve an ever purpose, if they do not constitute a constant end; they are often partial and exceptional, and not in result universal. Like human impostors, they are by such means frequently able to live, thrive, and perpetuate their kind. But all depends upon not being found out; there must be many Mr. Pickwicks and few Sherlock Holmes. To believe that a gradual mimicry can slowly arise by the process of natural selection which shall be anything but a very partial defence of the eatable from the eaters, is to imagine our most intelligent and civilized communities capable of being made invulnerable from the depredations of thieves and swindlers. An example is afforded by the colour of the Common Hare. Prof. Poulton makes much of this. He remarks: "It would be hardly possible to meet with a better example of protective colouring and attitude than that of the Hare as it sits motionless, exactly resembling a lump of brown earth, for which indeed it is frequently mistaken."* But the protection thus assumed appears to be founded on partial observation. To a casual evolutionist in search of evidence, whose knowledge of the animal is not intimate, and whose pursuit of the same is a chase not sharpened by necessity, the Hare affords illustrative importance. But let a sportsman, a poacher, or a farmer speak on the subject, and the whole conclusion vanishes. Jefferies may at least be quoted as a

* 'Colours of Animals,' p. 67.

good and careful observer:—"It is not easy to distinguish a Hare when crouching in a ploughed field, his colour harmonises so well with the clods, so that an unpractised eye generally fails to note him. An old hand with the gun cannot pass a field without involuntarily glancing along the furrows made by the plough, to see if their regular grooves are broken by anything hiding therein." . . . "If you watch the farmers driving to market, you will see that they glance up the furrows to note the workmanship and look for game; you may tell from a distance if they espy a Hare, by the check of the rein and the extended hand pointing."* Though the American Hare has the colour of its pile turned grey in winter, it is still much persecuted by the Great Virginian and Snowy Owls, "which prey extensively on the animal, keeping it in a constant state of dread, especially during winter, when, in common with other rodents, it seeks to evade the stoop of rapacious birds by diving instantly headlong into the snow, thus escaping them, but ensuring destruction by man, and such animals as the Fisher-cat and Lynx, who can easily dig it out."† It must not be overlooked that many zoologists and evolutionists estimate the survival of the Hare as due to the protection acquired by their speed, the animals having lived under conditions in which only the swift could escape the attacks of their enemies. Besides this aspect, the animal trusts to its highly developed cunning. Mr. Kearton, a good and practical observer, writes:—"When Hares are going to seek their day or sleeping quarters, they practise a very ingenious trick in order to mislead and baffle their enemies. This consists of travelling for some distance in a direction they have no intention of pursuing, and then doubling back exactly along their own track for a good way, and suddenly leaving it by making a tremendous sideward bound to right or left. This being accomplished to their satisfaction, they trot off at right angles to the path they have just left, and go to their forms."‡ The Hare itself seems to be well aware that the safety gained by colour-concealment is very precarious. The poet Somerville knew this.

* 'Wild Life in a Southern County,' new edit., pp. 7-8.

† A. Leith Adams, 'Field and Forest Rambles,' p. 80.

‡ 'Wild Life at Home,' p. 114.

“ So the wise Hares

Oft quit their seats, lest some more curious eye
Should mark their haunts, and by dark treacherous wiles
Plot their destruction.”—(‘ The Chase,’ Book II.).*

The test of protection is concealment from the keen search of enemies, not merely an assimilative process, as noted by casual observers. Of course a partial concealment is a partial protection, but it is difficult to see how this applies to the Hare, and in the Transvaal, where most of these lines were written, I found it as foolish an animal, and one as easy to discover and shoot, as in England. Dietrich de Winckell, who according to Prince Kropotkin “ is considered to be among the best acquainted with the habits of Hares, describes them as passionate players, becoming so intoxicated by their play that a Hare has been known to take an approaching Fox for a playmate.” † Describers are often carried away by their enthusiasm for the theory of mimicry and give their pens great licence. Thus, Dr. Meyer, speaking of the neighbourhood of Kilima-njaro, writes: “ The insects, too, have their ‘ magic mantle ’ of invisibility. No wonder it is difficult to make a collection, when the Butterflies and Crickets look like leaves and dry blades, the Cicadæ like leaf-stems, the Spiders like thorns, the Phasmodeæ like bare twigs, the Beetles like stones and bits of earth, the Moths like mosses and lichens.” ‡ Much, very much, has been made of the mimetic resemblance of the upper surface of Flatfishes to the bottom on which they rest. Mr. C. L. Jackson has given the result of a most interesting experiment he made by placing a number of small Flatfish in a tank which contained ten or twelve large Cod averaging fully twenty pounds weight each. These at once dashed after the Flatfish, “ which instantly covered themselves with sand and apparently disappeared. The Cod, however, knew better. They commenced to hunt for them, carefully and systematically quartering their ground as a well-trained pointer would do, and affording a beautiful illustration of the use of the curious ‘ beard ’ possessed by many members of the Cod family. By-and-by, one of them, by means of this feeler, detected one of the

* Cf. C. C. Coe, ‘ Nature *versus* Natural Selection,’ p. 184.

† ‘ Nineteenth Century,’ vol. xxviii. p. 706.

‡ ‘ Across East African Glaciers,’ p. 80.

youngsters and put it up. Away it went, full speed, followed by one, two, or three of the huge monsters. No Greyhound fancier ever saw a better bit of coursing as the little chap doubled and turned with the greatest agility, while over and over again the great lumbering Cod overshot their mark, and the little fish went to earth, only, however, to be again routed out and hunted until not one was left."*

The theory of mimicry is probably the still imperfect recognition of a great truth which is struggling to survive a mass of more or less irrelevant evidence too frequently offered in its support. It has long been regarded as an unconscious registration of a preservative action of Natural Selection; it is here suggested that it is largely an act of conscious animal volition. Whatever view be held, this alone is certain, that the theory in either its demonstrated or suggestive enunciation has been the means of a vast record of facts pertaining to the life-histories of animals and plants which would otherwise have remained either unobserved or disregarded.

* 'Lancashire Sea Fisheries,' pp. 34-5.

THE MOVEMENTS OF STARLINGS.

By H. E. FORREST, Hon. Sec. Caradoc and S. V. Field Club.

STARLINGS are so familiar to us all, whether living in town or country, that it would be natural to suppose we know all about their habits and economy, and that it would be almost impossible to find anything fresh to say about them. Up to a very recent date the writer was of the same opinion; but certain events led to his making investigations, and these have resulted in the penning of the present article, which he hopes will at least add to our knowledge of the movements of these interesting birds at different seasons of the year.

Perhaps no habit of the Starling has been more often described than their collecting in multitudes in autumn to roost together in reed-beds, &c. This may conveniently be made the starting-point in our investigations, and Shropshire the field of our enquiries.

The following is a list of the principal "roosts" in the county, with details as to the character of each place, and the name of the observer who has reported on the same:—

Alkmond Pool, two miles north of Shrewsbury.—A small sheet of water with trees on one side, and beds of osiers and reeds on projecting tongues of land on opposite sides. The Starlings roost on the reeds in tens of thousands.—*H. E. Forrest.*

Moreton Corbet, six miles north-east of Shrewsbury.—A coppice called Dawson's Rough; one of the biggest roosts in the county. The Starlings here probably number over a million, and roost on the hazel underwood. Pheasants roost on the big trees, but the odour of the Starlings and their droppings causes them to quit each year. The keepers have tried to drive away the Starlings by shooting, &c., but without any final success.—*W. H. Parry.*

Colemere Mere, Ellesmere.—A large sheet of water with extensive reed-beds. The Starlings used to resort to the reeds

in countless numbers, but during the last few years have come in greatly reduced numbers.—*Brownlow R. C. Tower.*

Llanforda, Oswestry.—In a wood.—*G. D. Lees.*

Chorlton, near Whitchurch.—In a covert. The birds came in millions, and destroyed the trees and undergrowth.—*G. D. Lees.*

Breidden Hills.—Two coverts at Great Woollasson.—*Rev. W. F. L. Harrisou.*

Nesscliffe.—At the south end of Ensdon Clump, in bushes.—*Chas. Kempster.*

Baschurch.—By the pool in Boreatton Park, in shrubs.—*E. H. O. Sankey.*

Ruyton XI. Towns.—In a wood; and at Fennymere, a reedy pool surrounded by trees.—*E. H. O. Sankey.*

Caynton, Newport.—In the reeds round the pool, and in an osier-bed.—*G. H. Paddock.*

Rowton Gorse, near Crudgington Station.—A Fox-covert, mainly privet bushes. Starlings roost here in such numbers that they drive the Foxes away. Large numbers were shot in hopes that the birds would leave, and a portion removed a short distance to Pointon; but the original roost was never forsaken.—*A. E. Payne.*

Kilsall, Shifnal.—In a reed-bed.—*Daniel Jones.*

Albrighton.—At Snowdon Pool, on the Patshull estate—the borders of Shropshire and Staffordshire—on reeds.—*F. H. Joynson.*

Bridgnorth.—At Tasley, in a covert with osiers.—*F. H. Joynson.*

Bridgnorth.—At Hilton, five miles north-east, in a plantation. Also at Gatacre Park; Starlings used to resort in thousands to a laurel plantation, which in a few years they destroyed, and then left.—*E. Ll. Gatacre.*

Madeley.—Three roosts close together were used by large flocks till recently, but are now almost deserted. One was in a covert called Lee Dingle, another an exposed plantation on high ground, and the third a rough field full of high hawthorn bushes.—*R. E. Anstice.*

Harley, Much Wenlock.—In bushes on a hill.—*T. R. Horton.*

Ludlow.—Oakley Park, on reeds by the decoy pools.—*H. Gray.*

Ludlow.—Moor Park. In a small plantation the birds roost in tens of thousands.—*J. Palmer.*

Wooferton.—In an immense hawthorn hedge twenty to thirty feet high.—*J. Palmer.*

Many interesting details have been furnished by the various observers, but want of space prevents our giving anything beyond a summary.

In the great majority of cases the roosts have been occupied by the Starlings *regularly for upwards of twenty years*. In only a few cases have the established roosts been deserted, and then probably the birds have only gone to a neighbouring roost. *In no instance has an entirely new roosting-place been started*. It will be noticed that the roosts are of three classes—(1) on reeds, (2) on trees or underwoods, (3) on osiers. We shall see later on that the nature of the roost has an important bearing on the duration of its occupancy by the Starlings. Lastly, it will be seen by a reference to a map that the distance between one roost and another varies from less than two miles to about thirteen miles. There are considerable tracts of country from which no reports have been sent in, and it would be safe to assume that there are a few roosts in these districts which are not recorded in the above list. On this ground *the average distance of the roosts from one another can scarcely exceed eight miles*.

Before quitting this part of the subject a few details may be given regarding some of the roosts.

Mr. W. H. Parry resides at Shawbury, close to the Moreton Corbet roost. He says that there is an enormous pear tree in his orchard, used by the Starlings as an outpost. They alight on it in great masses, so that it quite bends beneath their weight, and, upon their quitting it, the tree rebounds with such force that it continues to oscillate for some time. This and a few other trees in the surrounding fields are only used as outposts; the birds do not roost there, but in the coppice farther on. When alighting on the pear tree the birds generally make a loud chatter, but not always—sometimes there is no noise but the rushing sound of their wings. The ground and hazel underwood in the coppice are covered with the birds' droppings, and the fetid odour arising from these and the massed birds is perceptible at a considerable

distance. The number of birds assembling each night in autumn at this roost is enormous, and towards the end of September or early in October it is further increased by flocks from Caynton and other places. The reason for this is curious. Where the roost is situated on a reed-bed, the reeds get so completely broken down in autumn—when they are much more brittle than in summer—that the Starlings cannot get a footing on them. Thus it happens that roosts of this kind are always deserted early in October. At Caynton Mr. Paddock says that when the reeds break down the Starlings resort to a bed of osiers on another part of the pool, and finally desert those when the leaves fall off. Roosts of the other class—on trees and underwoods—are resorted to much longer. Indeed, the one at Moreton Corbet is never quite deserted; a few small flocks resorting to it through the winter and spring, and even in the breeding season.

The general habits of the Starling may be thus described: During summer they scatter in pairs all over the country to breed, except perhaps small flocks of young birds that do not breed. Even now they seem not to lose their gregariousness, for I have often found from twenty to thirty nests within such a limited area as the ruins of Haughmond Abbey. This is probably more apparent than real, and is due to the number of convenient nesting-holes in such localities. The nest is generally placed in some kind of cavity—in a hole in a tree or wall, under the eaves of houses, amongst piles of loose stones, in a rotten tree-stump, &c. Very rarely it is open to the air, and last year I noticed a very queer instance on the Buries, close to my house at Bayston Hill. It was on a large branch of a very tall ash tree close to the trunk, and, as far as I could see from below, was made entirely of sheep's wool! I watched the bird on and off the nest several times, or should never have recognized the lump of wool as a Starling's nest.

Mr. R. Moses writes that for several years in succession two Starlings' nests were to be seen in Shrewsbury, wedged in between two chimney-stacks four inches apart; they rested on nothing, and it is a mystery how the birds began them. Mr. Palmer says he has several times found the nest in ivy against a tree-trunk.

Ordinarily the nest is an untidy mass of hay or straw, lined

with a few feathers or bits of wool. The eggs are of a lovely pale blue, sometimes white, and vary greatly in size and proportions. As soon as the young are hatched the parents display intense activity in searching for food to satisfy their enormous appetites. There are generally five or six nests round my house, and I often watch the Starlings from my bedroom window while dressing in the morning. They regularly search every inch of the lawn for worms, insects, and grubs, and never failed to do this during the past dry summer, although, as there were hardly any worm-casts to be seen, the worms had evidently left the surface-soil and retired to the moister earth below; so that the search must have been rather a "forlorn hope." As soon as the Starlings have exhausted the lawn they go farther afield, and they do an immense amount of good by destroying noxious grubs and insects. In reply to a letter of mine on the subject, the Rev. J. B. Meredith writes:—"I agree with you that Starlings are most useful birds. I do not think they affect the earthworm which makes the worm-casts so much as the wireworm; hence their diligent search of your lawn even in the drought. You have evidently never had your cherry trees cleared by them in dozens and in scores as I have every year; and I have also caught them in the act of stealing raspberries, currants, damsons, and ripe pears—watched them gorging at them—though they do not systematically go for these as they do for cherries."

In regard to this matter, the only cherry tree in my garden is a "Morello," and the fruit is too sour for most birds. I have not seen the Starlings attack the other fruits mentioned, but have seen Blackbirds doing so frequently.

Mr. G. H. Paddock relates that his father used to shoot the Starlings round the house at Caynton, Newport; he urged him not to do so on the ground that they were such useful birds in destroying worms, &c., and at last persuaded him to give them a year's trial. As he anticipated, "the difference in the turf was most marked; it was no longer unsightly from worm-expellings, the Starlings hunting it over first thing every morning." Since then they have been protected; an empty oyster-barrel which Mr. Paddock put up for them in a tree was adopted for a nesting-place by a pair of Starlings the very next morning. Under date Dec. 9th, 1899, Mr. Paddock adds:—"During this summer the

whole of my choice carnations were attacked by wireworms, and I noticed Starlings continually amongst the plants. This appears to bear out Mr. Meredith's suggestion." Dr. Sankey says:—"Starlings feed greatly on animal food; those that I dissected some time back had their crops full of caterpillars," and they pick them off oak trees when infested. The stomachs of some that were killed at Shawbury during frosty weather in December were found to contain spurts from wheat, as well as spurting wheat-grains, and a few small weed-seeds. The damage done to one wheat-field necessitated its being resown. On the other hand, Mr. Beckwith found that no bird checked the ravages of the *Agrotis* moth so effectually as the Starling.

To return to our subject. As soon as the young are able to fly the Starlings go out every morning to feed, keeping together in family parties, and particularly frequenting meadows where sheep and cattle are grazing, to pick up the insects disturbed by their feet. They return each night to the nest to roost. The young grow so rapidly, however, that soon there is not room for them in the nest. In this emergency some other sleeping-place has to be found, and what place would so naturally recur to the minds of the parent birds as the spot where they roosted in the previous autumn? The parents and children start off together, and on the way fall in with another little family party bent on the same errand; then another and another, till, by the time the tryst is reached, the flock numbers several hundreds. Perhaps for the first few evenings the total assemblage will not be very large, but as successive families realize the necessity of quitting their nesting-places the congress increases night by night. Very few sights in the bird-world are so impressive as one of these great gatherings of the clans. About an hour before sunset the first flocks begin to arrive at the appointed place. These do not settle down at once, but continue to fly around; soon other flocks arrive in quick succession from all points of the compass, till the heavens are literally darkened by the cloudy masses of birds. They now proceed to execute in the air a series of complicated evolutions, like regiments of soldiers on a review day—charging forwards, wheeling to right and left, crossing and re-crossing over and under, converging and diverging, coalescing and separating, till at last, just after sunset, as if by one consent,

the whole body of birds descends like an avalanche, with a mighty rushing sound of wings, and covers every tree, shrub, and reed with a living freight so heavy that they bend almost to the earth beneath their burden. Now ensues a perfect babel of chatter, which continues for several minutes, till the last "good nights" have been said, and darkness and silence descend on the scene. The effect of any sudden sound, such as the stroke of an oar falling flat on the water, is startling. Instantly the thousands of Starlings rise into the air uttering cries of alarm, with much fluttering of wings, only to resettle the next minute, amid congratulatory murmurs of satisfaction, till silence is again restored.

Not always, however, is the scene thus peaceful. If there is a Sparrowhawk in the vicinity that has not fallen a victim to the keeper's gun—alas, how few *do* escape—it can hardly fail to discover such a happy hunting-ground as this. Two of my correspondents mention that Sparrowhawks have been seen haunting the roosts, and occasionally dashing into the throng to seize a Starling, its companions fleeing in every direction with mournful terror-stricken screams.

Midnight. All quiet.

Morning dawns. The Starlings begin to wake and twitter, and preen their feathers. Before the sun is well up they are off; scattered all over the country to their daily avocation of picking up their food. Now, however, instead of keeping together in families, they go about in small parties, and this habit they retain throughout the remainder of the year.

We now approach the most difficult part of our subject—the movements of Starlings between the middle of November (when the big roosts are nearly deserted) and the following spring, when they return to their nesting-places. It would only weary the reader to state all the little details upon which the following conclusions are based, so I will here only indicate briefly what I believe to be the actual facts. In order to make the matter clear, it will facilitate matters if we divide our native Starlings into three main groups:—

- (1) Starlings that migrate.
- (2) Starlings in towns.
- (3) Starlings in the country.

Anyone who observes our local birds must notice that the number of Starlings in any given neighbourhood suffers a great and sudden diminution some time in late autumn, and there is pretty good evidence that this is caused by emigration. The Rev. R. T. Kempthorne, who lived formerly in Cornwall, tells me that in that county the Starling is only a winter visitor, and rarely, if ever, breeds there. Mr. Howard Saunders, in his 'Manual,' says:—"Large flocks arrive on our east coasts in autumn, at which season there is a marked migration westward, localities in the interior of this country which have been frequented during the summer being then almost deserted, while great numbers visit the south of Ireland. . . . Throughout the greater part of the Mediterranean basin it is only a cold weather visitor, although at that season it occurs in almost incredible numbers." Towards the end of autumn enormous flocks of Starlings and Peewits appear on our western coasts, particularly in Merionethshire, Pembrokeshire, and Cornwall. We may conclude, therefore, that a large proportion of our inland Starlings leave us then, and go westwards. In reply to a letter of mine, Mr. Howard Saunders writes that the Starlings in the north of Europe, where in winter the ground is as hard as iron, go to the *south*.

(2) Starlings in towns, during winter, assimilate in their habits to Sparrows. They are hardly at all gregarious, but live on housetops, feeding on anything that falls in their way. It rarely happens that more than two or four are seen together, and I fancy that these are paired birds returning to their old nesting-places as a kind of head-quarters whence to forage around.

(3) Starlings in the country, during winter, behave quite differently; they go about in small flocks, sometimes alone, but more often in company with other birds that frequent fields, especially Rooks and Peewits. Around Shrewsbury, Peewits are very numerous, and it seems to me that there exists some bond of sympathy between them and Starlings, for we rarely see a flock of Peewits without its attendant train of Starlings. If the Peewits move into the next field, the Starlings do the same; while, if the former continue to wheel about in the air for some time, the Starlings wait till they settle, and then rejoin them. In severe weather Peewits leave the inland meadows and descend to the coasts in search of food. On Dec. 11th, 1899, a hard

frost began. Next day all our local Peewits disappeared: *so did the flocks of Starlings*. There were no Peewits to be seen after that date, nor any Starlings (except pairs about houses) till Jan. 4th, when *both re-appeared* in flocks on the meadows near Shrewsbury.

Whether each group of Starlings attaches itself to a particular group of Peewits or Rooks, we have no means of knowing, but it is hardly likely, as the size of the flocks varies greatly from day to day. The reasons why these different birds associate together are probably:—

(1) That they are similar in their tastes as regards food.

(2) That they are all very wary birds, and associate for mutual protection.

Parenthetically, we may remark that the Starling is remarkable for unfailing good temper—he never quarrels with his company, nor is he treated as an intruder.

At night the Starlings that have kept company with the Rooks and Peewits all day retire to an ivy-clad tree or wall to roost. They may then be found occasionally in numbers up to a hundred or two; but these are only accidental gatherings—very different in character to the big roosts before-mentioned—and the birds do not travel any distance from their feeding-ground; they merely go to roost in the nearest convenient place.

The following incident evinces the existence of a strong spirit of comradeship amongst Starlings. Mr. D. H. Meares shot a Starling on the ground out of a flock at about eighty yards distance, when the whole flock rose and hovered round their companion, swaying up and down in the air over it in a triangular formation; some even tried to lift it; this continued for several minutes.

Reverting for a moment to the subject of “Roosts,” we noticed, early in this paper, that the average distance between one roost and another was not more than eight miles, so that the radius of the area appropriated to each would be four miles. If we treat the area as a square it would contain sixty-four square miles. I believe that if *all* the roosts were recorded, we should find that this estimate is over the mark, and that the relative area is really much smaller. Anyone who has witnessed, as I have, the enormous multitudes of birds that assemble at some of

the roosts will hardly conceive it possible that they are natives only of the limited area surrounding the roost, and we can only conclude that the true natives of the district receive additional numbers that migrate thither from outside districts or even from the Continent.

I will conclude with a statement which may perhaps be received with incredulity. Nearly all ornithological writers say that Starlings breed two, and occasionally three times a year. Careful observation has convinced me that a very large proportion of Starlings—perhaps one-half—rear only one brood in the year; many rear two broods. I have never known three broods, and there are some Starlings that do not breed at all. Mr. G. W. Murdoch, Natural History Editor of the 'Yorkshire Weekly Post,' writes in reply to a query on this point:—"In Hants Starlings *very often* breed twice a year; I never knew them do so in Scotland. I am of opinion that a good many Starlings *never breed at all*, but for what cause I know not. That is also the opinion of my friend the Rev. H. A. Macpherson, M.A., author of 'The Fauna of Lakeland.'" Mr. E. S. Cobbold writes in April, 1899:—"Why are the Starlings congregating in flocks now? Hundreds fly over Stretton from the south-east at 5 or 6 p.m. to roost, I think, in a Scotch fir-plantation near; I have seen them three nights in succession, and on April 3rd I saw rather large flocks down by Craven Arms feeding together." He adds that at the very time when he saw the flocks flying overhead, the Starlings that were breeding about his house were busy looking after their nests or young, and did not take any notice of the others, much less offer to fly off after them. "Is it," he concludes, "the autumn habit not yet abandoned? I am inclined to think *not*, for I remember in previous years noticing them early in summer, when I supposed they had done breeding."

A simple and probable explanation of the phenomenon is this:—When Starlings rear *two* broods in the year, the second brood would be younger than the first by some two months or so. When the breeding season comes round in the following spring, the second broods are not sufficiently adult to breed, and, not having any duties to call them elsewhere, they naturally continue to resort at night to the old familiar roost. This

supposition also accounts for the presence of a small number of birds at the roost, even during the breeding season—a fact alluded to at the end of the description of the roost at Moreton Corbet.

With reference to the migrations of the Starlings that leave us, we seldom witness the actual departure, and still more seldom see their return; but this is not singular—we may say the same of all inland migrations. On the coasts the departures and arrivals are much more evident. Mr. D. H. Meares saw, on one occasion, several thousand Starlings roosting *on the ground* in a ploughed field close to Shawbury village; he supposed that they were preparing for a night flight. In returning to their inland quarters in spring, the birds arrive on our coasts in large numbers, but, after resting awhile, they continue their flight in such small bodies that they are not noticed.

The Starlings which remain here through the winter, in company with Peewits and Rooks, exhibit a tendency to break up into gradually smaller and smaller parties. Towards the end of February many pairs are to be found at their old breeding haunts. At this period the Peewits still keep together in large flocks, not pairing off till March; by that time their attendant Starlings have deserted them.

NOTES AND QUERIES.

MAMMALIA.

INSECTIVORA.

Curious Variety of the Mole.—During last autumn five Moles (*Talpa europæa*) were caught on different dates at Morville, near Bridgnorth, Salop. They were of a peculiar colour—glossy light pearl-grey all over, except the under parts, which were bright buff, the general effect being very pretty. On Nov. 11th Mr. W. F. Warren kindly sent me one in the flesh, which is now in the Shrewsbury Museum. I have seen mounted cream and buff coloured Moles before, but never one like the above.—H. E. FORREST (Shrewsbury).

Lesser Shrew in Worcestershire.—As upon reference I cannot find that the Lesser Shrew (*Sorex minutus*) has been taken previously in this county, it may be as well to record one taken by the writer at Lower Hagley on Jan. 19th last.—J. STEELE-ELLIOTT (Clent, Worcestershire).

Water Shrews taken Three Miles from Water.—During a short trip to Banstead last August, trapping small mammals, I was lucky enough to catch three Water Shrews (*Neomys fodiens*) (two males and a female), two in a small copse, and one in a hedge adjoining, at a distance of about three miles from water. The weather was excessively hot, and the ground like a rock. I think this is the first authentic British record of the occurrence of this Shrew at such a distance from water. I am aware that it is well known that this Shrew can exist at some little distance from water, as the following quotations show; but I think my record will be found to be the farthest known:—Bell's 'Brit. Quads.': "It is often found at some distance from water. There can be no doubt that it occasionally seeks its food on the land, probably when it has exhausted the ditch or brook to which it has attached itself." Also Jenyns, in his 'Brit. Verts.', mentions: "My specimen was taken in a corn-field at some distance from any water." If this question were looked up I have no doubt it would be found that this animal can live entirely away from water like the Vole.—C. H. B. GRANT (Putney).

A V E S.

Early Appearance of Chiffchaff.—On Feb. 25th I noticed a Chiffchaff (*Phylloscopus rufus*) in a local farmyard. The bird was briskly catching flies, and appeared to be in good condition.—WM. DELVES, JUN. (Maynard's Green, Horeham Road, Sussex).

Great Tit nesting in active Bee-hive.—In the Chester Museum there is exhibited in a glass case a Blue Tit's nest in an empty bee-hive. A far stranger incident occurred last year at Ludlow. A Great Tit (*Parus major*) built a nest and laid twelve eggs in the midst of an active bee-hive. The bird went in and out through the same entrance-hole that was used by the Bees, and neither bird nor insects seemed to interfere with each other. The hive was about half-full of honeycomb, and the Bees hard at work the whole time. The eggs were taken on May 2nd by Mr. J. Palmer, Secretary of the county Bee-keepers' Association, who reported the circumstances to me.—H. E. FORREST (Bayston Hill, near Shrewsbury).

Nesting Habits of the Great Tit.—While thanking Mr. Tuck for his suggestion (*ante*, p. 82), I should like to say that I am aware that *Parus major* is sometimes in the habit of covering the eggs of an incomplete clutch with loose nest-materials. In these cases the nests are "apparently unfinished." Among the tenants of his nesting-boxes Mr. Tuck does not mention the Robin, which has used boxes here. — O. V. APLIN (Bloxham, Oxon).

Marsh-Harrier in Berkshire.—A Marsh-Harrier (*Circus æruginosus*), which, I believe, to be a three years' old cock, was shot Oct. 2nd, 1899, by my nephew Ralph Cooper; his wing was only just tipped, and in three weeks he could fly quite strong again. I keep him in a large wire aviary, where he can have a good thirty yards' fly when he wishes, and have one corner covered on the top, and the sides done up with ivy, where he roosts on the top of a large bavin. He is fed on Sparrows, Rats, and Rabbits.—T. TERRY COOPER (Swallowfield, near Reading).

[This note was received through our correspondent Mr. George W. Bradshaw, who writes that the bird has also been seen and identified by Mr. H. M. Wallis, M.B.O.U., of Reading.—ED.]

Nesting of the Hobby in Shropshire.—Last summer a pair of Hobbies (*Falco subbuteo*) nested near Ludlow, utilizing a Crow's nest several years old in the top of a large oak tree, but adding a little fresh lining of birch-twigs and bracken-stalks. Early in May the male was found dead near the tree, but the hen went away and quickly returned with a new mate. The first clutch of three eggs was taken July 1st, but it is believed that the birds bred again, as they remained in the neighbour-

hood, and were seen repeatedly throughout the summer.—H. E. FORREST (Bayston Hill, near Shrewsbury).

The Great Lapwing Year. A Correction.—I beg to correct an error in my notes on Golden Plover and Lapwings (*ante*, p. 40), in eleventh line from top. The words "more numerous than in any year since 1878 (the great Lapwing year)"; it should be 1879. — ROBERT WARREN (Moyview, Ballina).

Land Birds at Sea.—With reference to the interesting communication on this subject by Surgeon Hurlestone Jones (*ante*, p. 51), I am able to add two species to his list of land birds observed straggling out to sea. On February 24th, 1891, on S.S. 'Wordsworth,' bound for Brazil and the Plate River, a small unfamiliar Warbler settled upon the deck, and was seen several times during the day. We had last sighted land at Cape Finisterre, and the observations for noon of that day (24th) showed that our position was lat. $40^{\circ} 12' N.$ by long. $12^{\circ} 48' W.$, so that at the time we were a considerable distance from the coast of Portugal. The little bird followed the vessel the whole day, but was not seen the following morning when we arrived at Madeira about six o'clock. I was unable to identify the species, but a conspicuous yellowish stripe over the eye led me to believe it was *Phylloscopus superciliosus*. Whether our little visitor reached land in safety or was drowned I am unable to say. Upon the previous day, in lat. $44^{\circ} 23'$ by long. $10^{\circ} 24'$, a Sky-Lark (*Alauda arvensis*) flew close to the ship, but was not observed to settle, and soon disappeared. At about the same position, on April 29th, in the middle of the Bay of Biscay, two others accompanied the vessel for some distance. Another species which I have observed under similar conditions is the Wheatear (*Saxicola ænanthe*), which flew on board the Orient steamer 'Garonne' on Aug. 27th. 1892, off the coast of Norway, long out of sight of land, but unfortunately my notes do not give the exact position. We were, however, about a day's journey from the land. A Turtle-Dove (*Turtur communis*), Starling (*Sturnus vulgaris*), and House-Sparrow (*Passer domesticus*) accompanied us for nearly a day between Harwich and Hamburg on Oct. 1st, 1899. At the time the birds were observed we must have been nearest to the coast of Holland or Friesland, and I have no doubt that they all reached the land in safety.—MALCOLM BURR (New College, Oxford).

PISCES.

Sea-Lamprey at Shrewsbury.—On June 13th a boy caught a Sea-Lamprey (*Petromyzon marinus*), thirty inches long, in the Severn, below the Welsh Bridge, at Shrewsbury. It rarely occurs so high up the river, though formerly common in the estuary. — H. E. FORREST (Bayston Hill, near Shrewsbury).

ORGANIC EVOLUTION.

Remarks relating to Mimicry.—I am obliged to Mr. C. T. Rope for informing me (p. 85) of the likelihood of black Ducks throwing white feathers; in the case of the drake and two ducks under my observation the drake alone did this. The nesting Fowl certainly does not hiss as clearly as a Duck; nevertheless it makes a puffing sound of the same nature, and apparently made in just the same way. It would be indeed a triumph of mimicry for an animal not only to feign death, but also the appearance of the decay which usually supervenes. In the case mentioned by Mr. Rope—that of *Bombinator igneus*—the shrinking might perhaps be caused by an effort towards *smallness* rather than the appearance of decay; otherwise a batrachian might be capable of mimicking its own skeleton, which is hardly likely. Unconscious mimicry, apparently due to sexual relations, is a common feature in wedded couples, who notoriously tend to resemble each other in facial expression, if not in feature, after many years of cohabitation. This may be consequent upon developed similarity of thought, or something else. Some cynics would deny that it was due to mutual affection.—CHARLES A. WITCHELL.

NOTICES OF NEW BOOKS.

The Races of Man: an Outline of Anthropology and Ethnography.
By J. DENIKER, Sc.D. (Paris). Walter Scott, Limited.

ENGLISH readers have long been familiar with the writings of French anthropologists. The names of Broca, Topinard, and De Quatrefages are quite household words among those who study the zoology of their own kith and kin, while the present work of Dr. Deniker will further increase our respect for the capacities of anthropologists across the Channel. There is always room for a fresh book on Man; the multitude of subjects that make for his history are truly complicated; each student and professor is always stronger on his particular specialty than on others; we leave the school of anatomy to study written records; from the unwritten testimony of prehistoric archæology we turn to the problems of philology; the physician and the zoologist compare notes; one measures the skull, another photographs the features; the traveller publishes his notes, the missionary gives his experience; the prison, the hospital, and the lunatic asylum alike contribute to our knowledge; the statistician, the comparative theologian, and the recruiting sergeant all have something to tell, while many a forgotten book contains the only detail of a vanished or vanishing race. Consequently to bring the subject up to date is a quest and not a feasibility; there is always something behind the arras.

Dr. Deniker in the present volume has added much to our knowledge by referring us to recent work that has been done, and his bibliographical notes are valuable. The general reader may learn much as to races other than savage, even as regards such a familiar being as the Jew. Of these people, contrary to general ideas, only some 250,000 are stated to be found in Asia, and Palestine can only claim about 75,000 in the present day. "Their total number is estimated at eight millions, of which the half is in Russia and Rumania, a third in Germany and Austria,

and a sixth in the rest of the world, even as far as Australia. The great majority of Jews are unacquainted with *Hebrew*, which is a dead language; they speak, according to the country they inhabit, particular kinds of jargon, the most common of which is the Judeo-German." A foot-note also points out the well-established fact that the isolation of the Jews from the rest of the peoples is not complete, as other races have been converted to Judaism. This may be taken as an instance of the concise information to be found in the volume, which is well illustrated from original photographs.

Among the few opinions that Dr. Deniker allows himself to formulate is one as to the use of the laryngeal sacs in the Orang-utan. These, considerably larger than those of the Gorilla, may "serve him as air-cushions to lessen the enormous weight of the jaw resting on the trachea."

A Book of Whales. By F. E. BEDDARD, M.A., F.R.S.
John Murray.

THE Cetacea have long required treatment in a handy but authentic book of reference. They have received great attention from two late naturalists who both held high official positions at the British Museum—Dr. Gray and Sir William Flower. Dr. Gray wonderfully increased the number of these animals by the descriptions of proposed new species, while his successor, Sir William Flower, endeavoured to analyse these creations of the printing press and to restore the balance of Cetacean nature. Now, as Mr. Beddard writes, the student of the Cetacea "has to deal with not more than thirty-five genera and almost eighty species."

The origin of these immense creatures, which "are not only the largest of living mammals, but the largest of all animals, mammalian or otherwise, which have ever existed," is still unsettled, and Mr. Beddard takes a cautious position after a consideration of the views of both Professors Albrecht and Max Weber, the first of whom inclines to the view that the Cetacea are the nearest thing now existing to the hypothetical "Pro-mammalia," and the second that they are not primitive Mammalia

at all. The view held in this volume is that "The general conclusion which best suits the facts at our disposal seems to be to look upon the Cetacea as an off-shoot from an early group of the higher Mammalia. This is unsatisfactory in its vagueness, no doubt; but it is difficult to see what more can be said which is not entirely speculative and devoid of foundation in ascertained fact."

The enumeration of the species is happily treated on the synthetic method, but the question of specific consideration is a complex one. Not only are specimens not easily procurable, but the skeletons of stranded examples do not altogether solve the problem. "Two quite different species might conceivably have a quite similar skeleton, showing their specific difference only in colour and other outward features."

Mr. Beddard has well attained his desire to write "a solid book tempered by anecdote," and to illustrate by the means of Whales "a very important biological generalisation, the intimate relation between structure and environment." The book is well illustrated by Mr. Berridge, and is written throughout with a greater tendency to fact than speculation. On this point the author's words are clear: "Nothing is more difficult in zoology than to arrive at convenient generalisations—for the paradoxical reason that it is so easy to frame hypotheses. The expression 'simplex sigillum veri,' not composed for the purpose for which it is used, and yet used with such frequency in zoological writing, especially in the newer developments of what is called sometimes 'Darwinism,' has had a most deleterious effect upon speculation. A simple and obvious explanation often seems to such writers to settle the question at issue. And yet in the long run it seems to be plain that the processes of nature are not so simple."

British Birds, with some Notes in reference to their Plumage.
Vol. II. By CLAUDE W. WYATT, M.B.O.U. Wm. Wesley & Son.

THE first volume of this beautiful quarto was published in 1894, and was devoted to the resident British Passerine birds. The second volume, now before us, "contains illustrations of all the Passerine Birds which are migrants to the British Islands,—

the Occasional Visitors being left out; also of the Resident and Migrant Picariæ, Striges, Accipitres, and Columbæ, the same reservation being made to the Occasional Visitors." Fifty-three species are figured, and form subjects for forty-two handsome coloured plates.

The story of our British birds has been told in many ways and by many writers. This volume may almost be said to be devoted to their iconography. The author seems to have taken it for granted that there was not much left to be written about his subject, and to have limited himself absolutely to describing the plumage and its seasonal vicissitudes. In this course, individually, he was probably justified; a good book is not necessarily one that exhausts its subject; it should, however, completely deal with its selected theme. We must therefore refer to the illustrations, and by these the work will be known.

The plates all bear the initials of the author, and have evidently proved a labour of love. Not only have we life-like portraits of the birds, but their environment has been sketched in no inartistic manner, and we almost seem to recognize some of the landscapes which an excellent insular prejudice has made us love so well. The homestead behind the Spotted Flycatchers is a case in point, while the background to the Tree-Pipit makes us almost believe we are at home on the Surrey hills. A sketch of the true environment of a bird is no mean hint as to its habits, and, in looking over our skins obtained in other lands, a mental picture of the scenery where it was procured appears to pertain to each specimen. Apart from its value to all lovers of our avifauna, it would perhaps be difficult to select a more acceptable present to a British naturalist residing abroad than this beautiful representation of the well-remembered birds of the old country.

A Manual of Zoology. By the late T. JEFFERY PARKER, D.Sc., F.R.S., and WILLIAM A. HASWELL, M.A., D.Sc., F.R.S. Macmillan & Co. Limited.

IN our volume for 1898 (p. 132) we noticed, at such length as is available in our pages, 'A Text-Book of Zoology,' in two volumes, by the above authors. The present publication may be

considered a condensation of the previous work, "adapted to the requirements of the student in higher classes of schools, and to some extent in junior classes of universities." The curtailment has been effected "(1) by leaving out altogether certain classes of existing animals; (2) by omitting all descriptions of extinct groups; (3) by dealing only very briefly with embryology." We may also accept Prof. Haswell as really the writer of this Manual, the death of Prof. Parker having taken place at an initial stage of the work.

Thus we have the essence of a really good book in a convenient form for teachers and students, and if the teacher has not also to learn his subject from its pages—as is unfortunately sometimes the irony of the position—but can really impress its contents on his pupils, then this volume should more than hold its own in that often undigested superstition that rejoices in the name of "science for schools." In these days, when everybody is a politician, a military general, and an evolutionist, it is at least something that the last position can be fortified by the sound zoological axioms obtainable in a small and inexpensive book. Not that the last word is said on any subject; and when we read that the Amphibia differ "from all fishes but the Dipnoi, in the presence of lungs for breathing air in the adult," we accept the rule, but recur to the exception in "Salamanders with and without lungs," recently noticed in these pages (*ante*, p. 96). Even a specialist may read with the greatest interest the introductory remarks as to what constitutes both "genus" and "species," and remember that in the description of the last a representative and not an individual is the real specific type. It is only fair to say that the authors of this volume do not lay down this rule, but the inference may be drawn from their definitions.

The Caroline Islands. By F. W. CHRISTIAN, B.A., &c.
Methuen & Co.

THE South Sea Islands are still, among naturalists, a name to conjure with. In Spanish Micronesia alone, between 139° and 170° E. longitude, are scattered a long chain of 652 islands. It was in this almost zoologically unknown zone that the once princely Hamburg merchant house of Goddeffroy Bros. incited their

employés to collect for their museum, and made their commerce a friendly helper to Natural History. The firm, we believe, no longer exists, but the name of its principals will be long remembered. Commerce and zoology are bad partners; they each exact too much to flourish together; it seems that one alone can succeed. Recently the Sandwich Islands have had their fauna investigated: missionaries from time to time collect in the Lotos lands to which they are not unoften consigned; huge folios still represent the partial work of the old voyagers; but it is probable that much more is known of the Ethnology than of the general Zoology of these lonely islands, where man alone seems to break the peaceful dream of life.

Mr. Christian has written a good book to lift the veil off the Caroline Islands, which he visited rather as a philologist than a zoologist, but has still given us incidentally much valuable information as to that insular natural history. Thus in the appendix we have not only a list of native names for "trees, plants, and shrubs," but also for "fishes, insects, birds, and animals" (*sic*). In the absence of scientific names we cannot of course identify the animals to which the local names apply, but we are able by his descriptions to form an estimate of the fauna and to seek for more precise information. Where the author allows himself to theorize he is always interesting—thus: "It is very remarkable the horror in which Micronesians and Polynesians alike hold Lizards and Eels, and it certainly seems to point to a traditional recollection of the Crocodiles and venomous Serpents they left behind them in the great rivers and jungles of Asia and the larger islands of Indonesia. What proves this so strongly is the fact that Crocodile and Snake names in New Guinea in many instances coincide with Lizard and Eel designations current in the dialects embracing all the isles of the Pacific."

The book is beautifully illustrated, and at p. 125 Mr. Macpherson will find an account of "Traps and Cages." We rise from its perusal with a full measure of the vast potentialities that exist for a naturalist who could spend a greater part of his life on one of these comparatively small islands, investigating the fauna as a whole, with a purview beyond both birds and insects, and pass the close of his days in publishing his life's work—one island, one man, one book.

EDITORIAL GLEANINGS.

PART III. of 'The Vertebrate Fauna of Bedfordshire,' by J. Steele-Elliott, has reached us. The publication has hitherto been slow, but the author hopes to accelerate it in future. Of the Jay (*Garrulus glandarius*) we read that in northern Bedfordshire this bird is particularly abundant, and its depredations noticeable. "In Angers Wood during the present year (1899) I was particularly struck with the innumerable nests of Black-birds and Thrushes, none of which contained eggs, and in all probability had been robbed by these 'avian birds'-nesters.'"

"THE Caradoc and Severn Valley Field Club" have issued their 'Transactions' for 1899. In the account of a half-day excursion to Birmingham, which was principally undertaken to see the collection of British Birds in the possession of Mr. R. W. Chase, many interesting jottings will be found by the British ornithologist. "There are three specimens of Richard's Pipit, two of them obtained near Birmingham; and the only specimen of the Siberian Bunting obtained in Britain, taken at Flamborough Head."

THE military correspondent of the 'Westminster Gazette' has brought the teachings of zoology to the aid of practical warfare. "I have a theory on this subject which I should much like to see practically tested. My readers will doubtless have noticed that the coats of all animals which depend for their existence on their comparative invisibility in their ordinary surroundings shade off to a lighter colour—usually white—underneath. I believe that, following this hint from Nature, our troops would become infinitely less conspicuous if their coats were of the ordinary shade of khaki or drab, their breeches somewhat lighter in tone, and their putties or leggings lighter still. At present, when men are dressed in one uniform tint of khaki, the lower limbs, being in shadow, appear very much darker, and consequently add to the conspicuousness of the soldier. This will be speedily noticeable if the photographs from the seat of war are studied. It will then be noticed that in many cases the upper halves of our troops are barely distinguishable, but that their lower limbs, much darker than the remainder, stand out quite sharply, though the colour of the clothes and the colour of the background are in each case the same."

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THE BIRDS OF GREAT YARMOUTH AND THE NEIGHBOURHOOD.

BY ARTHUR PATTERSON.

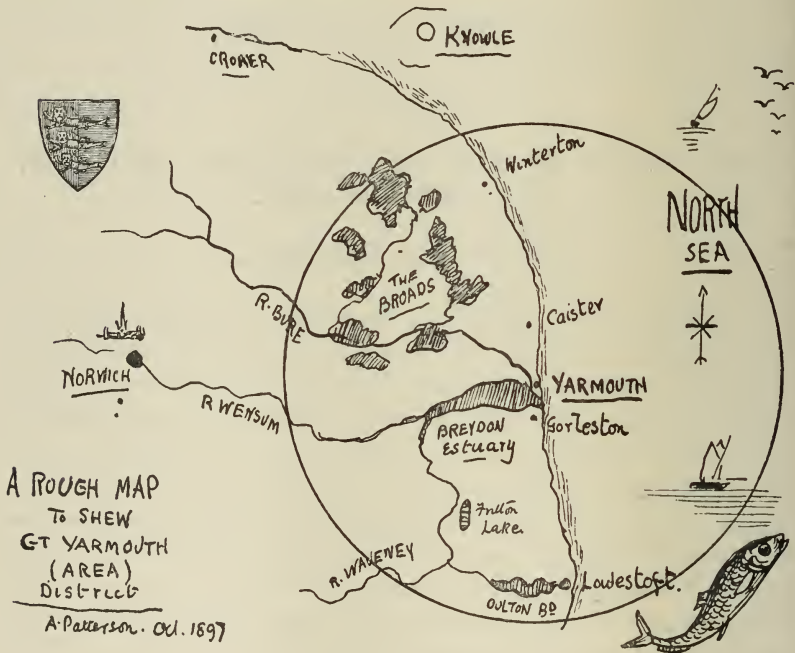
THE aspects of bird-life in the Great Yarmouth district are exceedingly interesting, and must have been peculiarly so in the earlier part of the century, prior to the improved drainage of the marsh-lands, the encroachments of the sportsman, the agriculturist, and the builder, the advent of railways, and many other untoward circumstances. The Rev. Richard Lubbock, in the introduction to his 'Fauna of Norfolk,' truly remarks: "We everywhere find the spirit of civilization and improvement warring with the *feræ naturæ*." In a note written by him in 1847* he says:—"Since I first began to sport, about 1816, a marvellous alteration has taken place in Norfolk, particularly in the marshy parts. When first I remember the fens they were full of Terns, Ruffs, and Redlegs; and yet the old fenmen declared there was not a tenth part of what they remembered when boys. Now these very parts which were the best . . . are totally drained . . . dry as a bowling-green, and oats are grown where seven or eight years back *one hundred and twenty-three* Snipes were killed in one day by the same gun." Mr. Southwell goes on to speak of a dry pasture pointed out to him by the late Mr. Rising, at Horsey,

* *Vide* Lubbock's 'Observations on the Fauna of Norfolk,' new ed. 1879, p. iii, Introduction, by T. Southwell, F.Z.S.

Zool. 4th ser. vol. IV., April, 1900.

which, in his father's time, "was a swamp whereon many thousands of Black-headed Gulls nested every summer; the marshes at that time swarming with Bitterns, Grebes, Ruffs, and Avocets."

No true naturalist can look upon these gradual but inevitable alterations and changes without experiencing feelings of profound regret; but, as the needs and gratifications of the many are ever superior to the sentiments and delights of the few, the naturalist must be content to accept the inevitable.



As, roughly speaking, a ten-mile radius has been kept to in covering the area of the Yarmouth district, Horsey comes within the northern boundary. But what may be said of the changes apparent there may well apply all round: the marsh-lands support herds of cattle where once the waterfowl dotted the swamp, dwelling-houses have supplanted furze-bushes, and visitors, other than avine, monopolize the sands. There is, however, no branch of natural history which can still be pursued to such advantage around Yarmouth as ornithology. It formerly was, and still is, without a doubt, one of the richest districts in England for birds

of the wading and swimming classes; its easterly position, the open, exposed, and varied nature of the locality, with its wealth of marsh-land, its spread of waterways, and extensive warrens, offer unusual attractions to those species which may be collectively termed wildfowl. The list which follows will amply support this statement.

Northwards for many miles stretches an array of sadly diminishing sand-hills, or undulating knolls and ridges of blown sand, held together by the roots of the marrum grass (*Ammophila arundinacea*), the sand-sedge (*Carex arenaria*), *Ononis spinosa*, and various other deep-rooting dune-plants interesting to the botanist, and in whose seeds, laid bare by the winds of autumn, migratory Buntings and Finches find an abundant supply of food. In turn these sand-dunes have attractions for the Sand-Grouse, the Dotterel, the Great Snipe, and others.

Nearer the town the sand-hills have been levelled in recent years, and are fronted by a sea-wall and macadamized road, which extends parallel for some distance to the once celebrated North Denes, at one time an extensive area of rounded and broken sand-heaps, covered with acres of furze, now extirpated, and given over to the golfer. A railway runs through the centre of them, and the town keeps slowly creeping northwards beside it. Up to the end of the seventies the Whinchat, Stonechat, Linnet, Wheatear, and even Partridges nested in the whins; the Wood-Pigeon, Turtle-Dove, Stock-Dove, and Mistle-Thrush came in flocks in summer to feed here. At Caister and beyond, the sand-hills become higher, and the vegetation more varied, the brake, broom, and sea-buckthorn being conspicuous; and Rabbits abound. The beach below presents a long monotonous level of clear firm sand, sparsely "shingled" or pebbled, with few tide-pools; spring tides cover the sands almost to the sand cliffs. Until within the past year or two a few Ringed Plovers have persevered in nesting among the higher patches of shingle, the site chosen being a depression probably caused by a horse's hoof, the bottom of which is usually lined with small pieces of shell or thin white chalky stones. Constant traffic has banished this bird, the only species known to have nested there within the memory of man. One nest was found on the south beach in 1899.

The absence of rocks and seaweeds forbids the abundance of certain fishes and Mollusca, so that the ornithologist may in some measure infer as to what particular species of birds would from choice be usually scarce or abundant. Surface-feeders are well represented, but those which dive or prey upon Mollusca, and those that delight in rocky and precipitous habitats, are generally uncommon, or merely storm-driven stragglers. An exception exists in the Scoter, numbers of which frequent the Broads all the winter, feeding upon the smaller bivalves which are apparently in spots plentiful at the bottom (*vide* note on Scoter).

The northern sand-hills mostly slope gradually into marshy levels or cultivated fields, reaching their level in the Broad-lands and the valley of the Bure.

Southwards of the town, after passing the mouth of the Yare, stretching away towards Lowestoft, is a range of crumbling sand-cliffs, the fields above which are cultivated to the very edge. A straggling colony of Sand-Martins nests here. All westward of the cliffs is cultivated, and merges off into a fairly well-wooded district, notably at Fritton and Belton, excepting which scarcely anything worthy of that name exists within the limits comprised in the district to which these remarks refer. Small thickets occur at the margins of some of the Broads, and a few carrs of alder and willow, interspersed with birch, are irregularly scattered over the swampy parts of the marshes, but seldom covering more than an acre or two of ground.

To the west of the town is the great alluvial flat, once the bed of the great estuary known to the Romans as *Garienis ostium*, and up which their galleys passed to their camp at Caistor, beyond Norwich. Remains of this estuary and the branches now exist in the famous Norfolk Broads, most noticeable of which is Breydon Water, into which the Yare, the Waveney, and the Bure empty their sluggish streams.

Before Breydon was walled* and the rivers banked, and the

* Breydon, five miles long and one in width, is surrounded by a winding mound or dyke, faced with jagged flints and backed with grass, forming a triangular barrier. The rivers are similarly confined. The ditches formed by the soil removed drain the marshes, and are connected with a network of others. Steam drainage mills pour the surplus water over into the rivers. Hence, although the marshes grow drier year by year, they are always below the level of high water.

vast stretches of marshes ditched and drained, the extensive level of swamp must have been at most hours of the tide a very paradise for the wildfowl, and those who sought them. "It would be difficult to imagine," wrote the Messrs. Paget in 1834, "a spot more suitable to their (the wildfowls') habits than Breydon affords, consisting as it does of a sheet of water some miles in extent, with shallow borders, or flats (as they are called), and surrounded, almost as far as the eye can reach, by marshes. The water leaving its banks quite bare for a considerable extent at every ebbing of the tide, exposes an abundance of the small crustaceous animals and other food most congenial to the Duck tribe. Even in the severest winters it is seldom so completely frozen over as not still to afford, in the small fish with which it abounds, and the crabs and insects about its banks, a sufficiency of provision for the fowl; and it is in such seasons that the greatest numbers are secured. Almost benumbed with cold, they flock together, and while they sit crowded up in a compact mass, to prevent the warmth of their bodies escaping, the gunner may, in his flat-bottomed boat, approach within a comparatively short distance of them by means of channels made in the flats, and with a single discharge of his gun, which moves on a swivel in the midships of his boat, effect a most extraordinary slaughter."

To-day these attractions remain much the same, but the birds are fewer. In severe spells of frost astonishing numbers of wildfowl are occasionally seen there, when a constant fusillade is heard, the frequent sharp crack of shoulder-guns being punctuated by the louder boom of the punt-guns. During a snap of frost in December, 1899, hundreds of Wigeon, Tufted Ducks, Mallard, and other fowl, besides thousands of Dunlins, swarmed on Breydon; and Durrant's game-stall presented a remarkable appearance, covered as it was with hundreds of wild birds of various species.

Reverting again to the Pagets' 'Sketch,' an instance is related of a punt-gunner, named Thomas, "who one morning, on awaking in his boat on the flats, saw not far from him a number of wildfowl sitting in a crowd close together on the ice. From the boat being nearly covered with snow he had escaped their observation while they were collecting in the night. He immediately fired

(his gun carrying about a pound of shot), and with those killed outright and the wounded, which he and his dog caught before they could make their escape, he secured no fewer than thirty couple of wildfowl, consisting principally of Wigeon and Teal." This same old gunner on one occasion, after considerable manœuvring to get within range, killed six Swans out of a flock of eight at one shot.

Mention is also made of a bird-preserved named Harvey (*vide* note on Pratincole), who "previous to the alteration in the game-laws" sent up to the London markets an average of about fifty fowl per week through the season—*viz.* October to April—the number varying with the severity of the weather; thus, in the winter of 1829, on one market-day, he had brought to him four hundred wildfowl of various species, five hundred Snipes, and one hundred and fifty Golden Plovers, "all of which he immediately carried up to London and disposed of."

Notwithstanding the changes which have of late years taken place in Breydon—such as the great silting up of the flats (over some acres of which now flourish field-like patches of *Salicornia herbacea*, the jointed glass-wort), and the lessening of certain species of fish, the Grey Mullet (*Mugil capito*), for instance, which now no longer ascends in shoals, while the Osprey and Cormorant are more seldom seen—most interesting glimpses into bird-life may be enjoyed. In spring large flocks of Wigeon may be observed pulling at the succulent stems of the *Potamogeton pectinatus* (local, "Wigeon-grass"), the Curlew boring deep to find the Nereid worms, and smaller species of Waders busily hunting *Gammaridæ*, *Mysis vulgaris*, and other crustaceans. Herons are seldom absent, for the Shore-Crabs (*Carcinus mænas*) and the Eels and Flounders have attractions for them. In autumn various migrants, the juniors coming first, are often abundant, and various Ducks and Geese and Swans may be expected in wintry weather. And what adds much to the pleasure of a jaunt on Breydon is the possibility that you may meet with *raræ aves* at any moment, and your delight will certainly not be lessened if your binoculars are handy. I have thus fallen in with the Siberian Pectoral Sandpiper, several Spoonbills, the Iceland Gull, and many another.

During the close season Breydon is comparatively quiet, the

local gunners having, as a rule, respect for the enforcement of the Protection Acts by the Breydon Protection Committee, who employ a watcher, and with gratifying results. The following figures, culled from the rough log-book of "Ducker" Chambers, the watcher, which has been kept by him in a most spasmodic sort of way for eleven years, will give a fairly good idea of the frequency and numbers of spring migrants visiting Breydon on their northward journey. Small migrants have been seldom noted; of course over such a vast area many birds escape identification. A careful and enthusiastic observer might compile a vastly superior list both in numbers and species.

MARCH-JUNE, 1890.

March 2nd, 1890.	200 to 300 Wigeon and Mallard.
" 5th, "	65 Shovelers.
" 6th, "	11 Geese.
" 9th, "	300 Wigeon, Golden-eyes; many small birds.
May 14th, "	60 Godwits, Whimbrel, Plovers.
" 24th, "	Several Greenshanks and Redshanks.
" 25th, "	6 Cormorants; several Black Terns.
June 4th, "	4 Shelducks.
" 13th, "	3 Bernacle-Geese.

MARCH-AUGUST, 1898.

March 3rd, 1898.	2 Swans.
" 4th, "	3 Golden-eyes.
" 9th, "	300 Wigeon, Pintails, Shovelers.
" 10th, "	1000 Wigeon (about).
April 8th, "	1 Spoonbill.
" 16th, "	1 Swan.
May 16th, "	700 Godwits; plenty Whimbrel, Plovers, &c.
" 24th, "	2 Goosanders.
" 27th, "	2 Spoonbills.
June 14th, "	2 Spoonbills.
Aug. 12th, "	400 Curlews.

The Broads, although slowly growing up, are still extensive. They have a beauty quite their own in their leafy setting of reeds and rushes. Of late years the rage for "doing" the Broads has banished the privacy and security which at one time characterized them. Some nesting species have disappeared, as the Bittern, the Godwit, the Black Tern, and the Ruff; whilst among some remaining a perceptible decrease is apparent, as in the case of the Bearded Tit. Many non-residents have become scarcer, although in sharp winters numbers of wildfowl drop in. The Crested Grebe fortunately appears to be on the increase.

There were at one time several decoys* in use on the various Broads, but these have of late years fallen into disuse, and are now not worked, with the exception of Sir Savile Crossley's on Fritton Lake. Mr. J. H. Gurney has kindly furnished me with the following extract from the many years' returns for this decoy in his possession :—

TAKE OF WILDFOWL AT FRITTON DECOY.

	Duck.	Teal.	Wigeon.	Shoveler.
October, 1887.....	41	17	0	0
November, ,,	198	14	0	0
December, ,,	176	2	0	1
January, 1888	121	2	2	0
February, ,,	133	0	0	0
March, ,,	6	1	5	0
	675	66	7	1

I have an entry from the 'Yarmouth Independent,' of a contemporary date, stating that on Dec. 13th, 1879, the decoymen at Fritton secured no fewer than 190 wildfowl at one pull of the net!

The following agreement for the hiring of a decoy, the very site of which appears now to have become lost, will serve to show how remunerative at one time these engines of destruction must have been :—

"Memorandum of an Agreement made this 17th day of March, 1810, between Mrs. Hannah Forder, of Rollesby, Norfolk, and her son Thomas Forder, have agreed with his mother for the use of a decoy now in her possession, from Lady-day next following it, at the Annual Rent £44 per year, and the said Thomas Forder shall at his own expense keep the same in tenantable repair; the rent to be paid half-yearly.

"And a further agreement between Thomas and his mother Hannah Forder for all fowles and fish he can catch. The said Thomas Forder do agree to deliver the same fowl at eighteen pence per couple, and half-fowl at half-price, and from August to Michaelmas at two shillings per couple, and half-fowl at half-price, and from Michaelmas to Lady-day at three shillings per couple, and half-fowl at half-price.

* For most interesting and graphic accounts of decoys and the methods of working them, see Stevenson's 'Birds of Norfolk,' and Lubbock's 'Observations on the Fauna of Norfolk,' new edit.

“Also all Pike under three Quarters [quarters?] sixpence each, and Eels at three shillings per stone.

“HANNAH FORDER, her mark ×.

“THOMAS FORDER. his mark ×.”

“Witness { John Stagg,
John Sandcroft, Jnr.

The taking of eggs was at one time carried on to a great extent, and tended undoubtedly to the diminution of certain species. “All the marshes,” wrote the Messrs. Paget in 1834, “but more especially about Oby, Thurne, and Acle, are found considerably profitable, by the numbers of Plovers’ eggs which may be collected in them, and of which there is carried on a most extensive sale during the months of March, April, and May. The same person (Isaac Harvey) before mentioned sends an average of between six and seven hundred eggs to the London and other markets every week during the season.” The “eggs” covered a variety of species, *e.g.* Snipe, Lapwings’, Redshanks’, Water-Rails’, Moor-hens’, and Coots’. At the present time a few small chip trays of Plovers’ eggs appear in Yarmouth market every spring, but, as with the wildfowl, there is but a limited local sale.

There are many features connected with the bird-life of the neighbourhood which are worthy of note, among them the extreme uncertainty of migratory movements in large bodies. In some years certain rare species have appeared in unusual numbers, as in the case of the Shore Lark, Lapland Bunting, Little Auk, Buzzards, Skuas, and others; on the other hand, years may elapse without such records. These fluctuations undoubtedly depend upon, or are affected by, atmospheric conditions; a sharp winter, with continuous occurrences of heavy gales from the north, north-east, or south-east, will drive in many species, more particularly during the periods of migration. In October the local ornithologist hails with pleasure a south-easterly breeze, with “dirty weather” in its wake. The day previous certain species will be perhaps altogether absent; at night, as the wind freshens or the drizzling rain makes the darkness dismal, he may hear their clamorous call-notes resounding overhead; the bewildered birds, unaccustomed to the glare of our gas-lamps, keep wheeling around, as if attracted by them, incessantly calling in order to keep together their respective flocks, until the day dawns, when they drop upon the Breydon mud-flats to feed and

rest, or pursue their journey. Thus the Golden Plover, the Knot, and many others are often to be met with a few hours after a shift of wind. The following "entry" from my note-book is a case in point:—

Sept. 30th, 1899.—Wind veered yesterday from south-west to south-east. Rough wet night. To-day Breydon was noisy with birds; saw some Turnstones and Whimbrel; number of Grey Plovers, some Greenshanks, and many small birds. Many scores of Grey Plovers were subsequently shot.

A similar occurrence is noted for September, 1897, as follows:—

Sept. 5th.—A "rush" of migratorial birds; wind suddenly veering to east after continuous west and south-west winds. Next day, Sept. 6th, on a game-stall, the following birds were exposed for sale:—Ten Godwits, one Shelduck, one Scaup, nine Curlew Sandpipers, one Reeve, one Greenshank, twenty Knots, two Kingfishers.

That the movements of certain birds are a fairly reliable indication that some atmospheric disturbance is approaching seems to my mind beyond dispute. Note the following entries:—

Nov. 23rd, 1897.—Extraordinary thick fog.

Nov. 24th.—Night noisy with cries of Plovers; this, with certain other birds being "uneasy," portending bad weather. (The weather changed almost immediately after.)

Nov. 28th.—Blew hard to-day (and next), the gale causing havoc all round the neighbourhood. Tide rose to an alarming height. The sea broke through the sand-hills at Horsey.

South-east winds are more favourable to the migratorial birds passing along our shores, whilst that from an opposite quarter, or from a westerly direction, will favour the Dutch coast-line, to the detriment of our own. With light north-west winds and moonlight nights, during October and November, the Woodcock is anxiously looked for. Westerly winds have been responsible for the visits of a few American wanderers—for instance, the Great Spotted Cuckoo. Severe winters, with much snow, drive numerous wanderers south, and there can be little doubt that many birds which rush ahead of hard weather have put off their exit until absolutely driven to it. In the cruel January of 1881, the day before the fearfully disastrous gale on our coast, I wit-

nessed an extraordinary immigration of small birds, amongst them many *Turdidæ*, besides Redpolls and other Finches, many of which fell exhausted on landing, some taking shelter in wheel-ruts in the sand. The chirp of a Sparrow particularly caught my attention, and *Passer domesticus* was distinguished as he flew by. Redbreasts were also noted. On Feb. 2nd, 1897, Fieldfares and Redwings were arriving in continuous flocks, as if it were an ordinary October migration. On the 3rd Larks were trooping in. Coarse wintery weather followed them. On Dec. 22nd, 1894, hundreds of Lapwings were coming over against a strong north-west gale. Many were drowned.

As to birds which fall exhausted in the sea and are drowned, there can be little doubt that numbers, especially of the smaller species—*e. g.* Chaffinches, Redpolls, and many others—perish in this way when overtaken by stress of weather; but few are seen washed up on the beach. Their disappearance may be accounted for by the presence at this time of numerous Gulls on the coast, which are eager to glean up any such flotsam that is almost sure to attract their notice as they ceaselessly patrol the restless sea. A sudden change of wind to an easterly point will sometimes drive a few of these unfortunate birds ashore. On Sept. 24th, 1881, during a walk along the north beach, I observed lying among the refuse three Common Buzzards, three Sparrowhawks, and a Harrier, which, with a few common species, had been overtaken by a storm and had perished. There had been that month an unusual immigration of raptorial birds, several others having met with an untimely end in the neighbourhood. I have also found in the wash and at the tide-mark at various times Guillemots, Razorbills, Crows, Merlins, and many others that have succumbed to fatigue or the violence of the storm. On one occasion I found the remains of quite a number of Kittiwakes (*vide* note on Kittiwake). When stranded these carcasses are very soon stripped by Hooded Crows, which do not scruple to dine even off defunct members of their own genus.

In some years it is extremely interesting to watch the steady influx of migrants of various species, often indicative, to my mind, of a long and severe winter ensuing. At other times migration goes on scantily or spasmodically. It was my custom for several years, when living at the north part of the town, to watch these

movements, more especially in October, keeping much to the beach and vicinity of the North Denes.* Amongst many observations made, the following few may be of interest:—I noticed that Larks were our commonest immigrants. Before daybreak their call-note might be heard as they “struck” shore. As light dawned they might be seen skimming shorewards just above the waves; as the day wore on they gradually flew higher, till sometimes a great altitude was obtained by succeeding flocks. Larks usually fly in from direct east. Fieldfares and Redwings generally arrived from north-east. Rooks and Hooded Crows at ordinary times leisurely trooped in, flying east to west. Occasionally “rushes” of these *Corvidæ*, more particularly Rooks, strike the coast farther north, and lead along, in quick succeeding flocks, the line of trees bordering Caister road. Small birds usually do the same, Linnets, Twites, and such like keeping more to the cliffs and sand-hills, in which line of flight the bird-catchers fix their nets. Jackdaws often mix with other corvine immigrants, and invariably are noisy, except when with the “rushes” referred to. My experience leads me to believe that by the first week in November the majority of immigrants have arrived, and not till the first spell of severe weather sets in does another movement take place, and that November generally is our dullest local bird-month. Lightship men, who formerly captured many tired migrants on board, complain of a falling off in late years.

The autumn arrivals of 1899 were scanty, beyond the fairly regular incoming of Rooks, Hooded Crows, and Larks. But early in December the weather set in cold, with wind at south-east. On the night of the 6th it was squally; the air was “alive” with cries of Golden Plover, which were plentiful on the marshes on the 8th. Snow fell on the 10th, with sharp frost ensuing. Snipe, which had hitherto been scarce, “inrushed” to the brackish ditches on the marsh-lands, Common and Jacks being shot in unusual numbers. I believe this abundance was, in Norfolk at least, universal. On a local game-stall I saw the following numbers of Snipe:—

Dec. 11th.—47 Common Snipe, 17 Jack-Snipe.

Dec. 12th.—(Almost identical numbers.)

* My spare time and many nights are now spent on Breydon, to and from, and in my houseboat.

Dec. 13th.—120 Common Snipe, 20 Jack-Snipe, 8 Woodcocks.

Dec. 14th.—Total Snipe on this date, 43.

Dec. 15th.—Did not obtain numbers on this date.

Dec. 16th.—Total Snipe, 310.

Thus, allowing an average of fifty Snipe on each of the dates missing, the week's record was something like 650 birds.

After the 16th numbers fell off almost to *nil*. Many other birds accompanied this inrush; Breydon and the Broads became alive with them. Hundreds of Dunlins and many scores of various Ducks were shot, only a portion of those killed locally being exposed for sale at this gamedealer's stall. Mr. Durrant, the proprietor, kindly furnished me with a complete list of birds brought up on the 16th, which is appended:—

Wildfowl on Game-stall, Dec. 16th, 1899.

336 Dunlins.	1 Goosander.
20 Coots.	80 Blackbirds.
6 Dabchicks.	1 Curlew.
12 Water-Rails.	32 Duck and Mallard.
3 Golden Plovers.	90 Half-fowl (being about equally divided between Tufted Ducks, Wigeon, and Pochards).
1 Heron.	3 Teal.
30 Larks.	3 Golden-eyes.
310 Snipe.	
10 Moor-hens.	
26 Lapwings.	

Besides these there were hundreds of Blackbirds and Thrushes, and many wildfowl scattered all over the Saturday's market.

From a wildfowler's point of view the above one day's figures compare favourably with a week's list given in Stevenson's 'Birds of Norfolk' (vol. iii. p. 175), which it will be interesting to subjoin:—

Wildfowl, Waders, &c., received from Dec. 14th to 21st, 1878.

447 Full Snipe.	2 Curlews.
21 Jack-Snipe.	4 Herons.
206 Green and Golden Plover	3 Kingfishers.
3 Grey Plover.	35 Teal.
14 Woodcocks.	147 Golden-eyes and other fowl.
41 Waterhens.	421 Duck and Mallard (220 from decoy).
2 Rails.	1 Great Plover.
17 Water-Rails.	1 Eared Grebe.
43 Coots.	2 Rough-legged Buzzards.
133 Stints.	2 Smew (male and female).
13 Owls.	29 Sundries.
4 Hawks (various).	Total, 1600.
9 Grebes.	

Another week's fowl is also enumerated with a total of 1107

birds, a note of explanation stating that the "Golden-eyes" (which is a common Norfolk gunner's name for them) were mostly Tufted Ducks. Of a total of twenty-two Grebes for the fortnight three were Dabchicks, one "Eared" (probably Slavonian), the remaining eighteen being Crested Grebes.

There is at the present time at Yarmouth but one dealer in wildfowl, Mr. Durrant, whose stall is in the market-place; and many thousands of birds, rare and common, have passed through his hands. His birds are received from the immediate locality, and from the country districts around, the smaller common species hanging in bunches, the larger ones singly from hooks. Rarer examples are promoted to a more conspicuous position upon a fruit-tray. This stall is a fairly accurate gauge as to what species are at any given time abundant, or are arriving. Durrant himself is full of anecdote. On one occasion he assured me that during some sharp weather he had brought to him in one day over 1100 Common or "full" Snipe, for which he paid during the greater part of the day sixpence apiece. Of these he forwarded two five-hundred lots to London dealers, receiving in the course of a day or two in return a remittance to the value of one penny each, accompanied by a polite note to the effect that "small cargoes were coming over from Holland" with other wildfowl. In the severe winter of 1890-91 Durrant had a large supply of birds. I was fortunate enough to peep into his market-book on Nov. 29th, 1890, on which date were recorded the following as received:—

Nov. 29th, 1890.

1 Bittern.	110 Common Snipe.
240 Dunlins.	2 Bewick's Swans.
9 Knots.	1 Pintail.
11 Woodcocks.	3 Curlews.
47 Duck and Mallard.	14 Jack-Snipe.
52 Blackbirds and Thrushes.	Golden-eyes (several).
1 Godwit.	39 Larks.
14 Plovers (various).	

As this was an exceptionally busy year with him, I kept a record, usually counting the birds myself, publishing the same in the 'Eastern Daily Press.' The following two examples will suffice:—

Dec. 6th, 1890.

Tufted Ducks (several).	5 Golden-eyes.
Duck and Mallard (several).	Pochard and Wigeon (several).
1 White-fronted Goose.	Moor-hens and Coots (several).
Snipe (several).	1 Red-throated Diver.
1 Goosander.	2 Curlews.
Snipe (number).	12 Water-Rails.
3 Bewick's Swans.	3 Dabchicks.
(making 5 for week).	2 Short-eared Owls.
3 Barn Owls.	1 Kestrel.
Small birds (many).	

Dec. 20th, 1890.

1 Bewick's Swan.	1 Red-throated Diver.
23 Scaups.	1 Redshank.
9 Wigeon.	16 Pochards.
2 Goosanders.	1 Shoveler.
17 Woodcocks.	2 Teal.
2 White-fronted Geese.	36 Knots.
20 Tufted Ducks.	Many small birds.
1 Shelduck.	

It goes without saying that rare species soon change hands, the bulk of the commoner kinds going in hampers at night to Leadenhall Market.

Up to within recent years local gunners, except in the case of isolated intelligent sportsmen-naturalists, were so eager to shoot birds *en gros*, and were so ready to turn their victims into pence, that many rarities without doubt escaped notice, and were consigned to the *cuisine*. Many a scarce Sandpiper has been strung together with a parcel of Dunlins, and so spoiled for a specimen. On Sept. 8th, 1881, a gunner killed six Little Stints (*Tringa minuta*), and, taking them home, cooked them, ascertaining their identity almost immediately afterwards. It is on record that Lilly Wigg, an old-time Yarmouth naturalist, cooked and ate a Red-breasted Goose (*Bernicla ruficollis*), and did not even guess as to its species until the feathers afterwards attracted his attention.

During the first invasion of Pallas's Sand Grouse, a local gunner shot an example on the North Denes, taking it to a dealer named Watson (who in his day received many a *rara avis*), who gave him half-a-crown for it; one long tail-feather had been shot away. Watson offered him another half-crown if he would find the missing one, which he did. Another rural sportsman emptied a bag of common birds on a dealer's stall some years ago, "throwing in" a specimen he did not know, and so did not value it. It proved to be a Buff-backed Heron.

But to-day all the gunners are on the alert, as are the bird-catchers,* who, on securing a bird that in any degree differs from any they have before possessed, are careful to have an identification before disposing of it. In this way some rare Finches and other small birds have been detected, as the Serin Finch, Tawny Pipit, Scarlet Bullfinch, and others. The Warblers and other small Passeres were for long deemed scarcely significant enough for the attention of local observers. Unfortunately for themselves, their small size, agility of movement, and similarity of characteristics make their identification on the wing almost a matter of impossibility. Hence the growing inclination to shoot every unusually attired little stranger.

Of late years bird-value has been greatly enhanced by the eagerness for collecting specimens. Prices paid for local rarities have at times been very high. At the sale of the late Mr. Rising's collection of authenticated birds at Horsey, the following prices were realized :—

White-winged Black Tern	12 guineas.
Brown Snipe	13 "
Red-breasted Pochard	21½ "
Buffel-headed Duck	25 "
Spoonbills, ♂ and ♀	10 "
Hoopoes, ♂ and ♀	3 "

Before closing this introductory chapter, it remains to enumerate the names of several local men who have been conspicuous as ornithologists, sportsmen, and collectors.

In the earlier part of the century lived Charles Stuart Girdlestone, "whose union," say the Messrs. Paget, "of first-rate sporting accomplishments with the greatest ardour in the pursuit, gave him advantages which none here have since equalled." His birds passed into the hands of Mrs. Charles Baker, and have since been scattered. A Jack-Snipe was believed to be the only existing specimen, but Mr. B. Dye has a Stilt Plover, undoubtedly the same referred to by the Pagets as having been shot on the North River, which he purchased at the sale of the late Town Clerk, T. M. Baker's, effects. A Fork-tailed Petrel from the same collection is in the Yarmouth Tolhouse Museum. Lilly Wigg, who immortalized the Red-breasted Goose by eating it,

* The only net used by the few local birdcatchers is the clap-net.

is stated by the Pagets to have bought a Harlequin Duck* in the market, but recent naturalists do not think the occurrence sufficiently well established to entitle the species to a place in the list of Norfolk birds; and the same applies to the King-Eider† said to have been obtained by the same person. This species has been, however, identified from another part of the coast.

Mr. John Youell was "a great bird man"; his collection contained some choice specimens. He is mentioned by the Messrs. Pagets as having afforded considerable assistance in the compilation of their lists.

The Rev. C. Steward, Rector of Caister, whose name will remain associated with the first and for many years the only British-killed example of Steller's Duck (*Somateria stelleri*), presented to the Norwich Museum his collection of over a hundred specimens, including this Duck, a Purple Heron, and a Caspian Tern.

Mr. C. A. Preston obtained one of the earliest recorded Ferruginous Ducks (*Fuligula nyroca*), which was shot close by Giber's mill on the South Breydon wall, and which he submitted, when identified, to Paget, after whom the hybrid between this species and the Pochard has been designated—the Pagets' Pochard.

A Yarmouth grocer named Lucia‡ is mentioned as having been a familiar figure on Yarmouth beach, "where, gun in hand, he used to be a terror to the Gulls," of which he appears to have had a fine representative collection of species in their various stages of plumage.

John Smith,§ Librarian at Yarmouth, also collected and kept records, but "has left but faint traces of his favourite pursuit."

Stephen Miller's collection contained many choice birds, which were sold in 1853. There were seventy-four lots, and amongst them were the Buffel-headed and Red-crested Ducks.|| They produced what we should now consider very low prices—

* *Vide* Stevenson's 'Birds of Norfolk,' footnote in vol. iii. p. 219.

† *Ibid.* pp. 192, 384.

‡ *Vide* Trans. Norf. and Nor. Nat. Soc. vol. vi. p. 82.

§ *Ibid.* p. 81.

|| Catalogue of Birds in the Collection of Mr. Connop.

the rage for collecting had not then set in; but some of these birds, sold thirty years after at Mr. Rising's sale, produced the very high prices already mentioned.

Amongst other names associated with those "halcyon days" may be mentioned Frederick Frere, Henry Teasdel, John Dawson Turner, Joseph Tomlinson, J. G. Overend, and Robert Rising of Horsey. Mr. Overend's very representative collection was dispersed in June, 1876. There were ninety-six uncased lots, numbering one hundred and eighty specimens, which fetched ridiculously low prices. Mr. Rising's birds were sold at Horsey, September, 1885. There were one hundred and forty-two lots of well-authenticated birds, which realized about £340, several of the best of them ultimately going to the Norwich Museum and to the Connop collection.

Among local collections at the present time stands prominently that of Mr. E. M. Connop, of Rollesby Hall, which at the time of cataloguing by Mr. T. Southwell a few months since consisted of 434 cases, containing 336 species of birds; and among them may be mentioned Overend's White Stork, Great Spotted Cuckoo, Black Stork, Greater Shearwater, Yellow-legged Gull, Little Bustard, and many others.

Mr. Fielding Harmer has choice birds, comprising a fine series of Breydon-killed Spoonbills, and several of the rarer Waders in nuptial attire, all obtained by him prior to the advent of the Bird Protection Acts. Mr. Bellin, Sen., has a locally killed Gull-billed Tern, Caspian Tern, and other rare Terns. Mr. B. Dye, a blind baker ornithologist, still collects, and is the proud possessor of a fine female Spoonbill with a grand crest, the Pectoral Sandpiper, White-winged Tern, Fork-tailed Petrel, and a number of others; several of them were preserved by himself before his eyesight failed him. Nothing more delights him now than being left to identify any bird placed in his hands by feeling it. Mr. E. C. Saunders, who collects as well as preserves his own specimens, has had, among others killed in this neighbourhood, Norfolk Plovers, Black-throated Diver, Montagu's Harrier, Solitary Snipes, and others. Mr. G. Smith's name is associated with the first recorded examples of the Tawny Pipit, the White Wagtail, the Mediterranean Black-headed and Iceland Gulls and the Greater Shearwater, mention of which, with other rare

occurrences, have been made at various times in the 'The Zoologist.' Mr. G. F. D. Preston has a grand Red-necked Phalarope in full summer plumage, and was the first to call attention to the increasing numbers of the Shore Lark visiting this locality, himself shooting several in 1876. He is the last of a family of local ornithologists of that name. The late Mr. E. T. Booth shot many of the choicest of his specimens, contained in the celebrated Brighton Museum, on Breydon, and on the sea off Yarmouth. Mr. W. Lowne, of Fuller's Hill, Yarmouth, taxidermist, should also be mentioned, as many of the rare birds noted in the subjoined list have passed through his hands, as have many in the county collections, noteworthy amongst them being Sabine's Gull (1881), White-tailed Eagle (1882), Manx Shearwater (1883), Roller (1883), Pallas's Sand Grouse (1888), Little Bustard (1889), Iceland Gull (1899), &c. Mr. H. C. Clark, of George Street, is the only other professional local birdstuffer.

The writer of these notes neither shoots nor collects, but has used eyes and field-glasses, and kept records of rare and interesting occurrences in local natural history for more than twenty years; and has helped in a small degree to found the Tolhouse Museum, which contains a number of cases of interesting birds.

The principal works relating to Yarmouth birds are as follow :

'An Account of the Birds found in Norfolk.' By Sir Thomas Browne, but not published till after his death in 1682. [Wilkin's Edition of his Works, vol. iv. pp. 313-324 (1835).]

"A Catalogue of Norfolk and Suffolk Birds, with Remarks." By the Rev. R. Sheppard and the Rev. W. Whittar. ['Transactions' of the Linnean Society, vol. xv. pp. 1-62, 1826.]

'Sketch of the Natural History of Yarmouth.' By C. J. and James (the late Sir James) Paget. [1834.]

'Observations on the Fauna of Norfolk.' By the Rev. R. Lubbock. [1845.] (A new edition, with additions from unpublished manuscripts of the author, and notes by T. Southwell, was published in 1879.)

"An Account of the Birds found in Norfolk," &c. By Messrs. J. H. Gurney and W. R. Fisher. [Published in 'The Zoologist' (1846, pp. 1300, 1373).]

'The Birds of Norfolk. With Remarks on their Habits, Migration, and Local Distribution.' 3 vols. By Henry Stevenson, F.L.S. [Vol. i. ii. published 1866 and 1870 ; vol. iii. being continued and completed by Mr. T. Southwell in 1890.]

"A List of all the Birds shot on Breydon Water up to 1890." By Mr. F. Harmer in P. H. Emerson's 'Wild Life on a Tidal Water.'

'Catalogue of the Birds of Suffolk,' &c. By the Rev. Churchill Babington. [Published 1884-86 ; contains much valuable matter relating to Yarmouth and Lowestoft.]

'Transactions' of the Norfolk and Norwich Naturalists' Society, published yearly [1869-1899], contain many local references.

The pages of 'The Zoologist,' founded and first edited by Edward Newman in 1843, are a perfect epitome of Norfolk zoology, having been the recognized medium for such records since its commencement to the present time. Annual "Ornithological Notes" in this Journal by Mr. J. H. Gurney include many local items forwarded to him by local observers during the last twenty years.

In conclusion, my best thanks are tendered to Messrs. J. H. Gurney and T. Southwell for assistance kindly rendered ; and to Messrs. Durrant, Dye, Lowne, Preston, and Saunders for several dates of interesting occurrences with which they have supplied me.

(To be continued.)

AN OBSERVATIONAL DIARY OF THE HABITS OF
THE GREAT PLOVER (*ÆDICNEMUS CREPI-*
TANS) DURING SEPTEMBER AND OCTOBER.

By EDMUND SELOUS.

THE Great or Norfolk Plover being not yet exterminated in East Anglia, I spent some time during last September and October in observing its habits.

A thick belt of bracken fringes on one side a barren area of sand scantily clothed with lichen or moss, or with some very close dry herbage, which (if not the lichen itself) is browsed on by Rabbits. In other parts it is bounded by a tangle of very long thin wiry grass, or by some stunted and sorry-looking heather, clinging amidst sand and flints. Beyond, on one side, is the river; on the other a piece of open moorland, which the bracken also fringes on one side, whilst the road skirts it on another. I had seen the Plover on this sandy waste (which I here call the amphitheatre or plateau), and thought the bracken might give me the means of getting closer to them than I had before been able to do.

The following notes were made almost always on the spot, sometimes whilst the actions noted were proceeding, usually just after. They were copied out, and sometimes a little elaborated or added to on my return home the same evening. If occasionally I put down something after a longer interval of time, I had always kept it quite fresh in my memory.

September 1st, 1899.—Crept up through the bracken to edge of open space between 5 and 6 p.m., and found myself close to a number of the Great Plover. They, however, shortly took alarm from the moving of the fronds, and flew farther off, but to no great distance for the glasses. Some three or four birds remained quite near. The birds that had flown off were joined by others, and at last by a flock of ten. They may then have amounted to some fifty in all, and stood stretched out in a long

straggling line, ganglion-like in form, swelling out into knots where the birds were grouped more thickly, with thinner spaces between. Watched them mostly through the glasses. Characteristic actions were preening feathers of the breast and wings. The latter they stretch out, and then, twisting the neck to one or the other side, passed the primary quill-feathers, as it seemed to me, through the beak. Another—one of the birds near me—laid one side of the head on the ground so that I could see the eye of the other side staring up. This I observed for the first time. The reason I do not know. Thought at time it was to rub the head, but, as I have often seen them scratch their heads with one foot most neatly and effectively—as indeed do all birds—this would seem superfluous, and moreover it kept the head still.

Whilst watching the main body of birds I observed one make several sudden little impetuous runs in different directions, beating and striking about with its wings. There was excitement, but the actions seemed to have no reference to the other birds (as of display), who seemed quite indifferent. The line was long and in general very straggling, and this particular bird was not in any close proximity to others, but rather segregated.

One of the birds that had remained after the others flew off now came very near, so that—still using the glasses—I observed, as he made one of the little quick characteristic runs forward (suggestive of a Thrush on the lawn), the object which occasioned it—a delicate white thing in the air, which I took to be a small thistle-down. This he secured and ate, and I imagined that his peckings at it after it was in his possession were to disengage the seed from the down. Almost immediately afterwards, however, a small brown moth came into the field of view, flying low over the belt of dry bushy grass where the bird was. Instantly the bird (who seemed to catch sight of the moth about the same time as I did) started in pursuit, with the same rapid run and head stretched out. He got up to the moth and essayed to catch it, pecking at it in a very peculiar way, not excitedly or wildly, but with little precise pecks, the head closely and guardedly following the moth's motions, the whole strongly suggestive of professional skill. The moth eluded him, however, and the bird stopped rigidly, having apparently lost sight of it. Shortly afterwards, when the moth had gone some way, he caught sight of it again,

and made another quick run in pursuit, coming up again, and again making his quick little pecks, but unsuccessfully as before. There was then the same pause followed by the same run, then a close near chase, and finally the moth was caught and eaten. What I had taken for a small thistle-down had been probably therefore (though the other is possible) a small white moth. It was quite a distance from where the bird first sighted the moth to where he finally caught it. In another chase, the object of which I was unable to see (twilight coming on), the same bird, at the end of a run, made a straight-up jump into the air (missing it, I think). This latter action I have not observed before, but the quick eager runs with sudden start-stops between—the head thrust eagerly forward—were so exactly the habitual actions of these birds (as I have often watched them at a greater or less distance through the glasses) that I now feel sure they are usually pursuing low-flying moths or other insects at such times. I had before often connected these actions with something on the ground—imagining a fresh object for each run—and had wondered both at the eyesight of the bird and its apparent want of interest when it got to the spot. Aerial game had not occurred to me.

Later, another of the few birds near me kept running about at short intervals in an excited manner, waving or rather flinging its wings about in a tumultuous manner.

Another one, quite close (but now getting dark), seemed much occupied in probing or picking up something from the ground; but all at once it also made a run forward, throwing about its wings, and did so several times afterwards in a way which suggested a relation between this and its search for food on the ground, or whatever else the actions suggesting such search may have really been. (Query. Did it attempt to beat down a low-flying moth with its wings? But the one that caught two moths—and this was very likely the same bird—made no such attempt, nor did the action suggest that at all forcibly.) In the two other birds this excited running about and beating of the wings suggested anything rather than a part of any process of food-getting. I incline to think that the ground probing or pecking action has some other meaning. Their sad wailing cry uttered all about by the birds whilst on the ground, as also whilst flying.

September 4th.—Got to same place about 6 p.m., and counted fifty-one birds standing or sitting about within the limits of the sandy amphitheatre in a scattered proximity. Watching through the glasses, I saw one bird advance quickly towards another (combatively, as I thought), and, when just in front of it, wave and flourish with its wings. Then, however, the same bird, turning, moved a step or two away from the one it had seemed to challenge,* and crouched on the ground in a manner not at all suggestive of combative inclinations.† Shortly afterwards either this same or another bird (but I think the same one) ran pugnaciously at another, and both then stood with outstretched wings and heads craned forwards (the tips of the beaks seeming almost to touch each other), apparently on the point of engaging in combat. They did not do so, however, but in a moment or so paced away from each other, and stood indifferent.

As it grew towards twilight I again noticed the sudden little rushings of the birds, accompanied with wavings of the wings, and this became much more frequent as the twilight deepened. At length, by fits and starts—now one and now another, so that there were generally several at a time in different parts of the amphitheatre—the whole troop of birds were thus occupied, and it became an interesting spectacle. I watched as long as I could through the glasses, and, when no longer able to use them, very luckily two birds came quite near me, so that, although now semi-dark, I could see them well with the naked eye. Watching the whole time as closely as possible, I endeavoured to make out the meaning of this wing-waving, and it appeared to me that it was in connection with the chase of flying insects, sometimes (as I observed and feel sure about) in aid of a jump into the air after one, at other times owing, as it seemed, to excitement merely—the excitement (and I think the *social* excitement) of the chase. But that it occurred in and as a part of the pursuit of game (insects) I could not doubt after what I had seen three nights ago. I noted that when one bird ran and waved his wings another

* The actions of the challenged bird I did not note at the time, and cannot recall, though I think they were similar. Do what one will, a certain amount will be seen and forgotten, or but dimly recalled.

† The bird appeared to me to elevate the tail and posterior part of the body generally.

would often run quickly up to him, also waving them, and join in the pursuit. Had I not seen the chase of the moths alluded to I should have thought this action either bellicose or a joining or rivalry in display, though I am sure I should not have felt satisfied with either theory. Now I can have no doubt that it was simply the desire of one bird to get what another was chasing—as with fowls, ducks, &c.

To sum up what occurs to me from this and the previous day's observation.

1st. The extension, waving, beating about, &c., of the wings—whilst not in flight—is an accustomed action of these birds, indulged in on various occasions, and ready to leap out under excitement, irrespective of any more *particular* reason.

2nd. It is employed (with some other set forms) as a challenge to combat, and (probably) acceptance of such challenge.

3rd. The birds spread and wave their wings whilst chasing insects.

(a) Through excitement merely.

(b) *Possibly* to beat down a moth, &c., on to the ground (doubtful).

(c) *Possibly* again to catch the wind, and assist them in their swift runs when it is with them (also doubtful).

4th. They help themselves with the wings in jumping up at flying insects which they are pursuing. (Seen distinctly.)

5th. I think, but cannot be sure (and assurance is much needed), that I saw *once* (Sept. 4th) a bird pursue a flying insect for a short distance *on the wing*, and near the ground. There was no doubt as to the chase on foot, and the flight came, or seemed to come, as part of such chase.

Not only were the actions of the birds whilst running (as described) exactly like those of the one I had seen catch the moths on Sept. 1st, but it would have been difficult to reconcile them with any other hypothesis than that of the pursuit of some aerial but low-flying prey. They frequently ran the game down, pecking it down as it were, and securing it either on or just above the ground, though to-day I never once actually saw the pursued insect.

The activity becoming so general and so greatly increased at twilight is in accordance with moths beginning to fly then.

A social feeling seemed to me to be manifested in this hunting scene—a sort of “Have *you* got one? *I* have. That bird over there’s caught two!” idea. But this may be quite imaginary. Isolated birds (*comparatively* alone) ran about in the same way. Still, the whole scene with its various little incidents gave me that idea. Gradually, as it became dark, the birds all flew away, two or three or more together. It often seemed as if a chase ended in a flight away, but this may not have been really the case. It *may* have now become too dark for the birds to see and chase (perhaps minute) insects, or to see them at all, though they seem fairly nocturnal, and their visual powers are no doubt in proportion to the very large eyes.

One bird to-day was sitting right in a Rabbit-burrow. Though looking down at it from where I was, I could only see its head, shoulders, and upper part of the breast. The whole amphitheatre is more or less a Rabbit-warren, and Rabbits and birds were often extremely close together. Usually they seemed unaware of each other’s existence, but when a Rabbit—either pursued by or pursuing another—ran with great speed, and seemed coming right down on a bird, the latter would manifest anxiety, and run a little to get out of its way.

September 5th.—Arrived about 5.30. Fair number of birds about, but not nearly so many as yesterday. Almost from time of my arrival they were all in more or less constant motion, their actions being exactly the same as before, excepting that the waving of the wings and little jumps into the air (as described) were, though not entirely absent, yet comparatively so. Just in front of me the air was peopled with a number of minute insects—gnats, flies, or small Hymenoptera—many hovering just above the ground, upon which (on blades of grass, &c.) they often settled. I make no doubt these, together with small moths, were the game pursued.

A large flock of Starlings came down upon the plateau, spreading themselves over the greater part of it, and they behaved just as the Plovers—running excitedly about in the same manner, and evidently with the same object. What interested me especially was that they frequently rose into the air, pursuing and, as I feel sure, often catching the game there (sometimes more than one in the same rise, I believe), turning and twisting about like

Flycatchers, though with less graceful movements. Often, too, whilst flying—fairly high—from one part of the plateau to another, they would deflect their course in order to catch an insect or two *en passant*. I observed this latter action first, and doubted the motive, though it was strongly suggested. After seeing the quite unmistakable Flycatcher actions, I felt more assured as to the other.

The very great diminution in the waving of the wings to-day as compared to yesterday, whilst engaged in the same pursuit, I do not know how to account for. It may perhaps suggest that this is more due to excitement connected with each other's presence (social) than to any other cause. If so, the birds were not so socially excited to-day as yesterday, and this may possibly be due to the fact that their numbers were not nearly so great—hardly, I should think, amounting to half. Though I was not able to make out with the glasses any insect actually the object of pursuit, I did see two small moths flying low over the grass—just as required to explain the birds' actions. I believe, however, that the staple of their food was minute flies or gnats.

As it grew towards twilight—after the Starlings had gone—large quantities of Swallows and Martins took possession of the air round about. Whether they had come wholly or chiefly or partly for the insects I do not know.

I frightened several birds this time, and as the twilight closed in not many were left. Lying just within the edge of the bracken birds in ones or twos would often walk past me within twelve paces (as I judged), presenting of course a splendid view. A sudden bob forward of the head in a very swingy manner, the tail at the same time swinging up (very suggestive of a wooden bird that performs the same actions upon one's pulling a string) is a characteristic action, and seems to have no special reference to anything—unless deportment.

Left about 7.15.

September 8th.—Arrived somewhere between 5.30 and 6 p.m. Though as cautious as I could be, and keeping well behind the bracken (always lying flat), yet several birds took alarm and flew off, though not to any great distance. Including these I counted forty-one standing scattered about the amphitheatre. They were all of them particularly dull and listless, hardly moving from

where they stood, and much less occupied in preening their feathers than has hitherto been the case. This inaction continued up to twilight, and I connect it in some measure at least with an unusual absence of insects at this time. For the first time I was bothered neither with flies nor (till nearly dark) mosquitoes, nor did I see any insect in the air or on the ground in front of me. Since the 5th it had rained heavily, and yesterday almost the whole day, whilst to-day has been bright and fine. This listlessness is in marked contrast with the great activity of the birds on the afternoon of the 5th, which was certainly displayed in catching insects, then much *en évidence*. Still the diminished preening of the feathers and almost moping demeanour is not accounted for in this way. The only piece of action I observed whilst it was still good daylight was when one bird pursued another in a hostile manner, a cry being uttered by one of them (I think the pursued one) as of distress or remonstrance. (This, at least I think, but the birds were at too great a distance for me to be *certain* that it was not another of the birds round about that called.) With twilight, however, activity began, and the running and waving of wings was now perhaps more marked than it has yet been (at least on the part of some of the birds). One bird executed what might certainly be described as a dance, making swift (and apparently aimless) rushes backwards and forwards, waving the wings all the while in an excited manner, making now and again (I *think*) a little leap into the air, and, as a part of all this, a short flight just over the ground. I am justified in saying "as a part," for the bird did not stop and fly, and, on alighting, recommence, but the flight arose out of the wild waving and running, and when it was over these were at once resumed. Another bird made three little runs—advancing, retiring, and again returning—all the time with wings upraised and waving, then made a short flight close above the ground (describing segment of a circle), and, on alighting, continued as before. The birds, as a body, behaved similarly. I could not of course observe each one, but kept catching the light inner plumage of the wings as they were thrown suddenly up. All about now over the plateau the plaintive wailing notes were heard, and gradually—as on former occasions—the birds flitted off. I was again lucky in the first of the birds, whose dance movements I have more particularly

described, being near to me, whilst the second, though a good deal farther off, was still plain through the glasses, in spite of the increasing gloom. Soon after this I had to lay the glasses down, and then I only got "dreary gleams about the moorland" as the wings of now one and now another bird were flung up. The interest to-day lay in the fact that, as far as I could observe, this wing-waving "dance"—for so, I think, it may be called—did not take place during (much less was it incidental to or part of) a hunt for food. The birds (so it appears to me) danced it purely for its own sake, and not in connection with anything else, which I had not felt satisfied about before. With most, at any rate, I think this was the case—certainly with the two that I saw best, and have chiefly instanced. One bird only I distinctly saw running and pecking something (insects presumably) off the dry scrubby grass, but this was not waving its wings.

On the last day of observation (Sept. 5th) the birds were early occupied in chasing insects, but it was not till twilight that the wing-waving began to be at all prominent. It then alternated with the chase, and it is possible that the two, though quite distinct, may sometimes have been combined together into a dancing hunt, or hunting dance, as indeed it seemed to me at the time (though very likely I was wrong). On all four occasions it is the close of the day that has ushered in the dancing, so that it would seem that the birds relax themselves in this way before leaving their grounds, and flying off into the night. (They are active during the night, and their cry is often to be heard as they fly high in the air.) But these dance-wavings of the wings must be carefully distinguished from when a bird pursuing an insect jumps into the air after it, aiding itself with its wings—as might naturally be expected. It is also possible that they may sometimes beat down a moth with the wings, but I do not think this has been the explanation of anything I have yet seen.

September 9th.—Arrived at about 7 p.m., when it was already getting dusk. Several birds there, but not so many as the day before. They were dancing when I got there, and I noted now, without any doubt, that they often made little leaps into the air whilst waving the wings—not at all in the same way, however, as the bird that I saw jump into the air after an insect. There was no doubt whatever as to the motive of that, and I now

at once appreciated the difference. Nothing further noted. Left at 7.30.

September 10th.—Arrived some time between 5 and 6 p.m. Thought at first there were no birds there, but at last located them—a fair number—far off on the outer edge of the plateau. They remained there till shortly after the arrival of a Heron, who flew down near the middle of the space. They then began to come up, several approaching very close to the Heron—to look at him, it almost seemed—and I cannot help thinking, though nothing occurred to demonstrate, that they were not indifferent to his presence. The shades of evening were now falling, and the birds began to disport themselves as before. The light seemed more than usually bad for the glasses, so that I had soon to lay them down, and I obtained, perhaps without their aid, a better general impression. The birds ran about raising and waving their wings, often leaping into the air, and often making little flights, or rather flittings, over the ground as part of the disport, all as described before, uttering at intervals their sad wailing cry. It must not be supposed that all the birds acted thus at once. It was now one and now another, and the eye never caught more than a *few* gleams (three or four or five) of the flung-up wings at one time over the whole space. It was a gleam here and a gleam there in the deepening shadows. “Dreary gleams about the moorland” is indeed a line that exactly describes the effect. This disporting ended in, and was the recognized preliminary to, the bird’s flying off. I counted seventeen (but many had flown before I began to count) as they flew one after another at short intervals over my head, uttering their wild note. Though of the same character, this note, as uttered on the ground, is not the same as when uttered flying. On the ground it is much more drawn out, and a sort of long wailing twitter* often precedes and leads up to the final wail. In the air it comes as just a wail without this preliminary.

These birds, then, stand or sit about during the afternoon (but from what hour I do not yet know) in their chosen place of assemblage, and if not occupied in catching insects or preening

* This no doubt is the “clamour” mentioned by Mr. Aplin in ‘The Zoologist’ for October, 1899 (p. 437). It is full of a wild sad beauty, and effective beyond words. I too have only heard it uttered on the ground.

themselves are dull and listless. But as the evening falls, and the air cools, they cast off their lassitude, think of the joys of the night, there is dance and song for a little, and then forth they fly. Sad and wailing as are their notes to our ears, they are no doubt anything but so to the birds themselves, and, as the accompaniment of what seems best described by the word "dance," may perhaps fairly be called "song." The chants of some savages whilst dancing might sound almost as sadly to us, pitched, as they would be, in a minor key, and with little that we would call an air. Again, if one goes by the birds' probable feelings—which may not be so dissimilar to the savages', or indeed to our own on similar occasions—"song" and "dance" seems a legitimate use of words.

September 13th.—Arrived 6 p.m. or little after. Very dark day. Sky livid and covered with clouds, and close sultry feeling as of approaching thunderstorm. It was with difficulty I could distinguish some few birds. As the gloom increased I caught a gleam or two, but nothing that I could see to note. Only some half-dozen or so birds flew over my head at the usual time. Whether the birds partook of the dullness of the day, or whether the small number checked the inclination to dance (as I suspect), there seemed to be very little of this.

September 14th.—Arrived at about 6 p.m., but have nothing special to note except that, there being some fifty or eighty birds in the amphitheatre, another large flock of them, numbering, as far as I could judge, from seventy-five to one hundred, flew over it. They did not, however, settle, and later I alarmed some of the standing ones, who flew farther away. Afterwards I counted thirty-five, but this may have included the later. This shows what numbers of the Great Plover there are in this part of England. Long may they continue, and (*that they may*) may nobody take the smallest interest in them!

September 15th.—(Weather dull, sky overclouded.) Arrived about 5.30 p.m. There were not many birds that I could make out, and none near. A drizzling rain soon began, and this increased gradually, but not beyond a smart drizzle. Shortly after the rain commenced the birds began to come down from where I had seen them, and (evidently) from other parts on the outer edge of the amphitheatre, and to spread all over it till

there were numbers of them, and dancing of a more pronounced, or at least of a more violent kind than I had yet seen, commenced. Otherwise it was quite the same, but the extra degree of excitement made it, of course, much more interesting. It was, in fact, remarkable and extraordinary. Running forward with wings extended and slightly raised, a bird would suddenly fling them high up, and then, as it were, "pitch" about over the ground, waving and tossing them, stopping short, turning, pitching forward again, leaping into the air, descending and continuing, till with another leap it would make a short eccentric flight low over the ground, and pitch suddenly down in a sharp curve. I talk of their "pitching" about because their movements seemed at times hardly under control, and each violent run or plunge ending, in fact, with a sudden pitch forward of the body, the wings straggling about (often pointed forward over the head) in an uncouth dislocated sort of way, the effect was as if the birds were being blown about over the ground in a violent wind.* They seemed, in fact, to be crazy, and their sudden and abrupt return, after a few mad moments, to propriety and decorum had a curious and "bizarre" effect. Though having just seen them behave so, one seemed almost to doubt that they had. One bird in particular that had come to within a moderate distance of me made itself conspicuous in the way I have tried to describe. It was one of some half a dozen gathered together under a solitary crab-apple tree almost directly opposite me, and both with the naked eye and the glasses I observed them all thoroughly well. One would often run at or pursue another with these antics. I saw one that was standing quietly caught, and, as it were, covered up in a little storm of wings before it could run away and begin waving its own. These little chases were evidently in sport, not anger. Very different was the action and demeanour of the two birds I saw about to fight. This and the general behaviour of the group made it evident that they were stimulated in their dance-antics by each other's presence. This is by far the finest display of the sort that I have yet seen, and must certainly be due to the rain, which the birds obviously enjoyed. They had been quite dull and listless before, but as

* There was little or no wind after the rain commenced, nor has this explanation been tenable as yet even in the smallest degree.

soon as it fell they spread themselves all over the plateau, and the dancing began. As far as I could observe, the birds now were very little occupied in procuring food. There was a peck or so at something now and again, but this was casual, and, as it were, an interlude. The constant quick running and stopping whilst the wings were folded appeared to me to be only a part (the less excited part) of the general emotion, out of which the sudden frenzies arose. There was also the usual vocal accompaniment. As soon as they had spread themselves out over the amphitheatre the wailing note went up, and was caught and repeated from one part of it to another at greater or less intervals. The whole ended in flight as before.

I remark a great difference in the shade of these birds, plumage. The breast and ventral surface is indeed light in all, but, whilst the back is in some so dark as to look, towards evening, almost black through the glasses, in others it is so much lighter that it looks almost white by contrast, or even of itself.

September 17th.—About 1 p.m. walked towards the amphitheatre without concealing myself, wishing merely to ascertain if birds were there at that hour. When I was still a good way off a very large number rose into the air, and I then edged off so as not to alarm them further, and to let them resetttle, which after a time they did, and I retired.

At 11 p.m., it being bright moonlight, I again went to the place, and walked around and over the entire amphitheatre, noticing and picking up several feathers in the moonlight. I did not put up a single bird, nor could I hear their cry anywhere around. The place was quite deserted. Returning, I had the pleasure of liberating a poor Rabbit caught in one of those vile toothed traps, the selling or possession of which should be made a criminal offence, with punishment to "fit the crime," à la Mikado.

(To be continued.)

NOTES AND QUERIES.

MAMMALIA.

INSECTIVORA.

Varieties of Mole.—The variety of *Talpa europæa* mentioned by Mr. Forrest (*ante*, p. 142) is not at all uncommon in some parts of the country. In their various stages they are known to the Mole-catchers as “blue” Moles. I have several in my possession. The most difficult variety of Mole to get hold of is one spotted with white—at least that is my experience. I have a good series of skins, but have never been able so far to obtain a spotted example.

With regard to WATER SHREWS being found far from water, I have several times noticed this, and have picked them up dead when shooting on dry sandy land, where the nearest pond or stream was some mile or so away.—OXLEY GRABHAM (Heworth, York).

Lesser Shrew in Shropshire.—The Rev. W. Lightfoot Harrison, of Great Woolaston, sent me, on March 15th, a little animal which he had found in his garden the previous day. On examination it proved to be a specimen of the Lesser Shrew (*Sorex pygmaeus*), a species which has never before been recorded in Shropshire. It will be placed in the Shrewsbury Museum.—H. E. FORREST (Bayston Hill, near Shrewsbury).

UNGULATA.

Equus quagga, L.—I have for some time been collecting information regarding the Quagga of South Africa, which, it is feared, is now wholly extinct, though other members of the family still survive in sadly diminished numbers. I should be glad for any information on the following points: Former range of the Quagga; range of variation in colour, if any; breeding season; Quaggas born in captivity; Quagga hybrids with Horse or other animal; date when a living Quagga was last seen in its old haunts; any aged animal still living in captivity. I have already details of external characters, male and female, and fœtal young; food; museum specimens; Lord Morton's Quagga hybrid, and so on. I should specially like to hear of any specimens preserved in museums; my list already comprises London, Edinburgh, York, Manchester, Paris, Leyden, Amsterdam, Berlin, Berne,

and Cape Town. It should be remembered that the true Quagga is meant, and not the comparatively common Bonte-Quagga, or Burchell's Zebra. All assistance would be gratefully acknowledged should enough information be gathered to publish in book form. — GRAHAM RENSHAW (Sale Bridge House, Sale, Manchester).

AVES.

Blackcap in March.—On March 12th I heard a Blackcap (*Sylvia atricapilla*) singing among the thorn-trees on Clifton Down, and had a good view of the bird more than once. It is natural to suppose that it has spent the winter in England.—HERBERT C. PLAYNE (Clifton College).

Wild Swans in North Ireland.—It may interest some of the readers of 'The Zoologist' to learn that there was an unusually large migration of Wild Swans to Loughs Swilly and Foyle this winter. Mr. D. C. Campbell, of Templemore Park, Londonderry, writes me "that one hundred and fifty have been seen in one flock on Lough Foyle, and quite a number have been frequenting the river some miles above Derry." Besides those noticed by me near Bartragh in 'The Zoologist' (*ante*, p. 39), several other flocks have been seen and heard passing to the various lakes during this winter.—ROBERT WARREN (Moyview, Ballina).

Unusual Numbers of Green Plover in Worcestershire.—During the winter large flocks of Green Plover (*Vanellus vulgaris*) in this county have been an unusual occurrence. They began to arrive in October, and during November, December, and January the flocks were enormous. They seemed to be plentiful over the whole of the northern half of the county, every suitable field having a certain number on it, the water meadows especially being very much frequented by them. Golden Plover also, which I consider rare in this part of the county, were, during November and December, quite common. For years the numbers of Green Plover in this district seemed to be decreasing for no apparent reason; I was therefore much pleased to see them return in such numbers. I might also mention that Bramblings and Redwings arrived in greater numbers than they have done for ten years, and remained all through the winter, feeding with other Finches on stubbles, except for the first fortnight after their arrival, when, as usual, they fed on the beech-mast.—H. E. HOWARD (Stone House, near Kidderminster).

Bleater Snipes (*Gallinago celestis*) near Aberdeen.—My attention was directed on the 5th of last July to a male of this species, which was producing the peculiar noise which gives these birds their name. I again saw a pair of these Snipe on July 16th, which led me to suppose that they were breeding in the locality. Although they were so often seen through the season as to show that they were resident, neither nest nor young were seen to prove that they had nested. The occurrence of these two birds remaining

here during the nesting season is worthy of notice, as not having happened, to my knowledge, for many years, although I have sometimes seen a solitary specimen at different times in various summers during that period. The birds are not rare here in winter, an occasional one being frequently seen. It is the appearance of the pair during the nesting season which surprised me. I recollect when several pairs nested near here, but they decreased to only a pair or so nesting in an occasional season. Then they became so reduced that no nesting was known. It would be interesting to know whether there have been any other extensions in the summer range of these birds during the past season. I have a special reason in being interested in the question, because for several years their favourite haunts were practically overrun by Rabbits, which are well known as being very much disliked by various other animals. Means were taken during the previous winter to decrease the number of these rodents on the spots the Snipe frequented during the past summer, and the idea crossed my mind that the Snipe had found their way to the marshy moorland after the Rabbits had been decimated there, and that the presence of the latter had kept the former away on some previous years at least.—W. WILSON (Alford, Aberdeen, N.B.).

Birds Singing during a Thunderstorm.—For some reason or other I have missed reading my 'Zoologist' for July, 1898, until now, and so have only just seen an interesting little note by Mr. Horsbrugh on this subject at p. 322. Mr. Horsbrugh records the singing of many Thrushes and a few Chaffinches during a heavy thunderstorm on May 23rd, 1898. I can add the Wood-Pigeon to his list; and in the 'Irish Naturalist' for October, 1899, at p. 231, will be found a short note in which I mentioned that the cooing of Wood-Pigeons was in no way interrupted by a heavy thunderstorm, accompanied by rain, on Aug. 18th, 1898. The voices of these birds were constantly audible between the thunder-claps.—G. E. H. BARRETT-HAMILTON (Kilmarnock, Arthurstown, Co. Wexford, Ireland).

PISCES.

Blue Shark in Killala Bay: a Correction.—In my notice in the January number of 'The Zoologist' of the occurrence of a Blue Shark on the island of Bartragh, I erroneously named it the Blue Shark from the description received from a person to whom Capt. Kirkwood related the occurrence. However, on meeting Capt. Kirkwood, and talking about the fish, it was evidently a fine specimen of the Fox Shark (*Alopias vulpes*), 10½ ft. large, and the elongated portion of the tail-fin nearly as long as the body, fully 4 ft. in length; and he was so struck with this peculiarity of the tail that he cut it off and brought it home.—ROBERT WARREN (Moyview, Ballina).

[Second-hand identifications are always unreliable. We were under the impression that Mr. Warren had satisfied himself as to the identity of the species.—ED.]

PRESERVATION OF ZOOLOGICAL SPECIMENS.

Hard-sat Eggs: a Suggestion.—As the nesting season is now at hand, I should like to suggest a method of dealing with hard-sat eggs which I have not yet seen mentioned in 'The Zoologist.' Of course no one would think of taking hard-sat eggs when fresh ones could be obtained, but sometimes we come across valuable eggs which one does not like to leave, even if much incubated. Some collectors endeavour to extract the embryo with fine hooks, with or without previously dismembering it with fine scissors (embryotomy); others cut a door in the shell, which is replaced after removal of the chick; while others again insert chemicals into the shell through the drill-hole. As is well known, skeletons of small mammals or birds may readily be obtained by placing the body of the creature near an ant's nest, when the bones will speedily be picked clean by the swarming and industrious insects. In the same way they would probably devour the contents of a hard-sat egg, as the foetal tissues, being only partially developed, would be more easily disintegrated than those of an adult animal; and it would be well worth while, in the case of a hard-sat and valuable egg, to drill a hole in the shell large enough to admit an ant, and, after cautiously breaking up the contents a little with a pin, to place it on the ground close to an ant's nest, where it could be left for a few days, if suitably protected from dust and injury. A very delicate and thin-shelled egg might be injured by the powerful mandibles of ground-loving beetles, such as those of the *Carabus* and *Staphylinus* type, but this would be only a rare and occasional accident. The embryo, however putrid, being enclosed in a shell, would probably not tempt the efforts of the burying-beetles, such as *Necrophorus ruspator* or *N. vespillo*; and I trust that this method may be of service in saving valuable eggs during the coming season.—GRAHAM RENSCHAW (Sale Bridge House, Sale, Manchester).

NOTICES OF NEW BOOKS.

A Monograph of Christmas Island (Indian Ocean). Physical Features and Geology by CHARLES W. ANDREWS, B.A., B.Sc., &c.; with descriptions of the Fauna and Flora by numerous contributors. Published by the Trustees of the British Museum.

THIS is the account of a piece of real biological work, well conceived and admirably carried out. It is truly zoological, inasmuch as palæontology has not been neglected; and by the inclusion of botany it becomes in a proper sense a full account of the natural history of the island. Christmas Island is situated in the eastern part of the Indian Ocean, in S. lat. $10^{\circ} 25'$, E. long. $105^{\circ} 42'$. Java, the nearest land, is about 190 miles to the north, while some 900 miles to the south-east is the coast of North-West Australia. Geologically, as Mr. Andrews describes it, "the island is, in fact, the flat summit of a submarine mountain more than 15,000 ft. high, the depth of the platform from which it rises being about 14,400 ft., and its height above the sea being upwards of 1000 ft." Sir John Murray defrayed the necessary expenses for the expedition, which was successfully carried out by Mr. Andrews, one of the staff of the British Museum.

Collections were made in all branches of natural history, and these, as a rule, have been worked out by specialists in their respective groups. Anthropology is alone discarded, but necessarily, for when visited by H.M.S. 'Egeria' in 1887, "the island was found to be entirely uninhabited, and there was no indication that it had ever been occupied."

Readers of this Journal will enjoy the bionomical notes of Mr. Andrews which are attached to the more technical references to many species. We can only notice a few. The Rat (*Mus macleari*) has for natural food mainly fruits and young shoots, and to obtain these it ascends trees to a great height. We read:—"I have often seen them run up the trailing stems of the lianas, and, in

fact, they can climb as well as a squirrel. In the settlement they utterly destroy all the fruit they can get at, and frequently come into conflict with the fruit-bats on the tops of the papaiatrees." The Frigate-bird (*Fregata aquila*) forms an article of food for the inhabitants, and is easily captured. A man climbs "into the topmost branches of a high tree near the coast, armed with a pole eight or ten feet long and a red handkerchief. The latter he waves about, at the same time yelling as loud as possible. The birds attracted by the noise and the red colour swoop round in large numbers, when they are knocked down with the long pole." Fresh information is also recorded concerning our old friend the Robber Crab (*Birgus latro*). "They have a curious habit of often dragging their food long distances before attempting to eat it. I have seen a Crab laboriously pulling a bird's wing up the first inland cliff, half-a-mile or more from the camp whence it had stolen it."

The geographical relations of the fauna and flora are mostly Indo-Malayan, and, although a large number of species are described as endemic, especially among the insects, this is probably owing to the entomological fauna of the neighbouring islands being still imperfectly known. The volume is well illustrated with twenty-two plates, a map, and numerous cuts in the text, and worthily upholds the character of British Museum publications.

The Atoll of Funafuti, Ellice Group: its Zoology, Botany, Ethnology, and General Structure. Based on collections made by Mr. CHARLES HEDLEY. Sydney: published by order of the Trustees of the Australian Museum.

PART I. of this excellent memoir appeared in 1896, and Part VIII., concluding it, was published last year. It altogether relates to the atoll of Funafuti, which was discovered by Capt. Peyster on March 18th, 1819. According to the observations of Capt. Wilkes, it lies in lat. $8^{\circ} 30' 45''$ south, long. $179^{\circ} 13' 30''$ east,— "a position which may otherwise be described as due north of Fiji, and precisely half way between that and the Equator."

Part I. is devoted to a general account of the atoll, its

structure, climate, vegetation, and population, the last topic being necessarily more or less ethnological, but its ethnology is treated also alone in Part IV., and these sections are all from the pen of Mr. Hedley. Some short notes on rock specimens are contributed by Dr. T. Cooksey. Aves are described by Mr. J. North, but as the ornithological collection consisted of only "six specimens, referable to four well-known Australian species," there was not much to write about. The interesting fact of the Frigate-bird (*Fregata aquila*) being domesticated by the natives and used as a carrier bird is, however, thoroughly dealt with. The Insecta and Arachnidæ have been studied by Mr. W. J. Rainbow, and the Crustacea and Echinodermata by Mr. T. Whitelegge, who has also dealt with the Alcyonaria, Sponges, Madreporaria, Hydrozoa, Scyphozoa, Actinozoa, and Vermes. Mammals, Reptiles, and Fishes have been detailed by Mr. Edgar R. Waite. "Excluding the birds, the indigenous terrestrial vertebrate fauna appears to be comprised in five species—a Rat and four Lizards." The Enteropneusta, which comprised two species, form a subject for truly biological treatment by Mr. Jas. P. Hill, and the Mollusca are naturally taken in hand by Mr. Hedley, who is the Conchologist of the Australian Museum.

In a summary of the fauna we read: "Prior to the advent of the Expedition, not more than eight species of animals were recorded in literature from Funafuti"; these published lists now "embrace about eight hundred and fifty entries." Zoologists will congratulate all concerned on the good work done, and those who study zoo-geography will value the volume.

The Norwegian North Polar Expedition, 1893-1896. Scientific Results. Edited by FRIDTJOF NANSEN. Vol. I. London, New York, Bombay: Longmans, Green & Co.

NANSEN's voyage in the 'Fram' is well known to the many English readers who have perused 'Farthest North.' But, beyond geographical exploration, natural science was also deeply interested in this boreal expedition, and the results achieved are now receiving publication in a handsome and complete form, of which the first volume is before us.

The first contribution is by Dr. Pompeckj, on "The Jurassic fauna of Cape Flora," which, as Nansen informs us, "situated in circ. $79^{\circ} 56'$ N. lat. and circ. $49^{\circ} 40'$ E. long., is the western extremity of the long and narrow peninsula which forms the south-western part of Northbrook Island." Unfortunately the fossils examined were generally in a very imperfect condition, but some complete work even under these circumstances was accomplished, and a fauna of at least twenty-six forms demonstrated as occurring in the Jurassic Sedimentary Rocks collected by Nansen in the Cape Flora district. Among the peculiar features of the fauna may be just mentioned the "prominent part which the Ammonite genus *Cadoceras* plays in its composition"; while in all the known fossils from the marine jura of Cape Flora, the Gastropoda are represented by a single specimen only. The Callovian fauna Dr. Pompeckj reports as "*nothing but a part of the fauna of the Russian Callovian.*"

The description of the "Fossil Plants" are outside the province of this Journal, and we pass on to an account of the "Birds," by Prof. Collett and Dr. Nansen, the first named of whom has contributed the strictly ornithological matter, while the second has added personal observations. This contribution is eminent by a very full account of the Roseate Gull (*Rhodostethia rosea*), referred to in more than one place, and in its juvenile first plumage forming the subject for a very beautiful chromo plate.

The Crustacea are described by Prof. Sars, and, when this excellent authority receives sufficient material, we all expect a banquet in biological information, and we are not here disappointed. We read: "As is well known, it has until recently been the general assumption of geographers, that the Polar basin, north of Siberia and Franz Josef Land, could only be quite a shallow sea, with depths scarcely exceeding some hundred fathoms, and the zoological equipment of the 'Fram' Expedition was arranged in accordance therewith. But, in direct contradiction to this generally adopted view, that part of the Polar Sea through which the 'Fram' drifted with the ice proved to be everywhere of enormous depth, exceeding in this respect even the Norwegian Sea." Although it is probable that there is very little animal life on the bottom in this part of the ocean, it was remarked that

the more superficial strata of the sea, though almost perpetually covered with a layer of ice, were found to abound with life, at all seasons, and in the most northerly altitudes reached. But Prof. Sars is of opinion that these pelagic animals are not strictly confined to the more superficial strata of the sea, "but that they also at times descend to considerable depths, perhaps even to the strata immediately covering the bottom." Forms also hitherto regarded as southern in distribution have been found in the Polar Sea; in the pelagic Copepoda, a Calanoid, of the genus *Hemicalanus*, hitherto only recorded from the Mediterranean and the tropical parts of the Atlantic and Pacific Oceans, being a case in point. Thirty-six plates illustrate this contribution.

Text-Book of Palaeontology. By KARL A. VON ZITTEL. Translated and edited by CHARLES R. EASTMAN, Ph.D. Macmillan & Co., Limited.

It is perhaps as difficult to imagine a science of zoology divorced from the past in palæontology, as a form of theology without any reference to a future existence, or a history strictly confined to modern events alone. Palæontology is one of the great witnesses to the truth of organic evolution, which we all regard as the philosophy of natural history.

This is not merely a translation, but rather an adaptation of Zittel's 'Grundzüge der Palaeontologie,' for though the chapters on Protozoa and Coelenterata stand essentially as in the original, "nearly all the remaining chapters have been remodelled, enlarged, and brought as nearly as possible up to date by a selected body of experts." The 'Grundzüge' itself was published as recently as the spring of 1895, and, although radical departures have been made with the author's sanction, "one must by no means presume he is thereby committed to all the innovations which are set forth." No fewer than twelve collaborators have assisted the editor, so that a "new and revised edition" is perhaps necessary to be added to the term "translation."

The present volume is devoted to what are usually considered "the lower forms of life." Seven "Sub-Kingdoms"—to use the term employed—are described, *viz.*: Protozoa, Coelenterata,

Echinodermata, Vermes, Molluscoidea, Mollusca, and Arthropoda, the Vertebrata being reserved for the next volume. In the introduction we are reminded how even in palæontology we have advanced beyond the Linnæan and Cuvierian conceptions, when we read: "Those holding to the theory of descent, evolution, or transmutation, look upon varieties, species, subgenera, genera, families, orders, classes, and sub-kingdoms, as distinctions of merely transient importance, corresponding to the state of our information at the present time; it being assumed that by means of gradual transmutation during the course of ages all organisms have become evolved from a single primitive cell, or from a few primitive types."

This excellent German work, made accessible to the strictly English reader under purely American supervision, forms a work of reference that zoologists will find most useful to consult. Even with its more than 700 pages of letterpress, containing 1476 figures, its subject matter is very far from exhausted, and its value lies in its summarized information. This is evident when we refer to the *Insecta*, revised by no less than the greatest palæontological authority on the subject, Prof. S. H. Scudder, and find that the information is compressed in ten pages. Those who are familiar with the palæontological writings on this subject by Prof. Scudder alone will not fail to comprehend that even this portly volume is but a digest of the ancient history of animal life.

An Elementary Course of Practical Zoology. By the late T. JEFFERY PARKER, D. Sc., F.R.S., and W. N. PARKER, Ph.D. Macmillan & Co., Limited.

HOWEVER much in our daily life we may somewhat avoid the too practical man, there can be little doubt we want more practical zoologists. The average naturalist to-day is perhaps concerned overmuch with the outsides of animals, and a very large proportion indeed of conclusions and theories are based on animal appearances. Surface zoology in a strict sense should rank very little higher than surface geology; but how few of us have now either the time, opportunity, or desire for undertaking even

ordinary dissection. This volume is an incentive to make us really understand all that can be practically learned about a few typical animals, and the thorough mastery of the anatomical and physiological details of these living forms will leaven the whole lump of many zoological conceptions. In fact, as the author states—for one only is now left—“Throughout the book I have borne in mind that the main object of teaching zoology as a part of a liberal education is to familiarise the student not so much with the facts as with the ideas of the science.”

The first thirteen chapters are devoted to the Frog; attention is then paid to some of the most primitive forms of animal life, after which the objects of study are those familiar “zoological models,” the Earthworm, the Crayfish, and the Fresh-water Mussel. A few illustrations of the Vertebrata follow, and the concluding chapter is chiefly of an embryological character. In the summary of views respecting the subject of organic evolution we meet with an advice which we do not remember having seen elsewhere:—“As a preliminary to the study of Darwin’s ‘Origin of Species,’ the student is recommended to read Romanes’ ‘Evidences of Organic Evolution,’ in which the doctrine of Descent is expounded as briefly as is consistent with clearness and accuracy.”

General Index to Miss Ormerod's Reports on Injurious Insects, 1877 to 1898.

Report of Injurious Insects and Common Farm Pests during the Year 1899, with Methods of Prevention and Remedy. By ELEANOR A. ORMEROD, F.R. Met. Soc., &c. Simpkin, Marshall, Hamilton, Kent & Co., Limited.

DURING a period of twenty-two years Miss Ormerod has issued her Annual Reports on Injurious Insects. The quantity of valuable information, thus one may almost say interred, except to the diligent readers of these reports, is now accessible to all by the publication of an excellent index compiled by Mr. Robert Newstead, himself well acquainted with the subject.

The twenty-third Report for 1899 commences a second series, and is in no way inferior to its predecessors. Miss Ormerod's

“study” must be a veritable “Scotland Yard” for insect predators. Here an account is kept of all previous convictions, and the names, habits, and life-histories of all these agricultural criminals are accurately recorded and regularly published, while the most speedy and convenient methods for their destruction are studied and advised. We fear, however, that these annual reports are not sufficiently procured by our agriculturists, fruit-growers, and foresters, to whom they should prove indispensable; while all who take an interest in a garden—“and who loves a garden loves a greenhouse too”—will find aid in its pages to resist the attacks of many enemies. We sometimes scarcely estimate the size of these insect hordes which ravage our crops. One of Miss Ormerod’s correspondents, a head-schoolmaster, relates that during the late season, when the larvæ of White Cabbage Butterflies made dreadful havoc among the cabbages and similar plants, he put two boys at a time during their dinner-hour, in his small garden of about a quarter of an acre, with a net to catch these butterflies, of which in *seven days* they caught and killed no fewer than 834. Again, from two hundred and forty plants the boys gathered more than 5000 caterpillars.

Insects alone do not curtail Miss Ormerod’s work, and in this issue we have a most interesting account of the Snail-Slug (*Testacella haliotidea*), an animal which is labelled (Beneficial) “ridding us of small ground vermin; they are wholly *carnivorous*, and prey chiefly on Earthworms, but also on Slugs and Snails, and even on each other.”

EDITORIAL GLEANINGS.

MR. A. SMITH WOODWARD, in this month's issue of the 'Annals and Magazine of Natural History,' has announced the discovery of an extinct Eel (*Urenchelys anglicus*) in the English Chalk. The writer observes:—"There is thus no doubt that the Apodal fishes date back to the Cretaceous period. . . . A well-preserved skull of a typical Eel from the Lower Chalk of Clayton, Sussex, is to be recognized in the Willett Collection in the Brighton Museum."

AT a meeting of the Asiatic Society of Bengal, held at Calcutta in January last, Major Alcock exhibited some enlarged drawings of the well-known caterpillar of the Notodontid moth, *Stauropus alternus*, and remarked:—"These caterpillars, which can be found in Calcutta and its vicinity in the rainy season, are as extraordinary in look as they are in behaviour. When touched they turn the hinder end of the body over on to the back, in the manner of an enraged Scorpion, and then begin to tremble as if agitated by the most uncontrollable emotion. There are certain particularly irascible Ants that behave somewhat in the same way, and there can be little doubt that the suggestion which has been made that the attitude of the alarmed *Stauropus* caterpillar may be mistaken by its enemies for the offensive posture of an Ant of enormous dimensions is somewhere near the truth. The insects that accompany these drawings are common enough during the monsoon in Calcutta, and I recommend them to your further notice. No observer can watch their behaviour without admiration. Of their power to terrify creatures like birds, whose high æsthetic and emotional development cannot but be accompanied by at least the germs of superstition, there can be no uncertainty."

Mr. de Nicéville, in criticising these remarks, considered that, although perhaps the "scares" might frighten birds, their most important function was to terrify ichneumon-flies and parasitic Diptera, which were far the most active enemies that caterpillars had to contend against. For this reason he thought that the more commonly received idea that the *Stauropus* caterpillar, when irritated, resembled a Spider was nearer to the truth.

WE have received the Report for the year 1899 relating to the Ghizeh Zoological Gardens, near Cairo, by the Director, Stanley S. Flower, F.Z.S.

The mammals, birds, and reptiles contained in the collection on the 6th October, 1899, comprised 473 specimens and 132 species.

In addition to the above, there are many animals living at large in the Gardens, which form one of the chief attractions of the place. Great care is taken to encourage the wild birds, and their numbers seem to have increased considerably during 1899. The most noticeable of these birds are :—

- Song-Thrush (*Turdus musicus*).
- White Water-Wagtail (*Motacilla alba*).
- Grey-headed Yellow Water-Wagtail (*Motacilla cinereocapilla*).
- Common Sparrow (*Passer domesticus*).
- Hooded Crow (*Corvus cornix*).
- Kingfisher (*Alcedo ispida*).
- Pied Kingfisher (*Ceryle rudis*).
- Hoopoe (*Upupa epops*).
- Grey-headed Love Bird (*Agapornis cana*).
- Barn Owl (*Strix flammea*).
- Southern Little Owl (*Carine meridionalis*).
- Kestrel (*Tinnunculus alaudarius*).
- Egyptian Kite (*Milvus ægyptius*).
- Grey Heron (*Ardea cinerea*).
- Night Heron (*Nycticorax griseus*).
- Wild Duck (*Anas boschas*).
- Common Teal (*Querquedula crecca*).
- Turtle-Dove (*Turtur senegalensis*).
- Stone-Curlew (*Ædicnemus crepitans*).

AUSTRALIAN ornithologists—a body of students which, we believe, is increasing—will doubtless appreciate ‘A Key to the Birds of Australia and Tasmania, with their Geographical Distribution in Australia,’ by Robert Hall. A beginning is made with 767 known species, but assuredly many more are to be discovered in this wide, and in many parts little-worked, area. A short description is given of each species, and the value of the list would have been much enhanced if a reference to the publication of the original description had also been given. This publication is in convenient form for pocket reference, and we should have greatly valued a similar compilation when collecting in other parts of the world. It is published by Melville, Mullen & Slade at Melbourne, and by Dulau & Co., London.

PROF. C. O. WHITMAN has reprinted and issued in a separate form his lecture on “Animal Behaviour,” delivered at the Marine Biological

Laboratory, Wood's Holl, Mass., U.S.A. Some most valuable and interesting observations on the life-histories of Leeches (*Clepsine*) are detailed, though the publication is mostly of a philosophical character. Special emphasis is devoted to the view "that instincts are evolved, not improvised, and that their genealogy may be as complex and far-reaching as the history of their organic bases."

WE have received from our contributor, Prof. J. H. Salter, a "List of the Birds of Aberystwyth and Neighbourhood," published by the University College of Wales Scientific Society. We need scarcely observe that such lists are highly valued by ornithologists, especially when compiled by competent authority, as is done in the present instance.

MR. L. UPCOTT GILL has again produced his annual 'Naturalists' Directory.' The publication for 1900 is far in advance of its predecessors. We no longer notice the absence of so many well-known names, though we think a reference to our pages could increase the number of British zoologists. The List of Societies, Field Clubs, and Museums is a welcome feature of this inexpensive and very useful handbook.

THE death is announced, in his eighty-sixth year, of Canon Atkinson, the well-known author of 'Forty Years in a Moorland Parish,' a delightful volume which was published some nine years ago. He had held the living of Danby-in-Cleveland for nearly three years over the half-century, and during his incumbency he calculated that he had walked 70,000 miles whilst engaged in clerical work. He was a naturalist, an antiquarian, and a sportsman.

WE also regret to record the death of Dr. St. George Mivart, which occurred on April 1st, at the age of seventy-three. The deceased was a zoologist who was best known as a polemical writer, his 'Genesis of Species,' though anti-Darwinian, being recognized by Huxley as worthy of combat, and who described Mivart as "less of a Darwinian than Mr. Wallace, for he has less faith in the power of natural selection. But he is more of an evolutionist than Mr. Wallace, because Mr. Wallace thinks it necessary to call in an intelligent agent—a sort of supernatural Sir John Sebright—to produce even the animal frame of man; while Mr. Mivart requires no Divine assistance till he comes to man's soul." Dr. Mivart, as before mentioned, was an accomplished zoologist. To the "man in the street" he will be remembered by his recently published differences with the Roman Church, with which he had been long in communion.

THE ZOOLOGIST

No. 707.—May, 1900.

BIRD NOTES FROM NORTH-EAST LINCOLNSHIRE DURING THE AUTUMN MIGRATION OF 1899.

BY G. H. CATON HAIGH.

THE autumn migration of 1899 resembled that of the previous year in the absence of any of those great migratory movements generally called "rushes," but differed in the absence of that quiet daily inflow of birds which characterised almost the whole of that season.

A remarkable feature in the past autumn was the scarcity of all Waders except Curlews, Grey and Golden Plovers, and Knots.

The first movement of land birds occurred on Aug. 23rd, but only comprised two or three species, and was scarcely noticeable. Throughout September very little migration took place. West and south-west winds prevailed during the whole month, the latter half of which was decidedly stormy.

The principal movements of the season occurred during October and the first half of November at four separate periods or rushes, namely, Oct. 4th to 9th, 17th to 21st, 27th to 30th and Nov. 7th to 10th. Much migration was, however, in progress all through October and the early part of November. October opened with much rain, and a gale from the east, which changed to south-west on 2nd and 3rd. The rest of the month was fairly calm, with south and south-west winds during the first half, and easterly winds from 14th to the end; while November,

up to the middle of the month, was characterised by light south wind and dull weather. Among the rarer visitors may be numbered the second Lincolnshire example of the Barred Warbler, the Arctic Bluethroat, Red-necked Phalarope, Spotted Redshank, Wood-Sandpiper, and Great Snipe, as well as such unusual migrants as the Wood-Wren, Grasshopper-Warbler, and Barn-Owl.

There are also some notable absentees, such as the Ring-Ouzel, Great Grey Shrike, Pied Woodpecker, and Wood-Pigeon. On the whole, however, the amount of visible migration was below the average of recent years.

Turdus viscivorus, Linn. Mistle-Thrush.—Appeared on the coast in great numbers, taking part in the "rush" of small birds of Oct. 4th and 5th; again numerous on 9th, and finally was still more abundant in the movement of Oct. 17th to 21st.

T. musicus, Linn. Song-Thrush.—A very small migration compared with that of 1898. A good many appeared in turnip and potato fields near the coast on Sept. 11th, and again in the hedges, with Redwings and Blackbirds, on Oct. 21st, 27th, and 30th; and a few were still present on Nov. 3rd.

T. iliacus, Linn. Redwing.—A very heavy immigration commencing with the "rush" of Oct. 4th to 9th in small numbers, but appearing in great abundance on that of Oct. 17th and following days, and lasting until about Nov. 10th.

T. pilaris, Linn. Fieldfare.—I saw a single bird in a hedge near the coast at North Cotes in October, but no more had appeared up to Nov. 15th, when I left Lincolnshire. On my return I found Fieldfares fairly numerous on Dec. 13th, and very large numbers appeared on Dec. 24th and 25th.

T. merula, Linn. Blackbird.—Several Blackbirds appeared in the neighbourhood of the coast on Oct. 5th, and a much larger flight on the 9th. Both these flights consisted of adult males and females in about equal numbers. On 17th and 18th another very large arrival took place, again consisting of adults of both sexes, accompanied, however, on the latter day by a few young cocks. On 21st scores of young black-billed cocks appeared with very few hens. Young cocks were still very abundant on 27th, with a good many old cocks and a few hens.

On 30th many cocks, old and young, but females were more numerous than on previous days. On Nov. 3rd swarms of Blackbirds, almost all females. Nov. 7th, again many young males, and on 10th young cocks abundant, with a few old cocks and hens. On the whole I believe the passage of Blackbirds was heavier than usual.

Saxicola œnanthe (Linn.). Wheatear.—Wheatears appeared very early, and I saw many along the sea-bank on July 29th. I saw no more until Aug. 23rd, when one or two appeared. On Sept. 1st and 2nd they were very numerous, and again on 15th. On Oct. 4th I noticed a single bird on the sea-bank, and on 5th three more stragglers appeared.

Pratincola rubetra (Linn.). Whinchat.—Numerous on turnip fields near the coast on Sept. 1st. On Sept. 11th and 20th, one seen each day.

P. rubicola (Linn.). Stonechat.—A single bird—a female—on a hedge in Thoresby Field on Sept. 25th.

Ruticilla phœnicurus (Linn.). Redstart.—A single bird near the coast on Sept. 13th. On Oct. 4th and 5th a good many in company with Redwings, Pied Flycatchers, Wrens, and many other small birds. This is an unusually late date for the passage of the Redstart.

Cyanecula suecica (Linn.). Arctic Bluethroat.—On Oct. 4th I shot a young female of this species near the sea-bank in the parish of Marshchapel. It is seven years since I last saw a Bluethroat on this coast.

Erithacus rubecula (Linn.). Robin.—A few Robins came in on Sept. 9th, but the first important immigration took place on Oct. 4th, and a somewhat smaller one between Oct. 17th and 21st, while a few stragglers remained until the 27th.

Sylvia cinerea (Bechst.). Whitethroat.—Many Whitethroats appeared on Aug. 23rd, with Hedge-Sparrows and Willow Wrens. Aug. 28th, several in the hedges, and from this date until Sept. 9th a few were always present; while on Oct. 4th I shot a single straggler.

S. curruca (Linn.). Lesser Whitethroat. — Always a scarce bird on migration. I shot one near the coast on Sept. 14th, and a second on Oct. 4th.

S. hortensis (Bechst.). Garden-Warbler. — I shot one on

some thorns near the coast at Tetney on Oct. 18th, an unusually late date.

S. nisoria (Bechst.). Barred Warbler.—On Oct. 17th I shot a young female of this species. It was in a thorn-hedge not far from the coast at Marshchapel. The weather had been fair and bright since the 15th, with light east wind, and white frost at night.

Regulus cristatus, R. L. Koch. Goldcrest. — The Goldcrest appeared in very small numbers this year. On Oct. 4th I saw a single bird on a hedge at North Cotes, and this bird remained about the same spot until the 13th. On the 17th and 18th Goldcrests were thinly scattered everywhere along the coast, though by no means numerous. By the 21st only three or four remained, and on 27th two only were seen.

Phylloscopus rufus (Bechst.). Chiffchaff.—I shot a Chiffchaff on the very unusual date of Nov. 10th, on a hedge close to the coast.

P. trochilus (Linn.). Willow-Wren. — A few Willow-Wrens appeared on the coast on Aug. 23rd, most of them frequenting the larger hedges. On Sept. 9th I shot an example of a small race of the Willow-Wren which occasionally occurs on migration.

P. sibilatrix (Bechst.). Wood-Wren.—I shot a Wood-Wren near the coast on Aug. 28th. This bird very rarely occurs on passage.

Acrocephalus phragmitis (Bechst.). Sedge-Warbler. — Last seen on Sept. 8th; one shot in a clover field near the sea.

Locustella naevia (Bodd.). Grasshopper-Warbler.—On Sept. 14th I shot one of these birds among the long grass in the bottom of a hedge near the coast. On 16th I saw another almost at the same spot, but failed to shoot it, as it was impossible to make it leave covert for more than a few feet at a time. I have never seen this species on migration before.

Accentor modularis (Linn.). Hedge-Sparrow.—The migration of this bird commenced just a month earlier than usual. A considerable number appeared on Aug. 23rd, but almost all left by the 28th. On Oct. 4th, and again on the 9th, large immigrations took place.

Parus major, Linn. Great Titmouse.—The passage of both the Great and Blue Titmouse proved quite a feature in the

migrations of the past autumn. This bird first appeared on Oct. 5th, and from that date until Nov. 10th was to be found daily in the trees and hedges near the coast in considerable numbers.

P. cæruleus, Linn. Blue Titmouse.—Like the last named, occurred in great numbers, generally in small parties of from two or three to half a dozen frequenting the hedges or the thorn-bushes on the drain sides. It appeared earlier than the Great Titmouse, two or three coming in on Sept. 14th. I saw no more until Oct. 4th, when they were very numerous, and from that date to Nov. 10th they were present in the coast district in great abundance.

P. palustris, Linn. Marsh-Titmouse.—I saw a Marsh Titmouse in a hedge by the roadside at Holton-le-Clay on Nov. 14th, and shot one in Fenby Wood on Dec. 28th.

Troglodytes parvulus, Koch. Wren.—A few Wrens came in on Oct. 4th, and their numbers had increased somewhat on the 5th. On the 9th they were very abundant everywhere near the coast; again on 21st a good many appeared, and the passage finished about the 27th.

Motacilla lugubris, Temm. Pied Wagtail.—Many young birds on grass-land near the coast on Sept. 2nd. Again many on Sept. 9th and 11th; on the latter date a few were old males. On 16th a few, all young birds; and on 20th many, both old and young. From this date no more appeared on the coast, but on Oct 11th at Wyham, and on 14th at Wold Newton, both on the top of the wolds, I observed numbers of Wagtails, both old and young, feeding among the sheep, folded on turnips.

M. melanope, Pall. Grey Wagtail.—A pair of Grey Wagtails appeared on Waith Beck on Sept. 24th; Oct. 4th, a single bird at one of the fish-ponds at Grainsby, and on 18th several on one of the marsh-drains near the coast.

M. raii (Bonap.). Yellow Wagtail.—One young bird on Aug. 9th. Several on Aug. 28th and Sept. 4th. Abundant on the 9th, and from this date they became gradually scarcer until the 22nd, after which I saw no more. All were young birds.

Anthus trivialis (Linn.). Tree-Pipit.—One shot in a hedge near the sea at North Cotes on Oct. 4th.

A. pratensis (Linn.). Meadow-Pipit.—I noticed many of these Pipits along the sea-bank on Aug. 28th, and again on

Sept. 2nd. On Sept. 4th their numbers had increased to hundreds everywhere near the coast, and the species continued very abundant until the 20th.

A. obscurus (Lath.). Rock-Pipit.—Two or three Rock-Pipits appeared on the foreshore at North Cotes on Sept. 22nd. A considerable immigration on Oct. 4th, and a still greater one on 17th.

Muscicapa atricapilla, Linn. Pied Flycatcher.—Three Pied Flycatchers came in with the “rush” of small birds on Oct. 4th—the only ones seen during the autumn.

M. grisola, Linn. Spotted Flycatcher.—The majority of these birds left about the second week of September, but I saw half a dozen in the garden at Grainsby on the 24th.

Hirundo rustica, Linn. Swallow.—Thousands roosting in the reed-beds on Madams Crike on Sept. 4th. Swallows became scarce about Oct. 9th, but I saw three or four flying over the village of Tetney on the 18th.

Chelidon urbica (Linn.). House-Martin.—A House-Martin flying about the house at Grainsby on Nov. 5th.

Ligurinus chloris (Linn.). Greenfinch.—A good many near the coast on Oct. 13th, and very abundant from the 17th to the 30th.

Carduelis elegans, Steph. Goldfinch.—Very scarce; one on the sea-bank on Nov. 10th.

Passer domesticus (Linn.). House-Sparrow.—Very large flocks in the hedges near the coast on Oct. 5th, and again on 21st.

Fringilla cœlebs, Linn. Chaffinch.—A large flock at Grainsby on Oct. 15th. On 17th many—apparently all males—about the sea-bank and neighbouring hedges.

F. montifringilla, Linn. Brambling.—One (a female) on a hedge near the sea on Oct. 4th. Two, both females, at Grainsby on Oct. 11th. A considerable number in a mixed flock of Linnets, Greenfinches, and Twites on Dec. 20th.

Linota cannabina (Linn.). Linnet.—Many on grass-land near the coast on Sept. 15th. Large mixed flocks of Linnets and Twites on the North Cotes foreshore on Oct. 9th and 18th.

L. flavirostris (Linn.). Twite.—Many small flocks along the

shore on Oct. 5th, and on 9th and 18th very abundant, associating with Linnets on the foreshore.

Emberiza citrinella, Linn. Yellowhammer. — Many small flocks in the vicinity of the coast on Dec. 20th.

E. schæniclus, Linn. Reed-Bunting. — One on a hedge near the sea-bank on Oct. 18th, and on 21st a good many, both on the hedgerows and among the weeds on the "fitties."

Plectrophenax nivalis (Linn.). Snow-Bunting. — A most insignificant migration; only two or three single young birds on the sands at Marshchapel on Nov. 3rd.

Sturnus vulgaris, Linn. Starling. — Huge flocks of Starlings on Tetney "fitties" and land adjoining on Oct. 4th, and again on 9th. On Oct. 17th thousands passing in from the sea to north-west until about 2.30 p.m. in long straggling flocks. On 21st an immense flock came in from the sea about half-past four in the afternoon, and passed inland to south-west. By this date there were millions of these birds on the coast marshes.

Garrulus glandarius (Linn.). Jay. — There was probably some immigration of Jays about the end of September, as on 28th of that month I noticed many flocks of these birds, some of them numbering over a dozen individuals, about the hedgerows at Grainsby. I have not permitted the destruction of Jays for many years, and they are now very abundant here, so that possibly these flocks were local birds. I have never met with the Jay actually on the coast.

Corvus monedula, Linn. Jackdaw. — A very slight immigration. On Oct. 21st I saw four Jackdaws among a flock of Rooks coming in from the sea, and going north-west, and on the 30th a few on grass-land near the coast.

C. corone, Linn. Carrion Crow. — On Sept. 13th a Carrion-Crow on North Cotes "fitties," and on 14th three in the same place. Very abundant in the winter; I saw over a hundred come to roost in Autby Wood in the evening of Dec. 29th.

C. cornix, Linn. Grey Crow. — First Grey Crow seen on Oct 3rd, on 9th two, and one each day on 11th and 13th. Many passing north-west over Tetney village on 16th. On 17th flocks of Grey Crows coming in from the sea, and going north-west until about 2.30 p.m.; afterwards single birds until sunset. On

21st a few coming in, and travelling north-west singly, or two or three together.

C. frugilegus, Linn. Rook.—A few coming in with Grey Crows, and going north-west on Oct. 17th. Oct. 21st, small parties coming in until about four o'clock. The morning was foggy, and the Rooks were only visible through occasional breaks in the mist; but the flocks appeared to be going south-west. In the afternoon the fog cleared, and all the Rooks went to north-west. On 30th a few coming in and going west. On Nov. 1st hundreds passing over Grainsby to west all day until dusk, and on 7th a few coming in until 2.30 p.m.

Alauda arvensis, Linn. Sky-Lark.—A very slight visible immigration. A few small flocks coming in on Oct. 9th, and going south-west until two o'clock. Again on 17th small parties coming in, some going north-west, others south-west. On 21st Larks were very abundant on the stubbles both inland and near the coast, and small flocks were going north-west, and about the same number on Nov. 7th. On Dec. 24th, 25th, and 27th straggling flocks were passing north-west over Grainsby in the morning, but on the last-named day a few of the flocks went south.

Cypselus apus (Linn.). Swift.—Several near the coast on Sept. 4th.

Alcedo ispida, Linn. Kingfisher.—Unusually numerous on the drains and sluices near the coast, particularly on Sept. 8th, 14th, and Oct. 18th. The first one was seen on Aug. 28th.

Cuculus canorus. Linn. Cuckoo.—Very few appeared on the coast, and all young birds. I saw one on Sept. 1st, two on 4th, and one on 6th. One of those seen on the 4th belonged to the red form.

Strix flammea, Linn. Barn-Owl.—On the evening of Oct. 1st I saw an example of this very unusual migrant near the coast at Tetney.

Asio otus (Linn.). Long-eared Owl.—I saw a Long-eared Owl perched in a low bush near the lifeboat-house at Donna Nook on Oct. 13th.

A. accipitrinus (Pall.). Short-eared Owl.—About the last week of August I saw, at a birdstuffer's shop in Grimsby, a freshly-skinned Owl of this species, which had been caught on

board ship about one hundred miles off the Humber. On Oct. 17th one among North Cotes sand-hills. Oct. 30th, one on the sea-bank, and on Nov. 7th one in a turnip field near the coast.

Buteo vulgaris, Leach. Common Buzzard.—On Oct. 14th a very dark coloured Buzzard passed over the wolds at Beesby at a great height.

B. lagopus. Rough-legged Buzzard. — On Dec. 24th one of these birds passed over me at Grainsby, almost within gun-shot.

Accipiter nisus (Linn.). Sparrow-Hawk.—A few young birds in the hedges and along the sea-bank at North Cotes on Sept. 22nd. On Oct. 17th one or two, and on 21st many Sparrow-Hawks along the coast. On Dec. 29th Sparrow-Hawks were exceedingly abundant; I saw over a dozen at Grainsby in about an hour in the morning, and many came in to roost in Autby Wood at night.

Falco peregrinus, Tunst. Peregrine.—On Dec. 29th a Peregrine flying over Fenby Wood in the morning, and another, or perhaps the same bird, in the afternoon. Dec. 30th, one at Grainsby.

F. æsalon, Tunst. Merlin.—A little cock Merlin in the cow marsh at Tetney on Oct. 16th, and a young female at Grainsby on Dec. 24th.

F. tinnunculus, Linn. Kestrel.—Two or three Kestrels about the sea-bank on July 29th, and a good many on Sept. 4th and 22nd; and two or three each day on Oct. 17th and 21st.

Ardea cinerea, Linn. Heron.—Several Herons, all immature birds, appeared on the creeks at Tetney on July 29th.

Anser brachyrhynchus, Baill. Pink-footed Goose.—First flocks seen on Oct. 4th. During the severe weather on Dec. 13th and 14th the coastguards at North Cotes reported many Grey Geese on the coast.

Anas boscas, Linn. Mallard.—Thousands of Ducks were seen going up the Humber by coastguards and others on Dec. 14th, soon after the commencement of severe weather.

Spatula clypeata (Linn.). Shoveler.—One shot at Tetney on Sept. 1st was probably a home-bred bird.

Nettion crecca (Linn.). Teal.—Not so numerous on the "crikes" at Tetney as usual. A few appeared on July 29th, and a good many on Aug. 16th.

Mareca penelope (Linn.). Wigeon. — One shot at Tetney on Sept. 1st.

Columba ænas, Linn. Stock-Dove. — Two small flocks at Grainsby on Nov. 4th and 5th. On 7th I shot a young bird close to the sea-bank at Tetney, and on Dec. 30th I shot four out of a flock of about one hundred of these little Pigeons.

Turtur communis, Selby. Turtle-Dove. — I shot a young Turtle-Dove from a hedge near the sea at North Cotes on Sept. 29th.

Crex pratensis, Bechst. Corn-Crake. — Last saw one in a turnip field at Cadeby on Oct. 11th.

Porzana maruetta (Leach). Spotted Crake. — On Oct. 4th I shot a Spotted Crake at Tetney.

Rallus aquaticus, Linn. Water-Rail. — First appeared near the coast on Oct. 27th, when I shot one at Tetney.

Charadrius pluvialis, Linn. Golden Plover. — On Oct. 4th I shot a couple of young birds—the first seen on North Cotes sands. Oct. 5th, several flocks of forty or fifty birds each on the sands. Very abundant on Oct. 9th; many flocks of from fifty to several hundred birds each on the sands and land near the sea. Again on 21st and 30th great numbers on the coast. On the latter day I killed eight out of one of the flocks, and found both old and young birds among them.

Squatarola helvetica (Linn.). Grey Plover. — A few on the coast on Sept. 2nd. On 14th a good many, all adults in full breeding dress. On Oct. 13th a great immigration of young birds all along the coast.

Vanellus vulgaris, Bechst. Peewit.—Very little visible migration, and Peewits appear less numerous in the district than usual. Small parties going west on Oct. 9th until about 2.30 p.m.; some large flocks on the coast with Golden Plover on the same day. Again, on Nov. 10th many flocks coming in, and going to north-west. On Dec. 11th—the second day of the hard weather—the gamekeepers reported large flocks of Peewits going south over Grainsby.

Streptilas interpres (Linn.). Turnstone.—A couple of young birds on North Cotes sands on Sept. 13th.

Hematopus ostralegus, Linn. Seapie.—A large flock appeared on Tetney Sands on Sept. 2nd.

Phalaropus hyperboreus (Linn.). Red-necked Phalarope.—A Red-necked Phalarope was netted by one of the Plover-catchers on Oct. 12th at North Cotes, and sent to me.

Scolopax rusticola, Linn. Woodcock.—The first flight came in on Oct. 19th, and another and apparently much larger flight on Nov. 10th. An unusually large number of Woodcocks were present in the coverts about Christmas, and it is probable that a third immigration took place about the beginning of the frost which commenced on Dec. 10th, as I shot one in Waith fen, a long way from any wood, on the 13th.

Gallinago major (Gmel.). Great Snipe.—One sent to me by one of the Plover-catchers, which he shot on Oct. 3rd close to the village of North Cotes.

G. cælestis (Frenz.). Common Snipe. — The first flight of migrating Snipes appeared on Oct. 30th, when I found many in the neighbourhood of the coast at Tetney. On Nov. 7th a second immigration took place, but on both occasions they were exceedingly wild, and I killed very few.

G. gallinula (Linn.). Jack-Snipe. — A couple of Jacks appeared on Sept. 29th, and a considerable number on Oct. 27th.

Tringa alpina, Linn. Dunlin.—A few on the sands on July 29th. Have been scarcer than usual all the season.

T. minuta, Leisl. Little Stint. — Very scarce; one caught by a Plover-catcher at North Cotes on Sept. 28th was the only one I saw during the autumn.

T. subarquata (Güld.). Curlew-Sandpiper.—I saw a party of four on the shore at Marshchapel on Sept. 18th.

T. canutus, Linn. Knot.—Scarce in the early part of the season. On Oct. 4th there were some large flocks on North Cotes sands, and on 17th thousands of Knot appeared.

Calidris arenaria (Linn.). Sanderling.—Scarce; three on the sands near Saltfleet on Sept. 2nd.

Machetes pugnax (Linn.). Ruff.—First seen on Aug. 16th, a single Ruff near Tetney Lock. On Sept. 11th a Reeve on a fresh-water creek near the coast, and on the 20th a Ruff on the sea-bank at high water.

Totanus hypoleucus (Linn.). Common Sandpiper. — A few appeared on July 29th, and were fairly numerous up to the middle of September on the sides of the marsh-drains. Last seen—a single bird—on Oct. 5th.

T. glareola (Gmel.). Wood-Sandpiper.—On July 29th I saw a Wood-Sandpiper on the side of Madams Crike, near Tetney Lock. It was very tame, and allowed me to watch it within ten yards.

T. ochropus (Linn.). Green Sandpiper.—First seen on July 29th, in company with the Wood-Sandpiper, but these birds were very wild, rising out of gunshot. Numerous on the marsh-drains throughout August and September.

T. fuscus (Linn.). Spotted Redshank.—One of the Plover-catchers sent me three immature Spotted Redshanks, caught by his son on Sept. 1st at Tetney on one of his Plover-pools. On Sept. 14th this same man sent me another—also a young bird—which he had caught on his Plover-decoy at North Cotes; and, finally, a fifth, caught at the same place on Sept. 28th. He told me that he believed all these birds were part of a flock of six which he had seen late in August.

T. canescens (Gmel.). Greenshank.—One or two on Tetney “fitties” on July 29th, a very early date. Last seen, a single bird on Sept. 16th.

Numenius arquata (Linn.). Curlew.—I saw two or three Curlews on July 29th on North Cotes sands. On Aug. 23rd they were numerous, and continued so through the autumn.

N. phæopus (Linn.). Whimbrel.—First seen on July 29th, and a few were present until the middle of September, but in unusually small numbers.

Hydrochelidon nigra (Linn.). Black Tern.—A young bird of this species was shot at North Cotes by one of the Plover-catchers, and sent to me about the middle of October.

Sterna macrura, Naum. Arctic Tern.—Terns were exceptionally scarce this autumn. On Sept. 2nd I saw a few small parties of this species at Saltfleet and Donna Nook.

Podiceps fluviatilis (Tunst.). Little Grebe.—A couple of young birds on North Cotes sluice on Oct. 13th. On 27th an old bird in breeding plumage on a fresh-water creek near the coast.

ON THE DISTRIBUTION OF SOME BIRDS OBSERVED IN IRELAND AND IN SWITZERLAND.

BY CHARLES J. PATTEN, B.A., M.D. (Chief Demonstrator in Anatomy, Dublin University), and W. J. WILLIAMS.

THAT the large majority of birds are widely distributed over the face of the globe is a fact now well ascertained. Their migratory propensities, which seem to be the rule rather than the exception, account largely for their geographical distribution. But it does not necessarily follow from this that certain species are equally plentiful in different countries; for example, the Redstart is decidedly rare in Ireland, whereas in many parts of the Continent it is quite a plentiful bird. Even in the same country a bird may be common in one province, and unknown in another. Thus, in Kilkenny and Queen's County the Jay is often seen, whereas it is practically absent from Louth and Dublin.

These facts concerning distribution are highly important to those who may wish to determine the absolute rarity of birds, a matter which every collector should consider before attempting to diminish their numbers. A non-breeding casual migratory species, seldom occurring in the British Isles, but common and widely distributed in other countries, cannot in any sense be considered a *really rare bird*. It is only relatively so, and in the cause of science it seems quite allowable to capture such a species provided that the scientist wishes to advance his knowledge of ornithology. By such a procedure he will not materially lessen the numbers of the species, and moreover he will obtain reliable evidence of the occurrence of a *so-called rare native bird*. The present article has been written with the view of supporting this idea. The occurrences of different kinds of birds (as many as possible) inhabiting both Ireland and Switzerland are in the first place recorded. Their variation in numbers in the two countries (the question of relative rarity) is then compared. But in all cases one must not expect the numbers to sensibly vary.

Some birds are equally common to both countries. A brief notice of these will probably suffice.

It should be borne in mind that the observations set down in this paper were chiefly made during a few tours through the alpine scenery of Switzerland; hill, dale, and large inland lakes being the nature of the greater part of the country traversed. Hence the following list treats of land birds for the most part, such as those found in the orders of *Accipitres* and *Passeres*. By far the greater number of birds recorded belong to the latter order. Still, the presence of large inland lakes (Geneva, Lucerne, &c.) one would almost think should have afforded suitable "*natural habitat*" for some fresh-water aquatic birds belonging to the orders of *Limicolæ* and *Natatores*, such as the Common Sandpiper and Coot; and, indeed, the absence of these and others of the same class appears somewhat remarkable.*

As we should naturally expect, the habits of a given species found in Ireland differed but little from the same found in Switzerland. If anything, the continental birds on the whole appeared rather the tamer of the two. As in Ireland, so in Switzerland, the birds of the mountainous districts showed a more marked tendency to shyness than those frequenting the towns and the vicinity of human habitations.

The plumage of a species common to the two countries seemed practically identical. To this there are a few exceptions, which will be referred to when dealing with the bird in question.

In order to render the subject-matter of this article more complete, and to endeavour to add to its interest, the authors have deemed it advisable to *very briefly* refer to the *general geographical distribution* of each species mentioned, in addition to its occurrence in Switzerland and Ireland.

Finally, before drawing up this list of birds, it is important to mention that the observations were made during *short visits* to the Continent in the summers of 1897, 1898, 1899. Each visit only lasted three weeks; but, when added together, they extended over the greater parts of July, August, and September. For this reason it is obvious that the numbers of birds which were noticed were no doubt proportionately small. Instead of this, had the visits extended into one of longer duration, lasting continuously

* It is likely that both Coot and Waterhen were overlooked.

for three months, then a fuller avifauna of the Swiss birds would have been furnished. Inasmuch as all observations were made in summer, it was not possible to compare the relative differences in the numbers of the winter visitants common to the two countries.

Order ACCIPITRES.

Accipiter nisus, Linn. Sparrow-Hawk.*—Somewhat uncommon.† Was observed for the most part in the valley of Chamonix. Common throughout Ireland. In the Swiss form the stripes on the breast are more defined, and, according to M. Gerbe,‡ there is a local species found in Switzerland and in Germany (*A. major*) larger in size, and the bands on the feathers of the tail are darker and more numerous. Other minor differences also exist.

General distribution.—Common in every country in Europe, in many parts of Asia, China, East Africa, and India.

Milvus icinus, Sav. Kite.—Three were noticed soaring over Lake Geneva on different occasions. They came under close observation, and, with the aid of a powerful binocular, their forked tails—a characteristic feature—could be distinguished. In this way the species was easily identified. Extremely rare in Ireland. According to the late A. G. More,§ it has only been observed five or six times. The specimen obtained by Sir R. Payne Gallwey|| seems as yet to be the only one known. This was shot in 1880–1881 on the Cashen river, in Kerry. The writer describes the bird as flying “in swooping and almost wing-motionless curves, the tail first slanted this way, then that, as it acted rudder to the bird’s flight.”

General distribution.—Common in most parts of Europe south of Norway to the Mediterranean. According to Yarrell,¶ the Kite does not breed north of lat. 61°. It occurs also in Egypt, Palestine, Algeria, and the Canaries.

* It was curious that the common Kestrel was not observed.

† In the following list it must be understood that the occurrence of the birds in Switzerland is noted in each case before their occurrence in Ireland.

‡ Revised edition of ‘Ornithologie Européenne’ of the late Dr. Degland.

§ ‘List of Irish Birds,’ 1890, p. 6.

|| ‘Fowler in Ireland,’ p. 307.

¶ ‘British Birds,’ vol. i. p. 96.

Buteo vulgaris, Leach. Common Buzzard. — Numerous in the pine forests of Lucerne, Chamonix, and Grindelwald. A Buzzard was constantly to be seen soaring over Lake Lucerne, rising to a great height, and then descending almost to the surface of the water, after the fashion of an Osprey when in search of fish. In Ireland the Buzzard has been rapidly decreasing of late years, and is now very rare. It formerly bred in Donegal, Londonderry, Antrim, and Down.* One was observed on June 4th, 1889, at Powerscourt Waterfall, Co. Wicklow, by Dr. C. J. Patten. Sir W. Jardine describes the Buzzard as “a fine accompaniment to the landscape, whether sylvan or wild and rocky.”

General distribution. — Inhabits the greater part of the European continent. Breeds in Sweden as high north as lat. 66°. Plentiful in Palestine in winter. Occurs also in North Africa, and rarely in Egypt. The American Buzzard is a different species.

Asio accipitrinus, Pall. Short-eared Owl. — One was noticed in the valley of Grindelwald in July, 1897. On account of its occurring at this time of year it probably bred there. In Ireland this species is a regular *winter* visitor in limited numbers, migrating before the breeding season.

General distribution. — Widely distributed and migratory in its habits. At one season or another it frequents the whole of Europe and the greater part of Asia (China, India, Palestine, and Egypt), Algeria, and Morocco. It is also found in many parts of South America. In North America it is a summer visitant. Mr. Darwin met with it in the Falklands.

Order PASSERES.

Lanius collurio, Linn. Red-backed Shrike. — Many were observed in Lucerne, Basle, and neighbouring districts in Switzerland. In Basle this bird was often seen perched on the posts which supported the vines grown in the open air. It also frequently alighted on the telegraph-wires. In Ireland this species is excessively rare.† Only one specimen has been recorded, *viz.*

* “Report on the Breeding Range of Birds in Ireland” (Proc. Royal Irish Acad. 3rd series, vol. iii. No. 3, 1894), by R. J. Ussher.

† In parts of England and Wales it is a tolerably common summer visitor (see Saunders, ‘Manual of British Birds,’ 1899).

that shot on the 10th August, 1878, near Belfast (Zool. 1878, p. 437).

General distribution.*—In summer it is frequent throughout the Continent of Europe, except in the south-westerly region. In Spain it is rare. It breeds as high north as lat. 64°. It is also found in Palestine and North Africa, and in winter its migration extends to Natal and Cape Colony.

Muscicapa grisola, Linn. Spotted Flycatcher. — Common summer migrant in both Switzerland and Ireland.

General distribution. — Frequents the greater parts of the continents of Europe, Asia, and North Africa in summer. Visits India, Arabia, and South Africa in the winter.

Cinclus aquaticus, Bechst. Dipper. — Common, especially along the mountain rivulets of Davos Platz and Chamonix. The pale-backed subspecies (*C. albicollis*), which inhabits the Alps and Southern Europe, was not noticed. Common and generally distributed throughout Ireland.

General distribution.—*Cinclus aquaticus* is frequent in Central Europe, but in the northern parts its place is taken by the dark-breasted form (*C. melanogaster*). The Dipper also frequents many parts of Central Asia. Subject to continental variation.

Turdus viscivorus (Linn.). Mistle-Thrush. — Common in Switzerland, especially in Chamonix. Also common in Ireland.

General distribution.—Distributed over the European continent, breeding from north to south. Found in many parts of Asia as a resident, and in winter migrates to North India, Persia, and North Africa.

T. musicus, Linn. Song Thrush.—Common and widely distributed in both Switzerland and Ireland.

General distribution.—Resident over the greater part of the European and Asiatic continents. Many migrate in the winter to Northern Africa and Western Asia.

T. merula, Linn. Blackbird. — Seemed somewhat scarce in Switzerland in summer. Mostly observed at Interlaken. Common and resident in Ireland.

General distribution.—Like the Song Thrush, it is resident over the greater part of the European continent, but does not

* For details, see O. V. Aplin (Trans. Norf. and Nor. Nat. Soc. v. pp. 286 to 310).

extend far east in Asia. Breeds as high north as lat. 67° in Norway. Many migrate in the winter to southern countries like the Song-Thrush.

Erithacus rubecula, Linn. Redbreast; "Robin."—Common in Switzerland and in Ireland. Much wilder in the former country.

General distribution.—Resembles the former species in its breeding distribution, but not extending east of Russia. Many migrate in winter as far south as Central Africa and Western Asia.

Ruticilla phœnicurus, Linn. Redstart.—Common in most parts of Switzerland, approaching close to human habitation. Very rare in Ireland. Has been found breeding in counties of Wicklow* and Tyrone.† Frequently taken at lighthouses when migrating in spring and autumn.‡

General distribution.—In Europe from the North Cape to the south of the Continent, migrating in winter to the northern parts of Africa, Arabia, and Persia. The Asiatic form (*R. mesoleuca*) differs from the European species in that it possesses a white patch on the wing.

R. titys, Scop. Black Redstart.—Abundant in many parts of Switzerland, where it breeds. Rather rare, but regular winter visitor to Ireland.

General distribution.—Common in Germany and Southern Europe, where it is resident. Its eastern range extends to Asia Minor and Palestine; in winter to Nubia (Saunders).

Saxicola rubetra, Linn. Whinchat.—Plentiful in many parts of Switzerland, especially Chamonix, Davos Platz, Grindelwald, and Lucerne. In Ireland it occurs as a summer visitor, but rather scarce and local. According to Ussher§ it breeds in Donegal, Antrim, Down, Armagh, Tyrone, Fermanagh, Longford, Louth, Dublin,|| Kilkenny, Mayo, Sligo, and Leitrim.

General distribution.—Breeds over the greater part of the

* Benson on 'Irish Song Birds,' p. 53.

† R. J. Ussher, "Report on Breeding Range of Birds in Ireland" (Proc. Royal Irish Acad. 3rd series, vol. iii. No. 3).

‡ 'List of Irish Birds,' by A. G. More, p. 10.

§ "Report on Breeding Range of Birds in Ireland" (Proc. Royal Irish Acad. 3rd series, vol. iii. No. 3).

|| The authors have often observed this bird in Co. Dublin, and twice have secured specimens in nesting and adult plumage. These are in Dr. Patten's collection.

European continent as high north as lat. 70° in Scandinavia. It winters in Africa, Asia Minor, and Northern India. Occurs as far east as the Ural Mountains in Russia.

Sylvia rufa, Bodd. Greater Whitethroat.—Frequent in many parts of Switzerland, and common summer visitor to Ireland.

General distribution.—Over the greater part of Europe. Resident in Palestine (Saunders). Summer migrant in Asia Minor. Winters in North Africa, Egypt, Abyssinia, and Arabia. Extends farther east than the Whinchat.

S. atricapilla, Linn. Blackcap.—Common in many parts of Switzerland. Visits Ireland every summer, but in small numbers. Breeds regularly in Dublin, Wicklow, Kildare, and Queen's County (Ussher). This bird has been observed by Dr. Patten in the winter (February, 1890) at Bray, Co. Wicklow ('Naturalists' Gazette' for 1890).

General distribution.—Widely distributed over Europe, North Africa, and parts of Asia as a breeder. Migrates in winter to Abyssinia and the Red Sea.

Phylloscopus trochilus, Linn. Willow Warbler.—Common in Ireland and Switzerland as a summer visitor.

General distribution.—Over Europe and eastward to the Caucasus, where it breeds. Winters in lat. South of France, reaching as far as Cape Colony.

P. collybita (Vieill.). Chiffchaff.—Common in Switzerland and in Ireland in the summer.

General distribution.—Resembles that of the last species, but extends farther north in Europe. Widely distributed in winter in the Southern Hemisphere.

Regulus cristatus (Koch). Golden-crested Wren.—Common in Switzerland and Ireland.

General distribution.—Over Europe, South-west Asia, and Northern Africa. Extends east to the Ural Mountains.

Certhia familiaris, Linn. Tree Creeper.—Common in Switzerland and Ireland in woody districts.

General distribution.—In most parts of Europe, being abundant in the conifer woods of Norway. Reaches as far south as Japan and China. Occurs eastward as far as Siberia. The North American forms are somewhat different.

Parus major, Linn. Great Titmouse.—Common in Switzerland and Ireland.

General distribution.—Plentiful over the whole of Europe, North Africa, and South-western Asia.

P. ater, Linn. Coal Titmouse.—Generally distributed in Switzerland, Ireland, and elsewhere, like the last species. (For variations in foreign forms, see Saunders, 'British Birds,' 1899.)

P. cæruleus, Linn. Blue Titmouse.—Appeared somewhat scarce in Switzerland. Observed mostly at Berne. Common in Ireland.

General distribution.—Including the many continental varieties, it is widely distributed over Europe, parts of Asia, and North Africa.

P. palustris, Linn. Marsh-Titmouse.—One of the commonest species in Switzerland. Very rare in Ireland. (For its occurrence see 'List of Irish Birds,' 1890, by the late A. G. More.)

General distribution.—Resembles the last species, but rare in Southern Italy and Greece. Subject to continental variation.

Acredula caudata, Linn. Long-tailed Titmouse.—Common in Switzerland and in Ireland. The Swiss form appeared lighter in colour.

General distribution.—Including continental forms, it is widely distributed over Europe, Asia, and North Africa.

Motacilla lugubris (Temm.). Pied Wagtail.—Common in Switzerland and Ireland.

General distribution.—Almost restricted to the western portion of the European continent.

M. alba, Linn. White Wagtail.—Common in Switzerland. Very rare summer visitor in Ireland. For its occurrences in the latter country, see (a) 'List of Irish Birds,' by the late A. G. More, 1890; (b) Dublin Nat. Hist. Proc. vol. iii. p. 115; (c) 'Zoologist,' 1866; (d) Thompson ('Birds of Ireland'); (e) 'Irish Naturalist,' vols. vii. and viii.; (f) Howard Saunders, 'Manual,' p. 124. A fine specimen, recently obtained (April 27th, 1899) at Bartragh, Co. Mayo, by A. C. Kirkwood, is in the collection of Dr. Patten.

General distribution.—Over the whole of Europe and Northern Asia; also Asia Minor, Palestine, and North Africa.

M. sulphurea, Bechst. Grey Wagtail.—Tolerably frequent in Switzerland and Ireland, and resident in both countries.

General distribution.—Common and resident in the central

and southern portions of Europe. Rare in Northern Germany (Saunders). Breeds also in Northern Africa. Summer migrant in many parts of Asia, and winter visitor to South Africa and the Indo-Malayan Islands.

M. raii (Bonap.). Yellow Wagtail.—Observed in Switzerland on different occasions. Rather rare summer visitor to Ireland, and locally distributed. Breeds “in the basin of Lough Neagh both in Antrim and Armagh” (R. J. Ussher). In Dublin (E. Williams). In Galway (Lord Lilford, recorded by R. J. Ussher). Near Loughs Mask and Carra, in Mayo (R. Warren).

General distribution.—Regular summer visitor to Western Europe, *i.e.* west of Belgium. Extends south to West Africa. The Eastern Asiatic species is distinct.

Alauda arvensis, Linn. Sky-Lark.—Appeared rather scarce in Switzerland, but probably was overlooked. Was heard in full song in Chamonix, July, 1897. Common resident in Ireland.

General distribution.—Throughout Europe and parts of Asia in the summer, but in autumn moves southwards. Winters in the central and southern portions of Asia and Africa. Found also in the United States, Australia, and New Zealand (Saunders).

Emberiza citrinella (Linn.). Yellow Bunting.—Common and resident in Switzerland and Ireland.

General distribution.—Widely distributed in Temperate Europe as resident. Occurs in Asia Minor and Palestine. The bird found in the latter country is somewhat distinct.

Fringilla cœlebs, Linn. Chaffinch.—Abundant in Switzerland and Ireland as resident.

General distribution.—Occurs plentifully all the year round throughout Temperate Europe. Breeds also in the east and north-east of Asia, as well as Persia. Winters in many parts of Northern Africa. Foreign forms are subject to variation.

Passer montanus, Linn. Tree-Sparrow.—Observed at Lucerne in small numbers. Rare and local in Ireland, where it breeds. Unknown to the latter country prior to 1852 (Saunders). A young specimen from Crumlin, Co. Dublin,* is in Dr. Patten’s collection. It was obtained on Aug. 4th, 1898. For the chief occurrences of this species in Ireland, see ‘List of Irish Birds,’

* Its breeding range in Co. Dublin is extending. Prior to 1898 it was only supposed to breed near Baldoyle and Raheny.

by the late A. G. More, p. 14; also H. M. Wallis in 'Zoologist,' 1886, p. 489. Apparently breeds only in the Co. Dublin (Ussher).

General distribution.—Distributed throughout Europe and the greater part of Asia. Has been obtained from North America as an importation.

P. domesticus, Linn. House-Sparrow.—Numerous in Switzerland and in Ireland. In Lucerne this bird was noticeably tame, especially about the cafés chantants, where it might be seen picking crumbs, &c., from under the tables at which the tourists were enjoying their repast.

General distribution.—Numerous throughout Europe and the greater part of Asia, and North, Western, and Central Africa. Plentiful in Australia, New Zealand, and the United States, where it has been introduced.

Carduelis elegans, Steph. Goldfinch.—Frequent and generally distributed throughout many parts of Switzerland and Ireland.

General distribution.—Breeds throughout Europe; rare in the north. Very abundant in Spain (Saunders). Also resident in many parts of North Africa. Winter visitor to Egypt and Persia.

Serinus hortulanus, Koch. Serin.—Was observed frequently on the Wengern Alp, Grindelwald: also at Chamonix and Davos Platz. Extremely rare in Ireland. One was obtained near Dublin on Jan. 2nd, 1893 (Saunders's 'British Birds,' 1899, p. 177). The Serin is in Switzerland one of the wildest of passerine birds, and therefore somewhat difficult to observe.

General distribution.—Found throughout the greater part of Central and Southern Europe, and on both sides of the Mediterranean. According to Saunders, it is resident and *extremely abundant* in Asia Minor. Visits in winter other parts of Western and South-western Asia. This species has been introduced into North America (United States).

Chrysomitris spinus, Linn. Siskin.—Frequent in many places in Switzerland. Not uncommon in Ireland, but rather locally distributed as a resident. According to Ussher* it breeds in

* "Report on the Breeding Range of Birds in Ireland" (Proc. Royal Irish Acad. 3rd series, vol. iii. No. 3, 1894).

Donegal, Down, Armagh, Fermanagh, Dublin, Wicklow, Wexford, Waterford, Cork ?, Kerry ?.

General distribution.—Resident throughout the greater part of Europe, migrating in winter across the Mediterranean to North Africa. Also found in Western and South-western Asia. In India a different species exists (*C. spinoides*).

Pyrrhula europæa (Vieill.). Bullfinch.—Common and resident in Switzerland and Ireland. The large form with the very brilliant red breast (*P. major*), which inhabits Northern and Eastern Europe, was noticed in Switzerland.

General distribution.—Throughout the greater part of Europe. Also wanders to North Africa and Western Asia.

Loxia curvirostra, Linn. Crossbill.—Observed in limited numbers in some of the pine forests of Switzerland. In Ireland it is rather rare and uncertain as a winter visitor. Locally distributed as a resident, breeding, or noticed in the breeding season, in the following counties:—Down, Armagh, Fermanagh, Westmeath, Meath, Wicklow, Kildare, Queen's Co., King's Co., Tipperary, Waterford, Cork, Kerry, Sligo (Ussher).*

General distribution.—Resident over the pine forests of Europe, North Africa, and Siberia. Winters in North China. Occurs also in Western Asia and North America.

Pica rustica, Scop. Magpie.—Common in Switzerland and Ireland.

General distribution.—Plentiful in Europe, Western and South-western Asia, extending to China and Japan. Found also in the northern portions of America and Africa.

Garrulus glandarius, Linn. Jay.—Abundant in Switzerland. Resident and local in Ireland. Breeds in King's Co., Queen's Co., Carlow, Kilkenny, Wexford, Tipperary, and North Waterford (Ussher). Like the English bird, the alpine Jay is poorer in colour than the same species found in Ireland.

General distribution.—Inhabits the wooded districts of the European continent. The Asiatic and North African forms differ from that found in Europe.

* For further information concerning this bird, see (a) Ussher on "The Crossbill," 'Irish Nat.' vol. i. p. 6; also (b) Thompson, 'Birds of Ireland'; (c) 'Zoologist,' 1889, p. 180.

Hirundo rustica, Linn. Swallow.—Frequently observed in Switzerland. Common summer visitor to Ireland.

General distribution.—Over Europe,* and the greater part of Asia and North Africa in summer, migrating to India as far east as Burma, and all over Africa in winter. This bird is subject to a variety of foreign representatives, especially those connecting the Old with the New World (American) forms (*vide* R. B. Sharpe's *Cat. Birds Brit. Mus.* vol. x.).

Chelidon urbica, Linn. House Martin.—Frequent in Switzerland. Common summer visitor to Ireland.

General distribution.—Much the same as the last species, but, according to Saunders, it seems to winter in Central Africa. (In Europe it is rare in the Basque Provinces.)

Order PICARIÆ.

Cypselus apus, Linn. Swift.—Common in Switzerland and in Ireland (except the west) in the summer.

General distribution.—Abundant in Europe in summer. Also found in Asia and North Africa at the same time of year. In these parts, however, there are racial differences. On the winter migration it visits India and South Africa. According to Saunders it has occurred at the Andaman Islands.

C. melba, Linn. Alpine Swift.—Observed in two distinct localities in Switzerland: (a) at a high latitude at Grindelwald; (b) in the town and valley of Lucerne. In the latter place many Alpine Swifts, in company with the common species, were observed flying round an old tower close to the town bridge over Lake of Lucerne. These birds often flew under the eaves of the building, disappearing for a few minutes, and then flying out again. They were evidently nesting there. Extremely rare in Ireland. Thompson ('*Birds of Ireland*') records three specimens. For occurrences see also '*List of Irish Birds*,' by the late A. G. More, p. 17; and Saunders's '*Manual*,' p. 263.

General distribution.—Frequents the high mountains of Central and Southern Europe in summer; also North Africa, West and South-west Asia. In winter it migrates to Central India (especially Ceylon), and as far as South Africa.

N.B.—This Swift can be distinguished from the common

* Breeds as high north as 70° N. lat. in Scandinavia,

species by its larger size, browner colour, and white breast and abdomen. When the two are not together the best test is the voice. In the Alpine Swift the note is a loud double twitter; in the common species it is a single screech.

Alcedo ispida, Linn. Kingfisher.—Only one was noticed, *viz.* at Lugano; but probably inhabits many other suitable localities in Switzerland. Resident and generally distributed in small numbers throughout Ireland.

General distribution.—Resident throughout Central and Southern Europe, also North Africa, where it also occurs as a winter visitor. The Western and South-western Asiatic types vary somewhat from the European birds.

Gecinus viridis, Linn. Green Woodpecker.—Rather common in different parts of Switzerland. To Ireland it is a very rare and accidental visitor. For its occurrences see the following:—(a) Thompson, vol. iii. Appendix, p. 441; (b) Watters, p. 97; 'Zoologist,' 1889, p. 145; (c) 'List of Irish Birds,' by the late A. G. More, p. 18; (d) Saunders's 'Manual of British Birds,' 1899, p. 273.

General distribution.—Distributed throughout Central and Southern Europe, as well as Western Asia.

Iynx torquilla, Linn. Wryneck.—Once observed at Geneva. Very rare in Ireland. For occurrences see (a) 'List of Irish Birds,' by the late A. G. More, p. 19; (b) 'Migration Report for 1886,' p. 155; (c) Saunders's 'Manual of British Birds,' 1899, p. 271.

General distribution.—In summer it is found over the greater parts of Europe and Asia, reaching as high as lat. N. 64°. In winter it visits Southern Asia and Central Africa.

Order COLUMBÆ.

Columba palumbus, Linn. Wood-Pigeon; "Ring-Dove."—Common in many parts of Switzerland. Resident and common in Ireland.

General distribution.—Over the European continent, North Africa, and West Asia, The birds from Northern Europe move southwards in winter.

Turtur communis, Selby. Turtle-Dove.—A few were seen about Central Switzerland (Lucerne and Grindelwald). Rare

summer visitor to Ireland, and locally distributed as a breeding species. Has probably nested in Down, Kerry, Wicklow, and Dublin (Ussher).

General distribution. — Over Europe, Western Asia, and North Africa. Most of the Asiatic representatives are distinct.

Order GAVIÆ.

Larus argentatus, Gmel. Herring-Gull.—A single example was observed on Lake Como. Resident and common in Ireland.

General distribution.—Widely distributed over the coast-land and seas of Europe and America.

Order HERODIONES.

Ciconia alba, Bechst. White Stork.—Five or six examples were observed in the open fields in the north-western parts of Switzerland during a tour from Basle to Lucerne. Excessively rare in Ireland. For its occurrences see (a) Thompson, 'Birds of Ireland'; (b) 'List of Irish Birds,' by the late A. G. More, p. 32; (c) 'Zoologist,' 1866, p. 524; (d) Saunders's 'Manual of British Birds,' 1899, p. 388.

General distribution.—Throughout the greater parts of Europe, Central and South-western Asia, and Northern Africa. Passes southwards in winter in large numbers through Egypt as far as Natal.

The following species, frequenting both Switzerland and Ireland, and widely distributed over the European continent, were probably overlooked, and so have not been included in the foregoing list:—Peregrine Falcon, Kestrel, Marsh-Harrier, Hen Harrier, Long-eared Owl, Barn-Owl, Hedge-Sparrow, Stonechat, Wheatear, Sedge-Warbler, Wren, Meadow-Pipit, Reed-Bunting, Greenfinch, Linnet, Starling, Chough, Rook, Jackdaw, Sand-Martin, Nightjar, Cuckoo, Waterhen, Water-Rail, Land-Rail, Coot, Common Heron.

List of a few birds of doubtful occurrence in Ireland observed in Switzerland.

Nuthatch.—Common in many parts.

Crested Titmouse.*— Observed in many parts, especially Grindelwald and Davos Platz.

Tree Pipit.—Common in many parts.

SUMMARY.

Mention has already been made in the introduction of this article on the *very brief reference* to the general distribution of each species. We must regard this theme as being dealt with in a mere outlined manner; indeed, the names of the individual countries in which the birds have been found have for the most part been omitted, and groups of countries taken together forming part of a continent have been designated as western, south-western, northern, &c., so and so. Example: Persia, Arabia, Asia Minor, and Palestine are referred to as South-western Asia; again, Morocco, Algeria, and Canary Isles as North Africa. This has been done for two purposes—firstly, to economise space; and, secondly, because much has already been written *fully* on the geographical distribution of birds. Hence standard works as Saunders's 'Manual' (1899), Yarrell's fourth edition of 'British Birds,' and the late Seebohm's works have been freely consulted on this subject, as time and opportunity do not permit of personal observations on birds being made in every distant land.

With regard to the personal observations made in Switzerland, it may be added that, although only a limited number of places were visited by the authors, nevertheless, as these were mostly far apart, some important and definite districts were explored. Indeed, a wide area of Switzerland was included in the investigation. Thus Davos Platz and many neighbouring districts may represent part of Eastern Switzerland; Como and Chamonix, Southern Switzerland; the districts round about Geneva as south-western; Basle, north-western; Schaffhausen, northern; while Lucerne, Berne, and Grindelwald may be considered as forming part of Central Switzerland.

Concerning the observations made in Ireland, it should be

* Often observed in company with the other common species of Titmice, Goldcrests, and Tree Creepers. The same sociable nature of the Titmice may be seen in Ireland.

noted that only in the case of birds *locally distributed* as breeders are the *counties* where they have nested recorded.

We may conclude by stating that in Southern Switzerland and Northern Italy a marked dearth of bird-life prevails. This may in part be accounted for. Hundreds of small passerine birds are killed off for the markets. In Como and other districts Greenfinches, Robins, &c., were seen in the market-places plucked and prepared for table use.

Some References to Birds observed in Switzerland.

(a) Aplin, O. V.—“ Birds seen in Switzerland ” (‘ Zoologist,’ 1892, pp. 3-14).

(b) Benson, C. W. — “ Ornithological Notes from Lake Lucerne ” (‘ Zoologist,’ 1893, p. 432); “ The Birds of the Riffelalp ” (1898, p. 506).

(c) Playne, H. C.—“ Ornithological Notes from the Alps ” (‘ Zoologist,’ 1893, p. 308).

(d) Sclater, P. L.—“ The Birds of the Riffelalp, Canton Valais, Switzerland ” (‘ Zoologist,’ 1898, pp. 474-76).

NATURAL HISTORY NOTES FROM YORKSHIRE
FOR 1899.

BY OXLEY GRABHAM, M.A., M.B.O.U.

THE nesting season of the year 1899 will ever be a red letter one in my calendar on account of the excellent series of photographs of nests and eggs, birds on their nests, birds feeding their young, &c., many of which are unique, that we—my friends Mr. T. A. Metcalfe and Captain H. Moore—were able to obtain. It was a bright sunny season, admirable as far as the light was concerned, and warm enough to be perfectly pleasant when we were lying up in water, or hiding for hours in the heather or gorse, for a shy bird to come back on to her nest. During the month of January many Duck were on inland flood water, but they were very bad to approach in a punt. Slavonian Grebes were about in some numbers. I had several Pipistrelle Bats and a sandy-coloured Mole brought to me. February was fine. Rooks and Herons were busy building by the 18th; a piebald Mole was caught near Knaresborough, but most unfortunately was thrown away before I heard about it. I have been trying to secure a piebald and a spotted example for years. Many Little Grebes about. The latter end of March was very cold and stormy. The pair of Rooks from Mr. Kitching's rookery at Heworth, that have built in a kind of cage just below the weathercock on the top of Heworth Church spire, 120 ft. from the ground, every year since 1887, have at last completed their nest after many failures. I saw a magnificent old male Heron that had unfortunately been trapped on a well-known Trout stream; he had been so often in the traps and escaped that he had not a whole toe left. His long crest-plumes measured nine inches.

Very early in April Long-eared Owls and Tawny Owls were sitting. On the 7th Metcalfe and I tried hard to get a photograph of the latter as she flew off her four eggs, which were in a hollow tree on a "scarr" side at the edge of a moor. There

were two holes, and she always came out of the left-hand one; so we crawled up the hill-side, amidst the mud and stones—Metcalf with the camera, and myself with a long hazel stick to tap the tree with—but she must have been on the look-out, for just as we got into position, and I was about to tap the tree, out she came from the right-hand hole, and so disappointed us. I found a Wild Duck's nest (Mallard) containing nineteen eggs. On the 25th of the month I saw the first Swallow, and heard the first Corncrake. The Cuckoo I did not hear till the 28th, on which date I found a Sky-Lark's nest with three eggs. Metcalfe got a lovely photo of a cock Lapwing, with crest erected, walking up to the nest.

On April 2nd, at 10.30 (Easter Sunday), a Noctule, or Great Bat, was hawking about in the sunshine over my garden.

MAY.

On May 1st a fine male Dotterel flew against the telegraph-wires at Kilnsea.

3rd.—Found two Woodcocks' nests, four eggs in each just hatching. Several pairs breed in this wood, and sit so close that if one wants to move them they have to be poked off the nest with a stick. They harmonize so beautifully with the surrounding dead leaves and grass that they are most difficult to detect. One was a much more golden-coloured bird than the other.

6th.—Moore and I found several Redshanks' nests, and eight Snipes'. Working with sixty feet of pneumatic tubing, Moore got a beautiful photograph of a Snipe on her nest. We found several Wild Ducks' nests, a Teal's, and a Shoveler's; there were four pairs of the latter birds in this locality, thanks to the protection now afforded them. The nests are most carefully concealed in thick tussocks, and have a regular run in, a foot or more in length, under the grass, from the place where the birds alight. When lying down in cover we had two drakes, looking lovely in the sunshine, fly within twenty yards of us. Several of the Redshank's eggs had been destroyed by Carrion Crows. Heard the Grasshopper Warbler, and saw several Adders.

9th.—Dug out a nest of four young Moles, about half-grown.

16th.—Green Woodpecker's nest containing two eggs; Coal Tit's, containing twelve eggs, well covered up; all the Tits

cover their eggs. Put up a Nightjar, which flew into a Scotch fir, and squatted, as they always do, lengthwise along a bough.

17th.—Found a Hawfinch's nest with eggs. Waterhen's with young on the top of a reed-fence five feet from the ground.

22nd.—Several Tree-Sparrows' nests in an old orchard. Long-eared Owl's with young in an old Magpie's nest.

27th.—A fine Allis Shad, weighing 6 lb. 2 oz., was brought to me. It had been caught in a Salmon-net not far from York. These fish rarely come up the Derwent so far nowadays.

28th.—Young Magpies out of the nest. In some of the market-gardens about here they do damage to the strawberry-beds, eating the fruit just before it gets ripe.

29th.—Metcalf and I found several Reed Bunting's, Lark's, Meadow Pipit's, and Whinchat's nests. It has been asserted in the pages of 'The Zoologist' that the latter bird is not double-brooded, but it is undoubtedly so here. The customs and habits of birds differ in different localities. Nearly all the Sky-Larks' nests contained three eggs. I look upon this as the usual clutch in Yorkshire; often there are four, but very rarely indeed five.

31st.—Found eggs of the Black-headed Gull. This colony, almost our last in the county, is, I am glad to say, holding its own, thanks to the protection afforded by the owner of the estate. It used to be ruthlessly harried, the eggs taken regularly, and it is a wonder that it has survived. The Wild Birds Protection Act is very often a mere farce, and were it not that private enterprise frequently steps in, it would be a complete failure. Moore got a photo of a Redshank on her nest. The camera was most carefully covered up, and he was working with a hundred yards of fishing-line tied to the trigger, and hiding behind a clump of gorse; but he had to wait five hours before she came back, and then he got a shot at her. A Cuckoo's egg, ordinary type, much incubated, in a Hedge-Sparrow's nest.

JUNE.

1st.—An old Rook, well powdered with white on the breast and back, got at Cottingwith.

3rd.—A fine old cock Crossbill, caught in a Magpie-trap at Thornton-dale, was brought to me by Mr. R. Hill, which I stuffed.

6th.—Moore and I went to photograph the Black-headed Gulls on their nests, and were most successful. I never thought they would face the camera; as the marsh took us up nearly to our middles, and we had to lash sticks on to the tripod, leaving the camera several feet above the water; then we screened it with green boughs of birch, and worked with one hundred yards of fine Trout-line. We got some beauties.

8th.—Moore tried to photograph a Turtle-Dove on her nest, but, though he waited five hours for the bird to come back, and the camera was so well concealed that three boys going to bathe passed within a couple of yards of it, and never noticed it, yet the bird would not return. They are most difficult birds to photograph on the nest.

10th.—Metcalf got three lovely photographs of a Common Sandpiper on her nest, in three different positions.

12th.—Went with Moore to photograph the nest and eggs of the Great Crested Grebe. I am glad to say these birds have increased considerably. If only we had had another ten feet of pneumatic tubing we should have got the old bird on the nest. We had the keeper up a tree ready to whistle to us when she settled, and she came close up several times; but most unfortunately she could just see our heads above a bank, where we were lying with our legs in the water. We were miles from home, and had to get back that night; and so we failed through want of a few feet of tubing. Found a Grasshopper-Warbler's nest with young.

19th.—Moore and I made a day's journey to get a Reed Warbler on her nest. Were most successful. Got her in four different positions coming on to the nest. I believe these, like the Redshank and Lapwing, are unique. Found several nests; some just finished, some with four fresh eggs, some with hard-set eggs. Also Moore got a very pretty photo of a Pheasant on her nest, using a long-focus lens. Saw a pair of Tufted Ducks, but had no time to look for the nest.

23rd.—Went down into Holderness for a night to enquire into the ruthless destruction that has been going on amongst our last remaining colony of Lesser Terns. While the watcher was on, appointed by the County Council, the birds increased in number; but now the trippers, who come over by steamer from

Grimsby, work sad havoc amongst them. One man alone took thirty-eight eggs back with him. The lighthousemen and the local policeman do what they can, but unless a proper watcher is again put on, as he most certainly ought to be, the birds are doomed. I found them so shy that they keep high up in the air, leaving their eggs to the heat of the sun and sand during the day-time, and only returning to them at dusk, when their enemies have departed. It is really iniquitous that our last remaining colony in the county of these pretty little birds should be so harried, and strong measures ought to be taken at once to ensure their breeding in peace. Was very glad to find a Shelduck sitting hard in a Rabbit-burrow on the sand-hills. Great numbers of Corn-Buntings about.

30th.—Metcalfé got a splendid photograph of a Golden Plover on her nest.

JULY.

1st.—A fine Trout caught at Thorntondale, weighing $2\frac{1}{2}$ lb.

10th.—Moore and I went to take a Nightjar on her eggs, which were just upon hatching. Working with sixty feet of pneumatic tubing, we got six good shots at her in various positions in a little over an hour; then we left her in peace. The difficulty was to keep her off the eggs. She was back again after each changing of the plates in a very short time. I wish someone would invent a method of changing plates without the operator having to leave cover—as, for instance, on pulling a string, the exposed plate to slip down into a compartment, and a new one pushed forward into position by a spring, or something of that sort.

11th.—Saw a curiously marked Fox-cub, having three large white stockings (one hind leg and both fore legs), and a large white patch on the back of the head, the size of the palm of a man's hand. Had a live Hawfinch brought to me that had been caught eating peas. I am sorry to say that many get shot in gardens owing to this habit.

13th.—Heavy storm; some lumps of ice fell as big as Black-bird's eggs, doing a great amount of damage.

15th.—Saw a curious Jackdaw with cinnamon-coloured wings.

19th.—Found a Little Grebe's nest containing three eggs. The nest was made of the following plants:—(1) *Sparganium*

ramosum, branched bur-reed; (2) *Potamogeton rufescens*, red pondweed; (3) *P. densus*, close-leaved pondweed; (4) *Anacharis alsinastrum*, water-thyme; (5) *Sium angustifolium*, water-parsnip; (6) *Hippuris vulgaris*, marestail; (7) *Equisetum arvense*, barren stem of common horsetail; (8) *Fontinalis antipyretica*, great water-moss. These were most kindly identified for me by Mr. M. B. Slater, F.L.S., of Malton.

21st.—Stuffed a Whiskered Bat.

24th.—Lying up in cover at dusk with a friend, we had seven Badgers, four old and three young, playing about within forty yards of us. (See the 'Field,' Feb. 3rd, 1900, for full account of the Badger in Yorkshire.) Would have given much to have been able to photograph them, but the light was gone for this purpose.

AUGUST.

August was a very hot month. Grouse have done well on nearly all the Yorkshire moors, and the young birds are fine and strong on the wing. An Osprey was shot on the 29th near Filey. Two young Dotterels at Easington, Holderness, on the 22nd.

SEPTEMBER.

September was also very hot. Partridges are plentiful. Over a small farm I and a friend shot eighteen brace; but here where we used to get fifteen or twenty Hares in a day fifteen years ago, now we never see one. I was over at Flamborough for a few days, and far out at sea saw many Skuas, mostly Arctic Skuas. An immature Sabine's Gull was shot here at the end of the month. A Great Snipe was obtained at Thorntondale, and another at Beverley, and near the latter place also a fine young Black-tailed Godwit, and a Greenshank. Mr. Stuart, the well-known birdstuffer of that town, tells me that a Wood Sandpiper was shot at Aike Beck End, on the river Hull, at the beginning of the month. Several Black Terns were observed off Bridlington, and some were shot. The large spring migration of these birds that has been noticed near Hemsworth for the last few years was not observed this year.

OCTOBER.

When Pheasant-shooting on the 2nd put up a Landrail. A fine Honey Buzzard was obtained near Beverley. I regret deeply

that another fine Osprey was shot near Scarborough. An archangel would have no chance in these days. Common Buzzard, Little Gull, Sandwich Tern, and Pomatorhine Skua were obtained at Bridlington. On the 14th a beautiful white Weasel was shot at Whixley by Mr. H. Pexton; it had normal coloured eyes, and was of a very pure white. These varieties of the Weasel are very scarce; this is only the second that I have seen. Mr. Allen, the well-known York taxidermist, showed me a young Rat, which cannot have been more than six weeks old, in which the upper incisors had either been broken completely away, or had never been; but the lower ones had grown and curled to the length of nearly two inches—a remarkably rapid growth. Had a white Mole sent to me, which I stuffed. Was away at the Lincolnshire flight-nets at the end of the month.

NOVEMBER.

A Gray Phalarope got at the Teesmouth, Nov. 19th, shot with a pistol. A Red-necked Phalarope obtained at Easington, Holderness, on the 8th. Several Whooper Swans in Bridlington Bay. Green Sandpipers about. In the middle of the month I was down on the Humber. At a certain spot there were great numbers of our commonest Wild Goose—the Pink-footed. I saw one huge mass of them, in which there cannot have been much fewer than a thousand birds; they arrive early in September, and remain throughout the winter. About 8 o'clock every morning, making a great noise, long skeins of them fly over North Cave Vicarage, where my friend the Rev. W. M. Tomlinson lives, on their way to feed on the stubbles, &c., on the wolds. One morning, with his Rook-rifle, Tomlinson fired at the leading bird, which was a great height up, and a big field's distance from the garden. He hit the third bird, and down it came. We had it in a pie, and excellent it was. I preserved the skin for him, as a memento of a wonderful shot. In such mild open weather we were quite unable to get near the birds on the Humber with a punt and big gun. On the 25th, when Pheasant shooting, I was surprised to see a large Frog hopping about in the middle of a wood as merrily as if it were June. Saw two Woodcock.

DECEMBER.

During December we had some very severe weather. Mr.

Moody, falconer to Mr. W. H. St. Quintin, of Scampston, saw several Bean Geese at Lowthorpe, and about fifty Whooper Swans at Scampston. Two Bewick's Swans were obtained at Leyburn, and a Brent Goose on the Swale, near Thirsk. A wild Gadwall, a very scarce Duck in the county, was obtained near Scampston. I am very sorry to have to record the slaughter of five Bitterns—two near Scarborough, one near Beverley, one at Easington, Holderness, and one at Lowthorpe. Several Little Auks were got on the coast, and one was put out of a hedge-bottom and caught by a Dog about three miles from York. Towards the end of the month vast numbers of Duck were on the Humber, many flying actually into the village of Easington, in which district one man alone shot thirty to his own gun in a single day. Many Duck also came inland, and great quantities of Duulin within ten miles of York. A wild Peregrine Falcon was observed near Scampston feeding on a Mistle-Thrush.

I cannot close these notes without referring to the very great loss all ornithologists have sustained, and especially we in Yorkshire, by the all too early deaths of Mr. John Cordeaux and Mr. H. Bendelack Hewetson during this year. They were both personal friends of mine, and both took the greatest interest in all that pertained to the bird-life of the county. Many a ramble have I had with them both with gun and field-glass in the most favoured bird resorts of the county which they both loved so well; and it seems strange now, when I visit these places, not to hear their cheery voices, and to be told by them all the latest bird news. Well, we must all come to it sooner or later, and we shall do well if, like them, we leave a few footprints behind us, however small, before we ourselves are summoned to join them in the Happy Hunting Grounds.

NOTES AND QUERIES.

AVES.

Curious Partnership of Hedge-Sparrow and Blackbird in a Nest.—

On April 13th this year a half-finished nest was found in a rhododendron in my grounds, the character and materials of which gave one the idea of it being a Hedge-Sparrow's (*Accentor modularis*), though from its size, and from the presence of large twigs and grasses, it seemed very doubtful that it could be the work of one. The nest steadily grew in size, and partook more and more of the character of a Blackbird's (*Turdus merula*), until in due course it was finished, and on April 19th it was found to possess its first egg—a Hedge-Sparrow's. On the 20th, when looked at next, the nest contained two Hedge-Sparrow's eggs and one Blackbird's. On the 21st the numbers had increased by one more egg of each kind, and on the 22nd the score stood at four Hedge-Sparrow's and three Blackbird's. The following day the Blackbird had brought the score up level, and begun to sit, but the weight of the hen Blackbird proved too much for the Hedge-Sparrow's eggs, and when the nest was looked at again on the 24th one of the four Hedge-Sparrow's eggs was crushed to pieces, and another badly cracked. The nest was then taken so as to preserve the production of such an ill-assorted couple of nest-builders. — W. FITZHERBERT-BROCKHOLES (Claughton-on-Brock, Garstang, Lancashire).

Pied Flycatcher in Somersetshire.—On the morning of April 27th I saw a male Pied Flycatcher (*Muscicapa atricapilla*) in my father's garden, Weston-super-Mare. The bird was very tame, and was probably resting on its way to its breeding haunts in Wales. This species appears to be rare in Somerset, and I only know of two records of its former occurrence in the county, namely, one killed near Taunton some years prior to 1869, as recorded in Mr. Cecil Smith's 'The Birds of Somersetshire'; and a record, noticed near Wells in the spring of 1870 (*vide* 'The Birds of Devon,' by D'Urban and Matthew, p. 53). It has doubtless been noticed more than once since 1870, but its visits to the county are evidently irregular, and probably accidental. On April 25th, 1897, I saw a male bird of this species near Gidleigh, North Devon, in which county the bird appears to be nearly as rare as it is in Somersetshire. Last summer I came across several pairs of Pied Flycatchers in a certain locality in Herefordshire,

where I found one nest on May 31st containing seven eggs. As far as I know, there are not many instances on record of its breeding in this county.—F. L. BLATHWAYT (Saltaire, Weston-super-Mare).

Lateness in Appearance of the Summer Migrants.—The following experience is unique in my recollection, and may be worth recording. Having failed up to April 4th to discover a single summer migrant of any species, I determined to spend the morning of the 10th in an elaborate search. It was fine and, on the whole, warm, and the country was extremely beautiful. I rambled about for three hours among woods and meadows, and along the banks of our stream, searching every spot which I have ever known to be frequented by Chiffchaffs on their first arrival, but without success. By this time we may usually expect to see three or four other species, though the dates of arrival in this upland district are seldom very early; but neither Blackcap, Redstart, or Tree Pipit were to be seen. I saw a small flock of Meadow Pipits, a species which *leaves* us for the summer. Starlings are still in large packs, though many, of course, are breeding; Lapwings are only just beginning their nests. The hedges are as black as in the winter, and I do not see the flies about them which accompany the opening of the leaf. Under such circumstances one can hardly expect the summer birds; but it would be interesting to know where they are, and what doing.—W. WARDE FOWLER (Kingham, Chipping Norton).

Observations on Birds during the exceptional severe Spring in Aberdeen.—Towards the end of March there was an unusual tameness of those birds frequenting the neighbourhood of farm-buildings, which indicated a continuance of severe weather at a later date of the year than is usual. While the general variety made their appearance at the late date, and were very tame, one bird which appears during snowstorms earlier in the year, the Snow Bunting (*Plectrophenax nivalis*), was not observed, except by a few stragglers. While the weather has been severe and the snow prolonged, there have not been many birds destroyed by starvation. Lapwings have evidently not been much disturbed, although there has been repetitions of severe frosts since they arrived. Partridges have been put to considerable straits, if we may judge by their tameness. Their haunts have been more closely covered with snow than is at all usual, and we find a wintery stillness following bird-life well into the spring of the year, when we are accustomed to hear melodies from many throats. Is this a sequel to the singing of the Sky-Lark in October of 1899, and does the cold snow-clad ground delay the melodies of this great songster? Pairing, which always accompanies an early spring, has also been retarded by the struggle for existence, packing having replaced the usual pairing

season of this year ; so that there will be no danger to reproduction through too early nesting, which sometimes is a risk when cold weather sets in later in the year. A Robin, which may be reasonably supposed to have made my stable its shelter up to this its tenth winter, was crushed by a horse a week or two ago ; it was acquainted with all the customs of the place. One at least appeared in the autumn that the stable was first in use, returning every following year, until its peculiar habits drew attention to it.—W. WILSON (Alford, N.B.).

Notes from Norfolk.—*Fritton Decoy*. Mr. Patterson (*ante*, p. 160) gives the catch of fowl in Sir Savile Crossley's decoy at Fritton for the season 1887–8. As that season was described by the decoyman as a bad one, "not many fowl on the decoy, plenty of Wigeon after the 1st March," which, as usual, were too late to add to the return, perhaps readers may like to know what was done in the past season, which in the months of December, January, and part of February was a very favourable one. I therefore send the following return :—

	Duck.	Teal.	Wigeon.	Pintail.
1899.				
October	67	—	—	—
November	56	4	1	—
December	1529	13	2	—
1900.				
January	561	—	—	—
February	472	4	10	2
March	—	—	—	—
Total, 2721	2685	21	13	2

The average take for the past thirty-eight seasons has been 989. It has often been said that perfect seclusion is an absolute requisite for the successful working of a decoy. In this instance, although the pipes and the adjacent water are kept perfectly quiet, a high road runs at a very short distance from the decoy, and the Ducks may be seen on the water from passing vehicles. Little inconvenience is experienced from this, as the fowl soon become accustomed to such sights, and it is only sudden or strange sights or sounds which cause alarm. Very few Teal are taken here now, and only an occasional Wigeon, as the decoy is not worked after the end of February, which is too early for the spring migration of these birds. The only other fowl are a few Pintails, and now and then a Shoveler, Goosander, or Coot.—THOMAS SOUTHWELL (Norwich).

Nesting Notes.—Mr. Aplin is quite correct in noting (*ante*, p. 143) my omission of the Robin from the list of birds which have used nesting-boxes

here, but we find old kettles, water-cans, &c., possess the same attractions for this species that boxes have for the Tits and Nuthatches. Several of our nesting-boxes have had the entrance-holes enlarged by Starlings, which seem to be able to peck away the wood from an old weather-beaten box without difficulty. This year, for the first time, we have had an old cask occupied by a pair of Tawny Owls, which had on March 27th four eggs laid on the remains of a Starling's nest.—JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds, Suffolk).

AVICULTURAL NOTES.

Cormorant in Captivity.—The historic Cormorant of Montagu has made interesting reading for generations. The following notes on one, "Joey," now in my possession, may not record anything so striking as the tameness and intelligence displayed by that naturalist's bird, but my example has been nevertheless interesting. He was brought to me from sea by a smacksman on March 22nd. After incarceration in an old hamper for some days, the bird exhibited his delight on being turned into a netted enclosure by mounting the rockwork, and immediately putting his plumage into shape by shaking his wings, and by the use of his mandibles. In two days he learnt to recognize his fish-basket, and had already, after a day's fasting, become adroit at catching the fish and fish-heads thrown to him. On March 28th, after receiving five Whittings, the last leaving its tail out of the corner of his mouth, he in a hour's time made room for two more. On April 18th, for his breakfast, he devoured three good-sized Whittings, one Viviparous Blenny, one Herring, one Flounder. Not yet satisfied, he accepted an 18 in. Conger-Eel. This vanished, save for three or four inches of the tail-end, which greatly annoyed him by refusing to be drawn or shaken down; at length, by flapping his wings and stretching his body to the utmost, it was lost sight of. Five minutes afterwards he seized a Flounder, and made room for it. The bird has not attempted to drink or even look at water, although, after feeding and a short nap, he anoints his plumage by a free manipulation of the oil-glands. After swallowing fish, drops of water drip from his mandibles. It is seldom that undigested bones are cast up, these few being usually those of large Plaice-heads that have been chopped in order to reduce them to a convenient size for swallowing. The bird has become tame, and salutes me with curious trumpeting notes, accompanying them with a profound salaam; and, although he allows me to stroke his back with a stick or brush, is ever on the alert to seize a finger if possible.—A. PATTERSON (Ibis House, Great Yarmouth).

PISCES.

Notes from Great Yarmouth. — Fishes rare or curious have been sparsely met with in local waters during the past six months. The only records of exceptional interest, beyond the great takes of Herrings of last fishing season, were a white Sole (*Solea vulgaris*), on Sept. 19th, 1899; one or two Anchovies (*Engraulis encrasicolus*) in October, from the drift-nets; a Porbeagle (*Lamna cornubica*), our locally commonest Shark; and a Sturgeon of the variety *Accipenser latirostris*, which measured 4 ft., on or about Nov. 23rd. A 10 in. Lemon Sole (*Solea lascaris*) was brought me on Jan. 13th of the present year, and on the 16th an albino Sole, measuring 11½ in. Only a very narrow ring of the normal colouring encircled the eyes, and the slightest tinge of pink was observable on the fins. It was forwarded to the Cambridge Zoological Museum. A Plaice (*Pleuronectes platessa*), which was all white with the exception of the head and ventral fins, came to hand early in March. The first example of the Planer's Lamprey (*Petromyzon branchialis*) that I have been fortunate in identifying as locally occurring, I discovered on a heap of seaweed washed up at the harbour's mouth on April 10th. It measured 4½ in. in length, and was big in spawn; the ova, indeed, oozed from it. In the Norfolk and Norwich Naturalists' 'Transactions,' it is recorded as occurring at Keswick, where it is described as being "numerous in ditches containing small springs, to which this species appears to be attracted." The colour was dull green, relieved underneath by yellowish tints. On April 20th a faded example, long kept in ice, of the Ballan Wrasse (*Labrus maculatus*) was brought me from a trawler; it had undoubtedly been taken in a trawl-net "nor'ard of the Dogger," and is scarcely entitled to a place in the local list; the species has, however, been identified already at Yarmouth. — A. PATTERSON (Ibis House, Great Yarmouth).

NOTICES OF NEW BOOKS.

A Treatise on Zoology. Edited by E. RAY LANKESTER, M.A., LL.D., F.R.S., &c. Part III. The Echinoderma by F. A. BATHER, M.A., assisted by J. W. GREGORY, D.Sc., and E. S. GOODRICH, M.A. Adam and Charles Black.

WE have during the last few years drawn the attention of our readers to several volumes of the 'Cambridge Natural History.' We now invite their perusal of the first volume issued by the sister University. For this is really an Oxford publication; and, as the editor states in his preface, "the authors are, for the most part, graduates of the University of Oxford, though it may not be possible to maintain this limitation in future sections of the work." "The work is addressed to the serious student of zoology," and as such must be taken and appreciated. We seem to be approaching once more the high water-mark of technical zoology. These pages have distinctly the imprimatur of the editor, and may be accepted as conveying information that is full, recent, and reliable. Prof. Ray Lankester has very thoroughly identified himself with the volumes, and seems to have accepted a complete responsibility as editor. Mr. Bather has undertaken the greater part of the work; Dr. Gregory has contributed the chapter on the Stellerioidea and Echinoidea; that on the Holothurioidea is from the pen of Mr. Goodrich.

It is to be hoped that this volume will circulate beyond the arena of even the serious student, if that term is to bear a restricted significance. The purely British zoologist is a recruit from many non-academical centres: he is often a good observer, with little technical knowledge; his tastes are frequently bionomical rather than widely biological; his knowledge of the living habits of an animal are generally in an inverse ratio to that of its phylogeny and ontogeny; he is practically a field naturalist, and knows the haunts of his creatures rather than the facts of their

evolution; he is more concerned with the appearance of the living form than with its structure; but he is, nevertheless, not seldom, a master of his craft. The value of his observations was appraised and canonized by Darwin; but that it should be less superficial, that it should be more introspective, have a wider meaning, and a more philosophical clue, is unquestionable, and a book like this supplies the one thing needful. Zoology can neither be divorced from the fields nor from the laboratory—it is part and parcel of our own history; in an evolutionary sense “our birth is but a sleep and a forgetting”; and even the Echinoderma, when thus described, and the inseparable technicalities absorbed by the ready mother wit of both student and peasant, will increase our knowledge of what they are, and our perception of what we are.

There is a most excellent bibliography attached to each branch of the subject; and the book is far more than a zoological ledger posted up to date.

Sexual Dimorphism in the Animal Kingdom: a Theory of the Evolution of Secondary Sexual Characters. By J. T. CUNNINGHAM, M.A. Adam and Charles Black.

MOST naturalists are familiar with Darwin's theory of “Sexual Selection,” a theory which perhaps met with less general acceptance than any other put forward by our great biological philosopher, being even vigorously opposed by Mr. Wallace, his fellow-enunciator of the doctrine of “Natural Selection.” Mr. Cunningham not only offers another hypothesis, but altogether starts from a Lamarckian standpoint, and is quite outside the views of either Darwin or Wallace on the subject, frankly stating that his object is to point out “how remarkably the multitudinous facts all agree with the hypothesis that secondary sexual characters are due to the inheritance of acquired characters.” This course leads the author to some most startling speculations. His conclusion being “that the direct effects of regularly recurrent stimulations are sooner or later developed by heredity, but only in association with the physiological conditions under which they were originally produced,” we meet with the following suggestions as to the origin of the beard in males, which “it is probable

enough was derived by ourselves from an Ape-like ancestor." The keepers of the Zoological Gardens having informed Darwin that Monkeys attack each other by the throat, Mr. Cunningham thinks it "not impossible that the growth of the beard was originally excited by the stimulus caused by such attacks, the hair of the throat and around the mouth being regularly moved and pulled by the adversary's jaws and teeth, or perhaps by the hands." That the true cause of the loss of hair on the evolved human body "was the wearing of clothes," will perhaps require more support from anthropological facts than is certainly at present obtainable. Starting from the fact that irritation of a bone by blows will cause exostosis, the assumption is considered "probable that the growth of the antlers was caused originally by the ancestral stags butting their heads together, and so irritating the frontal bone." The comb and wattle of the Cock, *Gallus bankiva*, may owe its original stimulation to the "pecking by the beaks of other birds"; while the fleshy caruncle of the Turkey Cock is ascribed to a similar origin.

These extracts will suffice to show the line of argument used to support this theory; and our object being rather to "notice" new books than to criticise new views, we think we have fairly focussed attention to this return from Darwin to Lamarck. The central idea or argument is carried through the principal zoological phyla, and to support it many interesting and little-known facts are adduced, which will interest and instruct, though perhaps not always convert the reader.

If a second edition should appear, it will be well to revise some personal names. On one page we read—Mr. Roland Trimen, on the next he is Sir Roland Trimen; Mr. Cronwright Schreiner has certainly changed his name, but has not yet called himself "Conrad"; and the late Alfred Tylor did not spell his name "Tyler." These are small matters, but Mr. Cunningham will doubtless be glad to rectify them.

Evolution. By FRANK B. JEVONS, M.A., D. Litt.
Methuen & Co.

ZOOLOGY has long been recognized as a progressive science—and it is. In 1859 Darwin did not introduce the doctrine of

evolution, as is so generally supposed by the "outlanders" of science, but by his own memorable enunciation of the theory of "natural selection" he cleared the speculative air which was full of fads and chimeras, and enabled the giant shadow of "organic evolution" to dominate all biological problems. But other studies besides biological ones were soon controlled by this line of thought; the argument applied to the physical development of the Ape was found to belong to the questions of the non-zoological philosopher; it guided the anthropologist, and absolutely captured the philologist. Theology at first was aghast, but by the year 1883 the late Sir William Flower was found reading a paper on evolution before a "Church Congress"; and now we have this very fair estimation of the theory in a volume which forms part of a series entitled "The Churchman's Library."

The position of the author of this book—which all who take an interest in the application of biological thought to general philosophy should read—is to be gathered by several candid statements scattered through its pages. Thus we read there are certain broad facts beyond dispute. "It is indisputable that there was a period in the history of the earth when there was no life upon it; that the elements which constitute living matter are themselves lifeless; that consciousness is correlated somehow with those organic compounds, the elements of which are inorganic. These facts constitute an irresistible presumption that ultimately mind and matter must obey the same laws." Again, we are told of those "who with us accept the continuity and uniformity between nature and man."

Here we welcome a real sympathy between science and theology, for, as Dr. Jevons clearly states, "religion is not science." He follows an argument that "faith" largely enters into both; but here we enter a dialectical arena, the tourneys in which these pages are not intended to record. The volume, however, is not outside zoology; if there is an evolution in animal life, it applies to man, and must affect all conduct and speculation. That it does so is generally recognized; how it does so is the thesis of this publication.

The Game Birds and Wild Fowl of the British Islands. By CHARLES DIXON. Second Edition, enlarged, improved, and thoroughly revised by the Author. Sheffield: Pawson & Brailsford.

IN perusing this very handsome volume, including Doves and Pigeons, it seems almost as difficult to define the limits of Game Birds as to give a correct description of what is meant by the term "Sportsman."

This is the second edition of a good and useful book, in which the subject is brought up to date. It possesses a very readable introduction, in which, as Mr. Dixon has his own views on migration, he propounds his own conclusions as to "the geographical history of avine life." He zoologically divides the world into three realms: first, an Intertropical or Primogæan realm, with northern and southern limits marked tentatively by the tropics; second, an Arctogæan or Northern realm, which embraces the entire world north of the Tropic of Cancer; third, a Notogæan or Southern realm, which in like manner includes the entire world south of the Tropic of Capricorn; and he looks forward to substantiate these propositions when the exploration of the Antarctic and high Southern regions shall have taken place.

Each bird is amply treated, its nomenclature being followed by its "Geographical Distribution," "Allied Forms," "Habits," "Nidification," and "Diagnostic Characters." Many species are figured, there being forty-one coloured plates, representing fifty-six coloured illustrations; while the number of species and races of Game Birds and Wild Fowl which Mr. Dixon includes in the British avifauna is 127. The literature already existing in reference to these birds seems to have been amply consulted, and little more of importance concerning the distribution and habits can probably be gleaned. This is a good book to possess, especially for those who seek to know the life-histories of these British Birds, as there has been no reason for unnecessary condensation, and ample space has resulted in liberal treatment. The plates have been drawn by Charles Whympers, and their reproduction reflects the greatest credit on the publishers.

EDITORIAL GLEANINGS.

MOST of our readers will have been made cognizant of the recent great "boom" of the last edition of the 'Encyclopædia Britannica,' and doubtless those who could spare the cash, and, what was far more necessary, room, have acquired those excellent volumes. We are glad to notice a very useful and novel publication on the same lines in the 'Temple Encyclopædic Primers,' published by J. M. Dent & Co., in which each subject occupies a small and very inexpensive volume, handy in size, nicely printed, and well illustrated. This method allows selection by those who limit their subjects, and who have already congested shelves. Two only of those yet published have appertained to our domain. One—"An Introduction to Science," by Dr. Alexander Hill, Master of Downing, Cambridge—cannot be considered foreign to our studies, for it admirably conveys what should philosophically qualify many of our conceptions and conclusions on what, are often, but materialistic appearances, while pointing to a moderate and healthy idealism. The second primer is on "Ethnology," by Dr. Michael Haberlandt, of the Ethnological Museum, Vienna, which will hold its place among other much larger and more pretentious publications on the subject.

WE have received the 'Illustrated Annual of Microscopy' for this year, published by Percy Lund, Humphries & Co. Ltd. Besides very much useful information regarding method of work and appliances, for those who study the small things of life, and, as says a motto on the publications of the French Entomological Society, "*Natura maxime miranda in minimis*," there are also some strictly biological articles. Mr. D. J. Scourfield has given a beautifully illustrated article on "A Hyaline Daphnia"; Mr. W. M. Webb has written on "Some Mollusca and the Microscope"; and "British Fresh-water Mites—Arrenurus" is the subject of Mr. C. D. Soar. As this last author well remarks, "very few workers in Britain have taken up this part of pond-life at present." Mr. Macer describes "A unique method of exhibiting microscopically a living fly in the act of feeding." These are the bionomic facts which will revolutionise the zoology of the future. We would fain hear more from microscopists in these pages.

IN the last (April) number of the 'Auk' is a most interesting communication entitled "Care of Nest and Young," by Francis H. Herrick. We can only give the following extracts:—"It is plainly advantageous for birds which breed on or near the ground to remove every particle of litter which

would stain or whiten the leaves and surrounding foliage, and thus advertise the secret of their nest to enemies, even to those who prowl after dusk. When a Red-eyed Vireo, whose behaviour I studied at close range, dropped any bit of excrement by accident, she darted after it with such speed that it was snatched up before reaching the ground, or before falling a distance of four feet. Not a trace of defilement is ever seen around the dwellings of any of these birds.

“On the other hand, predaceous species like Hawks pay no attention to such matters. The excrement of their young is voided in a semi-fluid state, and in a peculiar manner. With tail turned to the edge of the nest the bird shoots it off to a distance of two or three feet, and it may strike the ground six or seven feet from the nesting-tree. The only significance which such actions have is that of keeping the nest clean. The advertisement of the nest-stains on the leaves below is a matter of indifference to these bold and persistent outlaws, who have little to fear from any enemy save men.”

MR. WILLIAM CROSS, the well-known dealer in living zoological specimens, died at Liverpool on April 7th. Mr. Cross belonged to a family of naturalists. His father and grandfather were in their day the best known importers of wild beasts and birds in this country. In the early part of last century the Exeter Change, in the Strand, was the rendezvous of collectors eager to purchase the latest arrivals sent to the proprietor, Mr. Edward Cross. In London fifty-eight years ago Mr. Cross was born, but it was in Liverpool, near the North Docks, that he established his famous emporium. Scarcely a ship arrived at Liverpool from China, India, Australia, Africa, and America without having on board zoological specimens for Mr. Cross from his agents throughout the world, whom he had distributed. Thousands upon thousands of wild animals have passed through his emporium to owners of public and private collections or retail dealers. In twelve years he imported over a million Parrots, besides birds of every variety and from every clime. Twenty-eight years ago he brought to Liverpool a live Gorilla—the first that had been seen in Europe—and sold it to the Berlin Aquarium for no less than £1000. In private life Mr. Cross was known as a staunch teetotaler, and a keen supporter of all philanthropic movements.

WE regret to announce the death of an eminent zoologist in the person of Prof. M. Milne Edwards, Director of the Natural History Museum at the Jardin des Plantes, Paris, who died suddenly on April 21st, in his sixty-sixth year.

THE ZOOLOGIST

No. 708.—June, 1900.

ON SEXUAL DIFFERENCES IN THE FEATHERING OF THE WING.

BY ED. DEGEN.

UNDER this heading Dr. A. G. Butler has published (Zool. 1898, pp. 104, 105) his observations made on the Sky-Lark (*Alauda arvensis*), and more recently again (*ante*, pp. 74, 75) the results of his investigations in regard to the House-Sparrow (*Passer domesticus*). Unquestionably any additional knowledge of birds whose plumage, on account of the great similarity existing between the two sexes, offer such great difficulties in distinguishing between them, as the Sky-Lark and many others, will be not only appreciated by the aviculturist, but also by the ornithologist and student, the fuller such information is afforded. That differences in the area of the bird's wings of the two sexes exist, at any rate for the species referred to above, has been shown by Dr. Butler in the respective dimensions of their wings. More important, however, are the deductions he makes therefrom, other than mere sexual differentiation; especially when he calls attention to a possible advantage in power of flight acquired by the male bird over the female, induced by a slight increase in the wing-feather area—in those cases, at least, as he points out, where a reduction in the weight of the body, as in the male Dunlin, does not take place.

As I happen to possess a series of over thirty specimens of
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the Black-backed Crow-Shrike, or Piping Crow (*Gymnorhina tibicen*), erroneously, but very persistently, called Magpie by the colonists, collected during my stay in Australia, I decided, after reading with interest Dr. Butler's remarks on the subject, to seize the opportunity for trying to ascertain from such ample material the extent to which this principle might affect this particular species.

Dr. Butler's method for measuring the dried and mounted wing consists in ascertaining its length from the upper head of the upper arm-bone to the extreme tip of the longest of the flight-feathers, which is situated on the hand portion. Since any difference in the measurements can therefore only be the result of this *longest* of the primaries itself, I came to the inevitable conclusion that in this way no information at all is procurable in regard to the extent to which the rest of the remiges participate on the area of wing for supposed sexual difference, an adjunct of no mean importance in this question. To supply this deficiency necessitated the measuring of *all* the flight-feathers separately, on one side at least, which in the present case was that of the left-hand wing. This process was rendered somewhat easier from the fact that only three of the specimens examined were dry skins, all the others being preserved in spirit. There are ten primaries and also ten secondaries in the wing of this species. By commencing to count the primaries from the tip of the wing inwards, as Dr. Butler has done, the fourth flight-feather is found to be the longest of all. This makes this remex identical with the corresponding one of the song-birds proper, or Oscines, in which group it has been considered to be the third, owing to the "assumed" absence of the first or outermost remex. For this reason I have here followed the practice now generally adopted by systematists of counting the primaries from within—that is, the carpal joint, outwards to the extreme end. By doing this it will be found that the longest primary in this species is the seventh in number, same as in the case of the song-birds, where there is supposed to be one less, namely, the tenth.

All my measurements are expressed in millimetres. The highest figures for the seventh, or the longest primary, obtained for the twenty-seven specimens examined, are the following:—

For an adult male	...	...	...	219 mm.
For a juvenile male	...	...	...	212 „
For an adult female	...	...	...	205 „
For a juvenile female	...	...	...	205 „

The lowest figures obtained for the same quill-feather were:—

For an adult male	...	...	...	200 mm.
For a juvenile male	...	...	...	200 „
For an adult female	...	...	...	190 „
For a juvenile female	...	...	...	192 „

It will be noticed from the foregoing figures that, as far as difference of sex is concerned, there is a marked excess of length for this longest of the flight-feathers in both the old and the young individual male birds over the females of from 7 to 14 mm. We thus find Dr. Butler's conclusions fully confirmed when confining ourselves to *this feather exclusively*, but if the same test be applied to a considerable number of individuals we not only get every degree of length possible for this quill amongst the two sexes, but as a matter of fact the same individual variation manifests itself in all the other flight-feathers. For this longest one, then, we get a range from a maximum of 219 mm. to a minimum of 200 mm. for adult males; the latter being smaller by 5 mm. to female individuals, both old and young, which is that of 205 mm.

If the relative lengths range for the adult males between 219 to 200, for the young males from 212 to 200, they do the same in the case of the females, which for the adults is one of from 205 to 190, and one of 205 to 192 in young females.

A reproduction of the table of measurements of all the twenty flight-feathers in the wings of these twenty-seven birds would serve no useful purpose, as may be gleaned from the following example, applying to the first specimen composing the list of birds measured:—

Primaries.

X	IX	VIII	VII	VI	V	IV	III	II	I
mm. 105	176	209	212	210	195	169	159	150	145

Secondaries.

I	II	III	IV	V	VI	VII	VIII	IX	X
140	138	132	128	121	118	112	105	95	70

Sum total, 2889. Formula for index, $\frac{2889}{20 \text{ (remiges)}} = \text{index,}$

Not only does this index afford a means for a comparison of the specimens, but it should have the advantage also of giving a more accurate estimate of the real flight-feather area.

Table I. has been compiled from the indices thus obtained by placing them side by side, according to the respective sex and approximate age of the specimens, and in serial order of diminishing figures of these indices.

On the whole, the result of this investigation for eliciting additional evidence in proof of the establishment of a clearly defined line between males and females from the point of difference in the length of the flight-feathers cannot be said to have been a very satisfactory one—at any rate, not for this particular species. The same may very reasonably be inferred from the genus as a whole, to which this species belongs.

On the other hand, and which Table I. shows also, it has been productive of supplying an approximate estimation of the rates of percentages at which the two sexes participate in the maxima and the minima of excess or reduction respectively. Thus 18·5 per cent., or five males only, *absolutely exceed* in greatest length of flight-feathers; the 59·3 per cent. = nineteen individuals, indiscriminately represent males and females, as well as every range of length; these are Nos. 6 to 21 of Table I., or considerably over the half of this large series of birds. Of females, six only are *absolutely inferior* in length, forming 22·2 per cent. of the whole. By dealing, however, separately with the sexes, the five males just referred to, out of a total of sixteen, with absolutely higher indices, form 31·2 per cent. Similarly, of the eleven individuals constituting the female portion, six of them show indices absolutely inferior to the remaining seven, or 54·5 per cent., a little over the half for females.*

The measurements obtained for the seventh or longest primary, when compared with the indices derived from the aggregates of all the flight-feathers in the wing, *do not coincide always*

* These birds are a non-migratory species, and the greater proportion of males to females in a collection made in the same locality as this one was, may be taken as a fair estimate for the proportion of the sexes in a free state. This probably accounts also for the great number of them existing still, although they were considerably disturbed by the influx of the white population settling everywhere in the country.

exactly with the rank which has been allotted to the specimen on the list, the latter being the outcome of the index received. As an instance, the first specimen on the list (Table I.), whose index is 144·4, has its longest remex shorter by 2 mm. than the corresponding one of No. 4, whose index of 141·4 is so much lower. The adult male No. 2, with its inferior index of 143·4, exceeds the young male No. 1 by 7 mm. in the longest primary, which measures 219 mm., and is the longest of all. These examples should suffice for showing the great individual variations obtaining throughout alike. Not more than five males exceeding the others by highest indices, also exceed them by having the longest measures for the seventh primary.

It is obvious, then, that as a means of diagnosis for the determination of sexes, a really characteristic difference in the lengths of the wing, or wing-feathers, found to exist in the species dealt with by Dr. Butler, has almost broken down in this particular case.

In addition to the indices on Table I., I have appended a further column, in which the length and the girth of the beaks are given. A comparison of these dimensions in their present order of indices—with which they in no way agree, any more than amongst themselves—does not exactly afford a ready means for discriminating between them. To achieve this latter purpose better, I have dealt with this character separately on Table II. by numbering the specimens according to the diminishing lengths of their beaks, but otherwise adhering to the plan adopted in Table I.

The arrangement of Table II. therefore shows that, apart from the differences in the colour of the plumage on the backs between adult males and females of this species, which does not enter into the scope of this work, a very good character for sexual difference, and of *greater reliability than we have seen to exist for dimensions of wings, lies in the length of the beak.*

With one exception only, namely, that of an adult male (No. 25 of Table II.), which is conspicuous by having an abnormally short beak (like the two young females at the bottom of the list), *all females have their beaks inferior in length to the males*; but nevertheless there is, as might be expected, great individual variation perceptible also in both sexes.

Very little positive value should be attached to the girth measurements taken at the base of the beaks, as may be inferred by a consultation of the columns devoted to these on Table II., which may be noticed particularly in the case of the three dry skin specimens distinguished from the others by an asterisk, and mentioned before. They prove in a striking manner that considerable shrinkage takes place on drying out, which, if ignored when admitting this measurement for a comparison of fresh with cabinet specimens, may lead to erroneous deductions.

TABLE I.
INDICES OF FLIGHT-FEATHERS.

	No. *	MALES.		FEMALES.		†	BEAKS.	
		Old.	Young.	Old.	Young.		Length	Girth
18.5 per cent.	1	.....	144.4	.....	.....	10	50	71
	2	143.4	.....	.....	.....	14	50	70
	3	142.8	.....	.....	.....	6	53	70
	4	141.4	.....	.....	.....	7	52	71
	5	140.9	.....	.....	.....	3	55	70
	6	.....	.....	.....	139.7	19	48	66
	7	139.5	.....	.....	.....	8	52	70
	8	.....	139.4	.....	.....	2	57	70
	9	.....	.....	.....	138.6	17	48	73
59.3 per cent.	10	138.5	.....	.....	.....	9	50	73
	11	138.0	.....	.....	.....	11	50	70
	12	.....	.....	.....	137.9	20	48	—
	13	.....	.....	137.1	.....	23	47	69
	14	.....	.....	.....	137.0	16	49	68
	15	136.05	.....	.....	.....	4	54	72
	16	.....	136.0	.....	.....	5	54	69
	17	.....	135.9	.....	.....	15	50	68
	18	.....	135.8	.....	.....	12	50	70
	19	135.5	.....	.....	.....	25	46	67
22.2 per cent.	20	.....	135.1	.....	.....	1	57	75
	21	.....	132.7	.....	.....	13	50	70
	22	.....	.....	.....	131.3	27	44	64
	23	.....	.....	130.2	.....	24	46	75
	24	.....	.....	.....	129.8	21	48	62‡
	25	.....	.....	.....	129.8	18	48	68
	26	.....	.....	129.3	.....	22	48	62‡
	27	.....	.....	.....	124.9	26	45	62‡

* Serial numbers of specimens in diminutive order of their indices.

† Numbers referring to serial arrangement of Table II. (first column).

‡ Dried skins.

TABLE II.
DIMENSIONS OF BEAKS.

No. *	MALES.		FEMALES.		†
	Old.	Young.	Old.	Young.	
1	.....	57—75	.....	.....	20
2	.....	57—70	.....	.....	8
3	55—70	.....	.....	.....	5
4	54—72	.....	.....	.....	15
5	.....	54—69	.....	.....	16
6	53—70	.....	.....	.....	3
7	52—71	.....	.....	.....	4
8	52—70	.....	.....	.....	7
9	50—73	.....	.....	.....	10
10	.....	50—71	.....	.....	1
11	50—70	.....	.....	.....	11
12	.....	50—70	.....	.....	18
13	.....	50—70	.....	.....	21
14	50—70	.....	.....	.....	2
15	.....	50—68	.....	.....	17
16	.....	.....	.....	49—68	14
17	.....	.....	.....	48—73	9
18	.....	.....	.....	48—68	25
19	.....	.....	.....	48—66	6
20	.....	.....	.....	48	12
21	.....	.....	.....	48—62‡	24
22	.....	.....	48—62‡	.....	26
23	.....	.....	47—69	.....	13
24	.....	.....	46—75	.....	23
25	46—67	.....	.....	.....	19
26	.....	.....	.....	45—62‡	27
27	.....	.....	.....	44—64	22

* Serial numbers, with diminutive length of beaks.

† Numbers referring to serial arrangement of Table I. (first column).

‡ Dried skins.

LAND BIRDS AT SEA.

BY LIEUT. ROBERT E. VAUGHAN, R.N.

THE published notes in the 'Zoologist' under the above heading by Surgeon K. Hurlestone Jones, R.N. (*ante*, p. 51), and Mr. Malcolm Burr (*ante*, p. 144) greatly interested me, and have caused me to read up my own note-book and write a few words on the subject, more especially as I can add some fresh species to the list.

Dr. Hurlestone Jones mentions having recognized eleven species, while Mr. Burr makes mention of six. My list of land birds contains fourteen species, of which six have appeared in the two previous lists, and bring the total number under observation up to twenty-three.

My observations are of a recent date, extending from Sept. 10th to Oct. 16th, 1899, whilst travelling between Aden and Plymouth, and during the season of autumnal migration.

I happened to be returning to England from Australia in H.M.S. 'Royalist,' a small vessel, barque-rigged, and consequently supplied with numerous spars and ropes, which would form ample and convenient resting-places for any chance avian visitors, or passengers, as I may call some of them, seeing that a few remained on board for about a couple of days.

We left Sydney, Australia, on July 7th, and on the 8th, at sunset, a Noddy Tern (*Anous stolidus*) settled on one of the boats' davits and went to sleep, where I succeeded in capturing it. This is somewhat of a digression, but is worth recording. The Noddy is essentially a pelagic bird, which, being the case, I think makes its occurrence on board all the more noticeable, as it could have slept on the water in comfort, as the weather was fine. In fact, this is the first time during some years afloat that I have seen any sea bird settle on a vessel at sea, though when at anchor it is not unusual for some of the *Laridæ* to settle for a while.

No other bird visited us till after we had left Aden, on Sept. 10th, and were entering the Red Sea on the 12th, when a Hoopoe (*Upupa epops*) arrived during the night, and was discovered at sunrise. The efforts of a sailor in trying to catch it frightened the bird away, and it failed to return.

Next day, Sept. 13th, a Golden Oriole (*Oriolus galbula*, female) arrived and settled on top of the awning. This time the sailor did catch it by the tail, which was all the bird left behind in the hands of the astonished tar, and *O. galbula* flew away southwards, steering a most ungainly and awkward course. No sooner had she gone than a Collared Turtle-Dove (*Turtur risorius*) arrived and settled on the jibboom, where it stayed till the afternoon, when it also flew off towards some land which was in sight.

The next afternoon, while I was on watch, a Greenfinch (*Ligurinus chloris*), flying across the Red Sea from east to west, flew in at one of our gunports, across the deck, and out through the opposite port, and was soon lost sight of. I consider this a most odd and unnecessary proceeding, and the bird acted as if it was being pursued by a Hawk, although no such bird was in sight.

Daybreak next morning revealed two Turtle-Doves (*Turtur communis*), which had, I suppose, been attracted during the night by our lights, and about 9 a.m. they were joined by three more, the whole party remaining with us for the day and sleeping at night, two in the maintop and three on the topsail yard. Next morning, Saturday, the 16th, three of our friends the Turtle-Doves had disappeared, and the remaining two stayed with us all that day, and did not leave till the following forenoon, when the weather, which had been a flat calm, changed, and a fresh breeze sprung up.

Although these two Turtle-Doves (presuming they were the same, an assumption that seems allowable) had been with us over fifty-six hours, they had nothing in the way of food. It causes one to wonder what are a bird's fasting capacities, especially on migration. I tried to tempt them with peas, &c., spread out on the awning, but they refused to come down from aloft.

This afternoon I noticed, through a telescope, a flock of between forty and fifty birds, which I believed to be Greenfinches (*L. chloris*); but they were rather brightly coloured, and may

have been the African variety of this bird (or the *Ligurinus aurantiiventris* of the followers of Dr. Cabanis). They were flying in the same direction as the Finch previously mentioned, very low, only about two feet above the water. This was the only flock of any species I saw during the five weeks I was observing land birds.

Later in the afternoon a Quail (*Coturnix communis*) flew on board and settled on the nettings (or bulwarks, as they are called by landsmen). A marine tried to catch it, but it rose, and flying round the ship settled again in the same place. Then another attempt was made, with the same result; and seven times did this bird settle on its originally selected spot, only to be stalked by various members of the crew, who tried to catch it with their caps, &c. After trying an eighth time to settle, it changed its mind and eventually flew away. I don't know why the bird should have persistently chosen to settle on the same spot each time and meet with the same welcome, considering the ship was over two hundred feet long and there were many more comfortable and secluded spots where it would have been out of sight of everyone.

On getting into the Gulf of Suez next day at about 4 p.m., we were visited by three representatives of the family *Hirundinidæ*, and Her Majesty's Government that night provided well-aired lodgings, free, for three Swallows (*Hirundo rustica*), one House-Martin (*Chelidon urbica*), and three Sand-Martins (*Cotile riparia*). One of the latter and one of the former were caught and brought to me. The Swallow, when released, began to twitter; and I may say of all the birds I saw during our passage home this was the only one that uttered a note of any sort. The silence of our bird visitors (although they were not representatives of our most garrulous British species) was most apparent, and I cannot understand why it was they should all have been mute.

At the entrance to the Canal we were met by an Egyptian Vulture (*Neophron percnopterus*), who escorted and saw us safely into the Bitter Lake, although he did not perch on board. After he left, a Willow Wren (*Phylloscopus trochilus*) flew on board. A most restless little bird it was, flying all over the ship and creeping about the ropes, where, finding nothing in the way of insect life or refreshment, it left us at Ismailia.

We did not receive another visitor till three days out from Port Said, on 23rd September, when a Wheatear (*Saxicola œnanthe*) came to tea and slept the night. Next morning another had arrived, and a little later a Redstart (*Ruticilla phœnicurus*) put in an appearance. The Wheatears left in the afternoon for the south-east, and the Redstart made itself quite at home on one of the guns. It so happened that a sailor was turning out his "bag" (which is a nautical receptacle for clothes), and the ship during her twelve years in Australia had collected a very fine breed of Cockroaches. As the sailor was shaking out a jumper a Cockroach was jerked out on to the deck in front of the Redstart, who pounced down and greedily devoured it. That started half the crew Cockroach-catching, in which I joined myself, and there never was a pampered bird so banqueted before. I gave it eleven, and it was fed till dark; the capacity of its stomach was truly remarkable.

During the night our ship's terrier caught a small bird, which I believe was a Whitethroat from an examination of the chewed remains in the morning.

On sighting Malta, our friendly Redstart left us and flew away, not towards the land, but in a southerly direction towards the African coast; so I imagine the Redstart did not perch on board us for the sole purpose of resting, but had lost its way, and on its seeing Malta it recognised a landmark in the route southwards, and proceeded on its migratory course. The weather was fine all the way from Suez.

I never sighted another land bird till we were forty miles off the Land's End, when, in a strong north-easterly gale on Oct. 15th, a Song Thrush (*Turdus musicus*) flew on board. I never saw a more slovenly untidy bird, but as it was the first to welcome me home after an absence of five years from England, I forgave it its slatternly appearance. It didn't stay long, and, after trying vainly to fly to windward, turned tail, and was blown away on a course which would have eventually landed it in South America. Earlier in the morning I had seen a Duck (sp. inc.) very high up and flying very fast towards Ushant; but I can hardly include this in the list, as I failed to recognise the species. That completes my list of birds, and H.M.S. 'Royalist' arrived next day at Falmouth.

On reviewing the three lists I find the Turtle Dove (*T. communis*) appears in all three, and as I have observed it on a previous occasion, it seems to be quite a common visitor, and one feels inclined to wonder if it is gifted with insufficient powers of flight to cope with the great strain put on the species at this period of the year.

The same remark certainly cannot apply to the *Hirundinidæ*, yet they appear on my list and Dr. Hurlestone Jones's, and I can remember in 1893 catching three Swallows (*H. rustica*) in April when serving as a midshipman in H.M.S. 'Calypso.' Unfortunately I did not keep a note-book in those days, but we were somewhere between the Land's End and the south of the Irish coast. By the way, the Wheatear appears on all three of our lists.

Why do birds settle on ships—that is the question? One reason undoubtedly is the attraction of lights at night, especially the powerful white light which all steam vessels carry. For example:—One night, when off the Australian coast, a Red-tailed Tropic bird (*Phaëthon rubricauda*, Bodd) flew up against the mast this light was on, and, having stunned itself, fell on to the deck, where I picked it up, and skinned it. Its two long tail feathers were fortunately undamaged.

During autumn a vessel steering north in the Red Sea, where most of the birds on my list were observed, would meet, and attract, birds flying in a southerly direction. Several birds I have mentioned arrived and perched during the night.

But what about the daytime? In some cases, notably that of the Turtle-Doves, land was in sight all day, yet they did not leave us. The Red Sea is no great distance across at its widest part, and is well provided with littoral islands, offering many resting-places where the birds would be free from molestation. The only really weary wayfarer was the Quail, which appeared completely fatigued, and only rose at the last moment to avert capture.

In the Suez Canal, for example, the Willow Wren must have visited us out of pure curiosity, as it left a green and favourable-looking locality to perch on board.

The silence of birds on board I have already touched on, also the question of hunger.

As some of your readers are afloat, I appeal to them to make use of the ample opportunities that occur, principally in spring and autumn, for studying land birds that come on board. Some annotated observations on them *re* the two above-mentioned points would, I am sure, be of interest.

The majority of vessels in the navy now having merely pole masts and nothing in the way of rigging, but plenty in the way of funnels and ventilators, fail to offer the perching attractions that a masted vessel does.

When one starts discussing birds, the subject is so interesting that it can be spun out to an indefinite length, and the points in their economy that are after all only slightly known are many. I only hope that in writing these few notes and observations I have not wearied the patience of the reader.

HOW DOES THE CUCKOO CARRY HER EGG?

BY A. H. MEIKLEJOHN.

ON May 12th, while on the road between the villages of Hamstreet and Woodchurch, in Kent, I had, to me, the unique experience of seeing a Cuckoo in the very act of placing its egg in the nest of a Robin. The facts are briefly as follows:—I happened to be sitting down by the roadside watching a Wryneck through my glasses, when a Cuckoo flew over my head, and, turning sharply, alighted on a fence-rail about two hundred yards down the road. From there she flew across and entered the opposite hedge, which was raised on a bank covered with a thick undergrowth of nettles, grass, &c. The Cuckoo had scarcely disappeared before she again re-appeared with a small bird in close pursuit, in which two or three Starlings, which evidently had young in the farm-steading opposite, joined. At this moment a man passing in a cart disturbed the Cuckoo, which, flying over the hedge, alighted in the meadow beyond. Noticing the bird's apparent disinclination to leave the place, I walked down the road and lay quietly on the grass opposite to, and at a distance of twelve yards (paced) from, the spot where the Cuckoo first entered the hedge. I had not sat there for more than two minutes when back came the Cuckoo, gliding along the hedge, and finally alighting with a loud squawk exactly opposite me. What struck me at once from this and many subsequent views of the bird was the swollen appearance of her throat, which half-way down showed a distinct protuberance, as might well have been caused by an egg. I several times turned my glasses on her, and at that short range I could plainly see the feathers sticking out over the distended part of her gullet; and, as my subsequent remarks will show, it seems to me that this swelling was caused by her egg. From the moment of alighting to the close of this domestic tragedy, the Cuckoo was attacked with the

utmost fury by the pair of Robins, upon whose nest she desired to "board" her offspring. Again and again the little birds struck and buffeted her; and, on two occasions, one of the Robins seized hold of the Cuckoo by the back of the neck and hung on for a few seconds with all the fierce tenacity of a bull-dog. Whenever the Robins made one of their ferocious dives, the Cuckoo threw back her head, opened her great orange-coloured gape, and squawked loudly—*ergo, her egg was not carried in her bill.* Twice the Cuckoo disappeared into a recess at the root of a hawthorn, and this the Robins in no way resented. Emerging the second time from this recess, the Cuckoo, in spite of the fiercest opposition, alighted with out-spread wings and in a sprawling attitude about three yards further up the hedge. Here, pausing for an instant, during which the Robins got terribly excited, the Cuckoo made a sudden dash amongst the grass and disappeared entirely, *except for the end of her tail, which was sticking out and in full view all the time.* In two or three seconds she reappeared, and flew straight away out of sight, and so quickly that I was unable to see whether the protuberance in her throat had subsided or not. At once springing up, I ran across the road to the very spot where she had gone in. I put in my hand and felt three eggs, one of which was *moist and slightly sticky*,—and this egg proved to be that of the Cuckoo. I then went down and examined the recess which she had previously twice entered, and found to my astonishment a Robin's nest from which, by its appearance, the young had but lately flown—and in the hedge I saw a young Robin hopping about. What was the Cuckoo's reason for going to the old nest first? That this nest was in the same place as that which she had remembered as the last year's nursery for her egg seems to be one explanation.

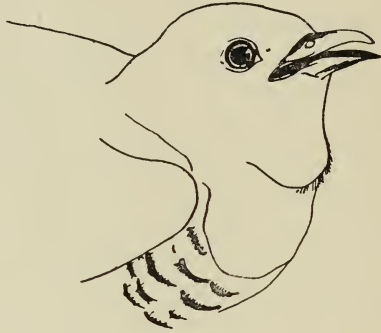
In support of my conviction that this Cuckoo carried her egg in her throat, may I be allowed to re-state the following facts? :—

I. She constantly opened her mouth to utter her continuous squawks of protest,—her egg, therefore, was not carried in her bill.

II. Her tail being visible to me all the time she was engaged at the nest, she did not *lay* her egg in the usual way.

III. The egg was moist and slightly sticky.

IV. The distended appearance of a certain region of her throat, as shown in the rough sketch below, might well have been caused by the egg.



NOTES UPON THE ZOOLOGICAL MEETING OF PAVIA.

BY COUNT ETTORE ARRIGONI DEGLI ODDI.

Two months ago a Committee, composed of the most illustrious Italian zoologists, invited their colleagues to a meeting which was to be held at Pavia on the 22nd and 23rd of April, 1900. The purpose of this meeting was to found a "National Zoological Union," and to facilitate and make possible an Annual Congress of Naturalists, which could only be done by long preparation. Amongst the subscribers may be mentioned the following University Professors:—Camerano (Turin), Cattaneo and Parona (Genoa), Emery (Bologna), Pavesi and Maggi (Pavia), Giglioli (Florence), Monticelli (Naples), and some others.

Many Italian zoologists approved of so useful and opportune an intention, and at the opening of the meeting in the Municipal Hall of Pavia several were present.

The President in the chair was Prof. P. Pavesi, a man dear to science and his friends, who is at the same time an illustrious naturalist, an appreciated politician, and now Mayor of Pavia. He warmly welcomed all those present, and stated he was pleased that the beginning of this Union should take place at Pavia. After the *vino d'onore*, Prof. Emery, of Bologna, thanked Pavesi for his kind welcome, and added some other opportune phrases. The first meeting took place at one o'clock in the Anatomical Hall, in order to decide if it would be useful to have a "Zoological Union" in Italy, and in this case to establish a scheme of statutes, and to name a temporary Committee. This meeting was presided over by Prof. Pavesi, having as a Secretary Miss Rina Monti, a young and clever naturalist. About forty persons were present, and amongst them I am pleased to mention Emery, Parona, Cattaneo, Maria Sacchi, Andres, Maggi, Mar-

torelli, Monticelli, Coggi, Giacomini, Damiani, Ghigi, Picaglia, Magretti, Rosa, &c.

After interesting discussions the following statutes were provisionally approved:—

That an Association be established in Italy in order to diffuse and to advance zoology, and also to facilitate *rappports* amongst the lovers of this science, as understood in its fullest meaning, and to defend the interests of the teachers. That it take the name of the "Italian Zoological Union." That the number of its members be unlimited. That the "Union" shall have no fixed place of residence; that every year an ordinary meeting will take place in any Italian town fixed upon by the members, but that eventually arrangements may be made for extraordinary meetings. That its Council be composed of a President, two vice-Presidents, a Secretary (to be also a Treasurer), and a vice-Secretary; the duration of office to be for three years, and no re-election be allowed except in the case of the Secretaries. That the "Union" publish a simple bulletin with the names of its members—the "social bill"—the verbal proceedings of the meetings of the Committee and of the general meetings, and a short summary of the scientific work. The other matters which were established refer to the ordinary rules of the statutes, and are not generally interesting.

Ultimately the temporary President, Pavesi, delicately resigned, in order to leave the assembly free to elect whom it would; but he was asked to stand for the presidential chair, and was unanimously elected. The Secretary was Miss Rina Monti. The entire Committee will be chosen at the first annual general meeting.

The next day another meeting took place, when it was decided that the first assembly should be at Bologna, at the end of next September, and Prof. Ghigi of that town returned thanks for this choice, saying that Bologna would be proud of the decision. After a long discussion, on the proposal to have a zoological journal in Italy, and regarding the means to support it, a Commission was nominated, composed of the well-known Professors Emery, Cattaneo, and Monticelli, who will examine the question, and give the result at the next general meeting. At the conclusion the late proposed law of Minister Baccelli was fully

discussed with regard to the teaching of natural history in secondary schools, and a motion was carried that the actual hours for study of natural history teaching, and particularly of zoology, be maintained as they are; that the same teaching be given only and exclusively by the Doctors in Natural Science, and it was decided that this be communicated to all the Natural History Societies of Italy, and afterwards communicated to the Ministry.

This concluded the meeting. On the same day a tablet was unveiled to the memory of that celebrated naturalist, Spallanzani, with a very masterly speech, delivered by Prof. Pavesi. A dinner afterwards took place.

To illustrate the real importance of a Zoological Union in any country is unnecessary. It certainly does not need any words, and every Italian naturalist will be grateful to Prof. Pavesi and his friends for this step. Before finishing these few notes I would express the wish that the newly founded Italian Zoological Society (Rome) will join itself to this Italian Zoological Union, and so make together a force and unite all the Italian zoologists in the best friendship for the advancement of our cherished science.

BIRDS ON THE RIGI.

BY REV. CHARLES W. BENSON, LL.D.

IN July, 1899, I was Chaplain under the Colonial and Continental Society at Rigi Kaltbad, and had an opportunity of observing the birds at different heights on the Rigi, not usually enjoyed by those making a very short stay in this truly delightful locality.

Although I was unsparing in my endeavours to note any birds from Rigi Kaltbad (4791 ft.) to Rigi Kulm (5900 ft.), I could only make a list of about twenty-six species, as follows:—

KESTREL FALCON.—Not common.

CARRION-CROW.—Very numerous.

NUTCRACKER.—Nesting near the path to Küsnacht.

MISTLE-THRUSH.—Fairly numerous.

SONG-THRUSH and BLACKBIRD. — To be heard singing below Rigi Kaltbad.

RING-OUZEL.—Very numerous, and taking the place of the Blackbird with us. Called "Berg Drossel" by the Swiss.

BLACK REDSTART.—Very numerous everywhere on the Rigi.

COMMON REDSTART.—To be found in more sheltered places.

WREN.—Very numerous.

GOLDCREST.—Not so plentiful.

BLACKCAP WARBLER.—Near Rigi Stäffel at height of over 5000 ft.

CHIFFCHAFF. — Breeding near Rigi Kaltbad Hotel. These were the only Warblers on the mountain.

ROBIN.—In the woods; not very common.

CHAFFINCH.—Rather numerous.

BULLFINCH.—Fairly plentiful.

LESSER REDPOLL.—Tolerably numerous.

COAL TIT (*Parus ater*).—Numerous.

SISKIN.—*The bird of the Rigi.* Very numerous everywhere, in small flocks, flying and singing. Some cocks in beautiful plumage.

SPOTTED FLYCATCHER.—Fairly common.

GREEN WOODPECKER.—To be heard every day.

TREE PIPIT.—Fairly numerous.

MEADOW-PIPIT.—Common.

WATER-PIPIT.—I saw but one, near the Rigi Stäffel Hotel. I was attracted by its greyish back and the whitish stripe over the eye.

WHITE WAGTAIL.—Not common.

SWIFT (*Cypselus apus*).—I saw but one, and we were visited with no “Alpensegler,” as the Alpine Swift is usually called.

In addition to these twenty-six species, I heard two different species of Woodpecker, which I could not see or identify, but think that neither was *Picus martius*, a bird I saw a few years ago at Bex, in the Rhone Valley.

As I always make it a rule to go up a hill on my birthday, I went up Pilatus on July 12th, 1899, and there, at a height of about 7000 ft., I saw the Alpine Chough, the Snowfinch, and the Rock-Thrush. I heard for the first time the pleasing little song of the Snowfinch, and the really delightful song of the Rock-Thrush; but this latter I had heard before at the Hospice of St. Bernard in 1896. To my mind the expression “bursts” or “snatches” of song best describes this delightful warbling, which alone enlivens those dreary and almost inaccessible places. There is just one little patch of green near the Hôtel Pilatus Kulm, and an observer standing above it, and looking over the wall, may see these rare birds below him, and hear undisturbed their delightful song, with something of the Robin in it, and of the Blackcap too.

I may mention that at the famous “Tunnels” on the Axenstrasse, near Brunnen, the Crag Martin may always be found, and also at the Gorges du Trient, near Vernayaz, at the Rhone Valley. I have also seen the Wall-Creeper near the Tunnels, but never yet have I been favoured with a sight of the Alpine Accentor, one of the very few Swiss birds whose acquaintance I cannot claim.

AN OBSERVATIONAL DIARY OF THE HABITS OF
THE GREAT PLOVER (*ÆDICNEMUS CREPI-
TANS*) DURING SEPTEMBER AND OCTOBER.

BY EDMUND SELOUS.

(Continued from p. 185.)

September 19th.—Arrived between 11.30 a.m. and 12 o'clock. The place seemed deserted. I could discover no birds after searching it well with the glasses. On rising to go, however, after remaining about half an hour, I put up one bird quite near on the edge of the bracken, and, later, three or four others from right amongst the bracken where it was a little thin and open. At about 4 p.m. a flight of some thirty or forty Great Plovers flew down on the scant (I think, burnt) heather bounding one portion of the amphitheatre, there having been none there before. Soon after I left.

September 20th.—Rose early, and, after some hours spent elsewhere, walked across the moor to the road that runs through it. Some little time after reaching it—it being now perhaps seven or between seven and eight—a large flock of Great Plovers flew over the moorland, and came down amongst the heather. They were followed by other flocks, all flying in a long, thin, irregular line. This made them less difficult to count, and I counted upwards of seventy in the largest flock. There must have been, *I should say*, near two hundred in all. A broad bank of earth runs near here, through both heather and bracken, clothed either with the one or the other, and behind the heathery part of this, and near to where a broad gap divides the two, the birds went down. Crawling up to this bank, and looking over it, I had a near and plain view of them. They were just standing and sitting about in the heather, and did not appear occupied with anything in particular. Whilst watching them another small party flew up, and, my attention being drawn by a note

which I had not heard before, I observed that one of these latter birds was pursued by a Hawk—I think, a Sparrow-Hawk. The two were close together—in fact, almost touching—the Hawk just above the Plover, spread like a fan over him, following every deviation of his flight, upwards, downwards, to one or another side, but sometimes falling just a little behind, though there was never a space between them. The two, so to speak, always overlapped. The Hawk, however, did not strike, nor, apparently, attempt to, and neither the pursued Plover nor any of the others appeared to me much concerned.* I can hardly say why—perhaps it was the easy, parachute-like flight of the Hawk, with nothing like a swoop or pounce, and the bright clear sunshine diffusing an air of joy over everything—but somehow the whole thing did not impress me as being in earnest, but rather a sport or play. After a little while the Hawk left the Plover, and flew off to some distance over the moor, and alighted upon it. The cry made by the bird pursued (I assume it was made by that one) was so different from the note I had yet heard that I at first thought it was the Hawk, which I imagined to be mobbed by the Plovers, and in distress. I was soon satisfied that this last was not the case, and doubt on the other point was soon removed, for, the whole flock of birds shortly rising and flying off, I now heard the same note uttered by them all about. It is very different to any other one that I have yet heard. Though plaintive, it is not nearly so wailing, and more musical. It is a whistling note, with a sort of tremulous rise and fall in it (“tir-whi-whi-whi-whi-whi”) very pleasant to hear, and bringing the sea and beach to one’s mind. The whole troop shortly returned, and came down once more in the heather, in a little while again rose, circled about, flew off, returning again—and did this several times, giving me the idea that they are congregating previous to migration, and have the restless feelings preceding it. When the birds settled they would proceed a little through the heather, making their quick short runs with abrupt stops, and following each other, but the greater number of them would before long settle down and sit about amongst the tufts. They never ran over the tufts, but in and out amongst them as we would do. I observed no dancing, though altogether I must have had the birds under

* But I may have been deceived. See pp. 275-6.

observation, I should say, at least a couple of hours. Neither did I observe them to be catching insects, or otherwise procuring food. Also I note that, except for this new note ("tir-whi-whi-whi-whi-whi"), and for far the greater part of the time, the birds flew silently. The whole flight up was in silence until the Hawk incident. No cry uttered whilst on the ground.

At about 5.30 to 6 p.m. I returned to this same bank, distant by about some thousand yards from the place where I had first seen the birds assembled, and watched them dancing. When they had flown off in the evening, they had always gone in one direction (towards where I now was), and I wished to see if they would again settle on the heather here, or fly on, as I supposed they would. Not expecting to find any birds here now, I walked up without precaution, and put a good many up from the same place as this morning. It was a pity, as I should have liked to have noted their behaviour also as the evening came on. I now sat down behind the bank, looking over it in the direction of the amphitheatre. About 7 p.m. (as I suppose), the moon being well risen and bright (full or almost full), the birds began to fly up and over me, heralded by their wailing cry. I counted some twenty odd, but most escaped me in the gloom (the moon not helping much). They showed no inclination to stop at this second place of resort (as I now think it to be), but went right away over the country, flying in twos, threes, or fours at irregular intervals. Compare this with their morning flight in a great flock, silent, or, if not, uttering a quite different note.*

September 21st.—Walking to the same place as yesterday, I concealed myself on one side of the bracken-covered part of the bank near the wide gap, and commanding the moor in two directions. This must have been about 5.35 or 40 a.m.

Bright and clear, but breezy and chilly. Rabbits about, but not very alert, and as I walked along the road I noticed several that sat as if asleep by their burrows.

Lightening now in the east, but sun not yet visible from behind a wooded hill.

A small flock of Starlings (first bird-life noted) fly by over the moor.

* But *this* morning flight was with little doubt due to the birds having been disturbed, as will shortly appear.

Few minutes afterwards cooing of Wood-Pigeons heard in distance (more or less) from wooded parts around.

Sun now risen over crest of hill.

Some small birds fly over the moor in same direction as Starlings (towards some wooded pieces).

A Stonechat hovers in the air quite near me (I think, examining me), the body seeming always to be in the same place, and almost motionless, the wings continually and strongly waving.

Some ten or fifteen minutes later (sun now shining through tops of row of tall fir-trees skirting road not far off) a couple of Wood-Pigeons fly over the moor, and the cooing becomes more *en évidence*. Then, as the sun crests the fir-trees, a Thrush (flying very high for a Thrush) flies over moor. Then seven Wood-Pigeons high in air. Small birds now fly over in numerous little parties, two often chasing each other in joy and sport, as though it were the pairing season. Their twittering is heard about, the earth becomes lightened by the rising sun (now well over firs), and life really awakes.

But no sign of the Great Plovers yet.

Sun well up (twice height of fir-trees), yet no sign of them.

Must now be getting on for seven.

Hawk sailing in air some way off, annoyed by quite a cloud of small birds. This continues for some time. They do not appear to be Swallows, but Buntings (to give a guess), and other small Passeres. Hawk makes no endeavour to catch one.

Splendid day as yet, but sharp and cold.

In about another quarter of an hour a small flight of Wild Duck fly high in air, following course of stream (up stream).

I now notice some Plovers amongst the heather on other side of bank in same place as before. They have, I think, been there all the time, but I had taken them for Rabbits, and not used the glasses. I cannot make out a dozen. They are quite quiescent, all sitting, some preening themselves a little. Searching the heather thoroughly can make out a few more, equally inactive.

Whilst thus engaged the main body of the birds came by in a great flock, flying right over me, many of them, I should think, not more than eight to twelve feet above me as I crouched on the

ground (perhaps lower). I had just got back to the other side of the bank, and raised my head, as it were, into a cloud of birds. It was a charming and indescribable sensation, to be thus suddenly surrounded by these free fluttering creatures. They were all about me, and so near. The delicate "whish, whish" of their wings was in my ears, and in my spirit too. I seemed in flight myself, and felt how free and how glorious bird-life must be. They had taken me quite by surprise, coming up quite silently from the direction of the amphitheatre—upwards of one hundred at the very least, I should say; but so effectually does the heather conceal them that, now they are down with the rest, I can only count thirty through the glasses. After running a little in their characteristic way, as described, they for the most part stand and sit about in the sunny heather. I can now, though none have gone up since, only count eleven in the heather.

Another flock—this time a small one—now flies over me, and joins the rest. I am again taken by surprise, as I am lying on my face, examining the other birds, with my back (or rather my heels) turned towards where these come from. Can only tell that they fly from the same general direction as the first flight, and they also pass exactly over me at a similar height.

The birds, having now thoroughly settled down, I search the heather well with the glasses over a wide space, and out of all that great number can only make out twenty-six. The glasses discover a good many open pools and little canals of grass amongst the heather, but in none of these is a bird to be seen. They must therefore be right amongst the heather. Many of those I count are heads just protruding from it. Others are standing or sitting against the side of the tufts where it is rather thinner. A small naked patch or two may therefore be said to be occupied in this way, but where it gets more open there are no birds. I should think, indeed, that the birds generally sit close against the sides of the heather-clumps, and not right in the middle of them. Those that I can see seem to be so situated.

It must now be past eight, perhaps past nine, but there has been no flying backwards and forwards from one place to another, or circling about, as on yesterday. The birds have all remained where they went down, nor have any of those that were there

when I came flown away. They are, indeed, wonderfully quiet this morning (compared, at least, with yesterday), hardly a bird running (none just now), but all sitting and sunning themselves; for one rising and running, or rising merely, becomes at once visible. It is a fine sunny day, but was fine and sunny in the morning yesterday too. It is, however, I think, somewhat less cold.

September 22nd.—Between 3 and 4 a.m. a violent storm was blowing, with, as I thought, rain, and I was anxious to see how this weather might affect the birds. At daylight, though not quite so rough, it was still blowing almost a gale. No rain was falling, nor do I think any had fallen. A west wind; the western part of the sky clear. I first went to my old watch-place on edge of amphitheatre, expecting to find the birds assembled there, as they had flown up yesterday from that direction; but, on searching with the glasses, I could not discover any. (It was quite light, probably between 5.30 and 6, but had forgotten to look at clock before starting.) I then walked to same place as yesterday, and, sitting with my face turned towards where I had come from, waited for the birds, hoping to be able both to watch their flight up and mark their point of departure. I first noted, however, that some birds (possibly a good number, though I could only make out six or seven) were sitting in the heather on other side of bank, in same place as before. This long bank, for the most part covered with bracken, dividing the moor, and approaching in one place near a patch of open wood, gives fine opportunities for patient watching. I watched, however, in vain—no birds appeared; and, when I judged it to be about nine or later, I thought it no use to stay longer. It may perhaps be on account of the very strong stormy wind inclining them to lie close, for I do not suppose they had flown up before I came, so much earlier than on the two preceding mornings.

As I am on the point of going five birds fly up, but on reaching bank they shear off, and fly right away instead of going down amongst the others; may possibly have seen me. They did not come from direction of the amphitheatre as on former occasions.

In reflecting on the incident of the Hawk and Plover, as witnessed by me on morning of 20th, I begin to think I may have misinterpreted it—undervalued it, so to speak. At the time it

did not seem to me either that the Hawk was much in earnest or the Plover much alarmed; nor could I observe that the birds generally seemed particularly scared or excited. Reflecting now, however, that my attention was first called to it by a peculiar cry on the part of the Plover, which I had not heard before, and that the frequent utterance of this cry by the birds generally, their restlessness, frequent risings, circlings about, and flights backwards and forwards from one place to another, all took place subsequent to the chase; and then, contrasting this conduct with their behaviour next morning (not rising again after they had once gone down), I am inclined to think that the one may be explained by their alarm at the Hawk, and the other represent their usual habits.

September 23rd.—Must have got to the bank (same place as yesterday) about six. Sun just rising. Fine day. A fair amount of wind, but nothing compared to yesterday. Calm and still in comparison. Some birds in heather as before. Cannot tell how many, or whether any have flown up. After sitting and waiting a long time my attention was attracted by some cries of Herons in neighbouring copse, and I crept up the bank and listened, with the intention, if the Plovers should not come soon, of walking over and trying to get close enough for observation. At this moment, and whilst looking in opposite direction, a small flock of Plovers flew over me, and came down amongst those already in the heather. There were seventeen, and they flew quite silently. Vexed to have missed them again, I re-descended the bank, and had not been settled in position many minutes when a large number (evidently the main body) rose in a cloud into the air (as it seemed to me directly over the amphitheatre), and after circling a little, shining in the sun (their light under surface looking a beautiful soft silver), came straight down in my direction. I concealed myself well amongst the bracken. They passed as before, but, as I had a little shifted my position, not so directly over me. They flew silently—I did not hear a single cry—and as soon as the last had passed me I crawled again to the edge of the bank, and was in time to see most of them come down in the heather amongst the others—a very pleasing sight. They alight with wings raised above the back, and little stilt-legs stretched down, slanting a little forward, and on touching the

ground give (in most cases, I am not sure if in all) a little run forward. After the descent there was a good deal of running about, and very shortly another smaller flock flew up, doubtless from same place, though this I did not see. This last may have contained some twenty to thirty birds. The main body it was impossible to count; they were more together than before, not in the long straggling line that I had noted on 20th. After they had gone down I made haste to count them before they had become more concealed by the heather, and I made out one hundred and eight, some five or ten minutes later about seventy, and again, counting them after making these entries (commencing from about the Herons, and taking, I should say, a quarter of an hour), I could still make out fifty-four. They do not therefore appear to have concealed themselves quite so effectually as on 21st. There were no birds running about. As far as I can judge without a watch, it must have been about 8 a.m. when the birds flew up. After the last batch of them had arrived I again heard, once, the whistling note I have described ("tir-whi-whi-whi-whi-whi"), otherwise there was complete silence.

(To be continued.)

NOTES AND QUERIES.

AVES.

Occurrence of the Water-Pipit (*Anthus spipoletta*) in Sussex.—On Feb. 27th last I received for identification a Pipit from Mr. G. Bristow, of St. Leonards. The letter accompanying the specimen stated that it had been shot on Feb. 19th at Hollington, near St. Leonards, by a boy named Peacham. On comparing the bird with the descriptions in Dresser's 'Birds of Europe,' I came to the conclusion that it must be a specimen of *Anthus spipoletta*. This identification was afterwards verified by Mr. Howard Saunders. The bird was a hen by dissection.—N. F. TICEHURST (Winstowe, St. Leonards-on-Sea).

Flycatcher feeding on Worms.—On May 12th I noticed a Flycatcher (*Muscicapa atricapilla*), which had only arrived that morning, feeding on worms. The day was cold and wet, and probably flies were scarce, and the bird weary. Is this unusual? I do not remember a similar case coming under my observation.—R. H. RAMSBOTHAM (Meole Brace, Shrewsbury).

Great Spotted Woodpecker (*Dendrocopus major*).—On Tuesday, May 15th last, about 7 p.m., I was in my garden on Greenhill, Evesham, and, hearing the peculiar rattling noise attributed to these birds in common with the smaller Spotted Woodpecker, I followed the sound which proceeded from the plantation adjoining the garden. I found it very difficult to determine the exact spot the noise came from; for one moment it appeared close at hand, and the next some considerable distance away. In the plantation there are a quantity of dead or dying beech trees, and, thinking it probable the noise proceeded from one of them about fifteen yards or more beyond me, I stood behind the trunk of a tree and waited. Fancying I saw a slight movement in a Scotch fir tree nearer to me than this beech tree, I watched carefully, and soon discovered a Woodpecker perching close against the trunk of the fir, its breast only being visible to me, its head and beak then being hidden by the trunk of the tree. All at once the bird began hammering with its beak at a dead branch which joined the tree-trunk where it sat, and the strange ringing rattle was produced. With the aid of a powerful glass I was able to observe the action of the bird carefully, and found myself scarcely able to believe that such a sound could be thus made. The branch was sharply hit or pecked by the bird

with the point of the beak, and its head was moved with extraordinary speed so that the action appeared almost continuous. I estimate the continuation of each period of hammering at five or perhaps ten seconds, which was followed by a somewhat longer pause. The bird was of very brilliant plumage—evidently the male bird—and the noise had been repeated four or five times when it was joined by a second bird, evidently its mate. The pair then moved to another part of the tree, and to the leafy branches of a beech tree standing between me and the fir, and it was only at times that I could distinguish them before they flew away. My presence was quite unsuspected by them, and I am convinced that the rattling was the call-note of the male bird, as it is said to be. Upon the meeting of the birds the noise was at once discontinued, and the only sound the birds made were soft twittering noises, as if speaking to one another. The branch used as a sounding-board was of considerable size, and at a height of about fifteen or twenty feet from the ground. The bird whilst hammering was almost sitting at the union of the tree and the branch in an upright position, and its beak was moved nearly horizontally, being very slightly inclined downwards. With the aid of the glass I clearly saw marks of the beak upon the bough.—OLIVER H. NEW.

Breeding of the Shoveler (*Spatula clypeata*) in Kent.—On May 3rd last I put up a pair of Shovelers from a piece of water in Romney Marsh; I got a good view of them through my glasses, and saw them a second time about half an hour later, when they flew back over my head. I searched the neighbouring rush, tufts, &c., but was unable to find any nest. On going back, however, to the same place on May 19th, I saw the hen bird swimming, followed by nine young ones a day or two old. The cock bird was not visible on this occasion. So far as I am aware, this is the first record of the Shoveler breeding in Kent.—N. F. TICEHURST (Winstowe, St. Leonards-on-Sea).

Breeding of the Garganey (*Querquedula circia*) in Kent.—I have the pleasure of recording, I believe for the first time, the breeding of the Garganey in Kent. My brother found the nest on May 2nd in Romney Marsh. It was situated in quite a dry place in some long grass, and between thirty and forty yards from the nearest water. When first seen the nest consisted of only a few strands of dead grass, and contained one egg. On May 3rd there were two eggs, and a lot more grass-strands had been added to the nest, which was so well covered up and hidden that we had some difficulty in finding it again. On May 7th the nest contained six eggs, which were sparsely covered with down and a few grass-stems, the nest itself, owing to its increasing size, being much more easily seen than before. Subsequently, on May 12th, we found a second nest containing

five eggs and the remains of a sixth, which had been broken probably by being trodden upon by a sheep. The nest was deserted, the remaining eggs being glued to the nest by the contents of the sixth, the spaces between the eggs being occupied by a small growth of mildew. The amount of down in this nest was much less than that in the first, but still there was quite enough to surely identify the eggs by, the down being quite characteristic, and wholly unlike that of the Common Teal. I have suspected that this bird bred in Romney Marsh for some years, ever since having been told by a former resident there that a pair or two of Garganeys generally turned up at a certain spot about the 1st of May every year, but that so far as he knew they did not breed.—N. F. TICEHURST (Winstowe, St. Leonards-on-Sea).

Little Crake in Shropshire.—A specimen of this rare bird (*Porzana parva*) was shot in November, 1898, by Mr. Tatton at Petton Park, seven miles north of Shrewsbury. It was lately recognized by my friend Mr. W. H. Hodges. Subsequently Mr. Tatton lent me the specimen, and I exhibited it at a meeting of the Caradoc Club. Mr. Howard Saunders has also seen it, and confirmed the identification. The occurrence is especially interesting since no authentic records are known, I believe, for any of the western counties north of Somerset.—H. E. FORREST (Shrewsbury).

The Tameness of unmolested Birds.—In a letter received last month (May 10th) from my friend the Rev. A. F. Day, S.J., he gives me some graphic accounts of the confidence shown by wild birds to the inmates of St. Benno's College, St. Asaph, N.W., where theology is the passion rather than zoology, and where skins and eggs are presumably not collected. He writes:—"Nearly all the Robins come freely on to the hand to take the food that is offered them; several will pick it out most dexterously from between the lips. The general accomplishment of cock Chaffinches is to catch fragments thrown up into the air, and one or two (at least) come on to the hand almost as confidently as the Robins; but now that nature's provision is plentiful we more seldom succeed with them or the other occasional birds. The Hedge-Sparrows have lately taken to stepping on to one's hands if lowered towards the ground, and it is with considerable assurance for such modest little creatures. The Coal-Tits have never been shy, but it was considered something of a triumph to get the Blue Tit to follow their example; and now there is even one Ox-eye (Great Tit) that does likewise—him I had on my hand yesterday. Such are the main facts connected with the St. Benno's natural aviary (I mean grounds). A short time ago I had a Coal-Tit firmly perched on my fingers for what seemed at least a minute, whilst excavating half an almond held between my thumb and forefinger. If you don't believe above, come and verify it."—ED.

Ornithological Notes from Shetland.—A specimen of Buffon's Skua (*Stercorarius parasiticus*) was obtained on May 24th, a male in full plumage, measuring from tip of beak to tip of central tail-feathers, $21\frac{3}{4}$ in. ; the central tail-feathers were $11\frac{5}{8}$ in. in length. The stomach contained a few small beetles and some vegetable matter like tops of heather. I am not aware that the bird has ever been recorded as visiting Shetland. The Blackbird (*Turdus merula*), usually described as merely a visitor to our isles, is now resident throughout the year, and has nested and brought out young for several years past. A pair built a nest in the honeysuckle which grows on the south wall of our house ; four eggs were laid, but a marauding fiend of a cat upset all the domestic arrangements, and the birds have disappeared. I have been watching for some time past another nest built by a pair of Blackbirds in a loose stone wall close by the house, and to-day (May 26th) I was pleased to hear the chirping of young birds, and to see the old male carrying food to and fro. The season has been very bleak and cold ; the leaves are only appearing on the trees now, and this, together with the desire to circumvent the odious cats, may have induced this particular pair of Blackbirds to abandon their usual habit of building in a shrub, and flee for security to a stone fortress. I am very much amused with a Starling which haunts this house ; his power of imitating is excellent. I have heard him imitating perfectly the Blackbird, Hooded Crow, Corn Bunting, my police-whistle, and the neighing of a Horse.—T. EDMONDSTON SAXBY (Halligarth, Baltasound, Shetland, N.B.).

AVICULTURAL NOTES.

Hybrid Doves.—*Homer Pigeon* ♂ × *Collared Turtle* ♀.—While in Manchester the other day I called upon Mr. Fred Muirhead, of Barnfield, Prestwich, to see his interesting little collection of living animals and birds, and more especially to examine a hybrid betwixt a cock Homer Pigeon and a hen *Turtur risorius* that I had heard of. It is a male, and was bred in 1899. Its parents were not regularly paired, as it was the result of illicit intercourse, the male parent having already his own household located in the same aviary close beside the Turtle. In appearance the hybrid is of bolder carriage and smarter figure than a Turtle-Dove, while in colour it is all over of a much darker shade, wanting the dark collar, or any indication of it. The neck shows a beautiful vinous reflection similar to that of many dun or red-coloured Pigeons. Across the terminal third of the tail there is an indication of a dark bar. In size it is decidedly larger than the Turtle, slim and elegant in outline. The voice differs markedly from either the Pigeon or the Turtle, and appears to me, allowing of course for the lesser volume of sound, to be exceedingly similar to that of the Wood-Pigeon (*Columba palumbus*). The hybrid (only one bird of the *mésalliance* was

reared) has been mated this season to a Turtle-Dove, but as yet the eggs have proved infertile. According to Count Salvadori ('Cat. of Birds,' xxi. p. 414), *T. risorius* is a domestic race of uncertain origin. It is not, however, probable that there is anything "composite" about its pedigree. Long domesticity would seem to have developed some tendency to hybridity when opportunity offers. Some instances are noted (*loc. cit.*) with the Passenger Pigeon (*Ectopistes migratorius*), and with the male Fantail Pigeon, a whole series of specimens being obtained in the latter instance. Mr. Blagg has recorded (Zool. 1891, p. 113) a cross with *T. communis*, and Mr. W. Williams has also described a similar case (Zool. 1894, p. 64).

Domestic Pigeon × *Columba ænas*.—Several years ago my friend Mr. James Blacklock, of Southwick, in my own neighbourhood, obtained eggs of the Stock-Dove from the ivy-covered sea-cliffs near his place, and had them hatched under Common Pigeons. The young Stock-Doves were reared successfully, and last year paired with Pigeons. Eggs were laid and successfully hatched, but all the hybrid young produced in successive broods have invariably died when a few days old. This present season the same thing has happened, and no hybrids have lived more than a week or so. I applied in the columns of a fanciers' paper to see if any Pigeon rearer could suggest a remedy, but so far none has been suggested to obviate this aggravating result.—ROBERT SERVICE (Maxwelltown, Dumfries).

PISCES.

The Pike and its Prey.—The voracity and cannibalism of this "fresh-water Shark" is so well known as to need no comment here, and the fact of my present note may be superfluous for the readers of 'The Zoologist'; but until recently I had an idea, from my own small experience in the matter, and information from various anglers, that the Pike invariably swallowed its finny prey head foremost; if so, I have an exception which proves the rule. At the end of January a friend of mine caught a female Pike weighing 18 lb., and, on opening it, a fish of the same species was found in the stomach, weighing originally, I should suppose, from eight to ten ounces; but the flesh of the tail portion of the body was partly digested, as it had been swallowed tail first, which I supposed was somewhat remarkable, as in my limited experience I had not met with a fish in a like position in stomach of either bird or fish, and I have dissected some numbers for the sake of ascertaining their usual food. I can well understand that a comparatively small fish once within the grip of such a tooth-arrayed and ponderous jawed monster had a very remote chance of escape, whether taken head or tail first; and I had been led to believe that if a fish was taken crosswise it was worked in the jaws of its captor until the head of the victim pointed throatward. Of course it is well known that the murderous pointed hooks are directed towards the head of the "bait," which seem to upset the theory of head first.—G. B. CORBIN (Ringwood, Hants).

NOTICES OF NEW BOOKS.

The Birds of South Africa. Vol. I. By ARTHUR C. STARK, M.B.
R. H. Porter.

THIS volume introduces the series about to be published on the 'Fauna of South Africa,' edited by Mr. W. L. Selater, the Director of the South African Museum, Cape Town, and possesses a melancholy interest by the fate of its author, who was killed at Ladysmith during the late siege.

Ornithology is rapidly becoming—even if it is not already—much less an esoteric science, to be followed only by students of means, who found it possible to acquire a charming but all too expensive a literature. We already possessed Sharpe's edition of Layard, and the excellent 'Notes on the Birds of Damara Land,' by Anderson, revised by Mr. J. H. Gurney; but these were practically the only handbooks on the South African subject. There was a large literature, as may be seen by the bibliography given in this volume, but it pertained to the possession of a specialist's library; while the ponderous, expensive, and somewhat unreliable volumes of Le Vaillant were not only outside the reach of most, but represented an archaic form of the science. Consequently this book supplies a real want, as any traveller or collector in that now unsettled region will gratefully acknowledge.

The classification pursued is very largely an eclectic one, based upon the proposed systems of Messrs. Selater and Sharpe; the plan and arrangement followed is that of Mr. Oates in the volumes on "Birds" in the 'Fauna of British India,' while a very welcome feature of the book is the quite unusual amount of information afforded under the heading "Habits." This subject should, and probably will, incite many observers to fresh efforts, for the bionomical story of the South African Birds is yet very largely to be told. Much has still also to be added to the distributional areas of the birds. Thus the so-called "Mountain

Canary" (*Alario alario*), stated to be confined to Cape Colony and Great Namaqua Land, is also a sometime visitant to the Transvaal, the writer of this notice having still a living specimen of this constant songster which was captured more than six years ago near Pretoria.

Much information is given as to the nidification of the species, which by the descriptions and descriptive "keys" can be readily identified, though the volume only deals with about one-half of the Passerine Birds. We shall await the appearance of future volumes with the greatest interest, and the series will probably do the same for the fauna of South Africa as those edited by Mr. Blanford have done for the zoology of British India.

Catalogue of the Arctiadæ (Nolinæ, Lithosianæ) in the Collection of the British Museum. By Sir GEORGE F. HAMPSON, Bart. Published by the Trustees of the British Museum.

WITH commendable energy and promptitude Sir George Hampson has completed the second volume of his "Lepidoptera Phalænæ," the previous volume having been noticed in these pages last year (1899, p. 37). The present instalment contains 589 pages, the critical arrangement and description of no fewer than 1217 species, and, in addition to over 400 uncoloured figures in the text, there is also issued in a supplementary form eighteen excellently coloured plates.

When we estimate the amount of thorough work expended in this publication, based on the examination of nearly all available material, with its specific and generic revision, its keys to facilitate identification, and its ample references to geographical distribution, combined with the universality of its fauna, there can be little doubt we are receiving the most important entomological publication of the day. Of course views will, and must, differ on generic division; on specific differentiation probably the last word is said in many cases, and naturalists, as a rule, as well as lepidopterists in particular, should welcome the healthy specific synthesis that obtains in these pages.

We are inclined to appraise these works beyond the purely entomological standpoint. A directory may give the names and addresses of a population, but does not constitute the history of

a people. If this is true of humanity, how equally certain is the application of the principle to other animals than man. The great conclusions that have been drawn from zoological studies—especially during the last fifty years—have been based on a nomenclature which has frequently misled and generally hampered the student who sought to philosophise on the teachings of specialists. According to one authority, a genus may be peculiar to an island; to another such a genus is considered as a synonym of one which ranges over more than a single continent. Some have actually been unable to treat a species as cosmopolitan, and have seized minute local characters for specific division; others have failed to see differences where such exist. It is thus evident that the right conclusions on zoo-geography depend upon some finality in nomenclature. Such a monograph as the present—for it is more than a catalogue—is the type of publication which, while assisting the lepidopterist, will prove a boon to the much distracted naturalist.

Descriptive Guide to the Collection of Corals on view at the South London Art Gallery, Camberwell, S.E.

WE have received this Descriptive Guide to the Collection of Corals on view at the South London Art Gallery, a collection lent for the purpose by Mr. John Morgan, of St. Leonards. We were quite surprised to find, instead of the usual type catalogue—as much at home with an exhibition of wax figures as a collection of zoological objects—a most readable pamphlet on life-histories of the polyps themselves. This small publication contains two good plates, some twenty-eight pages of printed matter, a reference to some “popular works on Corals,” and is sold for one penny. With such a guide any person of average intelligence, though without a previous knowledge of the subject, can follow each specimen in the collection, and at the same time learn some of the mysteries of Coral existence. This is a very good move in a right direction.

EDITORIAL GLEANINGS.

NOTES on the mode of growth of *Tubicinella trachealis*, the Barnacle of the Southern Right Whale, have been contributed to the 'Transactions' of the South African Philosophical Society (vol. xi. p. 1), by Dr. R. Marloth. The question had been raised by what means these parasites were able to penetrate into the epidermis of the Whale, seeing that their base was quite unarmed, their mouth being turned outwards towards the water. Dr. Marloth suspected that the Barnacle possibly secreted some fluid which possessed the power of dissolving the epidermis, and tested this theory by chemical experiment, which he details. This proved that a peptonising ferment diffuses through the basal membrane of the animal, and this fact explains its peculiar structure, as well as that of the skin of the Whale at the infested parts of its head. The young *Tubicinella* simply dissolves the epidermis with which it is in contact, absorbing the peptonised liquid. As it continually grows at its lower end, it gradually descends in this way into the epidermis, the digesting of the epidermal layers taking place at the same rate as the downward growth.

IN the last published Trans. Nat. Hist. Soc. of Glasgow (vol. v. n. ser. pt. iii.), Mr. R. Hedger Wallace has concluded his communication on "White Cattle; an Inquiry into their Origin and History," the first part of which was referred to in our volume for 1899 (p. 41). The author in this instalment has dealt with the historical data relating to his subject, and has gathered considerable evidence pointing to the sacrificial customs connected with White Cattle, such as the erstwhile "Oblations of the White Bull" at Bury St. Edmunds, and the autumnal sacrifices of cattle in South-western Brittany, where at the present day the sacrifice takes the form of an auction, instead of the more ancient burning. Mr. Wallace concludes that this yearly custom in Brittany supports him in the views he has already expressed, "that a study of the folk-lore of this country, coupled with a study of the ceremonials, festivals, and traditions of the church, will afford us a satisfactory explanation why White Cattle have been carefully preserved, so that we yet find them preserved in parks." A most valuable and extensive bibliography relating to the subject is appended to this very thorough publication.

In the 'Contemporary Review' for May, Mr. Matthias Dunn contributes an article on "Mimicry and other Habits of Crabs." The instances adduced as mimicry seem to fall under the terms "Assimilative Colouration" or "Active Mimicry." Of "Habits" there is quite a number of most interesting observations recorded. Of *Cancer pagurus*, the Great Crab, Mr. Dunn has been led to believe that the finest specimens exist between Dartmouth in Devon and the Lizard headland in Cornwall, where males are often known to reach thirteen and fourteen pounds weight, and where they are only called half-Crabs when under eight inches across the back; whereas on most other parts of the British Isles Crabs two or three pounds weight and six or seven inches across the back are considered large. The powers of smell and eyesight in this species are fairly good, and it prefers fresh red-coloured fish as food, such as the Red Gurnard, Red Mullet, and Bream, or the strongly perfumed flesh of the Whitehound Shark. Its enemies are all the large Skates existing on the coasts, with the *Octopus vulgaris*, and the Nursehound Sharks; while the Sea-Breams and Wrasse delight in feeding on the remains of their slaughter. The Skates hunt them with great energy, and with their tough snouts rout them out of the crevices of the rocks, and, after crushing them, devour them whole. Mr. Dunn has seen as many as five of these Crabs in the stomach of one Skate. The Octopus also feeds on them ravenously, and, but for their sharp nippers, would scarcely look for any other food. He has more than once seen such Cuttles with their arms bitten clean off, which no doubt was the result of battling with these Crabs. The Nursehound also feeds on the smaller forms.

In the 'Cornhill Magazine' for May, Mr. C. Parkinson writes on "The Great Birds of the Southern Seas." The Albatross was well observed, and graphically described. On approaching Tristan da Cunha three or four species of Albatross had congregated round the ship, as many as thirty birds settling on the water astern in a manner highly satisfactory for close and continuous observation. After half a gale of wind a lull not infrequently occurs, when the speed is reduced to two or three knots; then the hungry creatures literally clamour for food. Directly a bird intends to alight, the legs appear straddling downwards in ungainly fashion—a moment when even an Albatross looks like an ill-balanced Goose of unwieldy size. For half a minute it runs along the surface of the waves, treading water, so to speak, until the enormous wings become manageable. Then the bird swims with both wings thrown back, like a pair of lateen sails—a very Argonaut on the translucent sea. At length the difficulty is overcome, the wings are packed away, and—like a large Gull—it rides the waves with consummate ease. Sometimes it paddles to and fro, or again

it dives gracefully beneath the surface after Squids or similar ocean dainties. Half a dozen birds perhaps gravely assemble to inspect an empty beer-bottle thrown overboard to bob up and down idly upon the waves, and inquisitive bills peck vigorously at the unsatisfactory flotsam, until a battle-royal disperses the family party. The wiser ones meanwhile hover in mid-air, craning their necks to throw penetrating glances from a superior height.

Of the Wandering Albatross (*Diomedea exulans*), the writer found eleven feet six inches to be the average wing measurement, although a gigantic specimen in the Sydney Museum extends seventeen feet six inches, with a bill six inches long. At Randwick, near Sydney, he knew of one of the "Mollymauks" having lived for fifteen years in a garden. It is a universal pet, a sort of monarch of the domain, and quite unabashed even at the presence of strangers. It will answer to call, possesses an imperturbable temper, and is gentleness itself with children. Although the "thrice resounding waves" for ever reverberate on the shore close at hand, the bird, strangely enough, never evinces the slightest desire to return to a seafaring life. Yet on a ship the captive refuses all food, and simply pines away; the heat of the tropics is said to be always fatal.

SOME records of heavy weights of fishes have lately been published, and it is desirable that these should be preserved.

STURGEON (*Acipenser sturio*).—On May 30th, at the stores of Messrs. Spiers and Pond, Water Lane, London, a huge fish was exhibited, weighing 614 lb., measuring from tip of tail to extremity of snout a little over 11 ft., with a girth of 5 ft. 6 in. It was taken in the North Sea on May 28th. Another specimen from the North Sea was in the first week of May on view in the Pentonville Road. This fish weighed 525 lb., but its length was not ascertained. (R. B. L. in 'Field.')

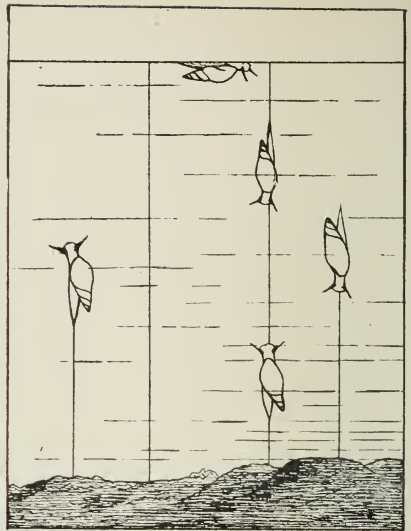
SALMON (*Salmo salar*).—One caught in the Severn of 51½ lb., at the shop of Mr. Grove, Bond Street, on May 15th.

RED MULLET (*Mullus surmuletus*).—A large specimen caught off Land's End on May 18th. Weight, 3 lb. 3 oz.; length from nose to tail, 18 in.; girth, 12 in. (H. T. Welch, 'Field.')

CAPE SALMON (*Otolithus æquidens*).—A specimen caught at Algoa Bay by Dr. Bateman, weighing 65 lb., 61 in. in length, 32½ in. in girth. Preserved, and exhibited at a meeting of the British Sea Anglers' Society, May 30th.

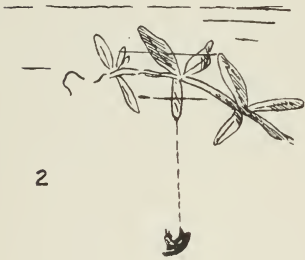


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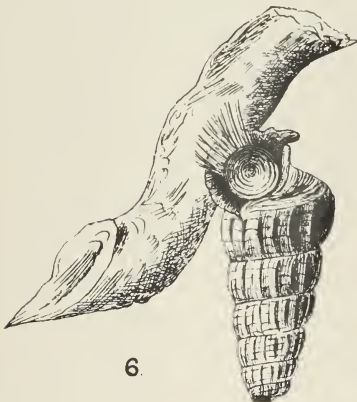
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THE ZOOLOGIST

No. 709.—July, 1900.

SPINNING MOLLUSCS.

BY H. WALLIS KEW.

(PLATE III.)

THE production of a mucus-thread, as a means of progression through the air, has long been known in the Land-Slugs, and has been observed in seven genera, representing *Limacidæ*, *Arionidæ*, and *Philomycidæ*.

The Spinning-Slug (*Limax filans*) of authors is a myth, the habit being general, extending possibly to all Slugs of the families named. The animals are occasionally seen descending from trees, fences, rafters in greenhouses, &c., and they are easily induced to descend from small exposed objects on which they may be placed. They crawl from the object, and, when the tail parts company with it, the animal is sustained by a thread, which is left by the body at the tail, and is gradually lengthened. Sometimes the animal thus reaches a new support without a fall, but the faculty is imperfect, the animal often falling either without a thread or after making a short one. Large Slugs, when full-grown, are incapable of this kind of locomotion; but small ones, and the young of large kinds, are occasionally capable of making successful descents of surprising length. Threads measuring 3-7 ft. have several times been observed, and others 8-9 ft. long have been reported.

On the foot of the descending animal wave-like appearances

are observable; these are the result of muscular action identical with that giving rise to the creature's ordinary locomotion; and we have here a clue to the nature of the progression through the air and of the thread. Whenever a Slug is in motion it discharges mucus, chiefly from the supra-pedal gland below the mouth; in ordinary locomotion it crawls over a film of this mucus which remains behind as a trail, and when in the air it crawls over a similar film, which collapses into a thread as the animal leaves it; this thread represents the trail in every respect, is derived in the same manner, and is in fact a continuation of it. The thread is lengthened by the continued crawling action, combined with a constant discharge of mucus, and perhaps also by the weight of the animal, which appears to elongate the collapsing film. There is thus no special spinning-organ. The thread, however, is of extreme fineness, and is silky when dry; it generally springs up and floats (remaining attached at the point of origin) when the animal alights; but it sometimes becomes attached to the new support, and is left, marking the animal's aerial course. If the animal does not find a new support, or fall, it sometimes turns upon its thread, ascends it, and regains the former support; it creeps up the thread as on a solid body, the slack (with other mucus emitted during the ascent) accumulating at the tail. It is chiefly when the creatures find themselves exposed to sunshine, dry atmosphere, or other dangers that they crawl from their supports. One doubts, however, whether they derive much advantage from the use of the thread; there is no reason to suppose that they would often be injured if they dropped (as they often do by reason of the imperfection of their spinning). Falls of a few feet do not appear to be harmful; and the writer regards the Slug's spinning as little more than an accidental circumstance resulting from the possession, for ordinary locomotion, of a continuous supply of tenacious mucus.

This faculty of making and using a thread, far from being confined to Land-Slugs, is found to extend not only to shell-bearing Pulmonata, but also to the remaining orders of Mollusca-Gastropoda—Opisthobranchiata, Pectinibranchiata, and Aspidobranchiata (with the possible exception of the last); and the writer's principal object in the present paper is to bring together certain scattered information concerning the so-called spinning

habits of these latter creatures—terrestrial, fresh-water, and marine univalves, and Sea-Slugs.*

PULMONATA.

In Pulmonata, other than Land-Slugs, spinning chiefly occurs among the air-breathing fresh-water Snails, in which it is probably general. Among the Land-Snails of the order it appears to be very rare; the *Helicidæ* (typical Snails) are entirely unrepresented, as also, with the exception of a single genus, are all the other groups with Helicoid shells. For *Pupidæ* we have two notes, but these, as it appears to the writer, are in need of confirmation. With regard to the more or less Helicoid, semi-Slug-like *Vitrina pellucida*, one finds that Mr. Collinge several times tried, without success, to induce the creature to suspend itself; † and a few trials by the writer with various land-shells (which were placed on twigs of needle-furze, &c.) were also unsuccessful, the animals gliding off and falling without a thread, or retiring into their shells and remaining on the twigs. In *Testacellidæ*, I tried *Testacella scutulum*; in *Vitrinidæ*, *Vitrina pellucida*; in *Helicidæ*, young *Helix aspersa* and *nemoralis* (or *hortensis*); in *Pupidæ*, *Clausilia laminata* and *C. rophii*; and in *Stenogyridæ*, *Cochlicopa lubrica*.

ZONITIDÆ.

According to Andrew Garrett, the mucus of *Trochonanina conula*, † and of other species of *Trochonanina*, is unusually tenacious, “and the animals possess the habit of ‘thread-spinning’ to perfection”; so much so, it is added, that it requires no small amount of patience, while gathering specimens, to detach them from the fingers, and secure them in the box or vial. §

* On the subject of the mucus-threads of Land-Slugs, I hope to give, in another place, details of observations and references; in addition to these molluscs, and to those now considered, the Mollusca-Pelecypoda (bivalves) are thread-makers and byssus-spinners, but I am unable at present to write of the habits of this class of Mollusca. For help in preparing the present paper, and in other tasks, I am much indebted to the courteous and continued co-operation of my friend Mr. G. K. Gude.

† Collinge, Zool. (3), xiv. (1890), p. 468.

‡ *Microcystis conula*.

§ Garrett, ‘Journal of the Academy of Natural Sciences of Philadelphia’ (2), viii. (1881), pp. 383–4; ix. (1884), p. 21.

These little Snails, as far as the writer has ascertained, are the only Helicoid-shelled molluscs known to make threads; the *Trochonanina conula* was collected by Garrett from foliage of bushes in the Cook's or Harvey Islands, and in the Society Islands.

PUPIDÆ.

There is a statement in Mr. Tye's "Molluscan Threads" (1878) that Mr. Dixon, of Leeds, "has seen several individuals of *Clausilia rugosa* var. *dubia* suspended."* A number of *Clausilia rugosa* kept by the present writer for a considerable time in glass vessels, with twigs, &c., were not seen, however, to use a thread; and, as indicated above, two other species of *Clausilia* have been experimented with on twigs of needle-furze with similar negative results. *Clausilia rugosa*, it is true, was sometimes seen hanging during rest by a point of dried mucus, attaching the lip of the shell to the object of support, and allowing the creature to swing freely; but this, apparently, was merely the result of the breaking away or failure of the greater part of the film by which resting *Clausiliæ* ordinarily fix the mouth of the shell; a method of attachment familiar to us in the common Snails (*Helix*, &c.). In *Helix* (and probably in *Clausilia* also) the mucus of this attachment comes, not from the foot, but from the mantle. On inquiring of Mr. Dixon, in 1893, the writer found that the observation on *Clausilia* had passed from his memory; he stated, however, that he had seen *Balea perversa*, in the Isle of Man, suspended by a string of mucus about an inch long from the under side of stone ledges; he supposed that the animals, in crawling over the ledges, had overbalanced, and that their mucus, more glutinous than usual owing to the dry weather prevailing at the time, had held them suspended, and had been gradually drawn out by the weight of the mollusc.

LIMNÆIDÆ.

The air-breathing fresh-water Snails of this and the next family are notorious spinners, the habit being associated with the visits to the surface of the water which most of these creatures are compelled to make from time to time for the purposes of respiration. Most of them have light shells, and when

* Tye, 'Quarterly Journal of Conchology,' i. (1878), p. 412.

the animal is extended, and the lung-sac filled with air, they differ from truly aquatic and truly terrestrial molluscs in being slightly lighter than the medium in which they live; when detached they generally rise to the surface, and from this position they appear to be unable to drop, except when they withdraw into their shells and expel air from the lung-sac. It thus happens that they usually spin upward instead of downward threads—a circumstance in which they differ, as far as the writer has ascertained, from all other molluscs. The process is probably identical with that seen in *Limax*, but the thread, instead of preventing the animal's fall, prevents its sudden rise to the surface. The animal, gradually raising the anterior part of its foot from the bottom on which it is travelling, crawls upwards through the water upon its slime, which, left behind in the form of a thread, retains the animal as it slowly ascends to the surface, to which, or to the slime-film now deposited there, the thread is fixed; subsequently, crawling down the thread thus fixed, the creature uses it as a means of descent to its former position. Mr. Warington long ago published notes on this subject, but we are chiefly indebted for our information to Mr. Tye.* The latter naturalist kept most of the Linnæids of this country in captivity for the purpose of observing their spinning. Some spun both when young and adult, others when young only; and, while some used their threads frequently, others did so rarely or not at all. The observer concludes, however, that all are more or less expert in this respect, and that "in the pellucid stillness of their own domain, when the eye of man is not present to pry into their daily avocations, this beautiful and delicate method of travelling is often used by them." It is maintained by this author, and by Mr. Taylor,† that the creatures can spin downward as well as upward threads; and from the observations of these naturalists it certainly appears that when the air in the lung-sac is sufficiently exhausted, the animal is heavy enough, while yet

* Warington, 'Annals and Magazine of Natural History' (2), x. (1852), pp. 273-6; (2), xiv. (1854), p. 366; Zool. x. (1852), pp. 3634-5; xiii. (1855), p. 4533; Tye, Hardwicke's 'Science-Gossip,' 1874, pp. 49-52; 'Quarterly Journal of Conchology,' i. (1878), pp. 401-15.

† Taylor, 'Monograph of the Land and Freshwater Mollusca of the British Isles,' i. (1899), pp. 318-9.

extended from its shell, to descend through the water, making a thread as it goes, and to remain suspended in the water upon a thread thus made. This, however, it is believed, but rarely happens. Several of the observations quoted below, it is true, imply descent and suspension; but, as the thread is generally invisible, it is possible that the animals, in some cases, may have been descending, or resting, upon threads already spun and fixed during ascent. The animal's ability to ascend or descend is attributed by Mr. Tye wholly to the condition of the lung-sac; the creatures are lighter than water, he says, when the sac is inflated, and heavier than water when the air of the sac is exhausted or expelled. It must be remarked, however, that it is when the air is exhausted that the creatures ordinarily require to ascend, and when the sac is fully inflated that they have to descend. It seems to the present writer that the changes in the creature's specific gravity are largely contributed to by the contraction or extension of the animal itself into or from its shell; and it is probable that the creature, when sufficiently heavy to sink, is usually too much contracted and withdrawn to form a thread. It is interesting to note that Mr. Tye recognizes the fact that here, as in *Limax*, the thread represents the mucus-trail of ordinary progression, such a trail, though usually invisible in the case of a Limnæid, being always present in the track of the moving animal. On plants in vessels in which molluscs have been kept for a few days, Mr. Tye adds, a network of mucus stretches from leaf to leaf, and is readily apparent when fresh water is put in, the bubbles given off by the plants then adhering to the mucus-lines.*

* The locomotory mucus, besides serving for ordinary crawling on solid bodies (when it is left behind as an attached trail), and for crawling through the water (when it is left in the form of a thread), serves also for a similar crawling progression at the surface of water, the animal, foot uppermost, now leaving the mucus in its path in the form of a floating trail. Limnæids and Physids are often seen thus crawling at the surface of the water of aquaria and of ponds; and the habit, which is common to many gastropods of all orders, was long a puzzle to naturalists. Alder and Hancock (1), however, who studied it in Nudibranchia (Sea-Slugs), saw the movements of the foot-sole to be those of ordinary crawling, and recognized the fact that the creature's progress was caused by these movements against the mucus which it emits and leaves in its track. The animal thus crawls along the floating

Limnæa.—"In watching the movements of *Limnææ* in the aquarium," says Mr. Warington, "I was for some time under the impression that they had a power of swimming or sustaining themselves in the water, as they would rise from the bottom of the pond, a portion of the rock-work, or a leaf of the plants, and float for a considerable period, nearly out of their shells," without any apparent attachment. On carefully watching this phenomenon, he found that the creatures "were attached by a thread or web, which was so transparent as to be altogether invisible, and which they could elongate in a similar way to the Spider; they also possessed the power of returning upon this thread by gathering it up as it were, and thus drawing themselves back to the point which they had quitted." The observer mentions a case in which a *Limnæa stagnalis*, having reached the extremity of a leaf of *Vallisneria*,

mucus, the authors maintain, just as it does on the attached mucus which it sheds on its path on a solid body. Willem (2), it may be added, evidently unacquainted with the work of Alder and Hancock, has confirmed their conclusions from observations on *Limnæa* and *Planorbis*:—"Les Gastéropodes d'eau douce," he says, "pour glisser renversés à la surface de l'eau, commencent par prendre appui sur la mince pellicule superficielle qui recouvre toujours l'eau des mares et des étangs; puis ils rampent à la face inférieure d'un mince tapis de mucus que leur pied sécrète au fur et à mesure de la progression. Cette locomotion," the author adds, "ne diffère de la locomotion sur les corps solides qu'en ce sens que, lors de la locomotion aquatique, le Mollusque est réduit à tirer parti de la rigidité de la seule trainée de mucus, tandis que, dans l'autre cas, la trainée est elle-même collée à une surface solide." By blowing lycopodium powder on the surface of the water, Willem clearly demonstrated the presence of the floating trail; the grains, gathering into groups on the rest of the surface, adhered evenly to the band of mucus, and showed it distinctly. Under natural conditions this floating trail is usually invisible, but not invariably. We find, for instance, that Mr. Crowther (3), passing along a disused canal connecting bends of the Calder, distinctly saw the tracks of *Limnæa stagnalis* at the surface of the clear water, in the sunshine, with a darkened background of black mud; they appeared as whitish iridescent paths of mucus, 6-8 ft. long, and half an inch wide, mostly straight, and often crossing one another nearly at right angles. (1) Alder and Hancock, 'Monograph of the British Nudibranchiate Mollusca,' 1845-55, pp. 20-1; (2) Willem, "Note sur le procédé employé par les Gastéropodes d'eau douce pour glisser à la surface du liquide," 'Bulletins de l'Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique' (3), xv. (1888), pp. 421-30; (3) Crowther, "Mucous Tracks of *Limnæa stagnalis*," 'Journal of Conchology,' viii. (1896), p. 230; and see also Taylor, *tom. cit.* p. 316, fig. 607.

launched itself off from it; and, after moving about with a sort of swimming or rolling motion in a horizontal direction for some time, lowered itself gradually. During the descent, the flexible leaf was bent with an undulating motion, corresponding with every movement of the Snail, and making it clear that the animal had an attachment to the extremity of the leaf. Proof of the existence of a thread was obtained also by means of an experiment which the observer often repeated with *Limnæa stagnalis*, *L. auricularia*, and *Amphipeplea glutinosa*.* When the Snails were some inches from the supposed point of attachment, a rod was introduced, and slowly drawn on one side in a horizontal direction; and, by this means, the Snails were made to undulate to and fro, obeying exactly the movement of the rod. This had to be done gently, for when too much force was used the thread broke, and the animal rose rapidly to the surface. According to Mr. Tye's observations, *Limnæa glabra* spins its upward thread well and easily; *L. stagnalis*, when young, does the same, but the habit decreases as the animal grows older; the same is the case with *L. palustris*, which, however, was not seen to use a thread as often as *L. stagnalis*. *L. auricularia*, *L. truncatula*, and *L. peregra*, though kept under observation by Mr. Tye, were not seen by him to spin. Mr. R. M. Lloyd, however, had observed the habit in the last-named species. The present writer has noted *L. peregra* and *L. palustris*, presumably retained by threads, slowly rise through the water in aquaria; the *L. peregra*, which was extended as if crawling on a solid body, did not always keep its foot in the same plane, from which fact the writer concludes that it was not creeping up a thread already fixed. The water through which it rose was about eight inches deep; and, on arriving at its destination, the animal applied its foot to the surface-film of the water, under which it crept in the usual inverted position. In *L. auricularia*, the use of a thread was observed, as we have just seen, by Mr. Warington. Mr. Taylor, also, has seen this species spin, and has recently published a figure of an individual using a thread. This figure (Fig. 1) shows the animal, moderately extended from its shell, suspended from the surface of the water upon a downward-spun thread. The drawing was at first supposed by the writer to be

* *Limnæa glutinosa*.

inaccurate; but Mr. Taylor, replying to an enquiry, states that it represents an observation made in his aquarium in 1889; and assures me that he has several times witnessed the formation, by *Limnæids*, of short downward threads.

Amphipeplea.—The use of a thread by *Amphipeplea glutinosa** has been observed, as already noted, by Mr. Warington. One individual was seen to gradually rise, from a piece of rock in the aquarium, to a distance of three to four inches; it then stayed its progress, and soon afterwards rose suddenly and rapidly to the surface, the retaining thread having evidently given way. Professor Tate has remarked that the water in which this animal is kept, if shallow and insufficient, “is soon rendered glutinous with their mucus-threads”;† and Mr. F. W. Fierke, who kept specimens in a jar, mentions threads of mucus “connecting weed to weed, and sometimes even decorating the shells of other molluscs with which *L. glutinosa* had evidently come in contact”; he mentions, also, having observed the animal gently rise through the water.‡

Planorbis.—In the flattened *Limnæids* of this genus (coil-shells), we are again indebted, for the first observation, to Mr. Warington, who appears to have seen the habit in several species. Mr. Tye saw it—less frequently than in *Limnæa*—in *Planorbis spirorbis*, *P. carinatus*, *P. complanatus*, and *P. contortus*, but not in six other species kept under observation. In *P. complanatus* the habit has been noted, also, by Mr. Musson.§

Segmentina.—*Segmentina lineata* || was kept by Mr. Tye, but was not seen to spin. We have a statement by Professor Cockerell, however, that one of his brothers, who had been keeping specimens in a bell-jar, had seen one “spinning a downward thread” from the surface of the water to the bottom of the bell-jar.¶

Ancylus: aberrant *Limnæids* (fresh-water Limpets).—Mr. Clark, long ago, saw that *Ancylus fluviatilis* living on pebbles in

* *Limnæa glutinosa*.

† Tate, ‘Land and Fresh-water Mollusks of Great Britain,’ 1866, p. 198.

‡ Fierke, ‘Journal of Conchology,’ vi. (1890), p. 253.

§ Musson, ‘Land and Fresh-water Shells of Nottinghamshire,’ 1886, MS.

|| *Planorbis lineatus*.

¶ Cockerell, “*Segmentina lineata*, Walker, a Thread-spinner,” ‘Zoologist’ (3), ix. (1885), p. 267.

brooks with a rapid current, must find it difficult to visit the surface to breathe, unless, as he suggests, it has the power "of veering out a filamentary cable," by which it can return to its original site.* It is probable, however, that the species of *Ancylus* are not bound, like the majority of Limnæids, to visit the surface; and, in all probability, they do not spin upward threads. For *Ancylus lacustris* we have a note by Mr. Taylor:—

"My valued correspondent, Mr. T. D. A. Cockerell, has communicated to me the interesting circumstance that this species has the power possessed by many other *Lymnæidæ* of spinning a mucus-thread. He says: 'I have just been watching a young specimen of *Ancylus lacustris* spinning a downward thread.' According to the rough but characteristic sketch of the circumstance made by Mr. Cockerell, the thread was about half an inch long, attached to the extremity of a leaf of the *Anacharis*, the body of the animal being bent during the operation, the head and tail nearly close together." †

The sketch referred to was not published by Mr. Taylor; but the writer is permitted to give a copy of it (Fig. 2). The animal appears to be the only mollusc with a Limpet-like shell known to produce a thread.

PHYSIDÆ.

The air-breathing freshwater Snails of this family resemble *Lymnæidæ* in habits; but they possess greater activity, and make a more general use of threads. Montagu (1803) states that *Physa fontinalis* ‡ "will sometimes let itself down gradually by a thread affixed to the surface of the water, in the manner of the *Limax filans* from the branch of a tree." § Here, however, as in some other cases, the animals observed were possibly descending threads already fixed; for Physids, like Limnæids, are ordinarily slightly lighter than water; and they spin their threads generally, if not invariably, during ascent. The habit was noticed also in *Physa fontinalis* by Mr. Warrington, who states that on one occasion introducing a rod between the creature and its point of attachment, he moved it out of its straight course a considerable

* Clark, 'Annals and Magazine of Natural History' (2), xv. (1855), p. 285.

† Taylor, "*Ancylus lacustris*, a thread-spinner," 'Journal of Conchology,' iv. (1883), p. 127.

‡ *Bulla fontinalis*. § Montagu, 'Testacea Britannica,' 1803, p. 227.

distance; and, by then slowly drawing the rod upwards, he succeeded in raising the Snail out of the water, a space of about seven inches, suspended by its thread, which, though difficult to see in the water, now became distinctly visible. Mr. Tye chiefly observed *Physa hypnorum*; he states, however, that *P. fontinalis* uses its thread in a similar way, though less frequently. According to this observer, the young, as soon as they issue from the egg, are capable of spinning a thread and rising to the surface of the water:—

“If my readers wish to see for themselves this habit of travelling, as used by the mollusca, let them take a few adult *Physa hypnorum* . . . place them in a glass vessel with some small pebbles at the bottom and a little weed . . . and keep them until they deposit spawn. As soon as the young are free from the spawn mass they will commence spinning, and practise it so often that the process may be seen at any time.”

All the threads observed were spun upwards during ascent to the surface; the longest were the work of *P. hypnorum*, and were spun in a vessel in which the water was fourteen inches deep; they extended from the bottom to the surface. When a *P. hypnorum*, spinning its upward thread, was much disturbed, it was seen to abandon the idea of reaching the surface, and to turn and descend the unfinished thread, altering its position, Mr. Tye says, with much dexterity and ease by bringing its extremities together, and changing the point of attachment of the thread from the tail to the head. This is certainly a curious performance; but, allowing for the reversed condition of specific gravity, it will be noted that it exactly corresponds with the turning and ascent of a thread by *Limax*; the buoyancy of *Physa*, of course, keeps the thread taut, just as does the weight of *Limax*. When the animal completes its thread, it attaches it at the surface of the water, a minute concavity at the upper end acting, according to Mr. Tye's description, like a small boat, of air, and sustaining the thread; but it is more correct to say, perhaps, that the thread is continued at the surface in the form of a floating slime-trail, and that, thus anchored, it slightly cups the water's surface-film. When the *Physa* returns from the surface by descending its thread, Mr. Tye further observes: the thread—not invariably gathered up and carried back—sometimes remains attached to the surface; and in that case, it may be used, both

for ascent and descent, as a more or less permanent ladder; it is strengthened by an additional trail of mucus each time a mollusc passes over it, and thus it becomes somewhat strong and lasts for a considerable time. Mr. Tye had young *P. hypnorum* crawling up and down fixed threads of this kind for eighteen to twenty days together; and on one occasion he noted three individuals, and a *Limnæa glabra*, upon a *Physa's* thread at the same time:—

“Often, when two *Physæ* meet upon the same thread, they fight as only molluscs of this genus can, and the manœuvres they go through upon their fairy ladders outdo the cleverest human gymnast that ever performed. I once saw one ascending, and when it was half-way up the thread it was overtaken by another; then came the ‘tug of war’; each tried to shake the other off by repeated blows and jerks of its shell, at the same time creeping over each other’s shell and body in the most excited manner. Neither being able to gain the mastery, one began to descend, followed by the other, which overtook it, reaching the bottom first. Yet they are not always bent upon war, but pass and repass each other in an amicable spirit. One of the most beautiful sights in the molluscan economy is to see these little ‘golden pippins’ gliding through the water by no visible means; and when they fight, to see them twist and twirl, performing such quick and curious evolutions, while seemingly floating in mid-water, is astonishing, even to the patient student of Nature’s wonders.”

This use of threads as more or less permanent ladders is unique, as far as the writer knows, among all the mollusca. Mr. W. Jeffery, who kept *Physa hypnorum* in an aquarium, has referred to the creature’s habit of spinning a thread while rising perpendicularly to the surface; he notes that after taking in a supply of air it may turn leisurely about and crawl down the same thread; and mentions that once, while the animal was thus returning, the thread parted from its mooring, “when poor *hypnorum* was quickly carried to the surface again by the air it had taken in.”* Mr. Musson, further, mentions having observed spinning both by *P. hypnorum* and *P. fontinalis*†; and Mr. Standen, who refers to *P. fontinalis*, has obligingly informed the writer of observations made by him. The last-named naturalist remarks particularly upon the junction of the thread with the

* Jeffery, ‘Journal of Conchology,’ iii. (1882), pp. 310-1.

† Musson, *l. c.*

surface of the water, stating that the point of attachment is plainly visible, especially when the sun's rays fall upon the water of the tank in which the animals are kept; he compares the cupping of the surface-film (which can be conveniently examined with a lens) to a small inverted parachute, and states that it is shown to perfection when affected by the jerking motions of an ascending Snail. The accompanying diagram, based upon the observations here stated for *Physa*, will serve, in a general way, to illustrate the use of threads by aquatic Pulmonates. (Fig. 3.)

OPISTHOBRANCHIATA.

Suborders Tectibranchiata and Nudibranchiata (Sea-Slugs). Of Tectibranchs, only one family—*Philinidæ*—is here represented; and that only by the following note by Mr. Spence Bate:—

“The fact, observed by Mr. Warington, of the power of the *Limnæus* to move from one place to another by means of a mucous suspending cord, I have observed also to be the case with *Bulla aperta* [*Philine aperta*] in the vivarium of my friend Mr. Smyth; but the power of secreting the mucus, which is exuded from the external surface of the animal, is limited in its continuance; to prove the fact, we raised it three times to a glass shelf in the vivarium; the last time, not being able to secrete the ladder, it fell head over heels, and therefore lost the power of choosing its place below, as it could do when it came down by the cord.”*

In the Nudibranchs (typical Sea-Slugs) the production of a thread has been noted in at least four families, and is perhaps general. As the creatures are not ordinarily lighter than water, they do not spin upward threads; like *Limax*, like the *Philine* just noted, and, like most other gastropods, they produce their mucus-lines during descent. While crawling at the surface of water, Alder and Hancock state:—“The Nudibranchs occasionally drop suddenly down, suspending themselves from the surface by a thread of mucus, which is fixed to the tail or posterior extremity of the foot. In this way they will let themselves gradually down to the bottom, or remain some time pendent in the water without apparent support; for the thread of mucus is so transparent that it can scarcely be seen. When carefully looked for, however, it can always be perceived, originating in the track of mucus left on the surface by the animal, the mucus forming a small inverted

* Bate, ‘Annals and Magazine of Natural History’ (2), xv. (1855), p. 131.

cone at the point from which the thread issues, and here slightly dimpling the surface of the water.”* It appears, from an observation by Gray on *Elysia*, that the suspensory thread can be subsequently ascended by the animal.

POLYCERIDÆ.

Thompson states that three Sea-Slugs believed to pertain to *Polycera quadrilineata*, † kept in a phial of sea-water, were generally seen suspended by their threads from the surface, the body at the same time moving freely about with much grace. ‡ *Polycera lessonii*, Alder and Hancock mention, may be seen, in captivity, for hours together, “suspended by a film of mucous matter from the surface of the water.”

DORIDIDÆ.

Chromodoris amabilis § (Ceylon), according to Kelaart, sometimes creeps at the surface, and “when touched with a feather it adheres by its foot, and can be kept dangling in this position by the aid of the mucous thread secreted by the surface of the foot.” ||

EOLIDIDÆ.

Mr. Sinel mentions having frequently observed *Eolis* hanging by a thread from the water-surface, the suspended animal having the body doubled up, Hedgehog-like, with the back downwards. ¶ The writer learns from Mr. Hornell that the animal thus referred to by his colleague is *Facelina coronata*.** The thread, Mr. Hornell states, †† is sometimes 4–5 in. in length.

ELYSIIDÆ.

Elysia viridis, †† from Swanage Bay, kept by Gray in a vase, usually rested, attached by the tail to the glass, with the body

* Alder and Hancock, *op. cit.* p. 21.

† *P. quadrilineata* v. *nonlineata*.

‡ Thompson, ‘Annals of Natural History,’ v. (1840), p. 92.

§ *Doris amabilis*.

|| Kelaart, ‘Annals and Magazine of Natural History’ (3), iii. (1859), pp. 294–5.

¶ Sinel, ‘Journal of Marine Zoology,’ i. (1894), p. 32.

** *Eolis coronata*.

†† Hornell, ‘Journal of Marine Zoology,’ ii. (1896), p. 59.

‡‡ *Aplysiopterus viridis*.

freely extended into the water, and the mantle-edges expanded; when the vase was moved or otherwise shaken, the animal contracted the mantle over its back, and descended "head foremost, as it were dropping down to the bottom, leaving a mucous filament attached to the glass"; subsequently, Gray adds, it ascended by the filament, rising thus towards the surface, and becoming attached to the glass as before.*

LIMAPONTIIDÆ.

A supposed planarian-worm, *Planaria variegata*—probably a *Limapontia*†—was observed by Dalyell to be liable, in crawling up the side of a vessel, to drop to the bottom, its descent being apparently retarded, the observer says, by an invisible thread.‡

ASPIDOBRANCHIATA.

In the whole of the Aspidobranchiata we have but a single observation, and this, it is said, requires confirmation. It is not surprising that no case of spinning occurs among the Limpet and Limpet-like families; but the absence of records for the land operculates of the order—*Helicina*, &c.—is less easy to understand, especially in view of the fact that several of the land operculates regarded as Pectinibranchiata are known to suspend themselves. The Aspidobranch said to be a spinner is our little fresh-water nerite (*Neritina fluviatilis*), whose name appears in this capacity in most of the books; its only claim to notoriety in this respect, however, rests upon the fact that it was listed by Mr. Warington (with several air-breathing Water-Snails) as having been observed by him to spin.§ No particulars are given, and it is supposed by Mr. Tye that the observer may have been mistaken.||

* Gray, 'Annals and Magazine of Natural History' (3), iv. (1859), pp. 239–40.

† Johnston, 'Catalogue of the British Non-parasitical Worms in the British Museum,' 1865, p. 12.

‡ Dalyell, 'The Powers of the Creator displayed in the Creation,' ii. (1853), pp. 115–6.

§ Warington, 1854, *l. c.*

|| Tye, 1874, *l. c.*; 1878, *l. c.*

PECTINIBRANCHIATA.

In Pectinibranchiata the spinners occur chiefly among the mainly phytophagous kinds, which live on seaweed growing near the shore or floating on the surface of the ocean, on aquatic plants in brackish and fresh water, and on branches and aerial roots of trees, bushes, &c., by the water's edge and on land; we have also a few notes for kinds living on rocks, coral, &c.; as well as for others whose habitats afford less facilities for the exercise of the faculty. Among the notoriously carnivorous Sea-Snails, Whelks, Murices, Purples, &c., we have no observations; nor have we any for the Volutes, Olives, Harps, Cones, &c.; among the Mitres, we have one known spinner; and among the Cowries, one. Some of these animals are of large size, but nearly all those with which we are concerned are small, or of moderate growth. These creatures, like other spinning molluscs (except air-breathing Water-Snails), are generally heavier than the medium in which they live, and thus they spin during descent; the threads in many cases are doubtless used for purposes of locomotion; in other cases, however, their chief function seems to be the retention of animals liable to be shaken from their supports during high waves and winds; in still other cases the threads appear to serve chiefly as means of attachment and suspension during repose, the creatures being upheld at this time sometimes by one and sometimes by several or many threads. Most spinning Pectinibranchs, no doubt, are able to ascend to their former positions by crawling up the suspensory thread; this has been observed in *Litiopa*, in *Valvata*, and perhaps in *Rissoa*.

In the molluscs above considered—air-breathing Water-Snails and Sea-Slugs—the threads are doubtless of the nature of those of *Limax*, being derived from anterior glands, and representing the mucus-trail of ordinary locomotion. The same is probably the case with some of the spinners of the present order; but the writer is doubtful on this point, for the foot in Pectinibranchs, often of peculiar construction, serves for locomotion, differing somewhat from that with which we are familiar in other gastropods. In some cases figures of the foot show conspicuously the long transverse slit-like opening of an anterior pedal gland,

whence the mucus of the thread might presumably be derived. In many Pectinibranchs, however, in addition to the anterior gland, a ventral pedal pore exists in the median line of the anterior half of the foot-sole; it forms the opening of a cavity said to be comparable to the byssal-cavity of bivalves, and from it, externally, a well-marked groove often runs to the tip of the tail. It can hardly be doubted that the threads, in many Pectinibranchs, are derived from this ventral pore; in *Cerithiopsis tubercularis*, for instance, Jeffreys appears to have clearly seen the thread issue from "the opening in the centre of the foot-sole"; a narrow but deep groove extends from this opening to the tail, and Jeffreys tells us that it is by the tip of the tail that this animal attaches its thread to an object of support.

CYCLOPHORIDÆ.

In Borneo, the writer was informed by Mr. Everett, certain land-operculates of this family, species of *Alycæus*, have the habit of suspending themselves, by a single thread, beneath overhanging ledges of the limestone rocks on which they abound. Mr. Everett often saw numbers hanging in this way, during rest, by threads which, to the best of his recollection, were sometimes an inch long; the habit, he adds, may "save them from the attacks of such foes as, for instance, Land-planarians, which are most frequently to be found in the same situations as these Mollusca, and which I have observed to prey on small Helices, which, however, have not the protecting operculum of the *Alycæi*." That molluscs thus escape certain enemies seems highly probable, and it is perhaps a mistake to suppose that operculates are already sufficiently protected; for Lucas, in Algeria, observed that numbers of *Cyclostoma voltzianum*, in spite of the operculum, are destroyed by the larvæ of a *Drilus*.*

According to Swainson, "*Megalomastoma suspensum*, Guilding," is often found suspended by glutinous threads; and the remark is illustrated by a woodcut showing a shell of considerable size hanging from a twig by threads of moderate length, thirteen to fourteen in number, arranged upon the twig in four groups, but all proceeding from one point from between the operculum

* Petit de la Saussaye (quoting Lucas), 'Journal de Conchyliologie' iii. (1852), p. 100.

and the outer lip of the shell. (Fig. 4.)* From the fact that Guilding lived at St. Vincent, the creature is probably West Indian; but unfortunately no description of it has been published, and its identity cannot be ascertained. The information and figure were probably derived from Guilding's unpublished papers, of which Swainson is known to have made use. The figure, perhaps worked up from a rough sketch not intended for publication, is probably inaccurate, and much enlarged; it does not appear to represent *Megalomastoma antillarum*, Sowerby, or *M. guildingianum*, Pfeiffer, to which names "*Megalomastoma suspensum*" has been referred; and Mr. E. A. Smith (British Museum), who has obligingly considered the figure for the writer, thinks that it represents, possibly, *Cistula lineolata*, a small West Indian shell, of which the Museum acquired unnamed specimens at the sale of Guilding's collection. If this be the case, of course, our spinner belongs not to the present, but to the following family.

CYCLOSTOMATIDÆ.

In some notes forwarded to 'Loudon's Magazine' in 1831, Guilding mentions a "*Cyclostoma*" common in the Virgin Islands, which, having given out a mucous thread, closes the operculum, and swings by the thread when hardened by the air, safe from ants and other enemies.† This note was received in the year preceding that of Guilding's death, and, as he does not mention any other thread-making operculate, the writer presumes that this "*Cyclostoma*" is identical with the "*Megalomastoma suspensum*." In this case, in the circumstances just mentioned, the creature is possibly a *Cistula*; and we find it stated by Mr. R. J. L. Guppy that *Cistula aripensis* ‡ (Trinidad) frequently suspends itself by two or three glutinous threads from branches, or from the under surface of leaves.§ Mr. Guppy, replying to an enquiry, has had the kindness to inform the writer that this little shell, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, is the only mollusc known to him in Trinidad

* Swainson, 'Treatise on Malacology,' 1840, p. 186.

† Guilding, 'Loudon's Magazine of Natural History,' ix. (1836), p. 195.

‡ *Adamsiella aripensis*.

§ Guppy, 'Annals and Magazine of Natural History' (3), xvii. (1866), p. 45; 'Proceedings of the Scientific Association of Trinidad,' i. (1866), p. 31.

to hang suspended, and that the threads are sometimes of considerable length. *Chondropoma dentatum** (Key West), a shell about half an inch long, is stated by Binney to spin a short thread, and hang suspended by it during rest; and at the end of one of his chapters the author gives a small woodcut, which, though not described, evidently represents this shell, slightly enlarged, hanging by a short thread from a leaf-stalk; the thread, according to the drawing, proceeds from between the operculum and the outer lip of the shell, considerably nearer to the umbilicus than to the suture. (Fig. 5.)†

Another species, *Chondropoma plicatum*, a little larger than the last, was obtained by Dr. J. S. Gibbons, at Puerto Cabello, hanging suspended during repose by a thread $\frac{1}{3}$ – $\frac{1}{2}$ in. long, very thin, but strong, flexible, and silk-like; the thread issued from between the operculum and the outer lip, two-thirds of the latter's length from the suture, a position similar to that shown in Binney's drawing.‡ Similar suspension was observed by Dr. Gibbons also in the allied *Tudora megacheila*. Near St. Ann's, Curaçao, on a waste piece of ground which appears to have been a kind of conchologist's paradise, he found this creature in great abundance, "suspended by its silk-like thread from *Acacia* boughs, or strewed thickly along the ground underneath"; the thread resembled that of *Chondropoma plicatum*, but was shorter.§

Among Old-World *Cyclostomas*, we have a note relating to *Cyclostoma articulatum*, a shell of considerable size, belonging to Rodriguez (Mascarene Islands):—"When it retired and closed its shell," says Woodward of a specimen kept under a bell-glass, "it still adhered, and sometimes became suspended, by a

* *Cyclostoma dentatum*.

† Binney, 'Terrestrial Air-breathing Mollusks of the United States,' ii. (1851), pp. 347-9; and see also W. G. Binney, 'Land and Freshwater Shells of North America,' 1865, pp. 96-7, fig. 194 (Smithsonian Miscellaneous Collections, vii.); and Tryon, 'American Journal of Conchology,' iv. (1868), p. 11; pl. xviii. fig. 15.

‡ Gibbons, 'Journal of Conchology,' ii. (1879), p. 134; and in Tye, 'Quarterly Journal of Conchology,' i. (1878), p. 412.

§ Gibbons, 'Quarterly Journal of Conchology,' i. (1878), pp. 411-2; and Tye, *l. c.*

tenacious thread of mucus."* It would have been interesting to have had more particulars of this attachment, for, according to Dr. Gibbons, the South African *Cyclostomas* fix their shells by a brittle pellicle of dried mucus, proceeding from the edge of the columellar lip, a mode of attachment, as he states, wholly different from that of *Chondropoma* and *Tudora*, whose flexible silk-like thread, as just mentioned, passes between the outer lip and the operculum.†

LITTORINIDÆ.

Gray has listed *Littorina* with Pectinibranchs capable of making threads,‡ but the writer does not know on what authority. For repose, out of the water, most of these Periwinkles closely fix their shell by a pellicle of dry mucus, compared by Gibbons to that of the Old-World *Cyclostomas*, and by Jeffreys and others to the attaching film of *Helix*.§ Of *Lacuna*, however, which belongs to this family, Jeffreys states that the creatures "occasionally secrete slimy threads (like the *Limax arborum*), by which they suspend themselves from the frond or stalk of a seaweed."||

RISSOIDÆ.

The use of threads is presumably general among *Rissoidæ*—small, often minute molluscs, which swarm on seaweeds and grasswack in pools and shallows, as well as on and under stones in some of the deeper waters of the coast. It was in 1833 that Gray made an often quoted observation to the Zoological Society of London, that "the animal of *Rissoa parva* has the power of emitting a glutinous thread, by which it attaches itself to floating

* Woodward, 'Proceedings of the Zoological Society of London,' 1859, p. 204; and 'Annals and Magazine of Natural History' (3), iv. (1859), p. 320.

† Gibbons, 1878, *tom. cit.* p. 339; 1879, *l. c.*

‡ Gray, 'Annals and Magazine of Natural History' (2), ix. (1852), p. 216.

§ Gibbons, 1878, *l. c.*; 1879, *l. c.*; Jeffreys, 'British Conchology,' iii. (1865), p. 363; Bouchard-Chantereaue, 'Mémoires et Notices de la Société d'Agriculture, du Commerce et des Arts, de Boulogne-sur-Mer, 1835, pp. 155-7; Gray, 'Proceedings of the Zoological Society of London,' 1833, p. 116; A. d'Orbigny, 'Histoire Naturelle des Iles Canaries: Mollusques,' 1839, p. 79.

|| Jeffreys, *tom. cit.* p. 343.

seaweeds, and is enabled, when displaced, to recover its previous position";* and we find it is stated by Jeffreys, for *Rissoa* generally, that the foot is grooved down the middle for about half its length towards the tail, whence it emits a glutinous thread, by which the animal suspends itself to foreign bodies or to the surface of the water.† "Lying on a rock by the brink of a seaweed-covered pool left by the receding tide," says Jeffreys, writing of *Rissoa parva*, "it is no less pleasant than curious to watch the active little creature go through its different exercises—creeping, floating, and spinning."‡ By "floating" the author means, evidently, creeping at the surface of the water, a habit which here, as in other molluscs, seems intimately associated with that of "spinning." The same naturalist mentions the latter habit in several other species: *Rissoa membranacea*, he says, "occasionally floats, or suspends itself by a viscous thread"; *R. vitrea* "suspends itself by a single byssal thread, keeping the mouth of the shell closed by the operculum"; *R. abyssicola* "floats like its congeners, and suspends itself in the water by a single byssal thread"; *R. pulcherrima*, exceedingly agile both in creeping and floating, "spins a delicate thread of attachment"; and the very tiny *R. fulgida* was frequently observed by the author "spinning a fine transparent slimy thread, and thus hanging suspended to a bit of seaweed or to the surface of the water." *R. cancellata*, Jeffreys further says, "is active and bold, floats like its congeners, and spins a byssal thread instantly on being detached from a crawling position"; *R. carinata*,§ moreover, like *R. cancellata*, "adheres with some tenacity to the stones on which it is found, and, when detached, it also spins a fine byssal thread, by means of which it suspends itself in the water."|| This last species,¶ according to Mr. Brockton Tomlin's experience in the Channel Islands, is usually found under rather deeply-buried stones, to which it moors itself, he says, by a strong "byssus";** each individual, this observer obligingly tells the writer, had more than one short thread, generally, as far as he remembers, four or five. *Barleecia rubra*, according to Jeffreys, creeps at the surface, foot uppermost,

* Gray, 'Proceedings of the Zoological Society of London,' 1833, p. 116.

† Jeffreys, *op. cit.*, iv. (1867), p. 1. ‡ Jeffreys, *tom. cit.*, pp. 25, 26.

§ *R. striatula*.. || Jeffreys, *tom. cit.*, pp. 6, 10, 20, 32, 41, 43, 44.

¶ *R. striatula*. ** Tomlin, 'British Naturalist,' iii. (1893), p. 123.

like the *Rissoæ*, and occasionally secretes a slight mucous filament, by which it suspends itself from the surface of the water or from seaweeds.*

HYDROBIIDÆ.

Lindström (1868) has referred to the spinning of a mucus-thread (by which the animal, with half-closed operculum, keeps itself suspended from the water-plants) as a character, among others, tending to associate the fresh-water *Bythinia* with the estuarine Hydrobiids.† *Bythinia*, now always regarded as a Hydrobiid, is certainly a spinner, Mr. Tye having seen *Bythinia tentaculata* suspend itself, usually after "floating," the thread being attached to the surface of the water;‡ but the writer is not acquainted with observations on other members of the family. In 1894 I kept several specimens of *Hydrobia ulvæ* and one of *H. ventrosa* under observation for ten days, in a vessel of water with weed, &c.; they often "floated" (crept at the surface of the water), but were not seen to suspend themselves.

SKENEIDÆ.

Skenea planorbis, according to Jeffreys, "occasionally suspends itself in the water by spinning a viscous thread with its foot."§

JEFFREYSIIDÆ.

Jeffreysia diaphana, also, according to the same author, "spins a slimy suspensile thread."||

LITIOPIDÆ.

Litiopa melanostoma, a small, more or less *Rissoa*-like creature (less than a quarter of an inch in length of shell), an inhabitant of the gulf-weed of the mid-Atlantic (Sargasso Sea), is perhaps the most notorious of all the spinning molluscs. Its history is briefly as follows:—

(1). Bélanger discovered the creature in 1826, and made a number of observations on its habits; and, on his return to France, read his notes to Rang, at the same time handing him

* Jeffreys, *tom. cit.*, p. 57.

† Lindström, 'Om Gotlands nutida mollusker,' 1868, p. 26.

‡ Tye, 1874, *l. c.*; 1878, *l. c.*

§ Jeffreys, *tom. cit.*, p. 66.

|| Jeffreys, *tom. cit.*, p. 60.

spirit specimens, and suggesting for the animals (regarded as belonging to two species), the names of *Bombyxinus melanostoma* and *B. uva*.

(2). Rang, from information thus obtained, drew up a memoir, and published it in 1829. He disregarded Bélanger's MS. names, however, and described the shells as *Litiopa melanostoma* and *L. maculata*.*

(3). Bélanger (1833 ?), dissatisfied with Rang's account, gave full details of his observations, the name *Bombyxinus* being here published for the first time.†

(4). Kiener (1833) restated Bélanger's observations, and united the two supposed species as *Litiopa bombox*.‡

(5). Eydoux and Souleyet, during the voyage of the 'Bonite,' re-collected specimens from the gulf-weed, and are believed to be the only naturalists, other than Bélanger, who have published observations on the living animal. This they did in 1839.§

(6). Naturalists agree that the two forms should be united; but Kiener's name is inadmissible (as also are those of Bélanger, over which the names of Rang have priority of publication). The creature—with *Litiopa maculata* among the synonymy—is now known as *Litiopa melanostoma*.

(7). Nearly all the books contain accounts of the animal's spinning habits. These, however, are derived from Rang and Kiener (without reference to the original notes of Bélanger and Eydoux and Souleyet); the information is thus unsatisfactory; and the tale, being an often-told one, has grown considerably.

Bélanger's notes have the form of extracts from a log, and are evidently the result of careful observation. It was on June 26th that the creature first came up with the gulf-weed, and, on shaking the weed to make the animals fall, Bélanger observed that some remained suspended, at a considerable distance, by an

* Rang, "Notice sur le *Litiopie* (*Litiopa*), genre nouveau de Mollusque gastéropode," 'Annales des Sciences Naturelles,' xvi. (1829), pp. 303-7; and 'Manuel de l'Histoire Naturelle des Mollusques,' 1829, pp. 26, 197, 198.

† Bélanger, "Sur les *Litiopes* (*Litiopa*, Rang), ou *Bomboxins* (*Bombyxinus*, Bélanger)," Lesson's 'Illustrations de Zoologie,' 1831: appendix (1833 ?).

‡ Kiener, "Quelques Observations sur le genre *Litiopie* de M. Rang," 'Annales des Sciences Naturelles,' xxx. (1833), pp. 221-4.

§ Eydoux and Souleyet, "Observations sur le genre *Litiopie*," 'Annales Françaises et Etrangères d'Anatomie et de Physiologie,' iii. (1839), pp. 252-6.

imperceptible thread like that of a small Spider. The thread proceeded from the foot of the mollusc. When the foot was touched with the finger, a thread was drawn out as the finger was slowly moved away, and when the finger was lifted in the air the animal remained suspended to it for a long time, and for a great distance—more than three feet; even when moved about considerably, and otherwise somewhat severely tested, the creature did not fall; and more than a score were experimented upon, always with the same result. The animal—in some at least of these cases—hung, not in its native element, but in the air. On June 28th and 29th more weed inhabited by this animal was fished up, and Bélanger again observed the creature's spinning habits.* Speculating upon the use of the thread, he remarks that the creature, born, living, and reproducing on floating weed, incessantly tossed with more or less violence by the very deep ocean, would be lost, when detached by a wave, had it not this faculty of spinning a silk which, like a cable, holds it to its habitat. On July 8th further weed was fished up, but the molluscs were now less numerous; and, having been out of the water some time when experimented upon, but few remained suspended after the weed had been shaken. Providing himself with a bucket of sea-water, however, Bélanger was able to make several observations; some of the animals adhered to his finger, and hung therefrom, both in the air and in the water. An individual which had lowered itself from the weed, on being placed in the water, remained suspended, and, though moved from one side of the bucket to the other, made to sink to the bottom and lifted up again, it still retained its hold. At length the observer allowed the weed to float on the surface, and after some time, to his great satisfaction, he saw the animal ascend by its thread, and replace itself upon the frond from which it had been suspended. Others which were at the bottom of the bucket, on being moved with a branch of weed, attached their silk to it;

* The author refers also to a bundle of weed, containing a quantity of eggs, supposed, no doubt erroneously, to be those of *Litiopa*. The eggs were united by numerous threads similar to those of the mollusc; each egg was attached by a particular thread, and the whole mass was so strongly fastened together that it was with difficulty that a part was detached. This structure, it can hardly be doubted, was the "nest" of the little Gulf-weed Fish, *Pterophryne*.

and when the branch was left floating at the surface some ascended to it by the thread, while others fell again to the bottom. Another observation, which the author regarded as of much interest, was as follows:—He saw issue from two or three of those which were at the bottom of the bucket a little bubble of air, which rose slowly; and, in trying to move it with a frond of the weed, he saw the animal—holding to the bubble by means of its silk—rise through the water. Speculating upon this last observation, Bélanger supposes that the creature would not be entirely lost even if the shaking, which had detached it from the weed, were also strong enough to break its thread; though not anchored it would still have a lifebuoy, and this buoy, floating on the surface of the water, and coming in contact with another plant, would enable the animal to ascend to a new home. Further, the author even thought it possible that the creatures might thus voluntarily change their positions; a family, he supposes, might find their plant insufficient to feed their increasing numbers; whereupon some of them, seeking new feeding-grounds, might abandon themselves to the water, and wait, suspended to their bubbles, till a new plant chanced to be carried to them by the waves. Finally, on Aug. 27th, the creature still occurred on the weed, but in small quantity, and mostly very young. Of those which remained suspended after the weed had been shaken, one of the larger ones was observed, while thus hanging in the air, to reascend by its thread. Placing the animals at the bottom of a bucket of water, the observer left them for the night; but in the morning all were dead, none having ascended to the surface or to the floating weed. Eydoux and Souleyet obtained numerous specimens, and, on shaking the weed on which the animals were brought up, they had no difficulty in confirming Bélanger's statements about the suspensory thread. They appear to have been at considerable pains, however, in attempting, unsuccessfully, to confirm the observations about the mucus-invested air-bubble; specimens were placed at the bottom of deep vessels of water, and allowed to remain there for a considerable time, but none ascended by means of a bubble. Some crept up the sides of the vessels to the water-surface, under which they crept like other gastropods. The appendages which characterize the upper part of the foot of *Litiopa* may be useful, these authors think, in

helping to keep the animal at the surface. Notwithstanding Rang's remark that the thread is doubtless formed of a special secretion, Eydoux and Souleyet think it probable that it consists merely of locomotory mucus, which, in these molluscs, may possibly possess special characters. Rang, it may be added, while examining spirit specimens, found, under the foot, a little glairy mass, which attached itself to the point of the scalpel, and was easily drawn out into a thread a foot and a half long; each specimen presented the same peculiarity, and Rang concluded that this was the substance from which the thread is made; it seems more probable, however, that the little masses were the remains of threads already spun, and perhaps reascended by the animal.

The above, the present writer believes, is all that is known of the spinning habits of *Litiopa*. These habits are certainly of a surprising character: the length of the apparently rapidly made thread, the animal's security upon it, and the facts that it can produce and afterwards ascend by it, not only in its native element, but also in the air, are points of special interest. As to the statements in the books, one may quote, for example, from Johnston's 'Introduction to Conchology':—

"The habits of the *Litiopa* are not less worthy of your notice. This is a small Snail, born amid the gulf-weed, where it is destined to pass the whole of its life. The foot, though rather narrow and short, is of the usual character, and, having no extra hold, the Snail is apt to be swept off its weed; but the accident is provided against, for the creature, like a Spider, spins a thread of the viscous fluid that exudes from the foot to check its downward fall, and enable it to regain the pristine site. But suppose the shock has severed their connexion, or that the *Litiopa* finds it necessary to remove, from a deficiency of food, to a richer pasture, the thread is still made available to recovery or removal. In its fall, accidental or purposed, an air-bubble is emitted, probably from the branchial cavity, which rises slowly through the water, and as the Snail has enveloped it with its slime, this is drawn out into threads as the bubble ascends; and now, having a buoy and ladder whereon to climb to the surface, it waits suspended until that bubble comes into contact with the weeds that everywhere float around!"*

* Johnston, 'Introduction to Conchology,' 1850, p. 134; with references to Rang and Kiener.

The speculations of Bélanger, it will be observed, here appear as statements of established facts, Johnston having been misled by Kiener, whose restatement of Bélanger's observations wants some of the precision of the original notes. Statements in other books (some adapted from Johnston) also exceed what is really known; and some are further objectionable from the fact that they do not make it clear that suspension is likely to be an occasional circumstance, not the usual condition under which the animal lives.

Alaba picta, a Litiopid found by A. Adams among *Zostera* in shallow water in the seas of Japan, is stated by him to spin a pellucid thread, with great rapidity, from a viscous secretion "emitted from a gland near the end of the tail"; it also creeps at the surface of the water, and, when fatigued, suspends itself, apex downwards, by means of the thread which is attached to the surface.*

VALVATIDÆ.

Valvata piscinalis (familiar in our ponds and canals) was observed to use a thread by Laurent. He noticed that the animals, in crawling at the surface of water, deposited there a trail of mucus, and that, when made to fall, some of them remained suspended to the floating trail by a thread; similarly, others were sustained in the water when forced to leave the branches of the plants on which they lived. In the former case some were seen to remount to the surface of the water by ascending their thread, which was gathered up by the foot.† Mr. A. E. Boycott has written of the same animal, immature specimens of which, in captivity, were seen by him actively engaged in thread-spinning:—"Their usual mode of procedure was to crawl up the side of a glass vessel nearly to the surface of the water; they then gave one or two twisting motions, and crawled out on the under surface of the water, leaving a thread joining them to their point of departure. They then either sank slowly, remained floating, or sank about half way, where they stopped." The thread, the presence of which was easily demon-

* A. Adams, 'Annals and Magazine of Natural History' (3), x. (1862), pp. 293-5, 419.

† Laurent, 'Extraits des Procès-Verbaux des Séances de la Société Philomatique de Paris,' 1841, pp. 118-9.

strated with a pin, was in most cases sufficiently strong to enable the observer to raise the animal to the surface, but not out of the water.*

CYPRÆIDÆ.

Our little Cowry (*Cypræa europæa*) makes considerable use of a thread, a fact first noticed by Charles Kingsley, who wrote to Gosse, in 1854, that he had seen the animal suspend itself from the under side of low-tide rocks by a glutinous thread an inch and more in length; in captivity, further, he saw it "float on the surface by means of a similar thread attached to a glutinous bubble."† According to a paper by Mr. L. St. G. Byne, the animal is occasionally seen at Teignmouth, hanging by its "byssus" on the rocks at low tide.‡ This statement, as the writer learns from Mr. Byne, is made on the authority of a reliable collector, who mentions, amongst other things, that on lifting a boulder he saw one of these molluscs hang from it by a thread 4-5 in. long. Mr. Hornell, from observations made presumably at Jersey, writes in an interesting manner on the same subject. In confinement in a tank, he says, the little animal frequently crawls foot-uppermost along the surface of the water, and occasionally may be seen to form a little disc of mucus, from which it lowers itself gently by a mucous thread till it hangs in mid-water, dangling in the fashion of a Spider at the end of its silken cord. "This habit of the Cowry is to be correlated," Mr. Hornell adds, "to that more familiar and natural one so readily verified by any observer who visits the low-tide caves and gullies where, amongst Sponges and Ascidians, this animal loves so to live. Here, when the tide recedes, Cowries more or less enveloped in their bright-coloured mantle robes are often seen passively hanging suspended from the gully's roof, or from points and jutting ledges, by a stout mucous thread."§

CERITHIIDÆ.

In this family we have notes on a *Bittium*, a *Cerithiopsis*, and

* Boycott, "*Valvata piscinalis* as a Spinner," 'Science Gossip' (n.s.), ii. (1895), p. 82.

† 'Charles Kingsley; his Letters and Memories of his Life,' edited by his Wife, ed. 3, i. (1877), p. 408.

‡ Byne, 'Journal of Conchology,' vii. (1893), p. 187.

§ Hornell, 'Journal of Marine Zoology,' ii. (1896), pp. 59-61.

a *Cerithidea*; general statements occur in the books also for *Cerithium* and *Potamides*, but these rise out of synonymy, the animals referred to being respectively *Bittium* and *Cerithidea*. Our little *Bittium reticulatum*,* according to Jeffreys, "crawls actively and quickly by means of its long foot, and occasionally suspends itself by a byssal filament to a bit of floating seaweed, or to the side of the vessel in which it is kept."† *Cerithiopsis tubercularis*, another little mollusc of our coasts (shell generally about $\frac{1}{4}$ in. long), resembles the *Bittium* in its active crawling habits. "When at rest," according to Jeffreys, "it spins a fine transparent thread, which issues from the opening in the centre of the foot-sole, its end being attached by the point of the foot to some foreign substance." The author, on one occasion, drew the shell up by the thread with a camel's-hair brush, and kept the creature thus suspended in the water for several seconds, the foot being doubled up.‡ *Cerithidea obtusa*,§ which is a mollusc of good size, presents one of the most curious of the cases noticed in this paper. It lives in brackish water, in mangrove-swamps, and the mouths of rivers in Singapore and Borneo; sometimes it crawls on stones and leaves in the neighbourhood, and, according to the observations of A. Adams, it is not unfrequently found suspended by glutinous threads to boughs and the roots of the mangroves, as represented in fig. 6. Further, according to the same observer, "when the animal hibernates, it retracts itself into the shell, and brings its operculum to fit closely into the aperture, after having previously affixed sixty or seventy glassy, transparent, glutinous threads to the place of attachment, when they occupy the outer or right lip and extend half-way round the operculum."|| Von Martens has observed that the attachment of this mollusc and of "*Megalomastoma suspensum*" (fig. 4) make a remarkable approach to the attachment of bivalves by a byssus,¶ but this remark, the writer pre-

* *Cerithium reticulatum*.

† Jeffreys, *tom. cit.* p. 260.

‡ *Ibid.* p. 268.

§ *Cerithium truncatum*, *C. obtusum*.

|| A. Adams, 'Zoology of the Voyage of H.M.S. Samarang: Mollusca,' 1848, pp. 43-4; and see also 'Narrative of the Voyage,' ii. (1848), pp. 389, 509; 'Proceedings of the Zoological Society of London,' 1847, pp. 21-2; and 'Annals and Magazine of Natural History,' xix. (1847), pp. 413-4.

¶ E. v. Martens, 'Zoologischer Anzeiger,' i. (1878), p. 251.

sumes, refers merely to the appearance of the figures ; for nothing appears to be known of the manner in which the threads are produced and attached. Adams's observations are referred to in nearly all the books, and figures based on his are found in Woodward and in Keferstein, that of the former having been repeated by Fischer and twice by Tryon.* Mr. Tye, who refers to Woodward, has by mistake attributed the observations to *Cerithidea decollata*,† an animal which does not appear to fix itself by threads, Dr. Gibbons having reported that large numbers seen by him on trunks of marsh trees in Natal were attached, not by threads, but by "a trifle of brittle mucus passing from the lip to the tree," a mode of attachment, as Dr. Gibbons says, resembling that of brackish water *Littorinæ*.‡

PLANAXIDÆ.

Planaxis has been listed among thread-making molluscs by Dr. Macdonald,§ but the writer does not know on what authority.

SOLARIIDÆ.

According to Mr. Harper Pease, two forms of *Torinia* (Hawaiian Islands) "suspend themselves by strong gelatinous threads, one of which will sustain the weight of several shells, and can be drawn out four or five inches"; the creatures are found almost invariably upon branched coral. ||

PYRAMIDELLIDÆ.

Among the crowd of little conical-shelled molluscs of the genus *Odostomia*, the use of a thread has been observed by Jeffreys in *Odostomia warreni*, whose foot is remarkable from being forked at the extremity like the tail of a Swallow. The

* Woodward, 'Manual of the Mollusca,' 1851, fig. 78; Keferstein, 'Bronn's Klassen und Ordnungen des Thier-reichs,' iii. (1862-6), pl. lxxxii. fig. 9; Fischer, 'Manuel de Conchyliologie,' 1884, fig. 449; Tryon, 'Structural and Systematic Conchology,' ii. (1883), pl. lxx. fig. 73; 'Manual of Conchology,' ix. (1887), pl. xix. fig. 6.

† Tye, 'Quarterly Journal of Conchology,' i. (1878), p. 409.

‡ Gibbons, 'Journal of Conchology,' ii. (1879), p. 134.

§ Macdonald, 'Journal of the Proceedings of the Linnean Society': Zoology, v. (1861), p. 209.

|| Pease, 'American Journal of Conchology,' v. (1870), p. 81.

animal crept at the surface of the water like other gastropods, and one individual spun a delicate glutinous filament from the middle of the sole of the foot, and kept itself suspended for some time in the water, with the point of the shell downwards. *O. acicula*, Jeffreys adds, has the same habit. Both animals are inhabitants of our own coasts.*

EULIMIDÆ.

Eulima intermedia, another inhabitant of our coasts, creeps at the surface, and, according to Jeffreys, "it remains suspended in that posture by means of a byssal thread, the operculum then closing the mouth of the shell";† statements, apparently applying to the genus generally, which occur in Fischer and in Tryon,‡ have their origin presumably in this observation.

MITRIDÆ.

The only representative of the Mitre-shells—and of a considerable number of surrounding families—of which we have any note is the little "*Mitra saltata*," Pease—probably the young of some larger Mitrid—a native of the shores of the islands of the Central Pacific. It is described as an elegant little mollusc, found living in hollows of coral-rock; and it is certainly a creature of remarkable habits. When disturbed (Mr. Pease found) it would skip five or six inches in a horizontal line, from one side of the cavity to the other, at the same time spinning out a very fine thread; and, when held in the hand, it would jump off, suspending itself by a thread to a distance of 2–3 ft.§

PLEUROTOMATIDÆ.

Another isolated note, the last we have to give, relates to *Mangilia nebula*,|| a little mollusc of our own coasts. The animal is exceedingly active, and the Rev. R. N. Dennis, who placed

* Jeffreys, 'Annals and Magazine of Natural History' (4), ii. (1868), p. 279; British Association Reports, 1868, p. 233; *op. cit.* v. (1869), p. 212.

† Jeffreys, *op. cit.* iv. (1867), p. 204.

‡ Fischer, 'Manuel de Conchyliologie,' 1885, p. 782; Tryon, 'Manual of Conchology,' viii. (1886), p. 259.

§ Pease, 'Proceedings of the Zoological Society of London,' 1865, pp. 512–3; and see Garrett, 'Journal of Conchology,' iii. (1880), p. 71.

|| *Pleurotoma nebula*.

specimens in a basin of sea-water, observed that they crawled to the edge and suspended themselves by a thread.*

EXPLANATION OF PLATE III.

FIG. 1.—A Water-Snail (*Limnæa auricularia*) hanging by a thread from the surface of the water in an aquarium. After Taylor, 'Monograph of the Land and Freshwater Mollusca of the British Isles,' i. (1899), p. 318 (fig. 610).

FIG. 2.—A fresh-water Limpet (*Ancylus lacustris*) using a thread. From a sketch by Prof. Cockerell.

FIG. 3.—Diagram illustrating the use of threads by aquatic Pulmonate Molluscs, based for the most part on observations recorded for *Physa hypnorum*, by Mr. G. S. Tye. The animal is ordinarily slightly lighter than water:—A, an individual crawling through the water towards the surface, leaving its locomotory mucus behind in the form of a thread, which retains the animal, and prevents its sudden rise to the surface; B, the animal at the surface, taking in a supply of air—the thread, having been continued as a floating slime-trail, is now attached to the surface; C, the animal returning by descending its thread; another individual is making use of the fixed thread for ascent. An upward journey (A) may be abandoned, the animal in that case returning upon its unattached thread, D.

FIG. 4.—"*Megalomastoma suspensum*," a land operculate of doubtful identity, at rest, suspended by a number of threads from a twig; probably much enlarged. After Swainson, 'Treatise on Malacology,' 1840, fig. 29; presumably from a sketch by Guilding.

FIG. 5.—*Chondropoma dentatum*, a land operculate, at rest, suspended by a short thread; slightly enlarged. After Binney, 'Terrestrial Air-breathing Mollusks of the United States,' ii. (1851), p. 347.

FIG. 6.—*Cerithidea obtusa*, a brackish-water, somewhat amphibious, operculate mollusc, at rest, suspended to a bough by a number of short threads. After A. Adams, 'Zoology of the Voyage of H.M.S. Samarang: Mollusca,' 1848, pl. xiii. fig. 3 b.

* Dennis, in Jeffreys, *tom. cit.* p. 386.

NOTES AND QUERIES.

MAMMALIA.

IN the British Gallery of the National Museum the Harvest Mouse (*Mus minutus*) is at present unrepresented, on account of the lack of specimens. I therefore venture to ask the kind assistance of readers of 'The Zoologist' in remedying this deficiency. I may add that specimens of all the British Bats, with the exception of the Noctule and the Long-eared species, are likewise wanted for the same gallery. Specimens should be forwarded to me at the Museum:—R. LYDEKKER (British Museum (Natural History) London, S.W.).

AVES.

Mistle-Thrush attacking Squirrel.—On April 27th last I was noticing the nest of a Mistle-Thrush (*Turdus viscivorus*) in an oak tree, when a Squirrel by chance passed along the branch on which the nest was; the female (I presume) left the nest and attacked the Squirrel violently, darting furiously at it and screeching loudly, until it had passed on to the next tree; she then squat upon a limb for a few moments, with wings partly extended and drooping, again taking possession of the nest a few minutes afterwards.—STANLEY LEWIS (Wells, Somerset).

Crossbills at Shrewsbury.—On June 24th and 25th a number of Crossbills (*Loxia curvirostra*) visited my garden. I counted seventeen in one place, and there were others in different parts. As most of them were young birds, I imagine they have been bred in the neighbourhood. They were wonderfully tame, feeding close to the windows on the seeds of the wych-elm, with which the lawn was covered. I may mention that a pair of these birds frequented my garden in January and February of this year. Probably they had a nest, but I could never find it.—R. H. RAMSBOTHAM (Merle Brace, Shrewsbury).

Early Appearance of Swift.—The arrival of our summer migrants has in almost every instance been unusually late, and now (May 15th) the Swallow and the two species of Martin are not abundant; but this need not be wondered at when we consider the wintry weather that has prevailed. The Swifts (*Cypselus apus*) seem to have come in fair numbers, and, strange to say, I saw two on April 26th, which was a very early date, especially

during this exceptional spring, for this usually late visitor. In ordinary seasons it is seldom seen with us before the end of April or beginning of May. I have a record as early as April 18th. But this season everything ornithological, entomological, and botanical appears uncertain, and out of its usual order.—G. B. CORBIN (Ringwood, Hants).

The Great Spotted Woodpecker in Surrey.—*Dendrocopus major* has become so rare a bird in Surrey that the successful rearing of a brood deserves to be recorded. Early in June I happened to notice a hole in the trunk of a partially decayed birch tree in an unfrequented part of the Hurt Wood, near Shere. The hole was circular, about fifteen feet from the ground, and appeared to be the work of a Woodpecker. On tapping the trunk the cries of young birds greeted my ears, and I therefore returned the following morning with a glass to watch for the old birds, and ascertain their species. After waiting about twenty minutes a female Great Spotted Woodpecker suddenly flew against the trunk, but, catching sight of me, swerved aside and retired to a small oak tree a few yards from where I sat. Here she perched upon a horizontal branch, lengthways, after the fashion of a Nightjar. She remained almost motionless (thinking apparently that she was invisible), and I was able for a quarter of an hour to examine her with my glass. She had in her bill a large bunch of insects, which, finding inconvenient, she deposited on the branch in front, but removed when taking her departure. When the male bird flew to the hole, as happened in due course, she warned him of the danger with loud and alarming cries of "quick," often repeated at regular intervals. Both birds then retired to a distance, and kept up their answering alarm-notes. After about half an hour the male flew against the further side of the birch, and peered round the side of the trunk in my direction. The young ones had by now become vociferous; but, though I remained about an hour, neither parent ventured to enter the hole. I am told that the brood was fledged a few days later. The Lesser Woodpecker (*D. minor*) may still be seen in a good many places in Surrey, and, though very shy and difficult to discover, is not so very rare. *Gecinus viridis* is abundant, and, I think, increasing in the unbuilt-over portions of Surrey.—HAROLD RUSSELL (Shere, Surrey).

Hoopoe in Hants and Dorset.—From information received from friends residing in widely separated localities, both east and west, and whose descriptions could be only referable to this handsome and conspicuous species (*Upupa epops*), I infer that it has visited us in some numbers, contrary to its usual scarcity; and on May 2nd I saw a specimen which had been found dead somewhere on the borders of Dorset, apparently starved. The body was very emaciated, and one wing had been injured, as if by a stone, which must have prevented flight, and possibly was the cause of its

poor condition. I am glad to say I have not heard of a specimen having been wilfully killed, and I suppose it is too much to hope that the birds recorded were of Hampshire origin. A writer in the 'Field' of January last recorded the nesting of the species two consecutive years in South Hants, the exact localities being wisely withheld for obvious reasons.—G. B. CORBIN (Ringwood, Hants).

Spoonbill at Great Yarmouth.—On June 7th a magnificent Spoonbill (*Platalea leucorodia*) was seen on Breydon, where I put it up. *Black-headed* Gulls, out of curiosity, were keeping it company, and *they* followed it to another resting place, not *he* them. I also saw two on the night of June 9th (not including the same bird), in company with *Black-backed* Gulls. Twelve were seen on June 4th for an hour or two on Breydon, and afterwards observed at Waxham.—ARTHUR PATTERSON (Ibis House, Great Yarmouth).

Hybrid Pheasant.—It is well known how readily the various species of Pheasants interbreed—sometimes even with the poultry of the farmyard—and this to such an extent that what is said to be the original stock, with dark uniform steel-blue neck and dark legs, is now seldom met with where extensive rearing is practised. Thus the size and consequent weight have in many instances deteriorated, and the plumage has become so varied that in some cases it is almost impossible to say to what particular species or "strain" in this most beautiful plumaged class of birds some individual specimens belong. I am alluding to birds in a semi-wild state, and not to those kept in confinement, for in the latter case, if I may judge from a series of skins I saw some time since, the variation in plumage is very great, especially with the Amherst and Golden Pheasant. I have heard it asserted—whether rightly or wrongly, I cannot say—that the Common Pheasant (meaning, I suppose, the hybridized bird so commonly reared) seldom interbreeds with the "Golden." In the spring of 1898 a gamekeeper informed me that in one of his covers he had seen a common cock Pheasant consorting with a hen "Golden," and subsequently he found her nest, with, I believe, seven eggs in it, five of which were duly hatched. During the shooting season of 1898-9 one of these birds was killed—a cock—of such a peculiar colour that the proprietor of the shooting had it preserved and mounted. It was of a uniform reddish cinnamon, except the neck, which was of a bronze-copper shot with shades of purple. The development of its plumage was, however, normal, except the tail, which was longer than in the ordinary bird. Last season two others of the brood were killed, and, being a year older, one of them at least was more fully developed; but, although a second season's bird, it had no indication of spurs. Its tail was of the same form, but much longer than in the ordinary

cock; the two upper feathers of a pale buff, with slight indications of darker transverse markings; under feathers barred after the manner of Golden. Body: under parts uniform bright reddish brown; back more yellow, dappled thickly with ash-brown and black; neck a purple-bronze, with small portion of scarlet on cheeks. It had no crest, but the "cape" or "tippet" was represented by a number of feathers two and a half or three inches long, of a uniform rich brown colour, which hung in a pendent manner from the back of the head, thus giving the bird a very peculiar appearance.—G. B. CORBIN (Ringwood, Hants).

Albatross near Faroe.—It may interest readers of 'The Zoologist,' to hear of the occurrence of another specimen of the Albatross (*Diomedea melanophrys*) in or near Faroe. Miss Elizabeth R. Taylor, who is residing in Faroe for the purpose of studying these isles and their natural and other history, writes me as follows:—"It has occurred to me that you may be interested in knowing that another Albatross has been shot near the Faroes this year (the last one being the Albatross of Mygganoes, shot in 1894). This one was shot at sea, on the Faroe Banks, about seventy or eighty miles south-west of Thorshavn. I heard of it just before I left Thorshavn, and did not ascertain any particulars, whether male or female. It is of the same species as the Mygganoes one. The taxidermist at Naalsole is preparing the specimen now, and I suppose it will be sent to the Museum at Copenhagen." With reference to the above interesting communication, I need not refer to the previous records of the Albatross in the Faroe Seas, as these records are so recent. However, I may mention that Mr. Thomas Parkin, with whom I have been in correspondence on the subject, intends to bring out a monograph of the genus, and has already delivered a lecture upon the different species. This lecture was given before the Hastings and St. Leonards Natural History Society at the Museum in the Brassey Institute on April 10th last, and printed in the 'Hastings and St. Leonards Observer' of the 14th of that month.—J. A. HARVIE-BROWN (Dunipace House, Larbert, N.B.).

Migration Notes from Great Yarmouth.—The spring migration of 1900, more particularly of the Grallatores, has been, in this neighbourhood, a very disappointing one, the prevailing winds being north-east, or thereabouts, and the weather exceptionally bleak and cold. South-easterly winds are those most favourable to the visitation of the water-loving species, although any wind from the southward suits the land-birds equally well. The other side of the North Sea has no doubt seen the bulk of passing migrants, and many birds must have put off their journey until the last extremity, and then have gone on straight ahead without gossiping, as they do in favourable seasons on Breydon, resting and feeding, thus breaking

the trip. The following extracts from my note-book will give a pretty fair idea of these movements this season:—Wigeon fairly plentiful, Feb. 17th. Small bunches of Larks flying north-east, Feb. 20th. Fifty Curlews on Breydon, Feb. 27th. Flocks of Ringed Plovers on Breydon, March 1st. Sailed past several Dunlins, on March 28th, on edge of "flat"; they were as grey as in depth of winter. About two thousand Starlings on a marsh, March 28th. Late for so big an assembly. Query, were they late-hatched birds? Will they remain unnesting? Numbers of Little Auks washing ashore dead; thirty picked up last week in March; also some Puffins. Wedge-flights of Starlings moving seawards, March 29th. About one hundred Wigeon on Breydon, April 17th. Six Geese passing over (Whitefronts?), April 18th. A few Godwits reported on beach, April 17th. Sailed into flock of one hundred Wigeon, April 20th. Several Kentish and Common Crows together on Breydon mud-flats, April 20th. Five Kentish Crows on Breydon late as May 11th; one had a drooping wing; the other laggards were no doubt anxiously wishing to be off, but loath to leave him; they were gone next day. One Spoonbill said to have been seen a few hours on Breydon on April 28th; on June 7th twelve were reported to me as seen there; I was on Breydon myself, but it was so rough I went in a leeward direction, otherwise I should have gone by the very flat they were said to have rested upon for only an hour or two. I did not see them. By one or two they were mistaken for Swans, a not unusual error to those who see them at a distance. Several Grey Plovers on Breydon, May 5th; wind south-west, suddenly veering to south-east by next morning—a shift I expected. A precisely similar thing happened on May 25th, the wind backing from north-east to south-east in a few hours (*cf. ante*, p. 162). Some delightfully "Black-breasted" Plovers (old gunner's nickname for Greys) on Breydon, May 10th; they were very tired, and I "quanted" to within a few paces and watched them. Only Knots seen, May 9th; about five or six. Seven Swifts arrived on May 11th; an early arrival. We usually expect five pairs. They vanished for a few days, it being cruelly cold, and returned again. Only very few Godwits. Saw three on May 12th; have seen only one or two others since. Saw a pair of Shovelers on May 16th; they undoubtedly nested in the vicinity, but, as they have frequently visited Breydon since, their nest may have been rifled. Saw them to-day (June 10th). Observed Whimbrel in couples, May 16th; they were numerous a week before, hunting singly or in small scattered flocks. Several there as late as to-day (June 10th). A few Yellow Wag-tails on marshes, May 16th, by no means plentiful as of yore. Saw one Turnstone, May 28th; only one I have seen. A goodly sized flock of Ringed Plovers on May 27th; a few on Breydon to-day (June 10th), possibly birds nesting on the adjacent coast; also three Dunlins, probably

non-nesters. Have seen no Terns, neither Black, Arctic, or Common. Hirundines rather numerous in adjacent villages. Cuckoos numerous; locally nesting Redshanks show no falling off this season; Common Sandpipers were fairly numerous last month. There may be nothing recorded above of any importance, but the bare summary of my observations will show how scanty has been the local record, and may serve for comparison with other districts.—ARTHUR PATTERSON (Ibis House, Great Yarmouth).

ARACHNIDA.

Rare English Ticks.—The study of Ticks (*Ixodidæ*) has been much neglected in England. Mr. E. G. Wheler, of Alnwick, has, however, recently taken up the subject, and has published, in 'Science Gossip,' a series of short papers upon some of our British species. In the hope of inducing others to take an interest in these parasites, I venture to put on record the occurrence in England of two species which have not, so far as I can ascertain, been previously recorded from this country, and of a third which is certainly not common. It is true that Mons. G. Neumann, in his recent monograph of this group, states that he has seen specimens of the first two, belonging to the Bureau of Animal Industry of Washington, that were taken off English Sheep; but whether the Ticks were collected off Sheep in England, or after their importation to America (which is a very different matter), I am unable to say. I may add that Mr. Wheler took up the study of these parasites on account of their connection with the malady known as "louping ill," which is so destructive to Sheep in some parts of England. It is known, too, that great havoc is wrought amongst cattle in the United States and our own colonies by these pestilent Arachnids; and, since there are some reasons for supposing that there may also be a causal connection between the bites of these parasites and that deadly tropical disease, "black-water fever," it is safe to predict that within the next few years there will be a boom in Ticks rivalling that in Mosquitoes at the present time. I should be grateful for any specimens readers of 'The Zoologist' may come across. They should be preserved in alcohol.

1. *Dermacentor reticulatus*, Fabr. — Specimens of this Tick were sent to the British Museum for determination by Mr. Richardson, of Stoke House, Revelstoke, Devon. Mr. Richardson writes:—"These Ticks are a pest of this immediate neighbourhood. They do not bite human beings, but punish Sheep and Dogs like the ordinary Tick. A farmer tells me they were not known here fifteen years ago, and that they appear about January, and disappear about May, being very plentiful in March and April. It is strange that they should not be known a few miles away."

2. *Hæmaphysalis punctata*, Can. and Fanz.—Specimens of this species

were taken by Mr. F. Pickard-Cambridge at Dungeness. They were found amongst the shingle on the beach, and also upon a Hedgehog.

3. *Hyalomma affine*, Neum. — A specimen (a gravid female) of this species was sent for determination to the British Museum in May, 1898, by Mr. P. C. Essex, who picked it up at Feltham. The specimen is very much larger than the ordinary British Tick, and closely resembles the so-called "Camel-Tick" of Egypt and India. My suspicion that it actually was an example of this species that had interested Mr. Essex was partially confirmed at the time by my inquiry eliciting the information that a travelling menagerie had passed through Feltham a short while before. Subsequent examination of the specimen, however, has shown that it is referable to *H. affine*, Neumann, a species which its describer mentions as common on Tortoises (*Testudo græca* and *mauritanica*), and records as taken in England off one of these reptiles. Hence there is no reason to doubt that the Feltham specimen was introduced, and is not a descendant of British-born parents.—R. I. Pocock (Nat. Hist. Museum, South Kensington).

ORGANIC EVOLUTION.

In the last copy of 'The Zoologist' which has come to hand in this out-of-the-way part of the world (Mashonaland), I find that Mr. Distant has terminated his series of deeply interesting articles on "Biological Suggestions," relating to "Assimilative Colouration and Mimicry." In these articles he has brought together a most valuable collection of observations and remarks, made by all sorts and conditions of men, upon the fascinating problems of animal colouration, a collection which bears eloquent testimony to the wide and careful reading of the author; indeed, although it may appear ungrateful to say so, the material offered for the contemplation of the reader is almost bewilderingly profuse—so much so, in my opinion, as frequently to obscure the real aim and object of the essays under a mass of citations. Thus, although many of the points raised by Mr. Distant appeared to be open to discussion, it seemed advisable to see the articles as a whole before attempting to comment on the conclusions which he suggests should be drawn from the records therein brought forward. I deal only with his remarks on "Assimilative Colouration," published in Sept. and Nov. 1898 (Zool. ser. iv. vol. ii. pp. 377 and 453).

If I have rightly comprehended Mr. Distant's meaning, his general object is to show that the theory of natural selection has been pushed too far by some of its supporters in their endeavour to explain colouring in nature, and to this end he propounds two suggestions: primarily, that "in the long past animals were uniformly and assimilatively coloured in connection with their principal surroundings" (*l. c.*, p. 461); and, secondarily, that "it is at least probable that, where we have protective resemblance in a unicolourous

condition, it is a survival of original assimilative colouration, and not a direct product of natural selection" (p. 473). The question to be considered is, whether these propositions have been sufficiently maintained.

I may here state that, so far as concerns the endeavours of some biologists to make natural selection responsible for every trifling detail of colour, I can sympathise to some extent with Mr. Distant's general attitude; as, for instance, when it is attempted to explain trivial local variations by the purely hypothetical and quite unprovable assumption that these are correlated with certain obscure but useful constitutional characters, of which we know nothing at all, on the ground that it is these characters, and not the trivial colours themselves, that have been operated upon by natural selection. Such contentions certainly do not commend themselves in the present state of our knowledge. But when one contemplates the vast mass of valuable biological work, both in arduous experiments and painstaking observations, that has been and is still being accomplished by the champions of natural selection in order to test the validity of the Darwinian theory in every hole and corner of the organic world, one can only read with unfeigned astonishment the assertion that "the tendency to explain all problems by natural selection is to-day greatly retarding the study of bionomics. It is not one whit removed from the proffered explanation of the old teleologists, and represents as little thinking"! An endeavour to refute this assertion would be out of place here; and I need only mention, with special reference to the last phrase of the above quotation, that although the explanation on the selection theory of the inter-resemblance of distasteful insects appears simple enough at the present day, yet for twenty years it baffled the ingenuity of such men as Bates and Wallace, until Fritz Müller put forward the ingenious theory of mimicry now associated with his name.*

But to return to Mr. Distant's suggestions. We are at once confronted with a difficulty in that no definition is offered of the exact significance of the term "assimilative colouration," which is evidently loosely applied, seeing, for example, that the brilliant red on the wings of the African Touracos is given as an instance of partial assimilative colouration (p. 460),† apparently on the assumption that these birds eat copper ‡—the common copper

* Of course Mr. Marshall does not suggest that Müller's theory has found universal acceptance?—ED.

† The exact passage to which exception is taken reads as follows: "This cannot be taken as an instance of pure, but only partial, assimilative colouration, but is sufficient to prove that colour may be largely derived from the mineral constituents of the earth's surface, and in this way can scarcely be altogether ascribed to the action of 'natural selection.'"—ED.

‡ The "assumption that these birds eat copper" is not found on the page criticised; and is negated by a quotation given from Mr. Monteiro (p. 459).—ED.

ores of the country being green. We must, therefore, assume that assimilative colouration, as here understood, signifies a close similarity of colouring between an organism and its environment, due to the direct action of the latter upon the organism, either through nerve stimuli or through the direct absorption of the environment into its system, such colouring being essentially non-significant, any utility it may possess being entirely fortuitous.

The general proposition that in the earliest ages of the earth's history such assimilative colouration everywhere prevailed is a perfectly legitimate surmise, though a mere surmise it must ever remain. But, on the other hand, while even the most advanced selectionists will doubtless allow that the earliest organic colour, or colours, were probably non-significant, they would be quite justified in opposing the hypothesis of assimilation, as above defined, on the ground that there is no reason whatever to suppose that the direct action of any environment upon an organism must necessarily produce in it a colouration identical with that of its environment; and Mr. Distant's own examples might be cited in support of this contention, *e. g.*, that a diet of hemp-seed turns Bullfinches black; that red and yellow feathers are produced in certain Green Parrots by feeding them on fish; that the feathers of *Cotinga* can be transformed from purple to brilliant red by the application of heat, and so forth—in all of which instances there is no colour similarity between the various causes and their effects;* and still further experimental evidence might be adduced. Indeed, when we consider the numerous instances of non-significant colours known to us both in the organic and inorganic worlds, there can be no reasonable objection to the hypothesis that the earliest organisms might have developed, through purely physico-chemical causes, non-significant colours, both brilliant and otherwise, which might, or might not, have corresponded with those of their respective environments; and thus, when natural selection *did* become a *vera causa*, there would already have been a considerable range of colour upon which it might operate. However, with regard to the first appearance of this factor, it seems more reasonable to suppose that this was practically synchronous with the first appearance of organic life, though the struggle for existence at that period would be solely against the physical forces of nature, and thus natural selection would then have little or no effect upon colouration, except perhaps indirectly.

Supposing, however, that, for the sake of argument, we agree to accept Mr. Distant's general suggestion, we have yet to consider the correctness of his corollary thereto, which is really the essential portion of his paper. According to this view: "If the earliest forms of life are to be sought only in

* These examples were prefaced in the article criticized by the remark: "The view of a direct action caused by a constant food on animal colouration has frequently been remarked."—ED.

an ancient geological record, it is also in that phase of animal existence that the beginnings of colouration must have developed. It therefore seems possible that assimilative colouration may have been a first and a very general consequent in animal development; and that the subsequent protective resemblance acquired by numerous living creatures through the process of natural selection, when life had advanced to the competitive stage, is far too frequently used as an explanation for whole series of uniform phenomena in colouration, which have probably survived unaltered from remote antiquity." (Pp. 383, 384.) And again: "As adaptation implies a previous state of variation, which again predicates a more or less stable condition from which variation arose, we come to the conclusion that the pre-variable condition was a unicolorous one, and from the data—scanty indeed—at our disposal, are inclined to suggest that the unicolorous hue was originally due to assimilative colouration." (P. 471.) In other words, it is suggested that the present unicolorous hues of such organisms as green birds and caterpillars, isabelline desert animals and flat fishes, &c., are preferably to be explained on the ground that they are survivals of an assimilative colouring which was acquired in early geological times, its persistence being due not to the direct action of natural selection, but to the fact that this colouring happened, quite by chance, to be of vital importance to the animals.*

Now, apart from other objections, the acceptance of such an hypothesis appears to me to land us at once upon the horns of a dilemma. Either we have to believe that these unicolorous animals have existed as we now see them since the "early stages of animal life," or we have to assume that these organisms, with their numerous ancestry, right back to the low generalised form from which they sprung in "remote antiquity," must have existed through countless ages of time and innumerable geological and climatic changes in an unchanging environment to which their primæval assimilative colouring chanced to be so well adapted, that natural selection has been quite unable to affect them in that respect throughout the entire period; although, be it noted, their structure has undoubtedly undergone, in most cases, very considerable modification.

This conclusion is to me almost as untenable as the previous one; and, as it is difficult to perceive in what other way the present phenomena of colour can be explained upon the suggestion of the survival of ancestral assimilative colouring, it seems to me that this hypothesis must fall to the ground. The fundamental error of the suggestion appears to lie in the fact that the development of colour has been regarded in a purely abstract light, and not in connection with the development of any particular animal or group of animals, as must be done in order to arrive at any reliable results.

* The inference, "quite by chance to be of vital importance to the animals," is not to be found in the pages criticized.—Ed.

It must be particularly pointed out that in Mr. Distant's general discussion of the subject he has most clearly suggested that the present day colouring, which is classed by him as assimilative (in opposition to adaptive) was *only* developed in the earliest geological epochs, and *prior* to the first appearance of natural selection as an efficient factor—according to his conception of that first appearance. Fortunately we are able to obtain, from certain passages, some idea as to this conception, for with regard to the Lias formation of the Jurassic Period (Mesozoic), when the gigantic Enaliosaurians abounded, it is freely admitted that “Here we see natural selection, with its iron and implacable rule, a real factor”;* and, further, in the later essays on “Mimicry,” good cause is shown for the recognition of the occurrence of natural selection so far back as the Carboniferous Period in Palæozoic times.

But when we come to consider the examples adduced in support of the above suggestion, we at once find that the fundamental proposition is practically disregarded. A single instance will suffice. Referring to the colouring of primitive man, it is remarked that: “Their colour would have been uniform, either derived from their more brutish ancestors, or, possibly, *a more assimilative colouration may have ensued* to the soil on which they walked.”† It will be thus seen that the vast majority of

* This quotation with its context is as follows:—“Thus, after a period of animal evolution which may be computed by millions of years, and in which fish abounded, perhaps not yet altogether under a severe stress of selection and survival, the Mesozoic period arrives, when, in the words of Oscar Schmidt, ‘the Placoids and Ganoids, hitherto predominating in the ocean almost without a foe, now found overwhelming enemies in the true Sea-lizards or Enaliosaurians, especially the Ichthyosaura and Plesiosauria.’ Here we see natural selection, with its iron and implacable rule, a real factor in the lives and development of these creatures, connected and increasing with an advancing animal evolution, but still only a term to express the modifying influences incidental to a struggle for existence” (pp. 388-9).—ED.

† Quotations are best unabridged. The following is as printed:—“As De Quatrefages has remarked, ‘The first men who peopled the centre of human appearance must at first have differed from each other only in individual features.’ Their colour would have been uniform, either derived from their more brutish ancestors, or possibly, as their habits became less arboreal, *a more assimilative colouration may have ensued* to the soil on which they walked” (p. 403).—ED.

A previous paragraph, *not quoted*, reads: “But although facts may be found to support new suggestions, such as a possible original assimilative colouration of man, the quest for such produces other recorded observations, which, though not altogether contradictory to the view, still point to other causes, support other conclusions, and reassert the problem we seek to solve” (p. 400).—ED.

instances cited by Mr. Distant are quite inappropriate as illustrations of his fundamental suggestions, though possibly they might be brought forward in support of a theory that assimilative colouration has been sporadically developed from recent geological times down to the present day.

On glancing through the quotations given, one is at once struck by the practically complete absence of anything in the way of experimental evidence as to the direct action of the environment, and this is the more strange seeing that such evidence is actually available. It will be sufficient to refer to the splendid series of exhaustive experiments made by Prof. Poulton upon the influence of both food and surrounding colours on the larvæ and pupæ of various Lepidoptera. These experiments have been carried out with the most scrupulous care and exactitude, and the conclusions which can be drawn from them are worth scores of hasty observations and occasionally inaccurate generalizations made by travellers and sportsmen. It would be beside the point to enter into details as to the results obtained by Prof. Poulton, since we are only discussing the possibility of the survival of primæval assimilation; but it may be mentioned that these experiments definitely prove that certain of these organisms possess, in varying degrees, the capacity of being modified in colour by the direct action of different light-waves; and, further, I consider it is sufficiently demonstrated that this capacity can only be satisfactorily explained by the theory of natural selection, and not by any theory of purely internal or external causes.

But to resume: with reference to the attempt to explain the crimson colour in the wings of the African Touracos (*Turacus* and *Gallirex*) as being due to the occurrence of copper in the districts which they frequent, I quite agree with the objections raised by Dr. Bowdler Sharpe.* In my experience of these beautiful birds, both in Natal and Mashonaland, I can find no connection between their distribution and the occurrence of coppers; and besides, the fact, noted by Mr. Distant, that they have been known to moult several times in captivity in England without impairing the brilliancy of their feathers, appears to entirely negative any such direct connection. Moreover, no attempt is made to explain why it is only these birds which are affected in this curious way; or why, in them, the effects are confined to a limited number of feathers.

It is noticeable that wherever phenomena are explained upon the theory of natural selection a detailed explanation of the "why and wherefore" is always expected, whereas exponents of theories of purely environmental causes are so frequently content to confine themselves to the widest of generalities.

* Dr. Sharpe's objections are given on the page criticized, and given as a qualitative contradiction.—ED.

Among the instances quoted by Mr. Distant as bearing on the suggestion that "Even the obscure problem of the colouration of mankind may have originally—and before migration became such an important factor in modification—been due to a more or less assimilative colouration," are some remarks (p. 398) on the natives of Mashonaland from a paper by the late Mr. W. Eckersley, whose acquaintance I made when he visited this country seven years ago. In one portion of his paper Mr. Eckersley states that "large areas of red soil are frequently met with"; in quite another part he mentions that the colour of the Mashonas is "dark chocolate-brown, some shades removed from black." As a matter of fact, the absolute proportion of red soil in Mashonaland is comparatively small, and, moreover, the vast majority of the Kafirs live on the huge outcrops of granite which constitute the great bulk of the plateau. But, quite apart from this, any argument for the hypothesis of assimilative colouration, based on the relation of the Mashonas, or indeed any of the Bantu tribes, to the soil they now inhabit, is entirely vitiated by the fact that we know that these tribes have come down from the North comparatively recently, and some of their migrations, at least, have taken place within historic times.* I certainly cannot agree with Mr. Distant's somewhat sweeping assertion that "the colour of mankind can in no sense come under the explanations of protective or aggressive resemblance or nuptial colouration." Any one who has seen a Kafir in his native bush must have been struck by his inconspicuousness as compared with a white man, and there can be little doubt that this assimilation to his surroundings must be of considerable value for aggressive purposes (as, for instance, in stalking game which might frequently be of vital importance); further, Darwin himself has argued ('Descent of Man,' ed. 2, p. 604) that racial colouring may be to some extent due to sexual selection.

Unfortunately, suggestions of the type referred to above are only too easily made, and might readily be multiplied with a little ingenuity. For instance, we might suggest that, as swallows are eminently aerial birds, the great predominance of blue in their colouring is due to continual exposure to the blue sky, and we might seek for confirmation of this in the fact that the blue colour is principally found on the upper surface, which is most exposed to this influence; and, finally, we should pass over in silence the little difficulty as to the colouring of the Swifts.

* Mr. Marshall does not seem to have read a passage which might have mollified his strictures:—"It is true that assimilative colouration seems to have little modified the colour of indigenous races, even in Africa, if we take a comprehensive view of the whole area. But we must not forget that men have so often migrated from their original birthplaces, and, more than that, much mixture has taken place" (p. 399).—ED.

Finally, I must mention the notes on the colouration of the Cat tribe. After referring to Darwin's remarks on the stripes occurring on young Lions, and also to Steedman's observation that these markings are likewise foetal (p. 462), Mr. Distant proceeds to say: "It seems more in consonance with present knowledge and opinion to consider that spots, though primitive, were not original, and succeeded, not preceded, unicolorous ornamentation, which has survived only where it has been more or less in unison with the creature's environment, and so afforded aggressive protection, as in the case of the Lion" (p. 464). Seeing that the foetal markings distinctly prove that, at least, the immediate ancestors of the Lion were striped animals, and that therefore its present unicolorous coat must have been subsequently acquired, it is certainly difficult to understand how this animal can be adduced as a survival of a supposed primitive assimilative colouration! *

In conclusion, I can only regret that my notes on Mr. Distant's paper have been perforce entirely critical. Although I, as a selectionist, cannot regard as sound the suggestions which he puts forward, I can still appreciate their value in drawing attention to these interesting topics. And I trust that some reader of the 'Zoologist,' more competent to discuss these matters than myself, will in turn point out any errors that may exist in my own arguments and contentions; for it is only by healthy discussion, followed by more careful observation and experiment, that we can hope to attain a true insight into those large biological problems, the solution of which is the ultimate aim of all natural science. — GUY A. K. MARSHALL (Salisbury, Mashonaland).

* On page 462, the writer of these suggestions, which Mr. Marshall is criticizing, actually states: "A fact, however, which very strongly stands against the view of original assimilative colouration here assumed, is found in the markings of the young of all the unicolorous Cats—Lion, Puma, &c.—which are more or less indistinctly spotted or striped; and as many allied species, both young and old, are similarly marked, Darwin has observed that 'no believer in evolution will doubt that the progenitor of the Lion and Puma was a striped animal, and that the young have retained vestiges of the stripes, like the kittens of black Cats, which are not in the least striped when grown up.' . . . Taking the cases of the Lion, Puma, and Cheetah, we see that the two first, unicolorous in their adult stage, apparently show by their spotted young a derivation from a similarly coloured ancestor, whilst the spotted Cheetah, from the apparent evidence of its unicolorous young, would point to a totally different conclusion" (p. 463).—ED.

NOTICES OF NEW BOOKS.

The Birds of Surrey. By JOHN A. BUCKNILL, M.A.
R. H. Porter.

SURREY, to the regret of many of its residents and of all its naturalists, is, to use the words of Mr. Bucknill, rapidly “degenerating into a colossal suburb.” To those who were born in the county, and have passed their lives there, the truth of this saying is painfully apparent, and the success of the “City man” now too often means the disfigurement of the Surrey hills. The hand of the builder has fallen very heavily on this lovely county, residential estates are being opened out, and many of the rarer birds vanishing from its boundaries. The *feræ naturæ* are receiving notices to quit. The preservation of game in this county seems too often designed to afford a London holiday, and the keeper decides what members of our fauna shall be exterminated in the supposed interests of his employers.

We are very thankful for this book, which gives the census of to-day; what it will be reduced to in another fifty years no man knoweth! Even now many of the rarer birds are confined to restricted haunts which may not be mentioned, and the writer of this notice only last May watched the Stone-Curlew within an hour’s walk of the busy town of Croydon. The Magpie is sadly becoming less known every year, and villagers in many parts will tell you how they could always procure a nest, if wanted, with little trouble some years back. Now a solitary appearance is, in many parts of Surrey, quite an event. The Jay still survives the persecution of the keeper, and is probably in many woods much more abundant than is generally supposed. The Sparrow-Hawk is considered by Mr. Bucknill as “undoubtedly decreasing,” though this year its visits to a poultry-yard at Warlingham on more than one occasion has proved that it does not restrict itself solely to the game-preserves around.

The writer has compiled with care, and, we are gratified to

see, largely from these pages. Much, however, is still to be learned about the birds of Surrey. Many considerable areas and little visited spots have not been sufficiently patrolled by the intelligent or judicious collector, whose operations for good or evil? have now been considerably curtailed by the legislature, and whose reputed powers of mischief on our avifauna, even in the cause of science, cannot be compared with the ignorant and ruthless destruction by the keeper, or the diabolical injury done by village bird-nesting urchins. But in an era of amiable fads and crotchets the British zoologist must lay low, and do good by stealth. In the coming years our records will be more of species supposed to have been seen than of those actually handled and correctly identified. The recent apotheosis of the Sparrow is an illustration of what may occur.

'The Birds of Surrey' should find a place in most county homes, but we were a little surprised to find no reference in the bibliography to the late Alfred Smee's 'My Garden,' which refers to the parish of Beddington and the river Wandle, and contains an interesting list of birds found in that section of the county.

The Birds of Cheshire. By T. A. COWARD and CHARLES
OLDHAM. Manchester: Sherratt & Hughes.

ANOTHER county has now had its ornithological fauna described, and it is singular that Cheshire has had to wait so long, though we read that "ornithology has found but few votaries among Cheshire naturalists"; and again, that, "compared with many other English counties, Cheshire has a remarkably poor avifauna." One hundred and ten species breed or bred until recent years within the county boundaries, but it is among the casual visitors rather than the residents that the deficiency is apparent.

The authors have, however, produced a volume which will not only be of value to all lovers of birds in Cheshire, but will afford interesting reading to that ever-increasing body, the intelligent students of British natural history. In fact, such books as these, which freely enter country houses, must do much to foster a love of nature in circles where more scientific zoology is *taboo*. Among

vertebrates, birds hold the same position as the Lepidoptera in the invertebrates; they are ever popular, and evidently appeal to the æsthetic sense. In any smoking-room men can be found who can say something about birds, while other animals, save such as appertain to sport, are too often distinctly *caviare*. We may therefore be thankful to ornithologists for always keeping their lamps trimmed, and sustaining a general interest in zoology.

One seldom reads a county book on birds without meeting with new or little-known facts, and this publication is no exception. Thus we are told that our old friend *Corvus frugilegus* often exhibits a preference for a particular tree in a rookery. "At Wythenshawe, Mr. J. J. Cash has counted forty nests in a single sycamore, which comes into leaf earlier than the surrounding elms and beeches."

The volume is embellished with six photogravure illustrations, and a map of the county.

Nature in Downland. By W. H. HUDSON. Longmans,
Green & Co.

THIS book may be described as a charming reverie on the Sussex downs by a naturalist. These bracing and rolling highlands are *appreciated* by two classes of visitors—the artist and the naturalist. The first absorbs the wild and somewhat monotonous scenery, and returns with a landscape engraven on his heart; the second patiently endeavours to read Nature's hieroglyphics, and to many, probably, appears as a lone and strange creature, like the local shepherd. Jefferies was the apostle of this method, and has evidently founded a school of thought which writes in prose what some of the older poets felt and sang in verse. But we shall never receive in print the deepest thoughts that Nature sometimes imparts; these things are fugitive, and never written. It is only a legend that the finest impressions of humanity may be found in books; the individual who might wish to print what should be unutterable is certainly outside the musings of the Sphinx. After all, the naturalist can only record facts; of his impressions he knoweth not whither they come or go. We would all gladly recall, if we could, some of these mysterious whisperings, but the quest is too often futile.

Mr. Hudson has wandered over these downs with his acquired natural history knowledge, an open mind, and his field-glass. He has described much of what he saw, and a good deal of what he thought, and he has regarded Nature through his own spectacles, and introduced remarkably little of other people's theories. Consequently he has produced a most readable book, the style of which is in unison with the quiet and lorn country which he writes about.

We read that the Long-eared Owl frequented, "and probably bred, in the thorn, holly, and furze-patches among the South Downs until recently"; and he refers to what in humanity has been called "pre-natal suggestion," as exhibited in a lamb with an Owl-like face, which lived for a few days only. He also gives some quite startling facts as to the quantity of Wheatears formerly destroyed by the shepherds at the instigation and remuneration of the poulterers, and truly observes:—"It is not fair that it should be killed merely to enable London stock-brokers, sporting men, and other gorgeous persons who visit the coast, accompanied by ladies with yellow hair, to feed every day on 'Ortolans' at the big Brighton hotels." Ultra advocates of the theory of mimicry will find some remarks worthy of consideration respecting the Common Snail (*Helix nemoralis*). The shell of this species is on the downs mostly of one type, the ground colour being yellow, or yellowish white, with broad black longitudinal bands, and "often startles a person by its curiously close resemblance to a small portion of a highly-coloured Adder's coil. This chance resemblance to a dangerous creature does not, however, serve the Snail as a protection from his principal enemies—the Thrushes. Wherever there is a patch of furze, there you will find the 'Thrushes' anvil,' usually a flint half, or nearly quite, buried in the soil a few feet away from the bushes, and all round the anvil the turf is strewn with shattered shells."

Recollections of my Life. By Surgeon-General Sir JOSEPH FAYRER, Bart. William Blackwood & Sons.

THIS book is the narrative of a useful and successful life, passed for the greater, and certainly for the probationary period, in that administrative forcing-house where so many reputations

have been made—British India. The author has distinct claims to be ranked among zoologists; his 'Thanatophidia of India' is the result of long, original, and valuable work on the intricate subject of Snake-poisoning; he was the proposer at the Council of the Asiatic Society for an ethnological investigation of the Indian races, which produced Dalton's reports on the different tribes in Bengal; and he projected the idea of the Zoological Gardens at Calcutta, which he subsequently had the satisfaction of seeing fully accomplished.

In the volume as a whole, the reader will not find very much distinctly zoological information, but he will meet with a most entertaining history of his own time, which after all is the period whose story we can appreciate best, for it appertains to the incidents belonging to our own sojourn on the planet, and of these we know most. There is a romance in the past, but a reality in our own lives, and Sir Joseph Fayrer takes us again over the old ground. The Indian Mutiny and the Prince of Wales's visit to India are the connecting links of interest, though perhaps both subjects have already reached the stage of exhaustive record.

The myth of the great Sea-serpent is again before us. The author had corresponded with Lieutenant Forsyth, of H.M.S. 'Osborne,' relative to "a marine creature seen by the officers of that ship not far from Sicily." Sir Joseph is of opinion that "it can hardly be doubted that the numerous reports that we have had from time to time, though many of them perhaps are not very well authenticated, are sufficient to show that some undescribed gigantic ophidian or sea creature still remains to be identified."

We are sorry to see at p. 59 a reference to the Toucan in India. The Hornbill there is generally so called, but the mistake should never be printed.

EDITORIAL GLEANINGS.

IN the 'Journal of the South-Eastern Agricultural College,' Wye, Kent, No. 9, issued in April last, Mr. F. V. Theobald has contributed an instructive article on "Diseases caused by Horse Worms and their Treatment." The following appear to be the major pests to the Horse:—

Amongst insects the Horse has several foes, including four species of Bot Flies. One of these flies, so far unidentified, forms warbles or tumours under the skin, like the Ox Warble. Probably this is *Hypoderma silenus*, but it is by no means common in this country; Mr. Theobald only remembers having seen one Horse attacked by it. The other Warble Flies live as parasites in their larval state inside the stomach and intestines (*Gastrophilus equi*, *G. hæmorrhoidalis*, and *G. nasalis*), where the bots cause annoyance and loss of condition, but seldom death. Lice of three species also annoy Horses turned out to grass, namely, the piercing-mouthed *Hæmatopinus macrocephalus*, or the Large Horse Louse, and two smaller species related to the Bird Lice, known as *Trichodectes pilosus* and *T. pubescens*, the former being the one most frequently seen, and is one of the three causes of that disfiguring rubbing of the tail. Numerous Diptera, such as the Gad Fly (*Tabanus bovinus* and *T. autumnalis*), Brimps (*Hæmatopoda pluvialis*), and others, suck their blood; whilst the Forest Fly (*Hippobosca equina*) causes annoyance in a few localities by tearing the hair and irritating the skin generally.

The three forms of "scab" or "mange" are also found on the Horse, caused by *Sarcoptes scabiei* v. *equi*, *Psoroptes communis* v. *equi*, and *Symbiotes communis* v. *equi*, mainly on weakly and ill-kept stock.

Amongst the vermiceous pests of the Horse we find representatives of the three great groups: *Cestoda*, or Tapeworms; *Trematoda*, or Flukes; and *Nematoda*, or Round Worms; but in this country the two former are rare and comparatively unimportant, for the loss they account for is slight. On the other hand, the *Nematoda*, or Round Worms, often are the cause of serious mortality, especially in young animals.

The Tapeworms found in the Horse are *Tania perfoliata*, *T. mamillana*, and *T. plicata*. All three are uncommon, and do not seem to have occasioned any loss, nor do they seem to cause much inconvenience to their host. The two first-named species live in the intestines, but *T. plicata* is

also said to be found in the stomach. Although uncommon in this country, *Tæniæ* are often abundant in the Horses in Russia and Germany. *Tænia perfoliata*, the commonest species, infests the cæcum and small intestine, sometimes the colon. It is a small worm, seldom reaching more than two or three inches in length—Rudolphi records it as reaching 80 mm.; the head is provided with four suckers, and, like the other two species, is devoid of hooks; the proglottides are thick and short, and the colour creamy white.

Nematodes we find in all parts of the body. This group of worms, which contains so many parasites, is of much importance to those interested in Horses and Horse-breeding in all parts of the world, for they are often the cause of serious epizootic attacks, occasioning very considerable loss. These Round Worms are particularly plentiful in the intestines of the Horse, where perhaps they cause the gravest functional disturbances; but they also invade the kidneys, eyes, blood-vessels, serous membranes, skin, &c. In Europe our chief pests are intestinal in habit, often causing great mortality in foals. The following are those which are most prejudicial to the health of the host, and which may be considered general equine pests:—

(*Sclerostomum armatum*, *S. rubrum*, and *S. tetracanthum*.)

Two species of so-called "Red Worms" are well known in the Horse, but observations made tend to show that we have evidently three species to deal with, for the common Small Red Worm, usually taken to be the *S. tetracanthum* of Diesing, does not agree with the detailed description of that species, which Mr. Theobald has observed only twice in England. He has therefore proposed provisionally the name *rubrum* for this Small Red Worm, as a distinct species from the one described by Diesing.

(*Oxyuris curvula* and *O. mastigodes*.)

The Maw Worm (*Oxyuris*) is a very prevalent equine pest, but, as far as can be gathered, it only occasions slight functional disturbances in digestion, and violent burning and itching sensations in the rectum and around the anus. When present in large numbers the Maw Worms nevertheless cause emaciation, and cannot be otherwise than prejudicial to their host.

(*Ascaris megalcephala*.)

This is perhaps one of the best known worms in the Horse on account of its size, the female often reaching 14 in. in length, and the male from 6 to 10 in. It is a special parasite of Horses. In colour it is yellowish white and rigid; the oral region is restricted off from the body, and provided with three lips with teeth on their free margin. The ova are globular, and are produced by hundreds, and are passed out in the host's excreta; numbers also come away with the female worms that are frequently passed by the Horse.

(*Filaria papillosa* of Rudolphi ; the *F. equina* of Abildgaard.)

Although seldom of fatal import, this Threadworm is often present in the peritoneal cavities of the Horse, Ass, and Mule. In one instance as many as would fill a basket (how large we are not told) were extracted from the thoracic cavity of a Horse by Menges, lungs and all being invaded.

Two species of *Spiroptera* are found in Horses, living in the stomach, namely, *Spiroptera megastoma* (Rud.) and *S. microstoma* (Sehn). They are both found in the right sac of the stomach. It is not probable that the second species is at all common, but the former is ; neither, as far as can be learned, causes any serious functional disturbances ; but the former, if in large numbers, might easily become dangerous.

WE have received the Annual Report (1899) of the Millport Marine Biological Station. "The station is now in a position to supply sets of beautiful marine zoological specimens at moderate charges to private individuals, as well as to schools and other institutions. As science is now receiving so much attention in school training, it is hoped that such sets may ere long be possessed by every well-equipped school."

At the request of the Vice-Chairman, Dr. Gemmill, repeated and persistent efforts were made during last winter to fertilize the eggs of the Limpet (*Patella vulgata*, L.), and to rear the young up through all their stages, but without success. Fertilization of the ova was easy enough, and the keeping of the little brown, opaque, free-swimming larvæ up till the twelfth or fourteenth day, but at that age they invariably died off, excepting in the case of one culture, in which a few lived till the twenty-first day. From the sixth day onwards the water in the hatching-jars was found swarming with Infusorians, which soon devoured the unfortunate larvæ. Similarly, attempts were made, with varying success, on fertilized ova of crustaceans, molluscs, worms, and fishes, as well as on unknown ova obtained from the tow-nets. Failure, when it did occur, was doubtless largely due to the inability to imitate sufficiently the natural conditions of the sea, even by constant gentle movements in the hatching-vessels, and by continual circulation of pure sea-water. With the facilities at command many perfectly normal and healthy batches of *Echinus* larvæ were successfully hatched out, and the interesting changes in their development carefully watched from day to day. The young of the common Urchin (*Echinus esculentus*, L.) is a favourite with students of embryology, as its transparency makes it easy to follow the successive changes in structural development, even when alive and active. Some exceptionally good fertilizations of this echinoderm were obtained early in May by Dr. Thomas H. Bryce, Queen Margaret College, University of Glasgow, from which he has prepared

microscopic sections, the photographs of which, taken by Dr. J. H. Teacher, have been made into a very valuable series of lantern slides. A finely mounted set of these slides has been presented to the Station by the gentlemen named, and by means of the lantern given by Mr. Paul Rottenburg, of Glasgow, they can now be used for demonstration purposes.

MR. W. WELLS BLADEN has taken a specimen of the Fresh-water Mussel (*Dreissensia polymorpha*) containing a very beautiful and perfect pearl. This shell was found in a large colony of the species in the North Staffordshire Canal, near Rugeley. The pearl attached to it is almost spherical in shape, and has a small protuberance at one side; it is 2 mm. in diameter, and is very pure in colour. This is said to be the first recorded instance of a pearl being found in this mollusc. The shell is figured in the Ann. Rep. and Trans. of the "North Staffordshire Field Club," 1899-1900, vol. xxxiv.

AT Stevens' Auction Rooms two more eggs of the Great Auk were recently disposed of. One—an unrecorded egg—sold for three hundred and fifteen guineas, and the other egg for one hundred and eighty guineas. They were both bought by Mr. Gardner, of Oxford Street.

THE 'Banffshire Journal' of June 5th last has published a letter received from Mr. J. A. Harvie-Brown, relating to Elvers, Eels, and Smolts. The following are extracts from same:—

"It is certain Elvers are largely consumed by Brown Trout for a few days. Soon after that, worm becomes the deadly bait. Why? Well, worm in low clear water, after the run of Elvers, becomes a necessary purge to Trout after the Eel 'stodge.' At least, I believe this to be the case—just as grass is an occasional vomit for a Dog.

"If Elvers are largely consumed by Brown Trout, they are also largely consumed by Sea-Trout, Grilse, and probably also by Smolts. What are known among Sea-Trout as Finnocks, at the mouths of our East Coast rivers in April, May, &c., are the Grilse of the Sea-Trout, which went down the previous year as Smolts, which went up as Grilse or Sea-Trout, do not breed, but attain a growth of up to, say, half a pound, or less, and come down again along with the Smolts of the Salmon. Their time so far is known to legislators, because fishing for Finnocks is prohibited whilst the Salmon Smolts are descending—*i. e.* about 15th May. The baskets of Sea-Trout and Finnock made in the spring months on the East Coast of Scotland—at Ythan, Deveron, Findhorn, &c.—are either down-run Kelts or unspawning Grilse of the Sea-Trout; or rapidly-grown Smolts of the

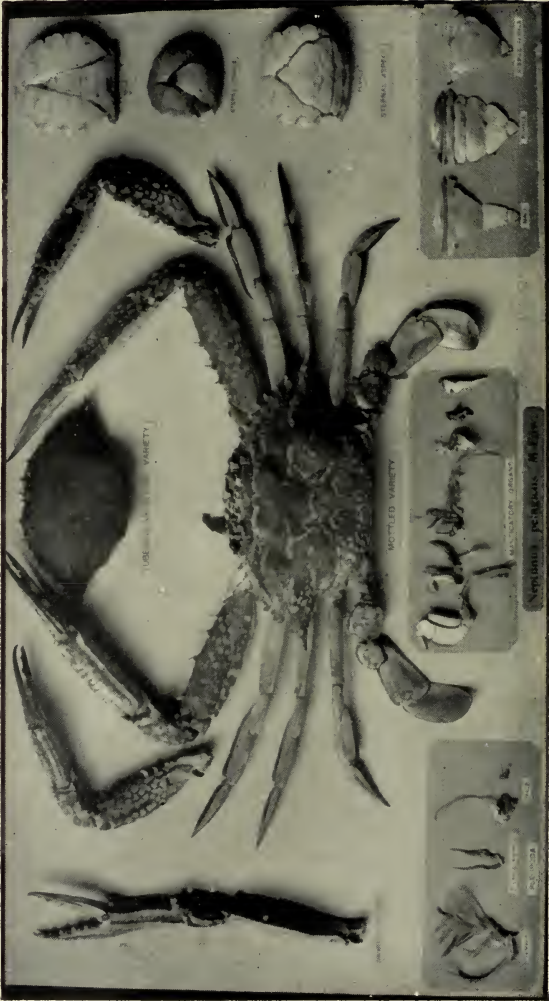
Sea-Trout; or Smolts of the Sea-Trout which have remained two years in the fresh-water streams, after putting on the silver. Thus we find Par $\frac{1}{4}$ lb. weight, but Smolts in silver often three inches long only, and others seven inches long. These, I take it, are the young of different hatchings, the larger of which are the progeny of older Salmon; the larger and smaller Par in the same way.

“ Now, if Brown Trout feed—‘ stodge ’—on Elvers, they lie in wait for them, because Brown Trout are not strictly migratory; but if Smolts and Sea-Trout Grilse also feed largely on Elvers—as I feel sure they do—they, being anadromous or migratory, come down in bulk to meet the Elvers. The first appearance of Elvers on any reach of water (on Deveron) wakes up the migratory instinct at once, and, acting almost like ground-bait, sets the Smolts and Sea-Trout Grilse—aye, and Salmon Kelts, too—on the move seaward. Thence the well-known name, ‘ A weel-mendit kelt.’ ”

WE are glad to see from ‘ The Scottish Geographical Magazine ’ for June that it is proposed to organize and equip a Scottish National Antarctic Expedition, which will co-operate with the German and British expeditions now being fitted out, and devote its attention more especially to physical and biological oceanographical researches, and to geology and meteorology.

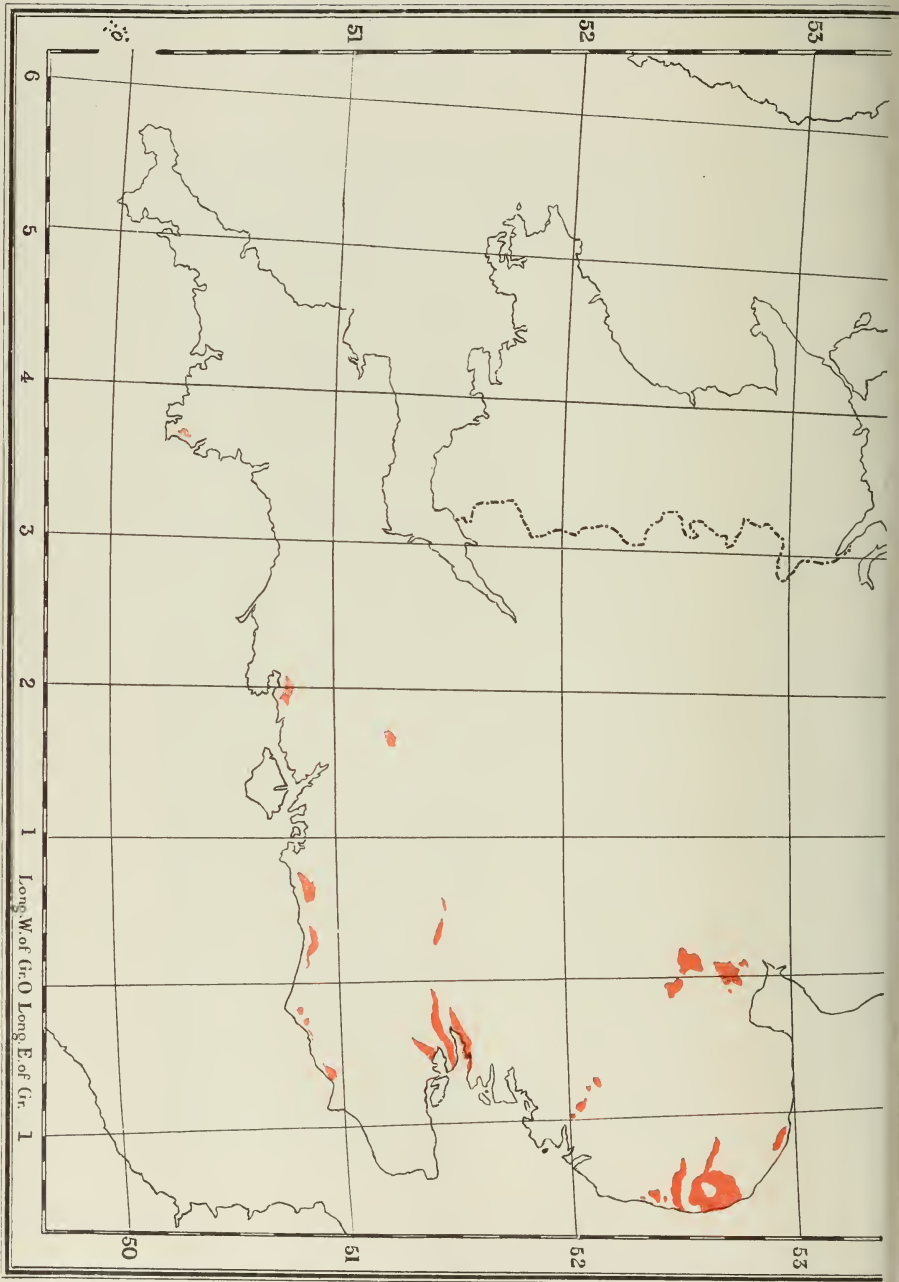
The Scottish vessel will be one of the ordinary Norwegian or Scottish type of whalers of about 500 tons, 130 ft. long, and steaming seven to eight knots. A ship of this size will have ample accommodation for thirty-seven all told. The proposed staff includes six scientists and five ships’ officers, and a crew of twenty-six. The ship will proceed from Scotland on August 1st, 1901, to Port Stanley, in the Falkland Islands, which will form the base for operations in the Antarctic regions. She will proceed southward by Weddell’s track in 30° W. This route has never yet been tried seriously with a steamer. Weddell, in 1823, penetrated far south with two sailing ships, one of 120 tons and one of 65 tons; Bellinghausen also was successful a little farther eastward. Ross, with sailing-ship, failed, but Larsen, with a steamer, reached 68° S. in about 60° W. The Dundee whalers, in 1892 and 1893, being on commerce bound, were chiefly occupied securing Seals, and, since these abounded in the vicinity of the Circle, they had no need to go farther south. There is little doubt that the ice can be penetrated by such a vessel as that above mentioned.

Mr. William S. Bruce will take command of the expedition with a whaling captain under him and four other officers; a naturalist will be permanently attached to the ship, and will take charge of and carry on the scientific work there during the leader’s absence with the wintering party. The land party will land in a high latitude on the east coast of Graham’s Land, and the ship will return northward for the winter.



NEPTUNUS PELAGICUS M.-Edw.

FORMER BREEDING RANGE IN ENGLAND
OF *PANURUS BIARMICUS*.



West, Newman lith.

THE ZOOLOGIST

No. 710.—August, 1900.

ZOOLOGICAL NOTES FROM SYDNEY.

BY DAVID G. STEAD.

(PLATE IV.)

LAST year (Zool. 1899, p. 407) I had the pleasure of narrating one of my zoological wanderings near Sydney. On the present occasion I propose to describe some of the objects of interest which it has been my good fortune to encounter on various rambles during the past few months.

At the time of writing the "bush" is teeming with animal life, chiefly insects, though the Reptilia play no small a part. Of the former, perhaps the Cicadas attract most attention, both by numbers and noise. It is only a few weeks since they made their appearance above ground (that is, in the city and environs), but they have been making the most of their time; and now the first thing to greet one's ears on awaking in the morning is the sound of their stridulation. Hot, still, sultry weather always suits them best, and under such atmospheric conditions, and as the season advances, they may be often heard long before daybreak, keeping up their "churr-urr-urr-urr" until about 7 or 8 o'clock, when there will be a general quietude until about 11 o'clock, when once more the concert is resumed with renewed vigour. This goes on with a few intermissions until about 4 or 5 p.m., when once more it ceases as suddenly as it began; only to start again about 7 p.m., and continuing until long after darkness has set in. I have even heard them as late as 11 p.m. I have

spoken of the Cicadas as "singing." To me it is music (though most people consider it a hateful sound), recalling, as it invariably does, so many happy hours spent in roving about the bush. But even I can have too much of it. I can well remember one such occasion. It was a glorious day, with a gentle breeze and a blue sky, with the air clear and bright, when I sallied forth, making my way to the ferry which traverses that long arm of Port Jackson known as Parramatta River. I soon found plenty to interest me, as the water was in parts almost alive with *Discomedusæ* of several species, some small transparent ones (of a bluish tint) floating lazily along at the surface; others (*Crambessa*), of a large size and fleshy-pink colour, forging along steadily by means of the rhythmical contractions of their ciliated discs; and others, again—"man-o'-war blubbers"—which especially attracted attention on account of their beauty. These last are of a semi-transparent red tinge, the disc having all over its surface large white spots. These spots become very dense near the margin, the fringe being almost entirely white. (Recently—Feb. 4th, 1900—I observed a large number of these animals in Circular Quay, Port Jackson. Some of them had been greatly mutilated by the propellers of the many ferry-boats which ply from here. In one instance I observed a specimen swimming along serenely minus its *manubrium*, while in another there was only three-fourths of a disc, and this still contracted rhythmically.) From the borders of the disc depends, besides the usual short fringe, a large number of long white and beautiful, though treacherous, tentacles (these being thickly studded with lasso-cells). When swimming in clear water the animal possesses a most pleasing and beautiful appearance; but when one's limbs come into contact with its tentacles, as while wading, the most intense and painful irritation is set up, which lasts for some considerable time after (as I know to my cost).

After travelling a few miles I landed at my destination—Ryde, a pretty little village situated in a fruit-growing district. Several hollows in this locality are a great breeding-ground for three or four species of Cicada, notably one — *Thopha saccata*—a large species. That day I heard such a tumult of insect-life as I have never experienced either before or since. The noise was deafening. Some men who were near at hand, upon seeing me searching about amongst the stones, evidently guessed that I was on the

look-out for zoological specimens, as they drew towards me, one of them carrying a magnificent green glittering beetle. He had to come quite close and shout before I could hear him, so tumultuous was the sound. All around on the trees (*Eucalyptus*), which were here tall and slender, were to be seen scores upon scores of Cicadas* in all imaginable stages—dingy sluggish larvæ that had just emerged from their holes at the foot of some tree, some of them just in the act of bursting from the larva-case; others, again, that had performed this act, standing or climbing slowly up the tree, waiting for their wings (which were hanging like little green globular bags full of fluid) to dry; and so on up to the beautiful-winged imago flying lightly from tree to tree. In dealing with these insects one cannot fail to notice the habit they have of spurting an acrid fluid as they fly off on being alarmed; this they eject with some degree of force, and in considerable quantity.

My attention was here attracted by the great number of large handsome red-and-black Hymenoptera (*Exeirus* sp.?), which were attacking the Cicadas, relentlessly pursuing them from tree to tree. (Afterwards, on my road home, I came across a specimen of this large Wasp, hard at work dragging a large green and apparently anæsthetized Cicada across my pathway. Unthinkingly I separated them, for which I was immediately sorry, as I might have witnessed the performance of stowing the Cicada away in some hole for the use of its assailant's future progeny.)

Here also I observed large numbers of the Coleoptera known as "Elephant insects" (*Curculionidæ*) of two varieties, one of a uniform dark colour, and the other black and green, both kinds (*Chrysolopus spectabilis*, Fabr.) being on the branches of a large wattle-tree (*Acacia*). These wattle-trees are usually swarming with insects, notably Ants, on account of the large amount of gum which is exuded, especially from where there has been a wound. Here the vibration set up in the air by the Cicadas became so intense and so intolerable that I took to my heels, and made for the beach, so that I might gain a brief respite.

* These consisted chiefly of five species:—*Thopha saccata*, *Psaltoda mœrens*, *Cicada angularis*, *Tibicen curvica* (this makes a tremendous noise, and can be heard at a great distance, though it is not very large), and, lastly, *Cyclochila australasiæ*, of which there are two varieties, one a beautiful green, the other yellow, with intermediate forms.

All along the shore were numbers of boulders which had been perforated through and through by the little Isopod crustacean *Sphæroma*, assisted here and there by a boring mollusc. These little creatures form a very powerful factor in the disintegration of the rocks, as, after they have driven their galleries through, it is quite an easy matter for the sea to do the rest. As commensals in the burrows of these Isopods, I have observed many other small crustaceans, several species of small fishes, including the Common Eel (*Anguilla australis*), and also a brown-coloured Araneid. This last—of which individuals were numerous—remains in the burrows even when the tide rises and floods them, and it may be seen moving about beneath the surface clothed in a tunic of air-bubbles.

While speaking of the seashore, I must mention something connected therewith which at once claims the naturalist's attention, and that is the zones which each animal (or set of animals) occupies. Taking a typical flat, and starting from the top, we would first come to a sandy zone, slightly above high water. This is inhabited by the beautiful "Swift-footed Crab" (*Ocypoda cordimana*), a small grey Isopod; and, in the event of there being decaying animal or vegetable matter, many specimens of the Common Sandhopper (*Talorchestia quadrimana*). Then, lower down, there is a zone just lapped at high water, about which are strewn clean stones (*i. e.* stones not overgrown with Algæ). Under these stones are to be found many interesting and exceedingly agile Crabs (*Cyclograpsus Lavauxi*). Going still lower, we come to a belt consisting of a mixture of sand and mud. On—or rather in—this we find the bright-coloured, martial-looking "Soldier Crab" (*Mycteris longicarpus*),* and an exceedingly fragile *Callianassa*. Going beyond this again, we arrive at a zone which is only just above low-tide mark. This is composed of dark evil-smelling mud, with occasionally small Algæ-covered boulders strewn sparsely over its surface. On the stones themselves (amongst the Algæ) we find some tiny Crabs (*Hymenosoma varium* and *Porcellana dispar*). Underneath will be found others and larger species, *viz.* *Chasmagnathus lævis*, *Sesarma erythro-dactyla*, and occasionally *Pilumnopus serratifrons*. In the mud

* For further information regarding these crustaceans, *cf.* author's "Notes on the Habits of some of the Australian Malacostracous Crustacea" (Zool. May, 1898).

itself are two species: *Helæcius cordiformis* and *Macrophthalmus setosus*; besides several kinds of *Annelida*. The last-mentioned Crab—*Pilumnopus serratifrons*—I have found, is occasionally attacked by a parasite—*Sacculina*.* The parasitized Crabs which I examined were found to represent both sexes in about equal proportions, and neither the pleons nor the abdominal appendages were affected in either sex; a different state of things to that recorded by Prof. A. Giard in the case of certain European Crabs† attacked in a somewhat similar manner; and also by Prof. W. Haswell in that of an Australian species—*Nectocarcinus integrifrons*.‡

I have spoken of Ryde as being in a fruit-growing district, which reminds me of the Fruit-Bats (*Pteropus poliocephalus*). These are perhaps the orchard's greatest enemies. The fruit-growers of the north-western suburbs of Sydney (of which Ryde is one) have annually large quantities of fruit destroyed by these "Flying Foxes," which congregate in immense numbers during the fruit season (the present time). After a night's ravaging they mass in great numbers in the heavy timber of the surrounding bush, and may be seen hanging thickly, almost like Bees, from the tree-branches. A war of extermination is waged against them periodically by bodies of fruit-growers. Recently, in pursuance of that custom, a party of fifty-three fruit-growers from the surrounding districts drove to a known camp of the pest, carrying with them 5000 cartridges. The number of "Flying Foxes" was estimated to be between 100,000 and 120,000. A successful raid was made upon the "camp," resulting in the destruction of about 2750 animals. In another district one hundred miles north of Sydney, at a recent *battue*, twenty men killed 13,000 of the same animal, which proves what a serious pest this *Pteropus* is to the orchards; as, for every peach, nectarine, or plum that the "Flying Fox" bites, it knocks down at least a dozen.

On two occasions recently we have had, on the coast of New South Wales, the most unusual phenomenon of a dust-storm at

* Cf. my "Contributions to a Knowledge of the Australian Crustacean Fauna. No. 2. On *Sacculina* parasitic upon *Pilumnopus serratifrons*" (P. L. S., N. S. W., part iv. 1899).

† Ann. Mag. Nat. Hist. (5), vol. xix. pp. 325-345, 1881.

‡ P. L. S., N. S. W. (2), vol. ii. 1888.

sea. A steamer on the way from Queensland to Sydney had a peculiar experience on the passage down the coast. After leaving Brisbane, and when crossing Moreton Bay, a thick haze was encountered, which made the atmosphere so dense that it was impossible to discern the leading lights. In consequence the vessel had to anchor from midnight till 5.30 a.m., when she passed out of the bay, the buoys in the channel being made out with difficulty, even though it was daylight. This continued for some distance down the coast. When the boat emerged from the thick weather everything (including the passengers' quarters and fittings) was covered with a fine red dust which had been carried out to sea by the strong westerly wind then blowing off the land. (*Apropos* of this, I am informed by Capt. Waller, who travels between New Zealand and this port, and to whom I am indebted for some interesting specimens which I hope to mention on some future occasion, that he has encountered moths and other insects whilst quite out of sight of the land, at a distance of from seventy to eighty miles from the New South Wales coast.) The red dust, upon undergoing a microscopical examination, was resolved into the remains of innumerable *Diatomaceæ*, a fact interesting alike to the zoologist and botanist.

While walking along the beach at Maroubra Bay (a few miles from Sydney), on an excursion some time ago, my attention was suddenly riveted by a very curious-looking object. This on close examination proved to be the fruit of *Barringtonia cupania*, which had evidently been in the water for some considerable time, as it was covered with stalked barnacles (*Lepas pectinata* ?), some of which were apparently full-grown. Upon its surface was also a species of *Bryozoa*. In one corner a hole had been excavated (whether by its occupant or not, I am ignorant), and safely ensconced in it was the small and widely distributed "Gulf-weed Crab," *Nautilograpsus minutus*. (For those readers who are not familiar with this branch of zoology, I may add that this famous little crustacean is believed, with good reason, to be the one which Columbus found on the floating "Sargasso Weed," and which caused him, fallaciously, to surmise that his ships were near land. However, it is perhaps almost needless to say that this was no proof, as the animal is found in nearly all the tropical and temperate seas of the globe upon floating seaweed and wood.) In the same cavity as the

Crab was a small "Sea-Mouse"; also in parts, where the husk was beginning to disintegrate, were several small brownish-black *Amphipoda*. The discovery of this current-borne *Barringtonia* is not by any means a unique one, though perhaps the finding of so many tenants is, as cocoa-nuts and other objects of interest are continually being found along our coast, which have been brought from the same far-distant source—the South Sea Islands. I have many times collected, at different points along the coast of New South Wales, small pieces of pumice and volcanic cinders. These have been continually washed up for a considerable number of years at least, as is amply borne out by the fact that they are found deep down in the grass-grown sand-dunes, whenever an opening is made (artificially or otherwise). The most interesting thing to the zoologist is that this flotsam carries with it occasionally—as I can personally bear witness—such animals as tubicolous annelids, and sometimes small specimens of coral. It is almost impossible to conceive what vast changes might be wrought, or what additions might be made, to the fauna or flora of an island lying in the course of the current which carries along this flotsam.

While on this subject I might mention some other ways by which Polynesian animals are transported to our waters. It will at once be self-evident that ships' bottoms are a very fertile agency, as there is a large amount of trade between this port and the islands of the South Pacific. Thus it is not very hard to understand how it is that fairly large specimens of Madrepores should have been found growing in Port Jackson, where they were certainly not pre-existent. Now, turning to the land-animals: our imports from the South Seas consist mainly of copra, pine-apples, bananas, cocoa-nuts, palm-leaf fans, hats, and native matting, and each of these brings along its quota of migrants. I had at one time brought to me a prettily marked Snake, alive, which was curled up in a bunch of bananas, and others have occasionally been found. But the three last-mentioned articles should perhaps claim priority for the number of Arthropoda—in the way of Cockroaches, Spiders, Centipedes, small Coleoptera, &c.—which they bring. On the other hand, I have reason to believe that many animals have been introduced from this country into the islands by means of the same agency—the ships.

During last year (1899), on several of my excursions round

about Sydney, in walking over the heights, I was much struck by the curious appearance of the rocks (sandstone), which were in many cases completely honeycombed. As I am always exceedingly inquisitive about holes, I determined to "get to the bottom" of the cause. Upon making enquiries amongst my naturalist friends, I found that many others had noticed it, and it had been the subject of a considerable amount of controversy. Most seemed to favour the hypothesis that it was the work of Wasps, but a few clung to the view that it was done by the Termites. After a considerable amount of labour, I found that the tunnelling was the work of the latter insects, as I found them



in situ and at work.* It would seem almost incredible that these little frail-looking creatures should accomplish such work as this, were it not for the fact that their depredations in houses, &c., are so well known. It was only quite recently that the weighty and apparently solid roof of the Australian Museum at Sydney was found to be in places completely honeycombed by these insects. In the course of their work they had actually bored through sheet-lead an eighth of an inch in thickness. Had the roof collapsed there would have resulted irreparable damage. The holes in the before-mentioned sandstone are beautifully uniform in size, are of great symmetry, and are lined in the

* P.L.S., N.S.W., part iii. p. 418, 1899.

manner so characteristic of the Termites. While speaking of excavations, it might not be amiss to mention another instance. One day I was out in the vicinity of Curl Curl (near Sydney), when I suddenly observed half-way up the stem of a young eucalypt a very round hole—in fact, it was the great symmetry which chiefly attracted my attention. Upon breaking down the stem, and cutting very carefully, I found the workmen within—the beautiful Carpenter Bees (*Lestis æratus*). Now, the most interesting part of this, is, that it points to an aberration of habit, in accordance with which these Bees usually burrow into the flowering stems of the “grass-tree” (*Xanthorrhœa*). Did they mistake this small stem—of the same thickness as a grass-tree stem—for the *Xanthorrhœa*? With about half the labour involved in cutting the eucalypt, they could have burrowed three times as far in the *Xanthorrhœa*.

Some time ago, while I was on one of my periodical trips to my happy hunting-ground—Manly—I was turning over the stones on the border of the bush above the shore, when, amongst other things, I came across several specimens of a large Millipede (*Julus*). This Millipede has a row of orifices along each side, one in the middle of each somite, from which, when irritated, it ejects a brownish-coloured fluid (in appearance much resembling iodine), which possesses an exceedingly penetrating pungent odour, very irritating indeed to the mucous membrane lining the nasal passages. But the supply of this fluid—which, scarcely without doubt, is for purposes of defence—seems to become very soon exhausted, as, after I had kept the Arthropods for a short time, scarcely any of the former odour was perceptible. Under this same stone I found specimens of a beautiful little Lizard (*Lygosoma æquale*), having very short, almost rudimentary legs, and truncate, though long, tail.

A little farther along this shore is a large rock-pool, which I often visit. In it I made rather a unique discovery in the shape of a specimen of the Gastropod *Hydatina physis* in the act of oviposition. The animal itself is beautiful, but the spiral ribbons of eggs, embedded as they were in a transparent jelly-like protoplasmic substance, were, in point of intrinsic beauty, equal to anything that I have ever observed. Molluscan ova are, of course, often to be met with; but unfortunately, in very many cases, without any satisfactory clue to the species to which they

belong. In the present instance, however, there could be no doubt whatever. My friend Mr. Charles Hedley, F.L.S., of the Australian Museum, informs me that they much resemble an *Aplysia* figured by Rang.

On another occasion, when at Manly, while walking along, I was very much struck with the conduct of an Ant. It saw me at the distance of a few paces. The insect was carrying what I thought to be a green leaf, but what turned out to be a comparatively large larval "Grasshopper," several times the size of its bearer. The Ant seemed to become very excited, twisting round from side to side, looking at me all the time, and holding its prey up as high as it could. It appeared as if it were challenging me to come on (which I did), and when I tried to effect its capture it dropped its burden, and made several quick springs in my direction, leaping from five to six inches at a time. Whenever I moved to one side my little antagonist followed my motions with its eyes in the same manner as does the Mantis. It looked, indeed, so uncommonly human in its actions that when I captured it I had quite a large amount of respect for it.

One morning I went to Mosman's Bay (Port Jackson), and walked from thence along the harbour coast. After walking for some distance, I observed two fishermen about to haul in their net; so I went out with them in their boat, and assisted in the unloading of the net. It was a poor haul (*i. e.* looking at it from the fishermen's point of view, but not from the naturalist's), consisting as it did almost solely of small *Discophoræ* and immature pelagic Crabs (*Neptunus pelagicus* (Pl. IV.) and *N. sanguinolentus*, *Thalassidroma sima*, *Charybdis cruciatus*, and *Nectocarcinus integrifrons*). There were a few specimens of *Squilla lævis*, also of the handsome Prawn *Penæus canaliculatus*, and of the smaller and commoner Prawn *P. esculentus*. There was also a goodly number of species of small fishes, the most noticeable of which were the "Fortescues" (*Pentaroge marmorata*), and two specimens of the "Stink Fish" (*Callionymus curvicornis*). The first mentioned is a harmless-looking little creature, but in reality it is just the reverse. It is armed on each side of the head with exceedingly sharp spines. When the poor unsuspecting mortal picks up one of these carelessly, it whirls round its head suddenly, and the spines inflict a wound of a very painful nature. I captured several of these, however, without being injured. Whilst thus engaged I noticed

a most noisome odour arising. While I was still wondering whence this was proceeding, one of the fishermen quickly settled the point by placing one of the last-mentioned fishes under my nose. I can assure the reader that I did not allow him to keep it there many seconds. It is a most objectionable stench, and would, in the writer's opinion, serve no doubt to restrain many other fishes from preying upon this one. In general appearance the fish is not unlike the "Flathead" (*Platycephalus fuscus*), but the mouth is very considerably smaller. I found that the odour was given off from two orifices at the back of the eyes, one on each side of the occiput.

I have no doubt that the story of the s.s. 'Perthshire' will be fresh in the memories of some readers at least. The vessel, while on a five days' voyage from Sydney to the Bluff (N.Z.) during last year, broke down, and was helplessly adrift at the mercy of the elements for a period of five weeks. While she was lying disabled on the 5th of May, about five hundred miles from the nearest land—Cape Howe, N.S.W.—a common "Bronze-wing Pigeon" (*Phaps chalcoptera*) flew aboard in an exhausted condition. The alighting of land-birds on ships close in shore, when the vessels are "making the land," is not an uncommon occurrence; but that a Bronze-wing Pigeon should have found a haven on a disabled vessel five hundred miles from the nearest land is indeed singular. This Pigeon is a short-flight bird, and, although it travels long distances during the hours of a long summer's day, it does it with frequent rests. How then did this hapless Bronze-wing manage to keep up over the five hundred miles of storm-tossed sea until it reached the vessel? The flock Pigeons of the far west and interior, which come periodically in countless thousands, are tireless flyers, at times coming in such swarms that at a distance they appear like a drifting cloud; then for a year or two they are entirely absent. One of these last-mentioned birds would have negotiated the distance (especially with the strong westerly wind behind it, which was blowing from the land at the time, and had been blowing for some days) with little difficulty. The marvellous thing is that a Bronze-wing should have done it; about the least likely species of Pigeon to attempt the feat—willingly! When I saw the bird it looked very well, and none the worse for its adventures.

Before finishing my notes on this occasion, I would like to

mention one more incident. While out in the vicinity of North Harbour (Port Jackson), on Jan. 1st, 1900, I made a few observations which I hope to be able to speak of on some future occasion; merely relating one of them at present. I was situated in a very pretty little nook of the harbour called Pirate's Cove, and, as atmospheric conditions were favourable, waited till night came on. I was well repaid, for, upon darkness setting in, I found that the whole of the water flooding the cove was filled with myriads of the *Noctiluca miliaris*. Here and there the wake of some fish might be traced out in silver. Then every ripple on the water was crested with light; scattered plentifully between these were little individual globes of light, and as each wavelet plashed up on the rocks or sand it would leave many *Noctiluca* stranded. Wading in until the water was over my knees, my nether limbs suddenly became clothed with phosphorescence. As there was no moon, the whole contrived to form a most beautiful and fascinating display of Nature's pyrotechnics.

While on the subject of phosphorescence, I may mention that, while walking along Jarrah Beach (Botany Bay) recently at night time, my attention was attracted by the number of little "orbs of light" which were being washed in. At first I thought it was the *Noctiluca*, but, upon handling one, I perceived that it was hard to the touch, and therefore came to the conclusion that it was an Ostracod crustacean; nor was I mistaken, for, upon examining it when I arrived home, I found that it was a species of *Cypridina*. When first I handled one of these it gave out a most brilliant greenish light; in fact, so strong was it that I was enabled to tell the time by my watch, the whole of the dial-plate, including the "second" marks, being visible. Though I have kept the animal alive since in a bottle of sea-water, it has not emitted any more light.

While continuing our walk the same evening, my companion and myself came upon some fishermen who had just drawn in their net. It was loaded with fishes—principally small "Mullet" (*Mugil*), though there was a somewhat varied assortment of others. As usual, there were amongst them a few "Cat-fishes" (*Cnidoglanis megastoma*). In feeling amongst the fishes in a net one had to be very careful not to come into contact with these animals. They have a most repulsive appearance, but this is not all. Amongst the cirrus which surrounds the mouth are

spines covered with a poisonous mucus. This mucus causes the most severe pain when introduced into the system. My attention was here drawn to a sharp coughing sound, which I found proceeded from two specimens of the "Fiddler" Ray (*Trygonorhina fasciata*). Botany Bay is a great place for many species of Sharks, Rays, and other Flat-fishes. One Ray was procured from that locality which measured fifteen feet from "wing" to "wing."

What a hideous monster is human ignorance! We have in this city bubonic plague (*Pestis bubonica*). In some of the factories hundreds of workmen have destroyed their dinner-baskets. One may well ask, "What connection is there between dinner-baskets and plague?" None whatever. That is to say, not any more than there might be with hundreds of other articles in daily use. The reason of their destruction is as follows:—Some of the men have discovered in their baskets the larvæ of the beetle which attacks this kind of ware. The beetles were there all the time, but the men had "no eyes to see" till they became possessed of the plague scare. As they did not know what the larvæ were, they came to the conclusion that their occurrence in the baskets must have something to do with the plague. Speaking of ignorance reminds me that I once observed an itinerant microscopist exhibiting to a wondering crowd a small bottle containing small fresh-water crustaceans of the genus *Cypris*, but he informed them that the animals were—Hydatids. Returning to the plague. As a consequence of our visitation by this dread enemy, an enormous amount of disinfectant has been poured daily into our drains and sewers. A great quantity of this has found its way into some of the bays of our harbour, and it has had the effect of asphyxiating thousands of fishes. The presence of all these fishes floating at the surface forms a unique and most unpleasant spectacle.

EXPLANATION OF PLATE IV.—CENTRAL FIGURE.—*Neptunus pelagicus*, M.-Edw.; mottled variety. UPPER CENTRAL FIGURE.—Tubercular-setose variety. LEFT-HAND FIGURES.—UPPER: Dwarfed cheliped. LOWER: PLEOPODA. Female; sterile female; male. CENTRAL LOWER FIGURE.—Masticatory organs. RIGHT-HAND FIGURES.—UPPER: Sternal aspects: male; sterile female; female. LOWER: Male; female; sterile female.

A SHORT HISTORY OF THE BEARDED TITMOUSE.

BY J. H. GURNEY.

(PLATE V., MAP.)

Parus biarmicus, Linn. S. N.*P. russicus*, Gmelin.*Panurus biarmicus*, Koch, Syst. d. Baier. Zool. p. 202.*Ægythalus biarmicus*, Boie.*Mystacinus arundinaceus*, Brehm.*M. dentatus*, Brehm.*Calamophilus barbatus*, K. and B.*Hypenites barbatus*, Gloger.*Paroides biarmicus*, Gray.

It is now generally admitted that there is only a single species of Bearded Titmouse, and that species stands by itself as a very well-marked genus (*Panurus* of Koch), with no nearer allies, in the opinion of a high authority, than *Paradoxornis flavirostris* of Bengal, and *Cholornis paradoxa* of China. Formerly better known as *Calamophilus biarmicus*, this curious bird is now nearly universally received by authors as *Panurus biarmicus*, but its position was for many years a moot point in ornithology, as the seven generic names at the head of my paper sufficiently indicate. Perhaps no one has done more to settle it finally than Professor Newton, who, in 1873, summed up the opinions of previous writers with his usual conciseness, and gave an excellent general account of the bird.

The "Reed Pheasant" of our Norfolk fenmen (so called from its resemblance in miniature to the nobler "longtails" of the *battue*) or "Maish [Marsh] Pheasant" as they sometimes dub it, or "Maish Tit" with a stress on the i—the *Het Baardmannetje* of the Dutch—has been regarded as a very remarkable bird, and has been the recipient of several English names.

For manifold reasons this species has long attracted the attention of naturalists, and the following notes and recollections

of the bird in its haunts—which are in part drawn from an article in the Norfolk and Norwich Nat. Soc. Tr. (vi. p. 429)—are compiled from different sources.

It was discovered by the ever-enquiring author of the earliest treatise on Norfolk Birds, Sir Thomas Browne, who communicated his discovery to John Ray, who published the first notice and description in 1674, in a scarce little book of which Canon Tristram is fortunate in having a copy. All subsequent authors appear to have been ignorant of this publication of Ray's, and ignored it, and no continental naturalist describes the bird before Linnæus.

Certainly it seems as if Sir Thomas Browne could not have been cognisant of the Bearded Titmouse when he drew up his memorable List of Birds (about the year 1663), yet the bird must have been an inhabitant close to Norwich.

The picture of the Bearded Tit which Browne sent to Ray—probably delineated by the same hand which portrayed him the Manx Shearwater,*—a literary curiosity, if it existed still—is tersely described in Ray's 'A Collection of English Words not generally used,' as "A little Bird of a tawney colour on the back, and a blew head, yellow bill, black legs, shot in an Osiar [doubtless on the Yare] yard, called by Sr Tho. for distinction sake *silerella*." A concise description of an adult male.

In the 'Synopsis methodica avium,' by Ray, but published eight years after his death, the Bearded Tit finds a place (page 81) among birds doubtfully identified by Aldrovandus and others, as : "II. *Salicaria*, Gesn. *An Silerella* D. Brown? *Avicula* est minima; colore partim fusco, ut parte prona"; &c.

Distribution.

At the present day the Bearded Titmouse is limited to the Norfolk Broad† district, an area twenty-five by thirteen miles, of which part is marsh. Here it still breeds annually, and is found in little flocks throughout the autumn and winter, but whether

* Browne also sent Ray several other pictures of birds ('Willoughby's Ornithology,' preface), but from a subsequent complaint it appears they were not returned (Wilkins' edition of Sir T. Browne's Works, i. p. 337).

† "Broad" is a local name for a shallow lake often surrounded with reeds, formed by the expansion of a river in former times; a "broad-water" it would be called in some counties, but in Norfolk and Suffolk it is a "broad."

all these flocks are the same individuals which summer on the broads may be doubted.

In some, if not in all, of its Dutch and German habitats it is alleged to be migratory. This is the character which Schlegel and Naumann give it, and one might expect the same in England. In Normandy it is only a summer visitant, but, on the other hand, in Luxemburg it is regarded as a winter visitant, and Keulemans has known it to occur in Holland in winter.

In Belgium it appears from Dubois's 'Oiseaux observés en Belgique' (1885) to be now very rare, though still to be sometimes seen in the marshes of Flanders and Antwerp, no doubt the same causes operating to reduce its numbers as in England. As it does not go further south than the Mediterranean, or further north than Pomerania, its migrations cannot be very great, as they are confined between 37° N. lat. and 56° N. lat. Norfolk is very near its northern and its western limits. But in an easterly direction its range is very extensive, for it appears to reach right across Asia—where it becomes slightly paler—into China.

According to l'Abbé David it is "extrêmement commune dans la région marécageuse qui s'étend au sud du coude septentrional du Hoangho" (the Yellow River), and this is on the authority of Col. Prjevalsky, who brought back large collections of insects and birds from that country. ('Orn. Miscellany,' ii. p. 191.)

It is also found in Turkestan ('Stray Feathers,' 1876, p. 154), where, according to Dr. Scully, it is exceedingly common. (Cf. map, p. 374.)

Increasing Scarceness.

We find very little about the Bearded Tit in the early authors, but this is not singular, because of the aquatic situations in which it resides, and Latham (1783) remarks that these birds had only been observed in marshy situations, as though, their peculiar characteristics not being known, there were some who thought they might be looked for in woods and thickets!

From Sir T. Browne's day (1674) to Sir William Hooker's (Diary 1807-40) there appears to be no Norfolk mention of the Bearded Tit. Hooker, occupied with plants, merely says that it was by no means infrequent at Surlingham Broad, which was

for long after a favourite locality, and where a marshman named Trent (now dead) used, I am sorry to say, to shoot a great many. Then there is John Hunt, the Norwich birdstuffer, who remarks that in 1819 there were large flocks at Burlingham (? Surlingham), Norf. and Nor. Nat. Tr. (iii. p. 260); but ten years later we find the same Hunt speaking of it as not common (Stacy, Hist. of Norf.), which the brothers Paget, writing in 1834, qualify into "common in some seasons."

Contemporary with Hunt's second statement is a very descriptive letter from J. D. Hoy to the well-known naturalist Selby, printed in the Norf. and Nor. Nat. Trans. (ii. p. 402), and which was the basis of a lengthy communication to the Magazine of Nat. Hist. 1830, p. 328. Hoy writes to Selby as follows:—

"June 23rd, 1828.—Sir, having been highly gratified in looking over your splendid 'Illustrations of British Ornithology,' and thinking that anything you had not perhaps observed in the habits of some of our birds might not be uninteresting to you, I have ventured to forward you a few observations. . . .

"I have had several nests of that most beautiful and elegant of our indigenous birds, the Bearded Titmouse. The margins of the extensive pieces of water, called broads, in the south-eastern part of Norfolk, which are skirted with large tracts of reeds, are the favourite abode of this species: its nest is composed, on the outside, with the decayed leaves of the sedge and reed, intermixed with a few pieces of grass, and invariably lined with the top of the reeds in the same manner as the Reed Wren. It is not so compact a nest as the Reed Wren's; the eggs vary in number from four to six, pure white sprinkled all over with small purplish spots, rather confluent at the larger end; full size of the Greater Titmouse. The nest is generally placed in a tuft of grass or rushes near the ground by the side of the water ditches in the fens, sometimes on the broken-down reeds, but never suspended between the reed stems in the manner of the Reed Wren. In the autumn they disperse themselves in little parties along shore, wherever there is an acre or two of reeds; during the winter months they feed entirely on the seed of the reed, and so busily employed are they in searching for their food that I have taken them with a fine bird-lime twig attached to the end of a fishing-rod. When alarmed by any

noise they drop down among the reeds, but soon resume their station again, climbing up the reed-stems with the greatest facility."

Though now slightly recovering its numbers, the Bearded Tit has become very scarce in Norfolk, and almost extinct in Suffolk. Self-interested marshmen and egg-collectors would like strangers to believe that this scarcity is owing to hard winters; but their own cupidity is one cause of the decrease, for the truth is, that Bearded Tits are not nearly so delicate as their frail appearance would seem to imply; indeed, Mr. E. T. Booth used to call them remarkably hardy, and in his 'Catalogue' says that they seem able to contend against severe weather with greater success than many much larger and apparently stronger birds. This I quite believe to be the case, for they are not tender in confinement.

Having asked the Rev. M. C. Bird, who lives among the broads, to keep notes as to their presence or absence, he being constantly on the spot, I received the following memoranda last spring:—

March 14th, 1899.—Four pairs seen.

April 14th.—A nest at Potter Heigham.

April 17th.—Three nests, with four, four, and five eggs respectively; two more nests, and a sixth taken.

April 25th.—Three nests found.

April 28th.—Additional nest with young a few days old.

May 1st.—Another nest.

May 6th.—The nest found on the 1st has eight eggs; another nest found to-day.

May 19th.—A nest with young flown.

With Mr. Bird's assistance I have compiled an estimate of the number of nests hatched off in 1898 on every broad in Norfolk where there is reason to think that there are any. This only gives a total for them all of thirty-three nests, as tabulated in the *Trans. Norf. and Nor. Nat. Soc.* (vi. p. 430), but the number may be slightly more. It is unnecessary to recapitulate the list, which has only a local interest, but we may assess the number of adult Bearded Tits in April, 1899, on Norfolk Broad, as certainly one hundred; but there were not more than seven nests on any one broad, and it will be a diminishing quantity unless the arm of

the law is upheld. Happily there is a desire on all hands to do this, and one gentleman even negotiated for the purchase of an estate, it was said, for the sole purpose of protecting the Bearded Tits.

The following is an approximate estimate of their decrease in Norfolk in six decennial periods since 1838, but the earlier figures given are little more than a guess:—

	1838	1848	1858	1868	1878	1888	1898
Number of Nests	200	170	140	125	90	45	33

The number of broads on which they now nest is about eleven large, and ten small ones, not including Wroxham Broad, where boating has banished them, though the Grebes remain.

One cause of their decrease is that the celebrated broads are gradually, but it is to be feared surely, growing up, though there is another more potent reason. For years, prior to 1895, there was a systematic trade in their eggs, and every egg dealer and moth hunter helped himself. Such devastation was criminal, but happily it is stopped now.

Both birds and eggs are protected by law, and the remnant are already feeling benefit from the protection afforded by this salutary measure, which came into force on May 1st, 1895. The broads where the Bearded Tits have had the best chance of escaping persecution are the small private ones, and those places where the proprietors have allowed the reeds to grow instead of cutting them, thereby providing high cover, which is an asylum where many a nest may escape the keenest eye. Unfortunately for the birds, it is rather an easy nest to find, for a pair will choose one particular bed of reeds year after year rather than move away.

Since the drainage of Salthouse sea-broad in 1851, the Bearded Tit has ceased to breed there, but the reed beds in Cley, adjoining, are still large enough to attract occasional migrants. It is very likely that the examples met with by Dr. Power and others in 1895, and on several previous occasions near Cley sluice, and at Morston and Burnham further west, had crossed the German Ocean, as also those seen in a pond at Holt in September, 1898, and May, 1899. In December, 1899, four were seen at Wiveton, still further north, where they remained a month.

Habits.

In its nest, and all that concerns the Bearded Titmouse, a protective colour may readily be traced. The old cock's black moustaches (which in Mongolian specimens are narrower) are like the dark chinks in the reeds, while his tawny colouring harmonises with the brown tints of autumn, and in spring there is a bloom on his freshly moulted plumage which goes well with the bursting into leaf of all around. Nowhere is the blend of nature's harmony better seen than in the flowers, insects, and birds of the broads, where everything suits its surroundings.

It has been said that these moustaches, from which the bird takes its name, are movable, and that their play gives a peculiar animation to the bird's expression, and it is likely enough that during courtship and before the breeding season this is so. They are composed of a considerable number of feathers, and, though wanting in the hen, there is a perceptible lengthening in her corresponding feathers, which are white.

A more beautiful object than a cock Bearded Tit in April, clinging tail uppermost to a tall reed stem gently waved by each gust of wind, it is difficult to imagine. Except in the vicinity of their nests, or when curiosity gets the better of them, they are shy and inclined to hide, but by their nests they give every opportunity for inspection as they flit across one mown space after another, betraying by their very anxiety the eggs which they wish to conceal.

They become still more unsuspecting when they have young, care for which causes many a bird to defy danger; yet they have much of that strange sense which we call instinct, and which tells them to creep to their well-hidden domicile, rather than fly to it in the presence of the enemy.

If there is any wind, they are not likely to show themselves, and this has been noticed in South Russia, for a wind which is enough to wave the tops of the reeds is enough to keep the Tits at the bottom. But when all is quiet they venture to the reed-tops, and, when concealed for a shot at Wild Duck, one has in this way sometimes the delight of being surrounded by an inquisitive little flock, and this is the time to study their engaging and active ways.

The flight of the Bearded Tit may be described as laboured,

as it flits rather than flies along with head rather high, in little parties just topping the reeds, and each bird half spreading the twelve graduated feathers of its heavy tail, intended to steer by, but surely incommoding rapid progress.

I have been surprised to find, when walking with an old marshman, an experienced "egger," how often he heard their notes when neither of us could see the bird, long experience in listening for the rarer, and to him profitable species, having sharpened his ear. The clear ringing of their call-notes, which one admirer compares to cymbals, and another to the mandoline, can never, says Lord Lilford, be mistaken for any other European bird by a good ear which has once heard it. By one observer the silvery notes are syllabled as "thein, thein," by another as "ping, ping," or, when alarmed, "churr, churr"; while the provincial name in the south of France is "Trintrin" (Crespon and Jaubert); but here its place is to some extent taken by *Ægithalus pendulinus*.

It is said that young Bearded Tits, after they have left the nest, sometimes nestle together in a cluster on the reeds of our broads, but this habit does not seem to have been observed on the Continent. Hoy's account of their habits has been quoted already, and need not be repeated (*cf.* letter, p. 361).

Their food is not entirely the seeds of the reed, but minute water insects and their larvæ, and one sent by me to the late Mr. Cordeaux contained a good deal of river sand. The reed-cutters have told me of seeing them searching the floating "muds" of nearly severed reed, which I have no doubt is explained by the following note:—Mr. W. H. Dikes, having examined three specimens, writes that the crops did not contain a single seed, but, on the contrary, were completely filled with the *Succinea amphibia* in a perfect state, the shell being unbroken. These shells were closely packed together, the crop of one which was not larger than a hazel-nut containing twenty, and four of *Pupa muscorum*. (Mag. N. H. iii. p. 239.)

Nidification.

The Bearded Tit is a very early breeder. Booth says: "I have on several occasions seen young birds able to leave the nest by the 4th or 5th of May, and so late as the middle of

August have known the female sitting on eggs" ('Rough Notes,' vol. i. p. 83). On one occasion I found some young as big as their parents in the middle of June, and on the same day an incomplete clutch of fresh eggs, which would indicate that they sometimes breed three times in a season, the first clutch of eggs being therefore hatched in April. Besides this, the number of eggs laid by Mr. Young's tame birds, to be mentioned presently, confirms me in thinking that they breed three, possibly even four times, in a very favourable season.

After the breeding season the young form themselves into family parties, but it is certainly not the case that the males and females keep distinct (*cf.* Mag. N. H., 1829, p. 224), and such a flock as fifty together ('Birds of Norfolk,' i. p. 151) is not to be heard of now in England.

Continental authors give all sorts of sites for the nest, such as a hut built for duck shooting, but in Norfolk it is placed among reeds (never in nettles, very exceptionally in rushy grass), and is said to take eight days in construction. It is generally a foot above the ground, if a swamp can be called ground, and never, to the best of my belief, suspended. The tallest and stoutest reeds in the reed-bed are its customary support, reeds eight feet high, sometimes quite sere, while exceptionally a nest is hid in a dwarf Alder or cluster of Sweet Gale (Bog Myrtle), a shrub with that aromatic odour which prevails on a dry marsh in June, the Cuckoo's favourite perch. Here it may be remarked that, common as the Cuckoo is round most of our broads, there is no record of its egg being deposited in the nest of the Bearded Tit, which is very singular.

The nests "are extremely liable to be submerged if the tides rise suddenly, either from a heavy fall of rain or a flow of salt water up the river. In such cases the birds at once commence a second nest on the top of their first edifice" (Booth, *l.c.*). I have not personally heard of any nests being submerged, but Booth was always an accurate observer, and can be trusted.

The nest is about 2·8 inches inside diameter, and is usually composed of the brown blades of the common *Arundo*, and lined with their feathery tops. A typical nest with its surroundings is reproduced in the Norf. and Nor. Nat. Tr. (vi. p. 434), from a photograph by Mr. R. B. Lodge, who writes:—"Within fifty yards

of our boat we had two nests with eggs, six each, one with young birds, and one from which young had apparently flown, and I saw the young birds early in May flying about. At one nest at which I spent half a day squatting in the same sedge bush, the cock did most of the sitting; he was easily distinguished, even at a distance, as he had no tail. They are the most fascinating birds



Nest of Bearded Titmouse (after Pike).

I know, and the easiest to approach at the nest, especially when the young are hatched. All our nests were in sedge."

Other photographers have visited our broads and been successful, notably Mr. Oswin Lee ('Photographs of Brit. Birds,' pt. viii.), whose large plate is worthy of all commendation, while that by Mr. Kearton, in 'Our Rarer British-breeding Birds,'

shows the eggs well in a characteristic bed of rushes. But the cleverest of all are the pictures taken by Mr. O. G. Pike (see pt. iv. of his recently published 'In Bird Land'), which, owing to his kindness, I am able to reproduce. It will be seen that in one the hen is feeding her young ones, which Mr. Pike observed that she did about every five minutes, distributing a beakful of



Bearded Titmouse feeding young (after Pike).

green caterpillars equally among all. In the other plate Mr. Pike has caught the hen in the act of cleaning out the nest, which she did on about every fourth visit.

The eggs are very peculiar, and at the same time very pretty; white, with specks and wavy lines of brown, with a pink tinge when fresh, and a zone when incubated. They (the first clutch) are

deposited in April, or even at the end of March possibly, and generally six in number, occasionally seven. Old Joshua, the companion of my rambles, averred that he had found two nests on the top of one another, and on another occasion twelve eggs in one nest, while a nest sent from Hickling to Mr. Frank Norgate contained ten eggs, but two of them were buried in the lining, and this year one was found at Hickling with eight eggs. Joshua



Bearded Titmouse cleaning out Nest (after Pike).

had also known them to sometimes lay the first egg before the nest was finished, and then, after a layer of material, more eggs, a common habit with true Titmice (*Paridæ*). An egg taken by Joshua was placed in an incubator by Mr. Evans, of Edinburgh, to ascertain the duration of its incubation, a subject he has specially studied, but the experiment was not successful. John Smith, of Yarmouth, considered the period to be

thirteen days (Zool., 1846, p. 1497), and Tidemann fourteen. None of the small birds appear to exceed a fortnight, but in such a distinct form as *Panurus* there might be a difference of a day or two.

I can testify to its being a fact that the cock bird occasionally takes part in incubation, though this has been doubted by Keulemans, who had in confinement the beautiful examples figured in Dresser's 'Birds of Europe,' and probably ascertained from them that the duration of the moult was nearly five weeks. His excellent account of its habits as a cage bird and in a wild state in Holland is given in the 'Birds of Europe,' and again in Keuleman's 'Cage Birds,' an uncompleted work, and therefore but little known.

Description.

The adult male and female are almost too well known to need description. The prevailing colour is tawny orange, and in the cock the head is blue grey, with a black moustache on each cheek, long and pointed, with no apparent utility other than ornament. These beautiful colours are at their best from December to April 1st, after which they deteriorate. Females are never so handsome as males, and always lack the grey head, which is so beautiful: excellent descriptions are given in the 'Birds of Europe' from specimens which I supplied of both sexes. But the plumage of immaturity is far more remarkable.

For a long time after quitting the nest the young have black backs, and are cream-coloured, so that if Bonaparte gave his name of *P. sibiricus* to a young bird it was a very excusable mistake. Radde was nearly led into the same error ('Ibis,' 1889, p. 87).

It is said that young males can be distinguished by their more lemon-coloured bills. The nestling when only a day old has a brighter mouth than any other nestling bird in England, for the palate is red, with four little rows of black and white dots. Mr. Lodge tried to photograph a brood with their mouths open, but it was a failure, and my sketch is not sufficiently accurate for reproduction, indeed, it would be exceedingly difficult to give the vivid colours properly. The colour of young birds'

mouths has not been sufficiently taken notice of. The nestling Blackcap's mouth is lake red, the nestling Willow Warbler's yellow, the Pied Wagtail dull yellow, and the Garden Warbler, according to Bettoni, buff. The nestling Hedge Sparrow has two black spots on its tongue, and the Grasshopper Warbler several spots (Macpherson). Probably none of these tints are lost until the young have left the nest.

Anatomy.

Under the heading of "Anatomy," I cannot do better than quote the precise description of Prof. Macgillivray, who in this branch of science especially excelled over other writers:—

"Œsophagus one inch two-twelfths long, inclined to the right, with a distinct dilatation or crop a quarter of an inch in width; the proventriculus bulbiform. Stomach a very muscular gizzard, six and a half twelfths long, seven twelfths broad, obliquely placed, with the lateral muscles very prominent, the epithelium dense, with broad rugæ, and of a yellowish colour, the right muscle two twelfths thick. The trachea as in the Passerinæ and Cantatores; its rings sixty."—(William Macgillivray.)

See also "Remarks on the Internal Structure," by Robert F. Tomes, 'Ibis,' 1860, p. 317.

In Confinement.

Since 1743, when the Countess of Albemarle brought a cageful of Bearded Tits from Copenhagen, it has been popular with bird-fanciers in this country, and the experience of all who have tried it is that it is a bird in every way to be recommended for the cage. There is no need to infringe on our native stock, for continental birds, which, in the opinion of some are finer than British, can be generally bought from Erbermehl, Abrahams, or Zache.

Mr. John Young has written one of the best accounts of this charming species in captivity (Norf. and Nor. Nat. Tr. iii. p. 519), and I am indebted to him for showing me his cage. He first of all provided them with proper nesting places and material, by sticking the tops of pampas grass round a six-inch pot of earth, a site somewhat similar to the reeds of their native haunts.

Here the eggs were laid early in the morning, and when the birds had left the nest he invariably found that the lining was pulled over the eggs. Many eggs were laid, two hens laying more than fifty in one summer, a fair proportion of which in a wild state would have been hatched.

Mr. Young thinks they might be hatched, and even the young reared in confinement, by supplying the old birds with the pupæ of the common blow-fly, which he has found to answer with Siskins, and fresh ants' eggs would probably be useful. He kept one nearly five years. Mr. Lowne, of Yarmouth, a well known prize-taker at bird shows, reared six Bearded Tits from the nest on dry ants' eggs with hard-boiled egg well sieved, but they were pugnacious enough to pull each other's tails out, and had to be separated.

Another correspondent, Mr. J. L. Bonhote, had a pair three years, and kept them in an outdoor aviary through the hard winter of 1895. In 1896 the hen built a nest with materials brought her by the cock, and, commencing on April 14th, laid a clutch of seven eggs, two of which were hatched on the thirteenth day, and the young grew well, but died suddenly on the seventh day when beginning to shoot their feathers.*

Former Breeding Area.

In the accompanying Map (Pl. V.) the pink colour is intended to show where this species formerly bred in England, an area which must always have coincided with the reed beds suitable to its requirements, which, prior to the draining of the great Bedford Level in the early part of the seventeenth century, were much more extensive than they are now. Of the nineteen spots marked pink in the map, only one is still a breeding-place at the present day, which is a somewhat sad reflection; while the old haunts on the Thames have long been deserted, though still sometimes referred to in books.

As it is a good plan to summarise what is known about any British bird's distribution (as Fatio and Studer are doing for Switzerland and Ternier for France), I have given at some length,

* Mr. Bonhote has just published an article on this subject (*cf.* 'Avicultural Magazine' for August).

from such sources as are still available, what can be gathered from authors about the Bearded Tit in the Norf. and Nor. Nat. Trans. vi. p. 429, and the following further particulars may be added. It only breeds in Norfolk, and the only other counties in which it is still to be found with any sort of regularity are Suffolk and Cambridgeshire.

In Suffolk, in March, 1899, a small flock was seen on Fritton Lake and another on Oulton Broad, where, from enquiries on the spot in 1885, I found it was to be met with; and in 1891 Mr. Bunn, the taxidermist, informed me of his having had several from there at different times. Babington gives interesting particulars of their former haunts (*Birds of Suff.* pp. 64, 251), but they are now extinct on the Blyth and the Alde, but Mr. Tuck was recently informed of some being on the River Lack.

In Lincolnshire the late Mr. Cordeaux never met with a specimen, yet in 1864 A. G. More thought it might breed in that county ('*Ibis*,' 1865, p. 120), which was one of the five enumerated by W. C. Hewitson. It is certain that when Gould, in 1873, said it bred in all the fenny districts of Lincolnshire, he was entirely wrong. Miller Christy has collected interesting details of its former abundance in Essex, and even thought it possible in 1890 that it might still be reckoned a resident in extremely small numbers, though the last identified seems to have been on the River Stort in July, 1888 ('*Birds of Essex*,' pp. 91, 92).

In Cambridgeshire, Mr. John Titterton, of Ely, does not know the last date of its breeding, but is able to give the most recent information of migrants, *viz.* that in 1897 fourteen were seen, and in 1898 a flock of five, and again in December, 1899, a flock of about a dozen, which remained for more than a month in one place. These, however, by the end of January, 1900, had been so upset by the harvesting of the reeds that only three or four remained. In the palmy days of Whittlesea Mere they must have been abundant, but Whittlesea is a thing of the past. A pair obtained there in 1841 are in Newcastle Museum, and it is on record that this locality furnished a white variety.

For Surrey, some additional particulars are given in the '*Birds of Surrey*,' by J. A. Bucknill, who remarks that authors have regarded the Bearded Tit as having been a resident at one

time in Surrey, but he has not been able to discover any evidence of such being the case.



General Distribution. (*Cf. ante*, p. 360.)

A VISIT TO LUNDY.

BY F. L. BLATHWAYT.

LUNDY has from time to time been visited by several eminent ornithologists, who have published accounts of the birds they noticed ; but, with the exception of the pages relating to birds in Mr. J. R. Chanter's monograph on the island, published in 1877, I have not been able to find any attempt at a complete list of the avifauna of Lundy. A notice therefore with regard to the birds I came across during a recent visit may be useful to anyone contemplating the formation of a full list of the birds of Lundy, and may also interest some of the readers of 'The Zoologist.'

After being detained two days at Instow by the stormy weather, I was at last able to cross to Lundy on May 5th of the present year, in the sailing vessel 'Gannet,' which takes the mail from Instow to the island every week.

Lundy, which, with the exception of the south-east corner, consists almost entirely of granite, rises from 300 to 500 ft. out of the sea, and lies in the entrance to the Bristol Channel, about twelve miles north-west of Hartland Point, its nearest point on the mainland. It is about three miles in length, and less than a mile in width in its broadest part. The southern portion of the top is under cultivation, but the greater part is moorland, and covered with heath, furze, and coarse grass, with large granite boulders protruding in many places, especially at the northern end. On the eastern side the land slopes towards the sea, and is covered in many places with tangled masses of bramble and bracken, out of which rise here and there huge piles of granite, some of them taking very fantastic forms. There are very few landing-places, the best being at the south-east corner, where there is a shingly beach in a natural harbour ; but even here it is difficult to get ashore with dry feet, if the wind happens to be in the east.

The cliffs on the western side are for the most part higher and

steeper than on the eastern, and consequently these are the favourite haunts of the cliff-birds for which Lundy is famous. When I arrived, on May 5th, I was told that all the birds had not yet come in from the sea, but during my short stay they arrived daily in large numbers, and by May 11th, the date on which I left, most of the sea birds must, I think, have settled down in their summer quarters. On May 7th particularly, which was a fine warm day, I noticed the Puffins coming in from the sea to the island in a continuous stream.

I was most anxious to find out whether the Gannet (*Sula bassana*) still nested on Lundy, and was pleased to find a few on the island, though I fear they are in great danger of extermination. Three pairs were building near the lighthouse at the northern end, and, if they are not disturbed, their numbers will no doubt increase. From what I hear, however, it is very seldom that they manage to take away any young, as the eggs have a market value of one shilling apiece. The history of the Gannets on Lundy is not pleasant reading for a lover of birds. In former times they inhabited an island off the north-east end, still called after them "the Gannet Rock." They were so persecuted, however, that they deserted this rock, and tried to establish themselves on the island itself; while some are thought to have migrated to Grassholm, an island off Pembrokeshire, where there is at present a small colony. The Gannets which remained on Lundy unfortunately did not escape persecution by their change of quarters; but in spite of this they persevered, and, from what I can gather from the islanders, there were about thirty pairs of breeding birds as lately as six or seven years ago. Unfortunately for the birds, the very spot they had chosen on which to build their nests was selected for the erection of the new lighthouse at the northern extremity, which, I believe, was opened towards the end of 1897. The quarrying and blasting operations which attended the building of this lighthouse necessarily disturbed the Gannets, though some few pairs seem to have clung to their old haunts, even while the work was in progress. Their numbers seem now to have dwindled down to the three or four pairs which I saw this year, and it is earnestly to be hoped that they will not be driven from this their only known nesting-place on English ground. The few remaining pairs seem to have learnt wisdom by experi-

ence, and have selected a place where only bold climbers could reach their nests. Formerly, I am told, they built their nests in places where any child could take their eggs without danger.

The building of the lighthouse and the noise of the fog-horns seem to have disturbed all the sea-fowl at the northern end of the island, and their numbers are said to be far smaller than in former years. Puffins, Guillemots, Razorbills, and Kittiwakes, however, still breed on the island in enormous numbers.

The Guillemots (*Uria troile*) have their colonies chiefly on the northern half of the western face of Lundy, where, in company with Razorbills (*Alca torda*), and Kittiwakes (*Rissa tri-dactyla*), they may be seen standing in rows, or packed closely together in bunches, wherever they can find a foothold on the cliffs. I noticed in particular one tall rock which was flat at the top, and on this the Guillemots were packed almost as closely as they are on the famous "Pinnacles" at the Farnes during the breeding season.

The chief colony of the Puffins (*Fratercula arctica*) is at the northern end, where the birds burrow in the soft soil among a *débris* of huge granite boulders scattered about in wild confusion. The number of the birds must be enormous, as, when one approaches the colony, all the rocks and the sea beneath appear to be covered with Puffins and Razorbills; while hundreds more are swinging round and round in a large circle, which extends some distance over the water. I was much struck by the remarkable tameness of the birds. As long as I kept fairly still they appeared to have no fear at all, and in a few minutes I had Puffins and Razorbills all round me, and some almost within arm's length. One Razorbill perched on the very stone which I had selected as a seat.

The Kittiwake is by far the most numerous of the Gulls on the island, and their chief quarters are on the north-west side in company with the Guillemots, and in two clefts at the north end. Their nests appear to be stuck against the faces of the cliffs, and on some of the most precipitous rocks it seems wonderful how the birds manage to get any hold at all.

Besides the Kittiwake, three species of Gulls breed on Lundy—the Herring-Gull (*Larus argentatus*), and the Lesser and Greater Black-backed Gulls (*L. fuscus* and *L. marinus*). There

are colonies of the two former species in suitable places all round the island, but in numbers the Herring-Gulls are superior, though to no very great extent. At the time of my visit the birds had just commenced laying. The Greater Black-backed Gull is much rarer, and I never saw more than four or five together. There are probably not more than six or seven pairs of these fine birds on Lundy, where, I am told, they usually select one of the rocky islets on which to place their nests.

I frequently saw one or two Common Buzzards (*Buteo vulgaris*), but could not be sure that there were more than one pair on the island. From the behaviour of the birds, I was convinced that there was a nest on the face of a certain cliff, though I was unable to locate it exactly. This species is happily still fairly common in North Devon, and early in April last year I saw no fewer than eleven during a day's ramble along the cliffs. On more than one occasion three could be seen on the wing at the same time.

But to return to Lundy. I noticed that Kestrels were fairly common, and I discovered the eyrie of a pair of Peregrines (*Falco peregrinus*) by accidentally startling the Falcon from the face of a steep cliff. She was quickly joined by her mate, and the two birds circled above my head, keeping up a continuous chattering cry as long as I remained in the neighbourhood of their stronghold. Another pair had, I think, established themselves at the opposite end of the island near the Shutter Rock. This Falcon may often be seen on the Devon coast opposite Lundy, and a pair can frequently be observed on Baggy Point.

A pair or two of Ravens (*Corvus corax*) are said to nest on Lundy, but by the time of my visit (early in May) they would probably have taken off their young, and I only noticed a single bird. This bird still nests on many of the bold rocky headlands of the North Devon coast.

Some years ago, it is said, a feud broke out between the Peregrines and Ravens on Lundy, and one of the aerial conflicts which were continually taking place ended in disaster to one of the Ravens, which, failing to elude the Falcon's fatal "stoop," was struck down into the sea and drowned. I have noticed that wherever these two species nest in close proximity, duels in mid-

air are of continual occurrence, but, as a rule, they do not appear to be attended with much bloodshed.

The Carrion-Crow (*Corvus corone*) breeds on the island, and is not uncommon. After the young have left the nest, twelve or more of these birds may be seen together. The Rev. H. G. Heaven, proprietor of the island, told me that a few years ago one or two Hooded Crows (*C. cornix*), usually only autumn and winter visitors, remained during the summer, and he thought that they interbred with the Carrion-Crows. This supposition is in a measure confirmed by the fact that I saw several birds on the island which to all appearance were hybrids between the Carrion and Hooded Crows.

The Jackdaw (*C. monedula*) is only a visitor, as is also the Rook (*C. frugilegus*), and neither species has been known to breed on the island; while the Chough (*Pyrrhocorax graculus*), formerly common, has now been quite exterminated. Their final disappearance is said to be due to the persecution they received from the men who some years ago were engaged in quarrying granite on the eastern side of the island. One of the islanders told me that in former years he often saw small flocks of Choughs flying about the fields, but that they no longer nested on the island. The price which may be obtained for the skins and eggs of these birds has done much towards banishing them from many of their former haunts, but I believe a few pairs may still be found on some parts of the Devonshire coasts.

Of the smaller land birds, the commonest, during my visit, were perhaps the Linnet (*Linota cannabina*), Wheatear, Skylark, and Meadow Pipit; while the House-Sparrow, formerly only a visitor, has now established a flourishing colony on the buildings of the Manor Farm.

The following birds I also identified on Lundy during my short stay:— Song-Thrush, Blackbird, Whinchat, Stonechat, Greater Whitethroat, Willow-Wren, Hedge-Sparrow, Wren, Yellow Wagtail, Rock-Pipit, Swallow, House-Martin, Sand-Martin, Goldfinch, Yellow Bunting, Cirl Bunting, Starling, Swift, Cuckoo, Cormorant, Shag, Corn-Crake, Lapwing, Golden Plover, Dunlin (the last two birds both in breeding plumage), and Oystercatcher.

The Manx Shearwater (*Puffinus anglorum*) is also well known

on Lundy, where it probably breeds, and the same remark very possibly may be applied to the Storm Petrel (*Procellaria pelagica*). These two species often escape notice owing to their nocturnal habits, but the weird cries of the former are said to be often heard by the islanders during the night.

Mr. Heaven told me of a tradition which still exists on the island relating to the former occurrence of a bird which, if not simply mythical, could be none other than the Great Auk. The story is, I think, worth repeating, but must, however, as Mr. Heaven impressed upon me, be taken for what it is worth. As far as I can remember it runs as follows:—About the year 1839 one of the men on the island brought in a large egg (which was kept by Mr. Heaven's family for some time until unfortunately broken), which he declared belonged to a "King Murr" (on Lundy Guillemots and Razorbills are both known as "Murrs"). The "King Murrs," the man said, were birds like "Razorbilled Murrs," only much larger; he did not think they could fly, as they were only seen near the water, into which they scrambled from the rocks when disturbed. There were only one or two pairs ever seen, but they had long been known on the island. A fuller account of this same story is, I believe, to be found in 'The Zoologist' for 1866,* though I have not the means of looking up the exact reference. The story is interesting, though it cannot be said to prove that the Great Auk was ever an inhabitant of Lundy.

I would advise anyone interested in birds, who may chance to visit Lundy by excursion steamer, to spend the two or three hours allowed on land in exploring the coast-line of the northern half of the island. It will have to be done hurriedly in the limited time at the tourist's disposal, as it takes about an hour to walk from the landing-place to the North Lighthouse. If time does not allow a visit to all the cliffs on the north-west side, where the Guillemots and Kittiwakes chiefly congregate, the visitor would do well to follow the rough track on the top of the island to the north end, where he may see the large colony of Puffins and Razorbills, which to the bird-lover is perhaps the most interesting sight which can be obtained on this picturesque island.

* At page 100, written by the Rev. Murray A. Mathew.—ED.

NOTES AND QUERIES.

MAMMALIA.

Lesser Shrew and Bank Vole in Berks.—I have never met with either of these little mammals in the part of Berkshire with which I am most familiar. Their congeners appear to be common enough. I should like to know whether either species has been satisfactorily identified as occurring in Berkshire. The *Microtus glareolus*, or Bank Vole, is no doubt found in Berkshire, though I have never chanced to come across it; but as regards *Sorex minutus* (the Lesser Shrew), its occurrence is not so probable. Any information therefore would be welcome. — W. H. WARNER (Fyfield, near Abingdon).

AVES.

Note on the Nesting Habits of the Sparrow-Hawk.—The Sparrow-Hawk (*Accipiter nisus*) is such a well-known bird that it seems hardly possible that any of its habits and ways should have escaped the notice of so many observers. Yet the following fact in the nesting economy of this Hawk still appears—as far as I know—to stand unrecorded. My knowledge of the Sparrow-Hawk has been confined chiefly to the eastern part of Fifeshire, in Scotland, where the bird is common and generally met with. When out looking for the eggs of the Long-eared Owl, in the latter days of March or the beginning of April, we used on these occasions to have a look round in those parts of the woods to which the Sparrow-Hawks returned from year to year with almost unfailing regularity for the purpose of rearing their young; and as a result of these observations we found that, though the Sparrow-Hawk does not, as a general rule (in Fife), begin to sit till the second or third week in May, she invariably begins to build her nest about the first week in April, or even, should the weather be warm, in the last days of March. At this time the outer rim only (composed, as a rule, of larch-twigs) of the nest is completed, and is so left until about a week before the laying of the first egg, when the bowl is added, this latter being generally made of small birch-twigs, and lined with pieces of Scotch fir and bark about the size of a florin. The nest was invariably placed on a branch well out from the main trunk, though more rarely in the “breek” of the tree. The tail of the sitting bird was generally to be seen projecting over the edge of the nest. It would interest me to know if this strange nesting

habit of the Sparrow-Hawk has been noticed elsewhere.—A. H. MEIKLE-JOHN (Highworth, Ashford, Kent).

Nesting of the Hobby in Shropshire.—In 'The Zoologist' for March last (*ante*, p. 143), I noted that the Hobby (*Falco subbuteo*) nested in 1899 near Ludlow. My friend Mr. J. Palmer, who originally found the nest, has just informed me that the pair have returned this year, and laid again in the identical spot. The eggs were taken June 30th, but, as last year, they have laid again, and are being allowed to rear the brood. The Hobby is known to return year after year to the same nest, but the habit is curious, inasmuch as it does not build a nest for itself. In this case the nest is an old Crow's. Another pair of Hobbies are haunting the vicinity, and a male was shot five miles away on July 3rd. These three are probably the young reared there last year. I trust they may be spared.—H. E. FORREST (Bayston Hill, Shrewsbury).

Curlew Nesting in Surrey.—I have just heard of a Curlew's nest (*Numenius arquata*) being found in the spring of 1896 on Chobham Common, about twenty-eight miles from London, two eggs from which are now in the possession of a Mr. Tice. Has the Curlew ever been known to nest in Surrey before? I have seen the two eggs, and they are certainly those of a Curlew.—SPENCER H. LE MARCHANT (Chobham Place, Woking).

[In Mr. Bucknill's 'Birds of Surrey' it is stated that in 1893, "during the whole of the summer, a pair were noticed near Frensham, which probably had a nest on the moor (*Streatfield in lit.*)."—ED.]

Variations in the Notes and Songs of Birds in different Districts.—The above subject is one which seems to have been noticed very little by ornithologists; in fact, I never remember seeing more than one reference at all to it. If this variation was slight, it would be possible for it not to have been noticed by naturalists; but this is not so, the differences being so marked that I cannot believe it has escaped the notice of those who know all the notes and the song of all birds they have come in contact with. It does not appear to me to be a difference in the way the song is put together, but rather that the note is in a different key, and therefore the first time you hear it you are apt to be misled into believing it is entirely a different bird. If it were only in the resident bird that this variation existed, it might be explained by the climate; but this is not so, the differences being much more marked in the summer migrants than in the more resident species. Then, again, it does not exist in all birds, and the explanation of it puzzles me. Taking the two districts that I am best acquainted with—that is to say, Worcestershire and Co. Donegal—I will give the difference as it appears to me. The notes and songs of all birds in which this variation exists are in a lower key in Donegal than Worcester-

shire, and the birds in which it is most marked are the Cuckoo and the Whitethroat, the latter appearing at first to have an entirely different song. After these two the change is most marked in the Chaffinch, Hedge-Sparrow, Wren, and Blackbird; while in the Willow-Wren (the only other Warbler I have listened to in the west of Donegal) I could notice no change whatever. Comparing these two counties with the district round Loch Lomond, there is again a difference, and the Whitethroat is once more the most marked, appearing to have a song between the other two. I should be glad if others would give their experience. — H. E. HAWARD (Clarelands, Stourport).

AMPHIBIA.

Rana temporaria in the Scilly Islands.—Previous to my taking a trip to the Scillies last month, I made some enquiries respecting their fauna, and was informed that no batrachians were recorded from these islands. I was fortunate, however, whilst on St. Mary's, in taking an example of the Common Frog (*R. temporaria*), which, although in itself no rarity (being a very ordinary female of the reddish variety), was certainly an interesting capture for locality's sake. It was taken on some boggy land (lying east of the town of St. Mary's), known locally as "the moors." The islanders seem well acquainted with Frogs, but say they are rare. A boatman told me he remembered years ago seeing them spawning in a pond on Bryher Island. I visited this place, but without success. Whether their "Frogs" also includes Toads, I could not discover, but probably the same confusion exists between the two animals here as in other parts of the country. Newts appear to be quite unknown, as are also Snakes and Lizards. It is probable that by carefully working suitable districts other batrachians may turn up, but unfortunately my time was too limited to do this.—F. W. TERRY (102, Kingston Road, Wimbledon, S.W.).

[Borlase, in his 'Observations on the Ancient and Present State of the Islands of Scilly,' published in 1756, states:—"There is no Adder, or venomous creature of any kind to be found in these islands."—ED.]

NOTICES OF NEW BOOKS.

Text-book of Zoology, treated from a Biological Standpoint. By Dr. OTTO SCHMEIL. Translated from the German by RUDOLPH ROSENSTOCK, M.A.; edited by J. T. CUNNINGHAM, M.A. Part I.—Mammals. Adam & Charles Black.

SUCH a series of publications on zoology—text-books, hand-books, introductions, manuals, &c. — is now appearing, that it seems only possible to suggest at present what shall be considered canonical, and what not. And this estimate becomes more difficult every day, especially when, as in the present work, the bionomical element is a pronounced feature; for now many brilliant, some hazardous, and a multitude of strange theories more or less enter the purview of every author. The editor—Mr. Cunningham—in his preface, opines that even in this volume, in reference to colouration, the author's idea is perhaps carried too far. But Dr. Schmeil advances no particular theory, and is anxious throughout to exhibit adaptability in structure to environmental conditions in a way that could have met with the approval of the—presumably—defunct teleologist, that ought not to offend the strictest “selectionist,” and may be countenanced by the “neo-Lamarckian.”

But these remarks, though legitimate to a general consideration, in no way express the aim of the book, which is one of the most interesting and suggestive to place in the hands of school-children, to whom zoology is not an end, but a part of a liberal education. It has the merit of producing thought, rather than the necessity of remembering details. Most children can repeat that a Cat “has nine lives,” but how few can explain the operation of what is styled “always falling on its legs.” Dr. Schmeil comes to the rescue:—“When a man in falling tries to support himself on his arms, he may easily break them; for, as he possesses clavicles, and needs them, his arms are firmly (without elasticity) connected with the shoulder-girdle, so that

the shock in falling is not diminished. The Cat, on the other hand, at every spring alights on the fore-legs. Fracture, however, does not take place, because the shoulder-blades are only connected with the skeleton of the trunk by ligaments and muscles, and yield to the shock (prove on the living animal how easily the shoulder-blades can be moved), and also because yet another safeguard occurs in the shoulder-joint. When the weight of the body comes on the fore-legs, the angle between the upper arm and shoulder-blade is diminished, enlarging again when the bones return to their resting position. (Hence we understand why all swift-running and springing animals have no clavicles)." A similar element of practical reasoning is found throughout the whole of this excellent manual, "made in Germany," and its illustrations will serve to interest as well as instruct.

Introduction to Zoology. By CHARLES BENEDICT DAVENPORT, Ph.D., and GERTRUDE CROTTY DAVENPORT, B.S. New York: The Macmillan Company, Ltd.

THIS publication is intended for the "use of secondary schools"; it "attempts to restore the old-time instruction in Natural History"—in method; it is "the outcome of a conviction that the needs of the secondary student are not best met by a course in comparative anatomy." The book is described "as like a 'Synoptic Room' in the vestibule of a vast museum, containing the most essential things for those who can go in but a little way, but also fundamental for those who can penetrate farther."

It will thus be seen that the authors have set themselves one of the most difficult tasks in the domain of natural science. To really popularise zoology—and the word "popularise" is not synonymic with "vulgarise"—requires the genius of a Huxley. It depends on knowing *all*, and having the faculty of stating clearly the *one thing* needful. To be a college professor is sometimes only the reward of tact and industry; to be a teacher of the people is a gift of the gods. After all, in secondary and other schools, zoology will be best taught by the enthusiastic and competent teacher, who knows how to expound the text-books;

and this, combined with a fair-sized aquarium and vivarium in every school, and a weekly excursion with a good field naturalist, would do for children nearly as much as all the books. Like the people we all meet who quote from the Bible and Shakespeare without ever reading one or the other, so we should have a generation growing up who were at least imbued with an interest in animal life. Once create the love of zoology, and all the rest will follow; a knowledge from books alone is always second-hand. One might as well expect an appreciation of art from Midas because he has purchased a picture gallery.

This book is a means to an end, and will doubtless help on the work. It gives so much information that the space at disposal is not sufficient, in many cases, to elucidate the details, and hence the authors are often, like preachers, a little over the heads of their congregation. The illustrations are apt, but very often borrowed—though with all acknowledgment—and sometimes “after Brehm.” Whether illustrations should be taken from the works of the taxidermist is a very open question, even when representing such excellent work as may be found in the Field Columbian Museum. Sometimes the text is a little vague, as when we read that “the Crocodile in the strict sense is found in the Nile and other African rivers,” as well as in certain American localities, without any reference to its oriental habitats.

As an appendix, there is a very useful and suggestive outline of laboratory work, and a bibliography of standard works.

In Bird-land with Field-glass and Camera. By OLIVER G. PIKE.
T. Fisher Unwin.

IF under the pseudonym of scientific ornithology the ubiquitous collector did much damage in “bird-land,” by the indiscriminate acquisition of eggs and nests, science seems now to have provided the antidote in the camera. The lovely photographs of nests and eggs, true to nature, and possessing all the real charms of the environment, which now embellish ornithological literature, will probably create a more exact knowledge of these objects, and prevent much unnecessary destruction. Better that the trade of the dealer should perish than that the birds must

ultimately vanish; though the worst destruction of eggs by human agency is, we are thoroughly convinced, occasioned by the boys of the village.

Mr. Pike's photographing-ground has been principally North Middlesex and South Hertfordshire, and he has in this artistic and harmless occupation acquired a very large experience of birds and their ways, which he has related in a small but charmingly illustrated book. The successful placing of the camera is largely dependent on the habits of his "sitters," and not only the nest but the whole environment is reproduced on his plates. We read with regret the usual story of vanishing species from once frequent haunts. He remembers "the time when it was possible to see a Sparrow-Hawk almost any day in our North Middlesex fields; but now a specimen is only seen at very long intervals; for, although I am constantly abroad in the open air, it is over a year since I saw one of these fine birds on the wing." And again:—"Not very many years ago the Raven used to breed in our inland counties; and not far from my home there still stands a tree in which the last pair of these birds built their nest in Middlesex."

Although the collector becomes callous—and we plead guilty to the impeachment—most will regret the truth contained in Mr. Pike's narrative concerning the Sky-lark:—"It is pathetic to hear, as I have done, how this bird, which makes the countryside so enjoyable, will suddenly stop in the midst of its beautiful song when its nest far below is being robbed of its eggs. I was once a witness of this phenomenon, and felt sad as well as indignant." It is probable that the greatest mystery of life is its sorrow; but with birds the camera will not increase it.

As regards the beauty of the illustrations, we can refer to those reproduced in the present number in connection with Mr. Gurney's paper.

Bird Gods. By CHARLES DE KAY. With an Accompaniment of Decorations by G. W. EDWARDS. Harry R. Allenson.

THE aim of this book is apparently to assert "the influence of birds and beasts on what may be called prehistoric religion," as against the more prevalent hypothesis that the planets, their satellites, and other natural phenomena have induced this specu-

lative view. The author asks "whether the primitive mind did not first invest the world of animals with mystery, because they are objects near at hand, within their limited horizon, and only afterwards rise to the point of grasping the heavenly bodies as being endowed with supernatural power?"

This is a purely mythological book, and, like all mythologists, the author must expect little sympathy when he fails to carry conviction. That disjointed but widely-spread custom, the *couvade*, the explanation of which has so perplexed anthropologists, is here sought to be divined by the aid of the habits of the Cuckoo, which, having been a pagan god, was afterwards "degraded to a devil." The Sphinx is considered as a Greek embroidery upon the Owl, and the author remarks that "we get thus an explanation of the sphinxes on the helmet of the great statue of Pallas Athené in the Parthenon, described by Pausanias. They were merely more elegant and artistic forms of the homely Owl, the bird of Minerva." That birds have entered largely into the old mythologies this book abundantly maintains with many valuable and apt references, but that they have played the part suggested for them by Mr. de Kay will, we venture to think, not be considered proven by all his readers. But, like the Phoenix, the best hypothesis usually arises from the ashes of its predecessors.

Whether the illustrations should be styled "decorations," as on the title-page, is altogether another question. Mr. Allenson's name appears as representing the publisher on the title-page, but A. S. Barnes & Co. is printed on the cover.

EDITORIAL GLEANINGS.

FORMALDEHYDE as an aid in collecting ornithological specimens is the subject of a communication by Mr. Joseph Mailliard to the last number of the 'Auk' for July. It appears that formalin can be procured at a much lower rate under the trade name of "formaldehyde." By its aid the collector is placed in an independent position in regard to the number of specimens he may collect in a day, as with its aid he can keep a number in good condition until time admits of preparing them for his collection. With an old-fashioned veterinary hypodermic syringe, and a bottle of saturated solution of formaldehyde, Mr. Mailliard is now provided on all his expeditions. This syringe holds one teaspoonful, and this is sufficient for a bird as large as a Partridge. The sharp needle is punched into the abdomen in one or more places, a few drops are sent down the throat of a bird to be saved, and, if to be kept for some days, a little is injected into the brain by opening the bill and forcing the needle upwards and backwards between the eyeballs. In place of a regular hypodermic, a common glass syringe, or even an eye-dropper, can be made to answer, especially if the end is heated and drawn out to a sharp point, as in an egg-blower. The amount injected and the strength of the solution must depend upon the size of the bird. Formaldehyde comes in saturated solution of nominally 40 per cent., while from 4 per cent. to 10 per cent. is what may ordinarily be used. For birds up to the size of a Partridge, 4 per cent. is sufficiently strong; from this to the size of a Duck, 8 or 10 per cent.; and for Geese and very large birds a comparatively smaller amount of the full strength seems more satisfactory than a larger amount of a weaker solution. It is well to avoid, as far as possible, having one's hands come in contact with the strong solution, as this is apt to harden the skin of the fingers, and cause cracks, into which arsenic may be introduced. Upon the basis of the original solution being 40 per cent., it is a simple matter to approximate any desired strength by mixing in a separate bottle one part of the solution to so many parts of water roughly estimated. The strength and amount necessary for different birds will soon be learned with a little practice. If too much or too great a strength is used upon small birds, the body becomes more or less hardened and dry, making it exceedingly difficult to skin the specimen. Care must also be taken to avoid using more than is absolutely necessary in the throat, as the thinness of the gullet allows the formaldehyde to act directly upon

the skin of the neck, which is apt to become so stiff and dry as to cause it to tear in the effort to skin the bird over the head. A few drops only will suffice for the preservation of this part of the bird, except in the case of a large crop full of decomposing food. When properly treated with this solution, and properly cooled off in the first instance, birds will keep a week even in warm weather in sufficiently good condition to make a fair skin.

DR. ALPHÆUS S. PACKARD, the well-known American entomologist, who is now in London, has ready for the press a volume entitled "Lamarck, the Founder of Evolution; his Life and Work. With Translations of his Writings on Organic Evolution." Dr. Packard has sought and obtained much original material for his publication in France, and the work will probably be published in England.

IN connection with the above, it is interesting to know that Darwin's great work, 'The Origin of Species,' will be out of copyright in about a couple of years, and that the publisher has decided to issue during the coming autumn an edition in large type, well bound and well printed, at a price which will bring it within the reach of all—half-a-crown.

THE monthly magazines still show by their contents that the ordinary reader is interested in the many curious details of animal life. In the June number of 'Pearson's Magazine,' René Bache writes on fish-culture in trains in the U.S.A., and describes the special railway-car used for the transportation of fry and eggs, under the direction of the national "Fish Commission."

Supposing the car is drawn up at one of the Fish Commission's central stations, and the captain of the car is to receive for transportation a cargo of 2,600,000 young Shad, and 400,000 Shad eggs; as quickly as possible the newly-hatched Government Shad will be taken aboard in about one hundred cans resembling milk-cans, each containing 20,000 fish. The eggs, in similar shipping-cans, will be rapidly loaded; the car will be attached to a train, and the journey will commence. The captain of the car and his four trained assistants must account for every one of the 3,000,000 lives entrusted to their care. This is no light responsibility, for young fishes die on slight provocation, and it is not surprising that the captain in charge of them all should be fairly overwhelmed with urgent duties. He has already sent telegrams to the traffic manager of every line over which he is to pass, making arrangements for the hauling of the car, so that there shall not be a moment's unnecessary delay. He has telegraphed in advance to various points on the route for supplies of ice and

water, and he has also prepared type-written instructions for each of his subordinates, telling them their precise duties throughout the journey.

As soon as they have been taken on board the young fish are at once examined, and the water in their cans is aerated. This is accomplished by drawing off a certain portion of the water into a suitable receptacle, dipping it up with a dipper, and letting it fall again, so as to mix air with it. Fresh water is added, and ice is put in to chill it to the proper temperature of 60°, when it is returned to the can. This process occupies more than an hour, and must be repeated every two hours. If any of the young fishes are dead they sink to the bottom, and are taken out with a syphon tube.

Meanwhile the 400,000 Shad eggs are transferred from the shipping-cans to the batteries of hatching-jars. The jars are put on shallow trays, which are placed over refrigerating tanks. There are forty-eight jars, each capable of hatching 100,000 eggs at one time. When the hatching apparatus has been set in operation it requires hardly any further attention, a continuous stream of water passing through the jars, and keeping the ova agitated. When hatched the young fish, being lighter than the water, pass out of the receptacles, through syphons, into glass aquaria, from which they may be taken with gauze nets when required.

When the car reaches one of the places on its journey where a consignment of Shad is wanted, an attendant takes perhaps fifteen cans, containing 300,000 fish, drives to the water that is to be stocked, and in the cool of the evening lowers the cans gently into the water, and releases his captives to their first experience of the world. The chances are that one in ten will live to grow up; the remainder will be eaten.

ANYTHING that relates to Gilbert White is of interest to naturalists, and when we have an article by Prof. Newton on "Gilbert White and his Recent Editors" ('Macmillan's Magazine,' July) we know that we shall have sound views, with pungent criticism. And we are not disappointed. The last two editions are certainly not bepraised, and the opinion as to former editions will probably receive general acceptance, though editors have a rough time. As Prof. Newton severely observes:—"The work itself has never suffered from its misuse by editors, of whom it has had so many, a few good, some indifferent, and several bad. If anything be needed to prove White's right to be considered a naturalist of the first order, it may be found in the fact that his most ignorant editor has been unable to degrade him from that rank, and how ignorant some have been would take too long to tell." Some, however, are "regarded as experts, and their work therefore to have real value. Among them are such men as Blyth, Jardine, Rennie, and Bennett, the labours of the last two forming the

foundation of the excellent edition (or editions, it must be said) of Mr. Harting; and the late Prof. Bell, who lived for forty years in what had been White's house at Selborne, and, possessing advantages far greater than any of his predecessors or successors, was able to give so much additional information that his edition still remains, and is likely for many years to remain, the standard. His biographical memoir, too, contains more numerous details of the author than had been before accessible; but for a complete Life we must await that which his great-great-nephew, Mr. Holt-White, is understood to have in the press."

MR. FRANK T. BULLEN has written in the 'Strand Magazine' for July on the subject of "Sociable Fish." On the question of the sociability of the Pilot-fish with the Shark, the author writes as follows:—

"Does the Pilot-fish love the Shark? Does it even know that the Shark is a Shark, a slow, short-sighted, indiscriminating creature whose chief characteristic is that of never-satisfied hunger? In short, does the Pilot-fish attach itself to the Shark as a pilot, with a definite object in view, or is the attachment merely the result of accident? Let us see.

"Here is a big Shark-hook, upon which we stick a mass of fat pork two or three pounds in weight. Fastening a stout rope to it we drop it over the stern with a splash. The eddies have no sooner smoothed away than we see the brilliant little blue and gold Pilot-fish coming towards our bait at such speed that we can hardly detect the lateral vibrations of his tail. Round and round the bait he goes, evidently in a high state of excitement, and next moment he has darted off again as rapidly as he came. He reaches the Shark, touches him with his head on the nose, and comes whizzing back again to the bait, followed sedately by the dull-coloured monster. As if impatient of his huge companion's slowness, he keeps oscillating between him and the bait until the Shark has reached it, and without hesitation has turned upon his back to seize it, if such a verb can be used to denote the deliberate way in which that gaping crescent of a mouth enfolds the lump of pork. Nothing, you think, can increase the excitement of the little attendant now. He seems ubiquitous, flashing all round the Shark's jaws as if there were twenty of him at least. But when half a dozen men, "tailing on" to the rope, drag the Shark slowly upward out of the sea, the faithful little Pilot seems to go frantic with—what shall we call it?—dread of losing his protector, affection, anger, who can tell? The fact remains that during the whole time occupied in hauling the huge writhing carcass of the Shark up out of the water the Pilot-fish never ceases its distracted upward leaping against the body of his departing companion. And after the Shark has been hauled clear of the water the bereaved Pilot darts disconsolately to and fro about the rudder as if in bewilderment at its great loss."

THE ZOOLOGIST

No. 711.—September, 1900.

THE ADDER-SWALLOWING THEORY FROM AN ANATOMICAL POINT OF VIEW.

BY GERALD LEIGHTON, M.B.

THE main objections of scientific naturalists to the belief that the Adder-mother (*Vipera berus*) swallows her young are the following:—First, that no Adder has been dissected by a competent authority with the young found in the gullet. Secondly, that the cubic capacity of the gullet is not sufficient to hold *all* the young ones in a litter. Thirdly, some (F. G. Aflalo, *e.g.*) hold that there is no adequate reason for the phenomenon, *i.e.* that the young ones would have a better chance of escape if they were not thus swallowed. Of these objections, the second is by far the most pressing to my mind, for if it could be shown that the gullet of the Adder is not capacious enough to hold the *average number* of young, then indeed one could not have much belief in the occurrence. It is this point that I wish to deal with at present. One must settle—

1st. What is the average number of young at a birth?

2nd. Is the anatomical structure of the gullet adapted for the reception of young?

3rd. Is the capacity of the gullet sufficient?

These are practical questions, only capable of decision by dissection of a sufficient number of adult female Adders. Take them *seriatim*.

1st. *The average number of young Adders at a birth.*

Various authorities give different figures: thus Dr. Stradling puts the litter at from 15 to 40, M. C. Cooke at 10 to 20. My own experience leads me to doubt very seriously whether Adders ever have forty young at once. I have dissected now a considerable number of full-grown female Adders in young (three this week), one of which I will now describe in detail.

Dissection of Gravid Female.—On Monday, July 23rd, I dissected a large gravid female Adder for the purpose of counting the number of young that had developed. A mesial incision was made from the position of the ovaries to the cloaca, and the skin turned outwards. Both oviducts were full of eggs. The upper and lower ends of the oviducts were tied with string, and the other organs gently separated. Both oviducts were then lifted out of the body cavity. The dissection showed the blood supply very beautifully, and the young were evidently only a day or two from birth. I took a photo of the full oviducts, as one cannot often get an Adder at this stage. The right oviduct contained seven and the left six eggs. (An egg often contains two embryos.) The specimen was such a perfect one that I thought I would preserve it *in toto* to harden, so as to observe later the precise position of the embryo in the egg. This being so, I could not be quite certain as to their number, but I think it is 19 or 20. The average of this series of dissections works out at *thirteen* embryos to each female Adder. (The eggs often contain more than one embryo; in this latter case there were thirteen eggs containing the eighteen embryos.) Possibly a larger series of dissections might give slightly different results, but I do not think the difference is likely to be great. To be on the safe side (as far as the question of capacity is concerned), let us consider the average to be *fifteen*.

2nd. *The anatomical fitness of the gullet for their reception.*

This is soon disposed of, as the Adder's gullet is, of course, adapted to its food. There is no difficulty whatever for a Mouse, a young Water Vole, or a Blindworm to pass into the gullet, and it is quite easy to press them out again if they are contained therein. (A short time ago I killed an Adder which appeared

very full in the throat, and, on gentle pressure, I got out two young Water Voles.) The mechanism of the jaws is indeed peculiarly fitted for the passage of bulky articles of food, a feature common to the Ophidia group.

3rd. *The cubic capacity of the œsophagus (gullet).*

This is a crucial point. If the Adder does swallow her young it is to be presumed that there must be room in every average-sized Adder's gullet for an average-sized family. The capacity of the gullet can be estimated by the simple process of dilating



it to its full extent with air through a blowpipe. I did this in the presence of a naturalist last week; his comment was, "There is room for twenty young ones, but for forty I think not." The average length of the gullet is 9 in., and the average diameter, when distended, 1 in., the average circumference $3\frac{1}{2}$ in. Young Adders can curl themselves up in a remarkable way, and I have no hesitation in saying that the *capacity of the œsophagus is sufficient to hold the young*. My conclusion is that, theoretically considered, there is *no anatomical reason* why the Adder-swallowing theory should not be true.

The third objection I alluded to, *viz.* that there is no need for the process, is a mere matter of opinion. Very curious instances could be given of the expression of maternal instincts in nature.

It only remains, then, for the first objection to be removed, *viz.* that a competent authority should have the opportunity of dissecting an Adder which has been observed to swallow the young. Until this is done scientific naturalists will continue to regard the question as one capable of proof, if true, but hitherto unproved.

THE BIRDS OF GREAT YARMOUTH AND THE NEIGHBOURHOOD.

BY ARTHUR PATTERSON.

(Continued from p. 172.)

The arrangement and nomenclature of Howard Saunders in his 'Manual of British Birds' has been adopted in the following catalogue.

ABBREVIATIONS.—C. means common; F. frequent; F. C. fairly common; N. U. not uncommon; N. C. not common; F. frequent; L. L. lessening locally; S. scarce; R. R. rather rare; R. rare; A. accidental. B. of N. means 'Birds of Norfolk' (Stevenson); B. of S. means 'Birds of Suffolk' (Babington); Nor. N. S. means 'Transactions' of the Norfolk and Norwich Naturalists' Society.

Turdus viscivorus. Mistle-Thrush.—L. L. Nested in market-gardens until end of seventies. Young birds from surrounding villages frequent the sand-dunes in the early autumn, seeking insects. Some scattered mulberry trees (themselves extirpated) were at one time an attraction. Buff variety shot, June 18th, 1898. Local, "Fulfer."

T. musicus. Song-Thrush.—C. Additions in autumn. Its services in autumn in destroying the Coleoptera and *Limacidae* on strawberry-beds are not appreciated by country gardeners.

T. iliacus. Redwing.—C. Numbers depend upon severity of winter. In winters of 1878 and 1881 were starving by thousands. Caught by boys with their caps in the streets. Local, "French Mavish."

T. pilaris. Fieldfare.—C. Numbers fluctuate with weather. In mild winters very few. November, 1891, thousands on neighbouring marshes. Found several dead on 8th on the beach. Example washed up on April 23rd, 1893; undoubtedly a late emigrant. Local, "French Fulfer."

T. varius. White's Thrush.—A. A male example obtained at Hickling, Oct. 10th, 1871. This, the only Norfolk specimen, is in Norwich Museum.

T. merula. Blackbird.—C. Appears to be on the increase. Occasionally great numbers arrive in autumn. Have met with cream, buff, and mottled varieties.

T. torquatus. Ring-Ouzel.—R. R. Occurs in spring; less rarely in autumn. At one time not infrequent on North Denes, haunting the furze, amongst which *Helix nemoralis* was abundant. Nest discovered at Horsey by late Mr. Rising in May, 1855, containing four eggs. A second nest subsequently. (Nor. N. S.).

Saxicola œnanthe. Wheatear.—C. Scarcer than formerly; nesting at one time on North Denes, and occasionally now on neighbouring warrens. Immature birds fairly common towards September; then patrol the shore catching dipterous insects, which swarm at the high-water mark. Mr. E. Saunders had a pied variety, September, 1898. Unusually numerous, spring of 1899. Local, "White-rump"; "Shepherd-bird."

Pratincola rubetra. Whinchat.—L. L. Used formerly to be abundant on North Denes, nesting there. Local, "Furzechuck."

P. rubicola. Stonechat.—L. L.—Formerly fairly abundant on North Denes. Local, "Furzechuck."

Ruticilla phœnicurus. Redstart.—F. More frequently observed in autumn in the neighbourhood of North Denes. Local, "Fire-tail."

R. titys. Black Redstart. R. R.—First observed as a county visitant, Oct. 31st, 1848. Adult female shot on North Denes. Two others following year; several since. I picked up an example, killed by telegraph-wires, same locality, Oct. 18th, 1898.

Cyanecula suecica. Bluethroat.—R. An adult male was found dead on the beach, Sept. 21st, 1841; and another at Lowestoft in May, 1856. A local gunner, "seeking for any small bird, just to empty his gun at," killed a specimen on Breydon walls in September, 1883. Another recorded at Horsey, 1885.

Erithacus rubecula. Redbreast.—C. Additional numbers in autumn. I have seen it arrive on the coast.

Daulias luscinia. Nightingale.—F. Not uncommon at Fritton, and in neighbourhood of Belton. I have observed it on a tree-trunk warbling in broad daylight.

Sylvia cinerea. Whitethroat.—C. Abundant in summer all over the neighbourhood.

S. curruca. Lesser Whitethroat.—R. R. By no means so plentiful as *S. cinerea*.

S. atricapilla. Blackcap.—S. Occasionally observed in market-gardens, and near Fritton.

S. hortensis. Garden-Warbler.—S. Less often seen than even the Blackcap.

S. undata. Dartford Warbler.—R. Has twice been seen on North Denes. The second example was caught by a dog in a furze-bush, Feb. 25th, 1859 (B. of N.). In 1884 Sir Edward Newton saw one at Lowestoft.

Regulus cristatus. Golden-crested Wren.—C. Immense numbers arrive in autumn, usually first week in October, as was particularly the case in October, 1882, and again in October, 1898. Fishing-boats often swarmed with tired birds. Local, "Herring-spink."

R. ignicapillus. Fire-crested Wren.—R. Two or three times observed in the neighbourhood. A male in market-gardens, April, 1889. One caught on a smack at sea, December, 1881.

Phylloscopus rufus. Chiffchaff.—C. Used to be abundant in market-gardens in March.

P. trochilus. Willow-Wren.—C. Frequently seen and heard in neighbourhood on spring migration. A singular variety of a uniform pale yellow, becoming straw-coloured below, killed near Lowestoft in August, 1861 (B. of N.).

Acrocephalus streperus. Reed-Warbler.—F. C. Met with in the Broadland district; its name suggests its habitat. The nest has been observed at Ranworth, built in laurel-bushes by the water's edge (B. of N.).

A. phragmitis. Sedge-Warbler.—C. Found in every "carr," reed-clump, and waterside thicket. Heard at intervals night and day "chitty cha-ing" by the idler on the broads and rivers. Local, "Reed-bird."

Locustella nævia. Grasshopper-Warbler.—R. "Occasionally met with, but rare" (Paget). As a county visitant it is by no means numerous.

L. lusciniodes. Savi's Warbler.—A. A nest of this species is said to have been found near Yarmouth, which was sent to Mr. Newcome's collection at Feltwell (B. of N. vol. i. p. 113).

Accentor modularis. Hedge-Sparrow.—C. More frequent in town gardens in winter, when its familiar notes are frequently heard.

A. collaris. Alpine Accentor.—A. On Sept. 21st, 1894, I met with an example on Gorleston pier. It was feeding amongst the weeded pile-stumps and stones under the pier, and allowed me to approach it very closely, when I carefully observed its plumage and actions for some time through my glasses. Mr. Stevenson (B. of N. vol. i. p. 90) has not included this species, but refers to Mr. Lubbock as having seen one in 1824 on a grass-plot at Oulton, near Lowestoft. He refers to one other only for the eastern counties.

Cinclus aquaticus. Dipper.—R. An example shot on Breydon walls in 1849 (Nor. N. S. vol. iv. p. 269).

C. melanogaster. Black-breasted Dipper.—R. An example of this Scandinavian form obtained on the River Bure, Nov. 9th, 1896 (Nor. N. S. vol. vi. p. 506).

Panurus biarmicus. Bearded Titmouse.—F. Nests decreasing on the Broads; mercilessly persecuted by broadmen and others. Eight killed by duckshot, brought to market Nov. 19th, 1890; seven of these mutilated specimens still unsold on the 22nd. Four killed at Filby; on sale Feb. 1st, 1895. Mr. J. H. Gurney (Nor. N. S. vol. vi. p. 429) estimates ratio of local nests as follows:—1848, 160;* 1858, 140; 1868, 125; 1878, 90; 1888, 45; 1898, 33. Is locally known as the "Reed-pheasant."

Acredula caudata. Long-tailed Titmouse.—C. A regular although uncertain visitor in autumn. Resident and migratorial. Hundreds in town gardens, Oct. 1st, 1899. The Rev. Churchill Babington says the White-headed Long-tailed Tit has been met with in Norfolk, probably referring to the neighbourhood of Yarmouth.

Parus major. Great Titmouse.—C. Often numerous in early winter; this increase points to a migratorial influx. Has been secured on lightships. "An apparently (return) migratory movement was observed at Yarmouth in February, 1848" (B. of N. vol. i. p. 140).

P. britannicus. Coal-Titmouse.—F. C. I saw a large flock near the sea, on the North Denes, Nov. 5th, 1893. Suspecting they were immigrants, possibly *P. ater*.

* Mr. Gurney has since estimated the number of nests for this year as 170 (*cf. ante*, p. 363).—ED.

P. palustris. Marsh-Titmouse.—F. C. I have no doubt this species is migratorial. Found on the marshy districts north and south of the town.

P. cæruleus. Blue Titmouse.—C. Much more in evidence in late autumn than at any other time. Local, "Pick-cheese."

P. cristatus. Crested Titmouse.—A. In the autumn of 1888 or 1889 (date unfortunately lost), I saw a bird which was unmistakably of this species among the firs on Caister Road. I had a gun at the time, and made two unsuccessful attempts to assassinate it with big shot. I followed it from tree to tree; becoming myself fast upon a nail protruding from a rail, it eluded me whilst endeavouring to extricate my nether garment. Has not hitherto been obtained in Norfolk. Has occurred, according to Babington, in Suffolk.

Sitta cæsia. Nuthatch.—R. R. Not uncommon in the Fritton woods and neighbourhood.

Troglodytes parvulus. Wren.—C. The autumnal additions appear to strike the coast higher up, and to work southward by land; then not in any numbers. Local, "Jenny Wren."

Certhia familiaris. Tree-Creeper.—R. R. Have observed it in the Fritton district.

Motacilla lugubris. Pied Wagtail.—C. Although not so numerous with us as formerly, a few remain in winter, a number arriving from the south in spring. Local, "Penny Wagtail."

M. alba. White Wagtail.—R. Two male examples obtained here on April 24th, 1888; a third on May 1st of the same year; another was taken alive at Lound, April 25th, 1896, and lived for some time in confinement.

M. melanope. Grey Wagtail.—R. The Messrs. Paget speak of it as not uncommon in winter. I have observed it in late autumn, recognizing it by its longer tail and more dipping flight as compared with others of this family. An example feeding against my boat-house doors, Dec. 27th, 1899.

M. flava. Blue-headed Wagtail.—R. Mr. E. T. Booth watched some on the edge of Breydon (Nor. N. S.). The second for the county was shot in April, 1851. One or two others recorded for district. Nest containing four eggs found at Herringfleet, June 16th, 1842, attributed to this species by the late Mr. Fisher.

M. raii. Yellow Wagtail.—C. Abundant in some years on

marshlands. Males arriving "yellow as a guinea," by autumn have assumed a dingy hue.

Anthus trivialis. Tree-Pipit.—F. C. Has occasionally been taken in market-gardens. Also observed in neighbourhood of Belton.

A. pratensis. Meadow-Pipit.—C. More numerous in winter than in summer; frequenting salt marshes. Young birds in autumn often seen catching "sand-flies" at the high-water mark in company with young *Saxicola œnanthe*. Local, "Titlark."

A. campestris. Tawny Pipit.—R. A female caught in a clap-net on North Denes, Oct. 7th, 1897. One at Lowestoft, Sept. 2nd, 1889 (Nor. N. S. vol. vi. p. 508).

A. richardi. Richard's Pipit.—R. Several times taken or shot on North Denes: three respectively in November, 1841; April, 1842; and April, 1843. Mr. Babington records occurrences as follows:—One, marshes at Yarmouth, Dec. 26th, 1866; another, Dec. 27th; a third, Dec. 29th. The last occurrence was on Dec. 11th, 1894.

A. obscurus. Rock-Pipit.—F. C. I have frequently observed this species in autumn on the Bure and Breydon flint-faced walls. Have never seen it beside other than salt water.

A. rupestris. Scandinavian Rock-Pipit.—R. Mr. Booth secured an example at Horsey in March, 1871 (Nor. N. S. vol. iv. p. 277).

Oriolus galbula. Golden Oriole.—R. Has rarely put in an appearance in summer. A female killed near Yarmouth, Aug. 1st, 1850; another, probably the male, seen at the same time (B. of N.). Mr. E. T. Booth ('Catalogue of Birds') says he had seen nest and eggs in Norfolk. I have some recollection of a pair attempting to nest near Ormesby in the early eighties. One seen at Burgh Castle, May, 1883.

Lanius excubitor. Great Grey Shrike.—R. R. Visits us rarely in late autumn. Three or four met with January and February, 1891. One I kept alive, quickly became tame, taking his bath very soon after capture.

L. minor. Lesser Grey Shrike.—R. One shot in the spring of 1869; another taken in May, 1875. Both of them adults. (Nor. N. S.).

L. collurio. Red-backed Shrike.—R. R. Nested on North

Denes up till the eighties. Have observed it feeding on the Field Vole (*Microtus agrestis*). Have observed young birds once since. Less frequent than formerly. Local, "Butcher-bird."

L. pomeranus. Woodchat Shrike.—R. An example obtained at Bradwell, April, 1829; another, April 29th, 1859; and a third, May, 1885. One also at Gorleston.

Ampelis garrulus. Waxwing.—R. R. An uncertain winter visitor. In some years arrives in most unexpected numbers; in others few, if any, are recorded. Early in 1893, several obtained in neighbourhood.

Muscicapa grisola. Spotted Flycatcher.—F. Have observed it darting at passing flies from a gravestone in Yarmouth churchyard, returning again to its look-out to watch for others.

M. atricapilla. Pied Flycatcher.—R. R. Unusual numbers observed on North Denes, June 1st, 1898.

M. parva. Red-breasted Flycatcher.—A. An immature female shot at Rollesby, Dec. 12th, 1896; the fourth example for the county, two of the others occurring in September, the third in October.

Hirundo rustica. Swallow.—C. Less frequently nesting in town; its nests are common enough in the pump-mills dotting the marshes, where they are found variously shaped, sometimes like a saucer on top a beam, at another fitting a hole formed by the crumbling of a brick. In 1878 a pair nested in the hold of a hulk, full of water, in the centre of Breydon, successfully rearing their young.

Chelidon urbica. Martin.—C. Have almost altogether forsaken the town through the persecution of the Sparrows, and from the constant destruction of their nests from the mud being rendered unstable, the roads being watered with sea-water.

Cotile riparia. Sand-Martin.—C. Last nested in sand-hills on North Denes in 1879. Great numbers come into the vicinity of the town in autumn; frequents the beach during westerly winds, seeking insects. Have found its nest in the Gorleston sand-cliffs lined with *Flustra foliacea* and Gull's feathers.

Ligurinus chloris. Greenfinch.—C. Much persecuted by gardeners at radish-sowing-time, when, in company with Chaffinches, pilfering the beds. Augmented by arrivals in autumn, but they appear to strike the coast some miles north of Yarmouth,

working, with other Passeres, southward along the sand-hills. Local, "Green Linnet."

Coccothraustes vulgaris. Hawfinch.—F. Visits us in uncertain numbers every winter. Have every reason to believe a pair tried to nest in a market-garden a few years ago, but were killed by a birdcatcher.

Carduelis elegans. Goldfinch.—L. L. Owing to incessant persecution by birdcatchers has so diminished of late years as to become almost a rarity with us. A hybrid between Goldfinch and Linnet netted at Acle, Sept. 4th, 1899.

Chrysomitris spinus. Siskin.—C. An uncertain autumn visitor, sometimes arriving in great numbers.

Serinus hortulanus. Serin Finch.—R. A male example shot at Yarmouth, June 13th, 1885; another netted on North Denes, Feb. 5th, 1887. A pair, April 1st, 1897 (Nor. N. S.).

Passer domesticus. House-Sparrow.—C. A great number repair all through the autumn to a clump of trees near St. Nicholas Church towards sunset, and chirp in chorus half an hour, making a great uproar, after which they disperse to their sleeping-quarters. Very destructive in villages around at harvest-time. One passed me within arm's length on Jan. 17th, 1881, coming from over sea with tired-out Twites, Linnets, &c. I am informed that during immigration some occasionally alight on lightships. My informant, an intelligent lightsman, on my suggesting he may possibly have mistaken Tree-Sparrows, distinctly referred to them as "House"-Sparrows, which he knew from *P. montanus*.

P. montanus. Tree-Sparrow.—F. C. Nests in the neighbourhood; I have found its nest under a tile in cart-shed. Have observed it arrive in October, alighting on sand-hills to rest after a tiring flight across seas.

Fringilla cœlebs. Chaffinch.—C. Great numbers arrive in autumn, many often perishing. Have observed it industriously feeding in winter on the seeds of *Astor tripolium*. The separation of the sexes is noticeable. Local, "Spink."

F. montifringilla. Brambling.—C. In some winters abundant. Winter of 1885–86 very numerous; again in 1894–95. Many dozens were caught by one birdcatcher who baited a certain meadow. Mr. J. H. Gurney (Nor. N. S. vol. iv. p. 278) refers to

a rare "variety with a white chin, like a chevril Goldfinch," as having been killed at Yarmouth, where the black-chinned variety has also sometimes occurred.

Acanthis cannabina. Linnet.—C. Formerly nested in numbers on North Denes. Great accessions to numbers in October, when thousands are netted and sent to London. The female is generally killed, or saved, with Twites, &c., for shooting matches. Hybrids between the Linnet and Greenfinch have been taken two or three times.

A. linaria. Mealy Redpoll. — F. C. In uncertain numbers visits us with the autumnal inrush. Unusually numerous, autumn of 1893.

A. rufescens. Lesser Redpoll.—C. This species occasionally comes over in great numbers with Linnets, Twites, &c.

A. flavirostris. Twite. — C. In some years arrives in enormous flocks, and annoys the birdcatchers by their persistency in entering the clap-nets. Local, "French Linnet."

Pyrrhula europæa. Bullfinch. — F. C. Relentlessly shot, our market-gardeners assuming it to be unpardonably mischievous in orchards. It is apparently more numerous on the Suffolk side of the district. Local, "Blood-ulf."

P. major. Russian Bullfinch.—A. A male was shot on the Denes near Yarmouth on Jan. 22nd, 1893 (Nor. N. S.). Yorkshire is the only other county in which the Russian Bullfinch has been at present identified.

[*P. enucleator*. Pine-Grosbeak.—A. A flight supposed to have been seen on the Denes, November, 1822 (*vide* Paget). Mr. J. H. Gurney thinks this very doubtful.]

Loxia curvirostra. Crossbill.—F. Small flocks occasionally arrive in autumn. Several were seen for several weeks at Somerton and Belton quite into the nesting season. Largest influx for many years past, first week in Aug. 1898, when Lowne had thirty-two in for preservation. Paying great attention to cherry trees and gooseberry bushes. I saw several both "red" and "green." Mr. Dye kept one in a cage six and a half years. A variety of the Crossbill which was erroneously recorded at the time as the Two-barred Crossbill was probably *Loxia rubrifasciata*.

L. bifasciata. Two-barred Crossbill.—A. On Sept. 1st, 1889, a male example was shot at Burgh Castle, near Yarmouth

(Nor. N. S.). An example of the American variety (*L. leucoptera*) is said to have been taken on the rigging of a vessel which arrived at Yarmouth in October, 1870 (*vide* B. of N. vol. iii. p. 413).

Emberiza miliaria. Corn-Bunting.—F. C. Not often observed in this immediate neighbourhood.

E. citrinella. Yellow Bunting.—C. Formerly nested on North Denes. Receives additions in winter from the more northern counties. A very conspicuous tenant of the hedgerows during winter. Local, "Guler"; "Yellowhammer."

E. cirrus. Cirl Bunting.—R. Two specimens of this bird were obtained by Mr. E. T. Booth at Hickling in the autumn of 1875 (Nor. N. S.). Two males netted on Breydon marshes during severe frost, Jan. 29th, 1888. (*Ibid.*)

E. hortulana. Ortolan Bunting.—A. An example netted at Yarmouth, April, 1866 (B. of N.). Six are said to have been caught here in May, 1871. One, Lowestoft Denes, May 5th, 1859.

E. schoeniclus. Reed-Bunting.—C. Abundant in the neighbourhood of the rivers and broads. I remember several years ago seeing an osier-carr near Acle swarming with them in late autumn; possibly migratory arrivals. Local, "Reed-Sparrow."

Calcarius lapponicus. Lapland Bunting.—N. C. Migrants arrive every winter in greater or less numbers. In October and November, 1892, considerable numbers seen and caught on North Denes. Over fifty taken or shot. More seen in 1893. Are now looked for by birdcatchers, who are not slow to observe distinguishing peculiarities of possible strangers. They mix freely with Snow-Buntings.

Plectrophenax nivalis. Snow-Bunting.—C. In some winters abundant on the marshes and North and South Denes. On the former they industriously feed on the seeds of *Aster tripolium*; on the latter, on those of various "dune" plants uncovered by the varying winds. Earliest recorded arrival, Sept. 11th, 1897, at Belton. Local, "Snow-bird"; "Snow-bunting"; "Snowmen."

Sturnus vulgaris. Starling.—C. It is most interesting to see in autumn continual parties arriving to roost on the reeds towards sunset in the broadlands. The huge flocks that used to wheel in aerial manœuvres over the marshes are not now so frequently seen. Immense numbers arrive in autumn. It is a common thing

to hear the Starlings on town chimneys most accurately mimicking the Curlew, Golden Plover, &c. It is often seen hovering over Breydon with Gulls, picking up floating refuse; and in summer sometimes aping Swallows catching insects on the wing. In September, 1899, an escaped *Molothrus bonariensis* attached itself for some time to a flock of Starlings, which its black colour closely resembled.

Pastor roseus. Rose-coloured Starling.—R. Paget records three: one shot by Capt. Manby near the hospital, April, 1820; a fine male shot at Lound in June, 1851; a female was obtained at Yarmouth in September, 1856.

Nucifraga caryocatactes. Nutcracker.—R. One shot at Rollesby, Oct. 30th, 1844; another shot off Yarmouth, Oct. 7th, 1853 (Nor. N. S. vol. iv. p. 283).

Garrulus glandarius. Jay.—L. L. Still found and persecuted in the wooded districts south of Yarmouth.

Pica rustica. Magpie.—L. L. Frequenting same locality as the Jay, has meted out to it the same fate. When living in Dublin, in 1890, I was surprised at the tame audacity of this species, which seemed somewhat numerous in Phoenix Park. At the Gardens they would alight near one's seat, and snap up tit-bits thrown to them.

Corvus monedula. Jackdaw.—Nests in one or two village churches north of Yarmouth; used to nest in the chimney of a high old house in heart of the town. On its recent demolition I saw in a niche about twenty well-preserved skeletons of young birds. Great numbers arrive with other *Corvidæ*. Early morning flights usually fly high and noisily. Some flying north, Feb. 17th, 1892.

C. corax. Raven.—A. "Now rarely seen" (Paget). I have recognized it only on one or two occasions flying overhead in autumn.

C. corone. Carrion-Crow.—L. L. Have occasionally met with it on Breydon flats, where Rooks also at times congregate in some numbers.

C. cornix. Hooded Crow.—C. Great numbers usually pass over in autumn, many locating for the winter in the neighbourhood. In severe weather becomes predaceous; have then known it seize wounded birds in presence of the gunners. Six observed

on the marshes as early as June 22nd, 1896 ; while in 1894 I saw seven on July 31st. Great gathering on Breydon mud-flats prior to leaving, on March 31st, 1898. Local, " Grey Crow " ; " Kentish Crow."

C. frugilegus. Rook.—C. Apparently increasing. Not much molested, as the natives have formed a better opinion of it than formerly. Great flights from over sea in autumn. On some days, as on Nov. 2nd and 3rd, 1899, incessant streams all day long ; arriving also after dark. Many assume omnivorous tendencies, patrolling the shore and mud-flats for edible refuse. I once saw one catch a " Tartar " in a live Crab, which seized it by the throat. Have observed departures from Scratby cliffs in March. In April, 1896, several visited a tree near the market-place. A pair nested, but the young being disturbed, they have not since attempted to nest there.

Alauda arvensis. Sky-Lark.—C. All the year round. Enormous influxes of a dark (Scandinavian) form in autumn. A noteworthy invasion on Feb. 3rd, 1897, when coarse weather from south-east followed. During protracted snows in November, 1890, cabbages in surrounding gardens were reduced to shreds by them ; at Belton, during open weather in October, 1896, cabbage patches were ruined by them.

A. arborea. Wood-Lark.—F. C. Mostly observed here in severe weather, in small parties. Seven shot in the snow by a gardener, Dec. 20th, 1890.

[*A. brachydactyla*. Short-toed Lark.—A. One stated to have been shot on Breydon walls, Nov. 7th, 1889. The bird in question may have been an escape (*vide* B. of N. vol. iii. p. 410).]

Otocorys alpestris. Shore-Lark. — F. C. Uncertain winter visitor ; sometimes occurs in considerable numbers, as in October, 1880. Consorts with Snow-Buntings on North Denes and sand-hills. The birdcatchers have learnt to distinguish its call-note and characteristics, and look for it yearly. About sixty were obtained during autumn and winter of 1882, mostly males.

Cypselus apus. Swift.—C. The numbers nesting here do not increase, although gathering in considerable numbers over the Denes in early autumn. A favourite prey is the St. Mark's Fly (*Bibio marci*). During a set-in of unusually cold weather in August, 1881, numbers of Swifts were picked up dead or benumbed. Local, " Davelin."

C. melba. Alpine Swift.—A. One shot on Smith's marsh, Breydon walls, by Alfred Andrews, Sept. 4th, 1872. It was stuffed badly by Harvey, restuffed by James Carter, and again restuffed by Gunn.

Caprimulgus europæus. Nightjar.—F. C. Occasionally seen in recreation-ground near the beach moth hunting.

Iynx torquilla. Wryneck.—N. C. In the Paget's list it is referred to as "not uncommon." Have seen examples from Fritton Wood. Local, "Cuckoo's Mate."

Gecinus viridis. Green Woodpecker.—N. C. Occasionally brought to market. Nests at Fritton.

Dendrocopus major. Great Spotted Woodpecker.—N. C. Migrates hither occasionally in some numbers. I obtained one caught alive on a fishing-lugger, Oct. 8th, 1898.

D. minor. Lesser Spotted Woodpecker.—R. R. A female example was picked up on Yarmouth beach some years ago, which suggests a probable migratory habit. A specimen in the market recently. The Messrs. Paget record it as "very rare." Babington (B. of S.) gives it as nesting at Fritton.

Alcedo ispida. Kingfisher.—F. C. Nests occasionally in the neighbourhood. Additions in autumn, working southwards. Unusually numerous in September, 1878, when dozens were shot! I saw eighteen during one morning's walk by the Bure. Its protection should be made imperative.

Coracias garrulus. Roller.—R. Like all other richly attired immigrants, it is shot as soon as it arrives. Several are recorded for this neighbourhood. One killed about 1817; one taken in rigging of a vessel off Yarmouth, May 25th, 1865 (B. of N.); an example obtained at Bradwell, Oct. 9th, 1883; also at Burgh Castle, Sept. 29th, 1892.

Merops apiaster. Bee-Eater.—R. One recorded by Sheperd and Whitear at Yarmouth (B. of N.). Lubbock, writing in 1848, says one "was killed lately at Yarmouth."

Upupa epops. Hoopoe.—R. "One or two," say the Messrs. Paget, "generally met with in the autumn." Three were shot at different times in the market-gardens. A worn-out gunner is still living who boasts of locally shooting four of these birds at various times. One on Hasborough lightship. April, 1884 (Nor. N. S.). Mr. Dawson Turner informed the late Mr. J. H. Gurney that

after a gale fifteen were brought him (B. of S. p. 98). One at Horsey, Oct. 9th, 1882. Dead example found on the Vauxhall line, April 15th, 1899, having probably struck telegraph-wires.

Cuculus canorus. Cuckoo.—C. Have known a single individual clear a cabbage-patch of the larvæ of *Pieris brassicæ* in a few days. I once reared one from the nest on bullock's lights. It was exceedingly pugnacious, and grew amazingly fast.

Coccytes glandarius. Great Spotted Cuckoo.—A. A young male was shot on Caister denes on Oct. 18th, 1896. Had been feeding on the larvæ of the Buff-tip Moth (*vide* Nor. N. S. vol. vi. p. 509).

Strix flammea. Barn-Owl.—C. Have observed it arrive early in the morning with autumnal immigrants. Still wantonly destroyed by many fools entrusted with guns.

Asio otus. Long-eared Owl.—N. C. "Rarely seen" (Paget). Examples occasionally brought up to market dead in winter months; two in the market, Dec. 16th, 1899.

A. accipitrinus. Short-eared Owl.—C. Sometimes arrives in considerable numbers in autumn; in other years scarce. Occasionally nests. A nest containing five eggs was discovered in a field of rushes not far from the sea in the neighbourhood of the Broads on May 2nd, 1898 (Zool. 1899, p. 119). I have observed this bird hunt in broad daylight. Coming over simultaneously with the Woodcock, is locally named "Woodcock-Owl."

Syrnium aluco. Tawny Owl.—R. Constant persecution has made this species (which the Pagets described as "common") rare with us.

Nyctala tengmalmi. Tengmalm's Owl.—A. "A single specimen is recorded by Messrs. Gurney and Fisher to have been taken some years since at Bradwell" (B. of N. vol. i. p. 60).

Athene noctua. Little Owl.—A. "Very rare; two specimens are well authenticated" (Paget). A male example brought alive into Yarmouth from sea, February, 1862 (Nor. N. S. vol. iv. p. 267). A female shot in the grounds of Naval Hospital, April 21st, 1881.

[*Nyctea scandiaca*. Snowy Owl.—A. "The late Mr. Stephen Miller, of Yarmouth, had a specimen of this noble bird, which, if not obtained in this district, was most probably British killed" (B. of N. vol. i. p. 58).]

Scops giu. Scops-Owl.—A. “Norfolk is accredited with six occurrences—two at Yarmouth” (Nor. N. S. vol. iv. p. 267). Mr. J. H. Gurney has one caught at Cromer Lighthouse, November, 1861. I distinctly remember one taken at Lowestoft Lighthouse some years ago, but can trace no printed record. One killed at Martham, June 1st, 1891.

Circus æruginosus. Marsh-Harrier.—R. The Messrs. Paget record it as “rather rare.” In the earlier part of the century was not uncommon on the Broads, where it nested. Now only occasionally seen. Last nested in the Broad district in 1878.

C. cyaneus. Hen-Harrier.—R. R. Becoming rarer year by year, thanks to game-preservers and others. “Not uncommon” (Paget). Occasionally brought to market from the Broad district in hard winters.

C. cineraceus. Montagu’s Harrier.—R. R. Rarely nests on the Broads. Mr. J. H. Gurney estimates six nests for 1858, but only one for 1898 (Zool. 1899, p. 115). More often met with than the two preceding. One caught in a bird-net on North Denes, April 28th, 1891.

Buteo vulgaris. Common Buzzard.—R. R. Occasionally turning up in autumn and winter in some numbers, as in September, 1881, when several were killed. I saw three washed up dead on the beach after a gale in the same month. The Messrs. Paget refer to it as “not uncommon.” One taken off Flegg Burgh, Nov. 16th, 1897.

B. lagopus. Rough-legged Buzzard.—N. C. In November occasionally arrives in some numbers. Two or three winters sometimes elapse without an example being recorded. The winter of 1839–40 was a noted year for *B. lagopus* in Norfolk; again numerous in autumn of 1858, when “about twenty specimens were obtained, principally in the neighbourhood of Thetford and Yarmouth”; and again in some numbers in September, 1881.

Haliaëtus albicilla. White-tailed Eagle.—A. Rarely seen, and then always in immature plumage. Messrs. Paget record six occurrences: “The late Mr. Girdlestone . . . informed Mr. Lubbock that in the sharp winter of 1837 ‘he had seen three of these Eagles in sight at once’ on Horsey warren” (B. of N. vol. i. p. 4). Several since recorded. One of two shot at Winterton in winter of 1856–7 was found to have been feeding

on the remains of a Whale stranded on the beach there. One taken alive in decoy at Fritton, December, 1878. I observed one circling high above head, autumn of 1879. Example shot at Belton, Dec. 9th, 1882; one on Breydon, May 2nd, 1892.

Astur palumbarius. Gos-Hawk.—R. "Very rare—a fine specimen shot in 1833" (Paget). A male taken at Catfield in April, 1854; a female taken on a fishing-boat off Yarmouth in 1886 (Connop Catalogue); an adult female at Somerleyton, March 29th, 1893.

Accipiter nisus. Sparrow-Hawk.—F. C. Receives additions in the autumn. An unusual invasion in September, 1881. I found several dead on the beach after a gale; one struck a gas-lamp exhausted on the 22nd. The majority were females.

Milvus iclinus. Kite.—A. Very rare in the Pagets' time. Only occurs as an occasional passing migrant. An example killed at Martham, December, 1865.

Pernis apivorus. Honey-Buzzard.—R. An uncertain autumn visitor. Several shot in September, 1881; several records previous. One shot at Lound in September, 1882, had the crop filled with larvæ of Wasps (B. of S.). Babington also records one shot at Somerleyton in spring of 1854, in the stomach of which remains of Blackbird's eggs were found.

Falco peregrinus. Peregrine Falcon.—R. Occasionally shot on passage. The two or three I have seen in the flesh were males.

F. subbuteo. Hobby.—R. R. "Not uncommon in summer" (Paget). Has been once recorded at Yarmouth in February. A male example shot at Caister on Oct. 2nd, 1882 (Connop Catalogue).

F. vespertinus. Red-footed Falcon.—R. "One shot in a marsh by Breydon in 1832. . . . Three more were shot in same year at Horning" (Paget). An immature male specimen obtained at Somerleyton, July 12th, 1862.

F. æsalon. Merlin.—N. U. A fairly regular and not uncommon autumnal immigrant. Occasionally dashes into the nets of the birdcatchers. A young one caught at sea, Oct. 11th, 1882. I have observed it dead on the beach.

F. tinnunculus. Kestrel.—C. Still fairly common, and in autumn it is nothing unusual to see three or four at once

“hovering” in different directions across the marshlands. Additions in autumn. Local, “Wind-hoverer.”

Pandion haliaëtus. Osprey.—R. R. “One or two shot nearly every year on Breydon or the Broads” (Paget). Was undoubtedly more common in the earlier half of the century, before the shoals of Grey Mullet (*Mugil capito*) forsook Breydon, owing to the great silting up of that basin. Two on Filby Broad, Sept. 20th, 1898. were observed fishing.

Phalacrocorax carbo. Cormorant.—N. C. According to Sir Thomas Browne this species nested in trees at Reedham, “from whence Charles the First was wont to be supplied” (Nor. N. S. vol. iv. p. 417). Till within a year ago, “we had (at Herringfleet) always more or less Cormorants with us all the year round, but more especially in winter” (‘Rough Notes on Natural History,’ by H. M. L.), in 1825 there were several nests there. It occasionally follows the Herring shoals, and I have observed odd birds on Breydon in spring. Six were seen there on May 25th, 1890, and seventeen on May 19th, 1892.

P. graculus. Shag.—R. R. “Very rare,” according to Messrs. Paget. May be more frequent after the Herring shoals than is observed. I procured one alive on March 28th, 1898, from a fishing-smack, which became an interesting pet. It ate $2\frac{1}{2}$ lb. of fish per diem., vomiting the more indigestible bones. Another, brought me alive on Nov. 11th, 1899.

Sula bassana. Gannet.—C. “Not uncommon; several were shot in the roads after the severe gale of Oct. 31st, 1827” (Paget). Is now fairly common out at sea during the fishing season. An adult specimen secured on Breydon, Sept. 24th, 1865. I have observed several washed ashore at different times, three as recently as Dec. 8th, 1899; these were possibly drowned, and thrown out of the Herring-nets.

Ardea cinerea. Common Heron.—C. Does not appear to have greatly diminished of late years. The Mautby heronry has disappeared since 1874, but a new one exists at Reedham. I have frequently seen upwards of twenty Herons at a time feeding in company on Breydon flats, where they may be watched catching Eels and Flounders. Local, “Hernsher.”

A. purpurea. Purple Heron.—A. “Has been killed three or four times” (Paget). An example, “Breydon, 1856 or 1857”

(Connop Catalogue). Other occurrences:—Ludham, October, 1865; Yarmouth, October, 1878 (Nor. N. S.).

A. ralloides. Squacco Heron.—A. “One caught in a bow-net that was hanging out to dry by Ormesby Broad, December, 1820” (Paget). Dates also given:—Oulton, May, 1831; Ormesby, 1834.

Nycticorax griseus. Night-Heron.—A. “Mr. Youell has known six or seven to have been shot here at different times” (Paget). “Three specimens of this Heron were killed on the North Denes” (B. of N. vol. ii. p. 175). An example obtained on Caister marshes, Nov. 8th, 1860 (*ibid.*), and another was shot at Rollesby Bridge on Nov. 8th, 1899.

Ardetta minuta. Little Bittern.—R. Messrs. Paget enumerate three examples obtained in this neighbourhood. It doubtless nested on the Broads early in the century. “A Little Bittern was shot at Runham, near Yarmouth, on the 10th of October, 1889” (Nor. N. S.). On July 3rd and 4th, 1893, two males in full plumage shot at Rollesby (*ibid.*); one, Oct. 9th, 1896.

Botaurus stellaris. Common Bittern.—R. R. The drainage of the Norfolk swamps has greatly decreased the number of these birds of late years. Last Norfolk eggs were discovered March 30th, 1868. A young bird in August, 1886 (Nor. N. S.). Two or three immigrants occasionally brought to market in winter. Local, “Bottle-bump.”

Ciconia alba. White Stork.—A. Messrs. Paget mention a pair shot on Burgh marshes in the summer of 1817, and two earlier occurrences. An accidental spring and autumn visitor. One shot at Oby, May 24th, 1865 (Connop Catalogue). Several others have been met with; a tired-out individual was seen resting on a housetop, June 26th, 1892.

C. nigra. Black Stork.—A. One shot on Breydon, June 27th, 1877, by John Thomas, punt-gunner.

Plegadis falcinellus. Glossy Ibis.—A. “A pair shot at the mouth of the Norwich river, Sept. 13th, 1824; . . . there were three or four more in company with them” (Paget). Stevenson records two or three others for this neighbourhood, the last being killed at Stalham on Sept. 13th, 1868.

Platalea leucorodia. Spoonbill.—N. U. The Messrs. Paget, writing in 1834, after mentioning that a flock of these birds were

seen on the marshes in 1774, and several others killed in 1808, state that two or three are generally shot every spring on Breydon ; the latter statement might apply to the present day, save that, happily, they are more frequently allowed to depart in peace. During the last twelve summers Mr. J. H. Gurney states that ninety-three Spoonbills have visited Breydon (Nor. N. S. vol. vi. p. 514). Sixteen were seen there on May 13th, 1894 : and on May 5th, 1895, twelve appeared. On May 10th, 1899, I rowed to within a short distance of six which were feeding in a flock on the edge of a mud-flat. Twelve on Breydon, June 4th, 1900 ; and subsequently several others. Local, "Banjo-bill."

Anser cinereus. Grey-lag Goose.—R. R. A winter migrant, once nesting in the fens. Messrs. Paget refer to it as "very common," which is far from being the case in the present day. Stevenson records single examples as follow :—November, 1847, at Horsey ; April, 1849, on Breydon ; September (?), 1854, Yarmouth ; March, 1862, on Caister marshes ; and in March, 1864, at Ludham—two examples ; and a third at Horsey same year. One was killed by a gunner named Gibbs on Sept. 24th, 1881. Babington speaks of several flocks seen on Breydon, Sept. 24th and 25th, two birds being shot (B. of S.).

A. albifrons. White-fronted Goose.—N. C. An uncertain visitor ; I find generally two or three examples brought to market every winter, usually immature.

A. segetum, Bean Goose.—F. C. "Less frequently met with" [than Grey-lag] (Paget). An uncertain winter visitant ; in some years none, in others several. Several seen late in January, 1892.

A. brachyrhynchus. Pink-footed Goose.—N. C. Have observed it occasionally in the market. In some years none ; in very severe weather more frequent than any of the preceding. Five were shot out of a flock, Feb. 14th, 1879 ; I also saw two immature, Dec. 11th, 1880. Two on Dec. 20th, 1890.

Bernicla ruficollis. Red-breasted Goose.—A. "Mr. Wigg," says the Messrs. Paget, "accidentally bought a specimen of this bird in the market, which, to his constant regret, he plucked and cooked."

(To be continued.)

NOTES FROM POINT CLOATES, N.W. AUSTRALIA.

BY THOMAS CARTER.

SINCE my last notes appeared in 'The Zoologist' (1899, p. 139), Mr. A. J. Campbell's description of the new species of Emu Wren (*Stipiturus ruficeps*), with a beautiful plate of the bird, was published in the 'Ibis,' July, 1899. There is little doubt that Mr. Keartland found the same species on the late Wells expedition, but, unfortunately, the skins obtained had to be abandoned in the desert, with many others. So far, I have only seen this bird on one limited part of a high rugged range that abounds with masses of large prickly spinifex and scrub, though apparently the whole length of the range (about seventy-five miles) offers similar conditions. I saw several of these birds there in July last, but failed to secure eggs or any particulars as to their breeding habits. It is surprising to see these tiny birds run, and occasionally fly, headlong into the dense prickly masses of spinifex, and thread their way through the countless spines like mice, without being impaled. One showery day, my native and self came upon a party of these birds, and succeeded in hunting one down and catching it alive, its feathers having become drenched with wet. One other new species I may claim for last year, *viz.* Western White Plumed Honey-eater (*Ptilotis leilavalensis*). I forwarded a skin to Mr. Campbell, as for some time I suspected it differed from *P. pencillata*, the eastern type, but had no skin to compare.

A specimen of the same species was forwarded to Mr. A. J. North about the same time from North Queensland, and the bird was named (differently) by both gentlemen. It is one of the commonest and most noticeable birds on all the rivers and white gum creeks where water lodges, from the Gascoyne River to here, and doubtless its range extends across the tropics. In fact it is so abundant that for some years I never even closely examined a specimen, never imagining it was likely to be a new

species, which shows how carefully one should work in new country. It is of very sprightly, inquisitive habits, constantly uttering its pleasant liquid warbling note from earliest dawn until dark. It has a harsh alarm-note, and is quick to sound it on the approach of a dog, hawk, or biped, and all within hearing will hurry up to help the first bird to scold.

The second week in July I paid a visit to the nearest gum creek that contains good pools of water, in search of nests (the eggs being then undescribed), and was fortunate in finding five—three with a clutch each of two eggs, one with two newly hatched young, and one ready for laying. The nests were of light construction, of fibrous roots and grass, mixed and lined with vegetable down and sheeps' wool, and suspended about three feet from the ground, either in the dense prickly acacia bushes, or sort of large salt bush that grows round water holes there. In the rushes surrounding these pools were nests containing eggs of the Black-tailed Tribonyx (*Microtribonyx ventralis*).

About February 14th, last year, some flocks of White-fronted Chats (*Ephthianura albifrons*) arrived here, but only stayed a few days. It is the first time they have come under my notice. Keartland's Honey-eater (*Ptilotis keartlandi*) was fairly common on the high country behind the range, but I found no nests. I may mention that a skin of this bird was sent by me from here to Melbourne in 1890 for identification; but it was not until 1895 that Mr. Keartland secured specimens, when it was recognized by Mr. North as a new species.

On July 28th one of my men went to Frazer Island in the boat, and returned with more than two hundred eggs, all fresh, of the Pied Cormorant (*Phalacrocorax varius*). They were a welcome addition to our meals for some days. The nests are built in thick, spreading bushes, with large, soft, greenish grey leaves, that grow only on the edge of the sea.

In August, White-eyed Crows (*Corvus australis*), Kestrels (*Tinnunculus cenchroides*), Brown and Rufous Larks (*Cinclorhamphus cruralis* and *rufescens*), Tri-coloured Chats (*Ephthianura tricolor*), Brown Hawks (*Hieracidea occidentalis*), Pipits (*Anthus australis*), Singing Honey-eaters (*Ptilotis sonora*), and Grass Parrakeets (*Melopsittacus undulatus*) were breeding numerously. I visited a new nest of Spotted Harrier (*Circus assimilis*), but it contained

no eggs; and found a nest of White-shouldered Caterpillar-eater (*Lalage tricolor*), with young, high up in a white gum sapling.

Yellow White Eyes (*Zosterops lutea*) were common, and I shot specimens occasionally through the winter up to August 6th, to see if they were breeding, but came upon no indications until February 13th, this year, when I shot a male in some mangroves near the N.W. Cape, with testicles much enlarged. When we were shearing in September, a tame cat brought in a black-fronted Dottrel (*Ægialitis melanops*), which was breeding, doubtless, on the adjoining salt-marsh.

On October 19th a pair, male and female, of the scarce Red-kneed Dottrel (*Erythrogonys cinctus*) fell to one discharge of my gun, at an inland creek. They had one or two others with them, doubtless young of the year. The Sandpipers referred to in my last paper (*Zool.* 1899, p. 142) were kindly identified for me by Mr. Campbell as the Grey-rumped Sandpiper (*Heteractitis brevipes*). They were common all the summer, especially in November; on the 2nd I killed eight with one shot, in company with other waders.

During the prevalence of heavy southerly gales in December, Silver Gulls (*Larus novæ hollandiæ*) forsook the beach, and were feeding on beetles on the high open country some miles from sea. On December 20th, after some parching east winds, an Oriental Pratincole (*Glareola orientalis*) settled on the beach near the house. So far, this is the south and west record.

In January, 1900, a Yellow-billed Albatross (*Thalassogeron chlororhynchus*), and, a little earlier, a Giant Petrel (*Ossifraga gigantea*), were picked up dead on the beach—a long way north for these birds.

In February last I took a trip towards the N.W. Cape. On the way a very heavy N.E. blow set in, with every indication of a hurricane, but the latter did not arrive. There were numbers of Lesser Frigate Birds (*Fregata minor*) blown down. A party of eight flew a few feet over my head, making their way north again; unluckily, I had just strapped my gun to buggy ready to move on. There were numbers at sea, and that night by moonlight I saw several flying north, and also the next day. They only occur here when hurricanes are about. Black-cheeked Falcons (*Falco melanogenys*), too, made their appearance in some numbers,

and flocks of Oriental Pratincoles. The latter soon left us. In a large mangrove swamp near the Cape, Pelicans, Egrets, Ducks, Mangrove Bitterns, and Waders were in numbers. I secured specimens of Red-capped Dotterel (*Ægialitis ruficapilla*) and Sharp-tailed Stints (*Heteropygia acuminata*), which I have never seen on the beach here. Sacred Kingfishers (*Halcyon sanctus*) were common on the coast in February; they visit us yearly about then: are they migratory? On February 20th natives brought in a Hoary-headed Grebe (*Podiceps nestor*), which they had caught on the beach. It was very poor, and a sign of bad drought inland. Fortunately this drought broke in March, and between March 10th and date of writing—April 21st—we have had fifteen inches of rain. The inland clay, flat country is flooded and impassable for miles.

At a large gum flat twenty-five miles east of here, which is now full of water, I last month shot, with other birds, the following interesting species:—White-headed Sea Eagle (*Haliastur girrenera*), Little Eagle (*Nisætus morphnoides*), Owlet Nightjar (*Aegotheles novæ-hollandiæ*), Black-eared Cuckoo (*Misocalius osculans*), Red-browed Pardalote (*Pardalotus rubricatus*), Variegated Wren (*Malurus lamberti*), Red-rumped Tit (*Acanthiza pyrrhopygia*), Little Black Cormorant (*Phalacrocorax stictcephalus*), Plumed Whistling Duck (*Dendrocyena eytoni*), Black-capped Tree-runner (*Sittella pileata*), Marsh Tern (*Hydrochelidon hybrida*), Oriental Pratincole (*Glareola orientalis*). The two latter species were in large flocks at my first visit, and I hoped would breed there, but when revisited a few days ago saw only one Marsh Tern. The Pratincoles were balls of fat. Some Straw-necked Ibis (*Geronticus spinicollis*) and White-necked Herons (*Ardea pacifica*) were there, and some Black Swans. Nests of Teal (*Nettion castaneum*) were plentiful in the hollow gum-trees, with eight or nine eggs. A Red-rumped Kingfisher (*Halcyon pyrrhopygius*) I shot had several large scorpions in its gizzard.

Last month I was at the Minilya River, and secured specimens of the Red-breasted Babbler (*Pomatorhinus rubeculus*), and saw a colony of their nests (old) in a large white gum close to the station-house. On July 26th, last year, I found an Osprey's nest with the unusual number of four eggs, all beautifully marked.

The nest was placed on a boulder about three feet high, in the bed of a strong creek where it emptied into the sea. Later in the season I saw a nest in a still more exposed position, *viz.* on the bare surface of a large open salt-marsh near the end of a salt-pool. The rugged range, before mentioned, was within half a mile of both these nests, and high scrubby sandhills still closer, so it is strange the birds should choose such absurdly accessible places. Doubtless, the reason is, that months or a year may pass without a human being visiting there.

This being a season of rain that may not occur again in a generation, birds should be plentiful; and I hope in the course of the year to have opportunities of making other interesting notes. No more Rabbits have been seen here.

NOTES AND QUERIES.

MAMMALIA.

Lesser Shrew in Cambridgeshire.—In September, 1899, I obtained two batches of pellets of the Barn-Owl from nesting places in hollow trees at Wisbech St. Mary. They yielded respectively one and four skulls of the Lesser Shrew (*Sorex minutus*), in addition to remains of the Common Shrew, Water Shrew, Bank, Field, and Water Voles, Long-tailed Field-Mouse, Common Mouse, Brown Rat, and House-Sparrow. The Lesser Shrew, although probably not uncommon, does not appear to have been often noticed in the fens. Jenyns, quoted by Miller and Skertchly in 'The Fenland Past and Present,' says, "I have taken it in a single instance in Horningsea Fen, but not elsewhere." — CHARLES OLDHAM (Alderley Edge).

Lesser Shrew and Bank Vole in Berks.—In answer to Mr. W. H. Warner's enquiry (*ante*, p. 381), I am pleased to be able to inform him that the Lesser Shrew (*Sorex minutus*) is certainly found in this part of Berkshire; I have taken it, but not recently. I much regret I have no skin by me at present. I am not certain about *Microtus glareolus*. The number of *Mus sylvaticus* that infests my garden is quite extraordinary; on one small herbaceous border I caught over seven hundred last year. It is almost impossible to grow yellow crocuses, though they are not nearly so hard on the bulbs of other coloured varieties, and never touch narcissus roots.—HEATLEY NOBLE (Temple Combe, Henley-on-Thames).

Insectivorous Habits of the Long-tailed Field-Mouse.—During the winter months Long-tailed Field-Mice (*Mus sylvaticus*) resort in numbers to the narrow horizontal tunnels in the sandstone rock connected with the disused copper mines on Alderley Edge. In November, 1898, when I first noticed the Mouse-holes among the heaps of loose stones, and the impressions of multitudes of little feet in the dry sand of the tunnel-floors, I was at a loss to think what had induced the Mice to adopt the life of troglodytes. A feeble light penetrates some of the main tunnels, but in the side workings it is pitch-dark at all times of the day, and here footprints were numerous in places more than a hundred and fifty yards from the outer air. The piles of gnawed hips and blackberry-seeds in birds' nests in

the woods outside showed that food was plentiful enough there, but in the tunnels there were not even fungi on which the Mice could feed, and the drippings from the candles of casual trippers did not seem sufficient to account for their presence. Besides two moths, *Gonoptera libatrix* and *Scotosia dubitata*, which are fairly abundant, a gnat (*Culex*), two flies (*Blepharoptera serrata* and *Borborus niger*), and possibly other insects, hibernate in countless numbers on the roofs and walls of the tunnels. That the Mice frequent the place in order to feed upon the insects was clear from an examination of the stomachs of several which I trapped. Wings and empty skins of the gnat and flies, as well as legs of the moths, were easily identified in their half-digested contents. In some cases vegetable matter was present in addition, and, as the footprints were present from end to end of the tunnels, it appears that the Mice obtain part of their food in the woods; whilst the burrows in the tunnels themselves seem to indicate that they actually live in their recesses for the time being, and do not merely visit them to prey upon the insects they find there. Even in June there are flies in thousands on the walls of the tunnels, but during the summer months I have failed to trap any Mice, nor are there then any fresh tracks to be seen in the sand.—CHARLES OLDHAM (Alderley Edge).

AVES.

Mistle-Thrush laying twice in the same Nest.—Last season I obtained a clutch of four eggs belonging to *Turdus viscivorus* from a nest near Bath. On visiting it again a short time afterwards—I think at about a week's interval—I found the bird had laid in the same nest a second time, laying two or three eggs. I was unaware that the Mistle-Thrush would return to its robbed nest, and should be interested to hear if others have met with similar instances. It is quite possible another pair of Mistle-Thrushes may have appropriated the vacant nest.—CHARLES B. HORSBRUGH (Marlock, Somerset).

The Bearded Titmouse : a Correction.—In the article on the Bearded Titmouse (*Panurus biarmicus*), *ante*, p. 359, Mr. Gurney says "John Ray published the first notice and description of this family of birds in 1674 (a scarce book.)" May I point out that in a much earlier work (now before me in my library), by Conrad Gesner "De Avibus," 1575, there are illustrations given of all the known Tits, with full descriptions. Seven are portrayed. The woodcuts are very quaint, and the volume is in folio, and in Latin. I expect Ray knew this book well, for he wrote and published his work just one hundred years later than Gesner.—E. L. J. RIDSDALE (The Dene, Rottingdean, near Brighton).

The Bearded Tit and other Birds in Norfolk.—I have just read Mr.

Gurney's most interesting paper on the Bearded Tit (*Panurus biarmicus*), *ante*, p. 358. I do not know how Mr. Bird arrived at the conclusion that there were only thirty-three nests in Norfolk in 1898, and I hope he has understated the number, or that they have increased since then. I know one small broad which has been most strictly preserved for some years, and where even the entomologist is not allowed, though it is sometimes difficult to keep him out! Here the Bearded Tits have increased in a most satisfactory manner. A pair or two might always have been seen. On May 7th, 1899, I found a nest with seven young just ready to fly, and there were at least two pairs with young. On May 3rd this year I saw one nest from which the young had just flown, and I watched both parent birds for some time. It was blowing very hard, and as I crouched in the reeds the male bird settled within a few feet; a beautiful sight it was to see him preening his feathers in the sunlight. On another part of the same broad I saw at least three pairs feeding young, or carrying excrement from the nests; further still I saw other birds feeding in the rushes, and I thought at the time there were at least six pairs on this broad. Quite ten pairs of the Great Crested Grebe (*Podiceps cristatus*) might have been counted. Over thirty male Wild Ducks rose as we rounded a sharp corner; several pairs of Shoveler (*Spatula clypeata*) were nesting, and I had the pleasure of seeing a Marsh-Harrier (*Circus æruginosus*). The keeper assured me he had never seen one of these birds here before. Montagu's Harriers try to rear their young here every year, but the nest is cut out, or the old birds are shot, though this season I have hopes that they got off. A pair of Kestrels were nesting in an old windmill. "They'll 'ave to die," said the keeper. It was no use my telling him that they did far more good than harm, and the fact that he caught two or three of these birds with Mice in their claws at the same spot last season in nowise impressed him; so I took the eggs, in the hope that the old birds might find more hospitable quarters elsewhere. I placed the four eggs in an incubator, and one was hatched in twenty-nine days. I never allow Kestrels to be killed at home, unless caught red-handed at the Pheasant-coops; and it is a curious fact that whereas each year we are obliged to destroy more than one of these birds, a pair of Sparrow-Hawks are continually flying over the rearing-field; neither my keepers nor myself have ever known them touch a Pheasant, though they often take young Sparrows and other small birds that are attracted by the Pheasant food. We never molest them, and I doubt not most keepers would think us quite mad. Whilst in Norfolk I noticed several of those indiscriminate instruments of torture, "pole-traps"; they were not set, and, on asking the reason, I was informed that they had caught five Snipe in them the week previous to my visit.—HEATLEY NOBLE (Temple Combe, Henley-on-Thames).

Nesting of the Great Tit (*Parus major*).—April 20th. Nesting-box

containing nest of Great Tit and five eggs. May 2nd, 8 a.m. Eight eggs ; old bird absent, and not looked at again to-day. May 3rd, 7 p.m. Found old one sitting without addition to clutch. May 13th, 1 p.m. Eight eggs still in nest. May 14th, 6 p.m. Six young hatched ; two eggs remain. May 30th. Between 6 a.m. and 7 a.m. the old birds visit the nest with food, sixty-four times within the hour ; when leaving nest they invariably left for further supplies in an opposite direction. Feeding at this rate is not carried on throughout the day ; they may sometimes be absent for a considerable time. Feeding commences about 4 a.m., and finishes about 7 p.m. June 2nd. The brood complete of eight young left their nest. In all probability the old one would commence incubation on May 2nd, with a result of twelve days, and an addition of, say, nineteen days for the young to remain within the nest.—J. STEELE-ELLIOTT (Clent, Worcestershire).

Nesting of the Common Sparrow (*Passer domesticus*). — Yarrell mentions the first batch of eggs laid usually consists of five to six ; Morris practically quotes the same words ; Macgillivray gives the laying four to six ; Saunders states five to six ; Seebohm goes one better, and says five to seven. My personal experience is that a clutch of six is most unusual, and does not happen in even one per cent. of nests containing the full laying. Nests with a clutch of four are about as numerous as those with five, and a remarkable quantity have a full complement of only three, at a rough estimate, say, fifteen per cent. There are many other remarks with which, after considerable experience, one does not care to agree, as, for instance, Seebohm adds it is probable that with those birds that build domed nests in branches of trees the habit is hereditary. He also adds that the Sparrow often sits upon the first egg as soon as laid ; my experience being that, if the nest is placed in a hole, then the female will roost at the side of the nest, but in no way adding to their incubation until (taking, for instance, the laying of a clutch of five) the evening following the laying of the fourth egg, when incubation starts. Yarrell evidently infers that the early layings of the Sparrow contain the largest clutches of eggs. This is by no means invariably the rule ; most frequently the same number is laid both in the second and third layings, and occasionally, as in this year, two nests containing six followed the robbery of the first laying, when previously nothing more than five could be found. Yarrell points out that the Sparrow may occasionally be seen in winter carrying materials to the holes they inhabit ; this is evidently only for sleeping accommodation. The actual nesting commences as early as the first week in March, the complete lining of feathers not being added for many weeks hence, and then not until several eggs have been laid. Laying usually commences with great regularity in the Midlands during the second week in May. Three broods are usually reared if no molestation takes place ; if the first two layings are robbed,

even then two broods will be reared. When a nest and eggs are destroyed, it takes but ten days before another nest is built, and five more eggs are deposited. The number of young reared would not average much beyond three to a brood.—J. STEELE-ELLIOTT (Clent, Worcestershire).

Nesting of the Starling (*Sturnus vulgaris*). — March 29th. Starling clearing out some of the old materials from last year's nesting-site. April 28th. Two eggs in nest. April 30th, 6.30 p.m. Four eggs; old bird within the nest, and eggs seemed slightly warm, but possibly she had not actually started incubation, as many birds nesting in holes roost on the side of the nest at night. May 1st. Sitting on five eggs. May 11th, 6.30 p.m. Five eggs still in nest. May 12th, 7.30 p.m. Four young hatched; other egg infertile. May 25th. Feeding young seems to average about fifteen times to the hour, and this I think almost regularly throughout the day of some fourteen hours' duration; at least, whenever I was watching, the old birds never seemed to cease their labours. Being able to conceal myself close to the nest, I gained the full advantage of watching the young being fed within a foot of me. The food (which at this period seemed to consist almost entirely of a large white larva, but, owing to the rapidity with which the food was given, it was impossible to identify it), when brought to the nest, was given to whichever young one clamoured most, and held a foremost position at the entrance to nest, the one frequently taking several feeds in succession, until pushed aside by another which by now had become still more eager in its hunger. Almost invariably after the food had been taken the old bird would wait a moment to allow of that particular young one turning round and voiding any excrement; if this failed, then a rapid search of the nest, and other excrement, if any, removed; in the brief meantime the old bird probably having undergone a severe course of pecking from the insatiable and impatient young. June 1st. All the young left nest. June 11th. The old ones again back at nest, but no further indication of a second brood took place. Reckoning from May 1st, the incubation lasted eleven days; but if such commenced on the evening of April 30th, and the last was the infertile egg, then incubation in this instance covered twelve days, and the young remained in the nest twenty days.

Particulars of another pair slightly vary:—May 6th, 7 p.m. Three eggs; old bird flew from nest. May 7th, 8 a.m. Three eggs in nest and cold; 7 p.m., four eggs and bird within nest. May 12th. Probably owing to my too frequent visits, the eggs had previously been forsaken, and this day I find the birds have removed them from the nest. May 12th. A Starling's egg placed by myself within the nest was also removed. May 18th, 7 p.m. Another three eggs in nest. May 19th, 10 a.m. Four eggs; bird flew out of nest, the eggs being warm. May 30th, 7.30 p.m. Four eggs remain in nest. May 31st, 8 a.m. One young and three eggs; 7 p.m., three young

and one egg; this constant interference causing them to again forsake. In this instance incubation had lasted at least twelve days.—J. STEELE-ELLIOTT (Clent, Worcestershire).

Cuckoo in the Shetlands.—On Aug. 8th I caught a young fully-fledged Cuckoo (*Cuculus canorus*) on the lawn in front of this house, where it was feeding. The bird was very tame (perhaps it knew that the Wild Birds Protection Act is in force in Shetland until the end of this month!) I have seen and heard the Cuckoo in and about the shrubbery many times during the past two months.—T. EDMONDSTON SAXBY (Halligarth, Unst, Shetland).

Common Buzzard (*Buteo vulgaris*) shot in Hertfordshire.—I regret that I have previously omitted to record the shooting of a Common Buzzard in Hertfordshire on Jan. 27th last. It was a male bird, and measured three feet from tip to tip, wing measurement, and turned the scale at two ounces short of two pounds. Mr. Spary, the local taxidermist, remarked to me that the bird was as fat as butter, and had probably been feasting in some rich game-preserves. He told me also that all the Hawks and Owls he had had through his hands were never very fat, and that the case of the Buzzard under notice was a singular exception. I have promised not to divulge the exact locality where the bird was shot, as the keeper is afraid of "marching orders" should it reach the ears of his employer.—W. PERCIVAL WESTELL (5, Glenferrie Road, St. Albans, Herts).

Nesting Habits of the Sparrow-Hawk.—In treating of an issue in this connection (*ante*, p. 381), Mr. A. H. Meiklejohn has awakened in me a responsive chord. No bird have I followed and studied more industriously in the breeding season than *Accipiter nisus*. Perhaps, then, as I aspire to the credit of knowing something about the species in question, a corner may be found for this communication, though I would wish, quite modestly, to say at the outset that Mr. Meiklejohn is mistaken in fancying that attention has never yet been called in print to the particular traits in the Sparrow-Hawk's economy so recently adverted to by him. Some four years ago a monthly publication, 'The Ornithologist' by name, entered on a somewhat precarious and certainly brief existence, and in its pages a very animated discussion was maintained for upwards of six months concerning the nesting economy of the Sparrow-Hawk. I should like to be allowed to reproduce in these columns the gist of what I wrote in the May number of that magazine for 1896, as I have had no reason subsequently to alter or even modify the views then expressed. They were the outcome of many years' assiduous and unrelenting study of Sparrow-Hawks in their woodland haunts during the breeding season, and should go to prove that the habit to which Mr. Meiklejohn specifically refers has not always *hitherto* been

shrouded in obscurity. I have found and critically examined many scores of Sparrow-Hawks' nests, and have taken hundreds of their eggs, and in the whole of my experience I cannot recall to mind a single case in which the parent birds had not resorted to the old and discarded nests of some other species. These same nests, erstwhile the possessions of Ring-Doves, Carrion-Crows, and Magpies, generally presented a very ragged appearance previously to adaptation, being tattered and torn by the storms and gales of winter. "*Long ere the leaf is out*—sometimes, indeed, as early as the end of March—mental selection is unquestionably made of the nest that is eventually to be used as a breeding-site." At dawn, and again at the approach of dusk, the birds are frequently to be found in its vicinity, either soaring high in the air, and occasionally uttering sharp screams as they wheel to and fro, or else perched in the trees beneath. "*With the advance of spring* they will be found busy at the nest itself, apparently cleaning and patching it up, while in course of time there is superimposed a shallow and very extended structure of twigs and sticks, in which receptacle the eggs are laid." The substructure or basis is entirely the handiwork of some other species, the superstructure that of the Sparrow-Hawks themselves. The birds gather the supplementary materials chiefly from beneath the tree, flying up and down in turn, as I have repeatedly proved by watching them from an ambush. The eggs are laid on alternate days, six being the largest clutch I have taken, though I have secured as many as fifteen and sixteen from single nests, the first egg of the latter number having been laid on May 1st, and the last on May 31st; so that, by judicious manipulation of the nest and its contents, I had induced the bird into laying an egg on every other day throughout that traditionally merry month. It will generally be found that one egg in a clutch differs appreciably in the markings from the remainder; sometimes it is altogether devoid of colouring matter, while at others a considerable portion of its bluish-white ground is blushed over with brown of a much paler shade than that with which the rest of the eggs in the clutch are usually so handsomely clouded and blotched. Sparrow-Hawks begin to sit about May 10th, in Leicestershire, or about six weeks after the first overtures have been made to the nest that has been selected. So far as I have been enabled to test the point, the eggs—which are exceedingly thick-shelled—are seldom hatched before the expiration of five weeks. The ultra-extended platform built by the Sparrow-Hawks themselves, and superadded to the relics of the nest of some other species, is assuredly a beautiful expression of the instinct when considered in relation to its use at a subsequent stage. Nevertheless, the fact that this roomy plateau not only does duty as a repository for freshly-killed prey, but as a family banqueting-table, whither the young periodically return for many days after they are fledged and gone out into the world,

appears to be too obvious a feature in the economy of the species to be even incidentally noted by any of the so-called popular writers on the birds of these islands !

Before concluding, I must explain one little matter. I have spoken of the hundreds of Sparrow-Hawks' eggs that I have taken, but it must be remembered that the species is notoriously baneful to shooting interests, and that gamekeepers wage a war of extermination against it at all seasons. On many and many an occasion my plundering of a nest has sufficed to save the bird's life ; whereas, had I not been present to plead for mercy and climb to the nest, the brooding bird would have been ruthlessly shot on the spot, and the beautiful eggs left to their fate. Such interposition profited the owners of the various nests equally with myself, seeing that they were allowed to escape with their lives, and subsequently laid eggs elsewhere for my appropriation. It may appear strange, but it is none the less absolutely true, that the old female Sparrow-Hawk, from whose nest I abstracted the fifteen eggs, got to know me, through my repeated visits to her home in a Scotch-fir, so well that at the last she never troubled to leave the nest until my head was on a level with it. It was only on the occasion of my final "call" that she evinced real indignation, however, and for a moment the situation was not pleasant when she faced round and unfolded her wings at the distance of a few inches only. What a wicked eye she turned on me, too, but that was the full extent of her hostility. — H. S. DAVENPORT (Melton Mowbray).

Quail in Cheshire. — Several times during the latter half of July I heard the liquid trisyllabic note of the Quail (*Coturnix communis*) near Wilmslow. On one evening four or five birds were calling on Lindow Moss, and in the surrounding fields. — CHAS. OLDHAM (Alderley Edge).

Quail in Hertfordshire. — A Quail (*Coturnix communis*) was picked up dead outside the post-office here in May, 1899, by one of the city police, it evidently having come in contact with the telegraph-wires. — W. PERCIVAL WESTELL (5, Glenferrie Road, St. Albans, Herts).

Black-tailed Godwit (*Limosa belgica*) in Hants. — On Aug. 20th, whilst out in my punt in the harbour, I shot three Black-tailed Godwits ; they were feeding on some very soft and rotten mud. One bird which I weighed scaled $8\frac{3}{4}$ oz. — JOHN STARES (Portchester).

Rough Notes on Derbyshire Ornithology, 1899–1900. — Although the winter of 1898–1899 was so mild, large flocks of Bramblings were reported from different parts of the county. A single shot fired out of curiosity into a large flock not far from Derby, on Jan. 26th, 1898, brought down no fewer than fourteen. On Jan. 27th I saw a nicely set-up Slavonian Grebe at Hutchinson's shop, which had been killed at Allestree towards the

end of the previous November. A Little Auk was also received at the same time, taken in an emaciated state on the moors outside Sheffield, and now in the Sheffield Museum. Mr. Storrs Fox obtained a Rook (about the beginning of February) "whose upper mandible was very much elongated, being about $1\frac{1}{4}$ to $1\frac{1}{2}$ in. longer than the lower one. This additional part was narrow and curved downwards after the manner of a Chough's beak. The bird was put into an aviary, but was killed by a Rat the same night." The bones of the skull proved to be normal in size and shape, the long tip being composed of horny covering alone. The Chiffchaff was singing in the Ashburne district by March 30th, and Sand-Martins were noticed on April 6th. Owing to the mild weather Lapwings began to lay earlier than usual, and eggs were found before the end of March. Long-tailed Tits were exceedingly numerous in the spring of 1899, and more nests were found than in any year I can remember. The Grasshopper-Warbler was absent from its usual breeding haunts; generally six or seven pairs are to be found within a radius of three or four miles, but in 1899 and 1900 none of the old breeding places were tenanted. A Carrion-Crow's nest, found on April 15th, contained a single egg. The tree showed no signs of having been previously climbed, and on the 20th a single young Crow occupied the nest. As the clutch of the previous year had only consisted of two eggs, perhaps they were the produce of an almost barren pair. Mr. H. G. Tomlinson noticed a Swift at Burton on May 4th, and on the following day Mr. Storrs Fox saw one at Ashford lake. The Swift is perhaps the most regular in its visits of any of the migrants, and often returns literally to the day.

Under date of April 17th, Mr. Storrs Fox writes that one of the keepers in his neighbourhood saw a Great Grey Shrike "about a fortnight ago." He had a shot at it, but it flew away. On May 10th a Dotterel was picked up under the telegraph-wires on the Nottingham road just outside the town of Derby (*cf.* 'Field,' May 20th, 1899). It was an adult in spring plumage, and, with the exception of those mentioned in 'The Zoologist' for 1894, is the only specimen recorded from the county during the last twenty years. Waterhens' nests are often built some distance from the ground, but on May 11th I came across one quite sixteen feet up a large chestnut on the shore of Calwich Abbey Pond. Another nest at Yeldersley contained thirteen eggs, but, though they were of much the same type, of course they may have been the produce of more than one bird. In addition to the breeding places of the Tufted Duck mentioned in 'The Zoologist,' 1899, p. 476, they have also established themselves at Bradley, a couple of miles to the east, and with a few years' protection would probably become numerous in the district. As it is, most of the young birds of the year are shot, and the increase is hardly perceptible. A Willow-Wren's nest at Shirley Vicarage was built in a small dead spruce, three feet from the ground.

This is the only nest out of some seventy which I have seen which was quite clear of the ground, though I remember one built among ivy at the bottom of a wall which did not rest on but was just above a path. On the other hand, it is not uncommon to see Chiffchaffs' nests from three to seven feet from the ground, and I have seen one ten feet high in the trellis on the side of a house. A male Jackdaw paired with a female Magpie at Bentley, and actually built a nest, but soon afterwards deserted it, perhaps on account of being disturbed. They were repeatedly seen together, and the Jackdaw has been observed to feed the Magpie. The Jackdaw is an escaped bird, and had been noticed associating with Magpies during the previous winter. The nest, which was built by the Magpie, was of the usual type, but had no roof, and when deserted had no clay lining. During the winter of 1899-1900 many Bitterns were shot in different parts of the country. Through Mr. G. Pullen, I heard of one which was shot at Morley in November, 1899; and Mr. Hutchinson has recorded two others in the 'Field' as having been "lately" (Jan. 30th) shot at Egginton and Smalley. In November, 1899, a watcher named Hudson picked up a dead bird in the grounds of Wootton Lodge, Staffordshire, which, from his description, appeared to be a Fork-tailed Petrel. It was apparently starved to death. Mr. J. Masefield, of Cheadle, has kindly traced this specimen, which luckily was preserved, and has ascertained that the supposition was correct. It is now in the possession of Mr. Mears, of Longton.

1900.—The very severe weather in February proved destructive to the birds. Many dead Chaffinches, Blackbirds, and Starlings were to be found by the roadsides as the snow melted. It was a curious sight to see the Tree-Creeper diligently searching the churchyard-wall in the very middle of the village, and so engrossed in its task that it allowed one to stand within a yard or two of it. An enormous flock of Wood-Pigeons, consisting of many hundreds of birds, frequented the Ramsor Woods till late in March. A curious incident which took place on March 18th seems to show that there is more affection between birds than is commonly supposed. A cock Blackbird was found lying dead outside a window at 10.15 a.m. Probably it was killed by flying against the window, as blood was oozing from its bill, its feathers were unruffled, and wings outspread. The hen stood by the dead body, and actually allowed itself to be touched with a stick by my brother-in-law, only uttering a mournful note. He then picked it up, but replaced it on the ground by its mate. Twenty minutes later he found it still by the dead bird, but, on gently touching it with his foot, it flew easily away, and skulked among the bushes. Two hours later the dead bird had disappeared (possibly picked up by a Dog). Many species of birds seem to have suffered from the severe weather of February. The Long-tailed Tits, which were so common the previous year, were almost extermi-

nated, and the same may be said of the Golden-crested Wrens. Curiously enough, the number of eggs laid by our common birds seemed to be fewer than usual. Very few Thrushes' or Blackbirds' nests contained more than four eggs, and often only three were found; while I have found nests with only two young birds. On April 18th a Brown Owl was found nesting in the fork of a tall spruce in Dovedale. The nest was quite open, and the Owl could be seen from the hillside above. Nearly all the nests in this district are in holes of trees, but I have seen a Brown Owl's nest on the ground under the shelter of a small rock in a wood in North Wales. While returning from a visit to a Sparrow-Hawk's nest on May 12th, I heard a clear, ringing, quickly-repeated note, quite unlike that of any of our common birds. Directly afterwards the chatter of a Mistle-Thrush and the Lapping's cry called my attention to three birds flying rapidly up the valley close together, with regular swift beats of the wing. As they passed me I had a good look at them, and noticed their pale faded brown colour and somewhat Gull-like-shaped wings. They flew straight and fast, and were soon out of sight. At the time I thought they were Sand-Grouse; in fact, I know of no other bird that could be mistaken for them. Black Grouse still breed in small numbers in this neighbourhood. A nest with six eggs was found on May 16th on the Staffordshire side. On May 17th I visited the site of the Raven's nest in Howdenchest, which is mentioned by Seebohm ('British Birds,' vol. i. p. 49). Although it is nearly forty years since the nest was last used by the Ravens, the remains of the nest are clearly visible. One of the keepers told me that he saw a Raven on his beat about April 5th. It was circling round a lambing ewe, and flew right away out of sight. He had also noticed Short-eared Owls above Mulbrook in the autumn of 1899. A Hawfinch's nest, which was found in Clifton on May 26th, contained three incubated eggs, and was built nearly at the top of a good-sized sycamore close to the roadside. The hen sat close, and the nest was only discovered by accident. The Merlins made another attempt to breed on the Grouse moors of North Derbyshire, but the nest with four eggs (almost hatching) was found, and I believe both birds were trapped. A Common Sandpiper's nest found on June 17th, with two eggs chipping and two newly-hatched young, was placed on the side of the railway embankment between Clifton and Norbury, only eight feet from the metals. The old bird was running along the sleepers, and only took wing when a passing train was within a few yards of it. The eggs which were chipped had the largest fragments of the broken shells neatly fitted on to the small ends. The nest was about one hundred and fifty yards or so from the River Dove. On Aug. 4th two large white birds flew over Clifton at a good height, which were almost certainly Gannets. The previous day had been very stormy.—FRANCIS C. R. JOURDAIN (Clifton Vicarage, Ashburne, Derbyshire).

Ornithological Notes from the Wilsden District (Yorkshire).—

Pratincola rubicola. Stonechat.—A male bird was seen near Keighley last Easter. It is somewhat curious that this species should so seldom make its appearance in this district, which seems so very suitable in every respect, and scarcely at any other season except early spring, and exceptionally rare as a nesting species.

Sylvia curruca. Lesser Whitethroat.—Although regarded as being generally distributed in Yorkshire, it is a very rare and local visitant to this neighbourhood, only two instances having come to our knowledge—one found by two of my sons in Beckfoot Lane, near Bingley, some years ago; and, curiously enough, I found a nestling last year (1899) within a few yards of the same place.

Phylloscopus rufus. Chiffchaff.—Exactly the same remarks apply to this species as the Stonechat. A few years ago a clutch of eggs were brought to me, which had been taken in Bingley Woods, which bore a striking resemblance to this species, and might have been so; if so, it is the only instance known to me of its breeding here.

P. trochilus. Willow-Wren.—A gamekeeper was describing a nest to me the other day which he had found built against the trunk of an oak at least two yards from the ground, and in all probability was referable to this species. I have found the nest in two instances built at some distance from the ground.

Locustella naevia. Grasshopper-Warbler.—One of my sons heard this bird last May in the Aire Valley, near Bingley. It may breed here more commonly than is supposed, but I have never been so fortunate as to find its nest.

Lanius excubitor. Great Grey Shrike.—One was shot in the Goit Stock Valley last autumn, and another killed in the same valley some twenty years ago; these, with one seen near Shipley by my brother and myself, are the only records.

Muscicapa atricapilla. Pied Flycatcher.—One (male) observed last May (1900) by one of my sons near Bingley. Occasionally seen on migration, but very rarely breeds. It is, however, local but abundant in the next valley (Wharfedale).

Coccothraustes vulgaris. Hawfinch.—Saw two individuals last year (1899) in Bingley Wood. One of my sons and myself, a few weeks ago, found two nests within a short distance of each other in Wharfedale. There is no doubt about its extending its range northwards, as it is much more common than even a few years ago.

Carduelis elegans. Goldfinch.—Seen by one of my sons near Bingley last winter. Rather an irregular winter visitant with us. It is said to have nested here formerly, but does not now.

Linota cannabina. Linnet.—Much less common than formerly, but the partial disappearance of whin-covers may to some extent account for their comparative scarcity.

L. flavirostris. Twite.—Even more striking in its scarcity as compared with former years, and more unaccountably so than the last species.

Loxia curvirostra. Crossbill.—A pair were seen last May or June (1899) in Upper Wharfedale, but I cannot ascertain that any nest was actually found, although it is probable it may have occurred in the beautiful pine-woods which abound there.

Sturnus vulgaris. Starling.—A few more appear to winter with us than formerly, although much more abundant both in winter and summer in some years than others. It often leaves its breeding haunts where it can be observed in colonies without any apparent reason. Mr. Forrest, in 'The Zoologist' (*ante*, p. 140), remarks:—"Careful observation has convinced me that a very large proportion of Starlings, perhaps one-half, rear only one brood in the year." In this district it is practically single-brooded. A few may not improbably have two broods in one season, but such instances are rare. A good many are sometimes seen in flocks when others are breeding, and have been for some time, but, as the season advances, gradually disappear, perhaps to breed in higher latitudes; and it may be more apparent than real that a good many "never breed at all." I have been asked if three Starlings occasionally feed the young belonging to one nest; one person here stoutly maintains he has repeatedly had ocular demonstration of the fact. Although it is not at all an uncommon thing to see three birds about one nest, I have never once been satisfied that more than two ever engaged in feeding the young.

Dendrocopus major. Great Spotted Woodpecker.—Has been more than usually common of late years; whilst the Green Woodpecker, on the other hand, has become much scarcer—indeed, I have not observed a single specimen for some years.

D. minor. Lesser Spotted Woodpecker.—A very rare visitant. One, however, was seen in Bingley Wood last May, and the keeper thinks it may be breeding, as he saw it again only the other day. It is about twenty years since last record for this district.

Cuculus canorus. Cuckoo.—During the past year (1899), and up to the present, the only species of birds which have come to my knowledge in the nests of which the Cuckoo has deposited its eggs are the Meadow-Pipit and Whinchat. It seldom lays its egg or eggs in any other species except these two in this district. I recently found a young Cuckoo nearly fully fledged in the nest of a Titlark. One of my sons observed that the foster-parents were feeding it chiefly upon the heath-moth. A good many years ago, on a heathy waste near here, I watched a Cuckoo come repeatedly to the nest

of a Whinchat—at least, I should think, a dozen times—and then flew away; but at last, on going up to the nest, I found it had deposited an egg. The nest was in such a position, access being by a long narrow winding passage, that it could not have been deposited in the nest in the usual way, but must have been conveyed by the beak; and, as far as I can remember, one egg of the Whinchat was missing. I think that there can be little doubt but that it occasionally robs birds' eggs; but the question arises—"Is it a common habit to rob eggs except from nests where it intends to deposit its egg?" Our evidence on this point is decidedly in the negative. Nests of various species abound on Blackhills, where the Cuckoo is also abundant, and very seldom an egg is missing from any nest; and it is certain, if eggs constituted an important item in its bill of fare, such a propensity could not so long have escaped notice. One thing is certain, *viz.* that it very seldom selects a nest in which to deposit its egg where the eggs are in an advanced stage of incubation; and this suggests another question, *viz.* "How does the Cuckoo ascertain when the eggs are fresh; or, rather, when such condition obtains as to induce her to deposit her egg?"

Asio otus. Long-eared Owl.—A nest was found with young in May (1899) in a fir-tree, but as a breeding species it is not at all common; perhaps, however, more so than formerly.

Falco aesalon. Merlin.—A friend brought one here last winter, which was presumed to have flown against the telegraph-wires, and in a few days became as tame as one which had been brought up from the nest. It could eat enormous quantities of food for its size.

Eudromias morinellus. Dotterel.—Mr. Ellison, of Steeton, having informed me that this species had bred recently on the moors above Keighley, a young bird having been sent to Mr. Mosley, of Huddersfield, for identification, I wrote to Mr. Mosley, requesting him to furnish me with any particulars in his possession. He replied stating that the young bird in question was certainly a Dotterel, but that there was no ground for coming to the conclusion that it must of necessity have been bred in the vicinity where it was caught, as in his opinion, judging from its size, it could have flown from some distance. Mr. Walker, of Appletrewick, in Upper Wharfedale, informs me that it has bred near there for two or three years, which is rather an unlikely habitat.—E. P. BUTTERFIELD (Wilsden, Yorkshire).

PISCES.

Opah at the Shetlands.—An Opah, or Sun-fish (*Lampris luna*), was caught at West Voe, Dunrossness, on the mainland, on July 20th.—T. EDMONDSTON SAXBY (Halligarth, Unst, Shetland).

NOTICES OF NEW BOOKS.

Yearbook of the United States Department of Agriculture, 1899.
Washington: Government Printing Office.

THE Government of the United States of America is to-day a greater scientific publisher than that of any other State in the world. Its voluminous Reports are also scattered with the greatest generosity in every scientific centre, and though the term "exchange" is used, the actual debit must be largely on the side of our American cousins. We have just received the above, consisting of 880 pages, strongly bound and beautifully illustrated, and though of the greatest importance to the agriculturist, its zoological information is not inconsiderable. In noticing three contributions only, it must be understood that they appertain to our special studies, and are for that reason selected.

"Some Examples of the Development of Knowledge concerning Animal Diseases" is the title of a contribution by Mr. D. E. Salmon. This paper is necessarily largely pathological, but it is a full and excellent *résumé* of the evolution of scientific methods and discoveries; while its estimate of the earlier theories as structures without stability, representing "the individual workings of the philosopher's mind rather than the truths of nature," will apply to much thought of the present day.

"Progress in Economic Entomology in the United States" is the subject of a paper by Dr. L. O. Howard. At the beginning of the present century the United States, with its population of only 5,000,000, and its restricted husbandry, suffered comparatively little from the attacks of insects on its crops. But now the conditions are vastly altered. Increased cultivation has been accompanied by a multiplication of plant-eating insects; many pests have been imported; and now, as "the century has grown older, the need of remedies against insects has grown greater." The State has not, however, neglected its duties. "During the

calendar year 1898, for example, sixty-one separate publications were issued by the different State experiment stations, either devoted entirely to matter on economic entomology, or containing articles upon the subject, the total number of pages on applied entomology reaching nearly 1400. During the same period nineteen separate publications on economic entomology were issued by the Department of Agriculture, containing a total of about 1000 printed pages." A notice of some of the principal workers is given, and excellent photographs of Asa Fitch, Townsend Glover, T. W. Harris, B. D. Walsh, and C. V. Riley will be welcomed by many entomologists; while "Remedies" will be valued by the agriculturist.

Mr. T. S. Palmer has written "A Review of Economic Ornithology in the United States." The history of American ornithology may be traced back to the middle of the sixteenth century, though a great starting point may be established by the publication of Catesby's 'Nat. Hist. of Carolina, Florida,' &c., in 1731-43. A host of well-known names can be recalled since that time, but it appears to be only about the year 1850 that economic ornithology attracted attention. "As a result of fourteen years' work, the Biological Survey has brought together a collection of about 32,000 bird stomachs, of which some 14,000 have been examined. This article constitutes a fund of information respecting the destruction of birds by excessive egg collection, and by the demand for feathers established by feminine vanity.

Bulletin of the United States Fish Commission. Vol. xviii. for 1898.
Washington: Government Printing Office.

THIS is really a lovely quarto volume, with its exquisite views of Alaskan lakes and scenery, and is a storehouse of information on many branches of economic ichthyology. A large section is devoted to "The Salmon and Salmon Fisheries of Alaska," and this portion is, apart from its zoological information, a practical guide to the waterways of the country. The account of "The Southern Spring Mackerel Fishery of the United States" is replete with interest, and is written by Mr. Hugh M. Smith. The schools of Mackerel usually approach the coast of the United

States in the latter part of March or early in April, and are generally first seen by the fishermen off the coast of North Carolina, in the region of Cape Hatteras. The year 1885 was a remarkable one in annals of American fishing; it was a period of glut in Mackerel. About 175 vessels were engaged in the fishery, and to New York alone probably no fewer than 850 trips, all told, were made; these averaged from 140 to 150 barrels each, so that during the season about 125,000 barrels of fresh Mackerel were landed in that city, this quantity representing about 31,250,000 fish.

The reappearance of the Tile-fish (*Lopholatilus chamaeleonticeps*) is detailed by Dr. Bumpus. Most naturalists are familiar with the facts of the recent sudden appearance and subsequent disappearance of this fish; and it was included by Mr. F. A. Lucas in his memoir on "Animals recently extinct or threatened with extermination, as represented in the Collections of the U.S. National Museum." Recent investigations have shown that the area of the distribution of the Tile-fish "probably extends from 69° to 73° west longitude, and along a band of the sea bottom of varying width, and from seventy to eighty fathoms in depth, although no tests were made in deeper water." It is also clearly a "warm water" fish.

The usual American enterprise has been exhibited in all things pertaining to economic ichthyology. The demand for fresh Herring as bait in the Cod fisheries led, in 1890, to the building of a number of freezing-houses along the New England coast, where shore Herrings are frozen during the fall, and kept for use during the winter and early spring; while "The Mussel fishery and pearl-button industry of the Mississippi River," already referred to in the pages of the 'Zoologist' (1899, p. 480), receives ample and well-illustrated treatment, and again proves that man's interference with nature has not yet reached its full dimensions.

EDITORIAL GLEANINGS.

Two notices of changed feeding habits in birds found in South and East Africa have recently been published. The first, by Prof. F. Ray Lankester, appeared in 'Nature' (Aug. 16th), and refers to the common Rhinoceros-bird (*Buphaga erythrorhyncha*), as observed by Capt. Hinde, of the British East African Protectorate. This bird formerly fed on Ticks and other parasites which infest game and domestic animals; occasionally, if an animal had a sore, the birds would probe the sore to such an extent that it sometimes killed the animal. Since the cattle plague destroyed the immense herds in Ukambani, and nearly all the sheep and goats were eaten during the late famine, the birds, deprived of their food, have become carnivorous, and now any domestic animal not constantly watched is killed by them. Perfectly healthy animals have their ears eaten down to the bone, holes torn in their backs and in the femoral regions. The second report relates to the South African Vulture, and is contributed to the 'Field' of Sept. 1st by H. L. Lempriere, of Natal. He writes:—"It is probable that the disappearance of the enormous herds of game that used to roam at will over the veld has caused a change of habit in this bird, and that the scarcity of carrion has forced it to seek its food in a manner so unnatural and abhorrent as to cause every man's hand to be turned against it. Be that as it may, the fact remains that, as surely as the lambing season comes round, so surely large flocks of Vultures appear, and, circling and wheeling in the air above the ewes, seize the opportunity when the poor creatures are in their most helpless condition to attack them, pick out their eyes, and eventually kill both lamb and ewe with the most frightful torture conceivable. Only the most unremitting care and attention during the lambing season can prevent the most serious losses from this cause, and the rifle and shot-gun, and even poison, are freely used to destroy these repulsive birds. Nor are ewes the only victims. Foaling mares are killed in the same frightful manner, and I have personally seen a flock of Vultures following on the ground a heifer that was about to calve, awaiting their opportunity. The plaintive lowing of the terrified beast attracted my attention, and I was fortunately able, by the aid of a few well-placed bullets, to prevent another tragedy of the veld by dispersing the loathsome crew."

THE breeding of the Cuckoo in the London district is now a well-established fact. Mr. C. J. Cornish, writing from Orford House, Chiswick

Mall, to the 'Times,' at the end of July, states :—" For some years Cuckoos have been in the habit of visiting the osier-bed on Chiswick Eyot very early in the morning. This eyot runs into the London county boundary. I always suspected that they were seeking nests to lay their eggs in. Three weeks ago, when on the lawn by this house by the river, I heard a young Cuckoo screaming for food in a privet-bush hanging over the river. Looking among the thick branches with a glass, I could see its orange maw, and two unhappy Sedge-Warblers working overtime putting food down its throat. It was fully fledged, and could fly. For three weeks this bird has remained in this and adjacent gardens by the river, being fed all the time by the Sedge-Warblers. Every evening it took a flight up and down the river, apparently practising and testing its strength. When hungry it screeched at the rate of just one hundred screeches per minute, which had such an effect on the nerves of other birds that I have seen even the irreclaimable Sparrows fly down, peck up food, and fly into the thick bush where it was, though I did not see them feed. 'In July away he fly' is part of Cuckoo lore. It is now known that the young Cuckoos leave first. This one, whose evening flights have been daily more extended, has gone. I dare say among the birds of Chiswick Eyot it is regretted as a 'fashionable departure.'"

THE above was at once supplemented, in the 'Daily Mail,' by Mr. A. E. Day, of Highgate Hill, who wrote :—" Mr. Cornish's young Cuckoo at Chiswick is not unique. Young Cuckoos have been hatched in Highgate Cemetery this year. In one instance several of us watched a Hedge-Sparrow's nest in which a Cuckoo had laid an egg, and the little bird sat and hatched out that one egg. Although the bird left the nest on July 23rd, it may still be seen flying about the cemetery, fed by the Hedge-Sparrows. At least two Cuckoos, to my knowledge, have been hatched here this season."

THE reintroduction of the Great Bustard (*Otis tarda*) seems to be inaugurated in Norfolk, and the following letter from Lord Walsingham has appeared in the 'Norfolk Chronicle':—

"Sir,—An attempt is being made to reintroduce the Great Bustard in what was formerly one of the favourite haunts of this fine bird on the borders of the Norfolk fens. This effort is due to the public spirit of an English gentleman resident abroad, whose love of natural history has induced him to incur considerable expense and trouble in the matter. It is hoped that residents in Norfolk and Suffolk will agree to respect the birds, which will probably be at large before this letter appears, and by preventing their destruction will secure the success of an experiment to which the reintroduction of the Capercailzie in Scotland affords a parallel instance and an encouraging precedent.—WALSINGHAM. Aug. 14th."

We trust that these birds may be allowed to survive, though as a commentary to the desire we extract the following note from 'The Shooting Times' (Aug. 25th):—"A Portsmouth sportsman thought he had made a lucky haul a few days ago. His eagle eye detected five fine Storks sporting themselves on a local waste, and, after much trouble, he succeeded in stalking them, and bagged the lot. He took the rare birds to a taxidermist, and a day or two later learned that the Storks had escaped from Sanger's circus, which was visiting the neighbourhood."

WE regret to learn the death of Dr. John Anderson, M.D., F.R.S., which took place very suddenly at Buxton on Aug. 16th. For the following particulars we are largely indebted to the 'Athenæum.' John Anderson was born in Edinburgh in 1833. He was educated for the medical profession, and in 1861 took the degree of M.D. of Edinburgh University. His strong taste for natural history, however, led him definitely to abandon his career as a medical man when, in 1864, he was offered the curatorship of the newly founded Indian Museum in Calcutta. In 1868, and again in 1874, he was selected by the Government of India to act as scientific officer to an expedition into Western China; and in 1881 he was sent by the Trustees of the Indian Museum to investigate the fauna of the Mergui Archipelago in Tenasserim. Since his return from India, in 1887, Dr. Anderson, acting under medical advice, spent the winters in the south, and his periodical visits to Algeria and Egypt roused in him an interest in the fauna of North Africa and Arabia, which has proved of the greatest benefit to science. He defrayed the costs of a collector to accompany Mr. Theodore Bent's expedition to the Hadramaut; and of late years much of his wealth and time has been devoted to the preparation of a series of volumes upon the vertebrate zoology of Egypt, which his untimely death leaves uncompleted.

THE friends of the late Sir William Flower, K.C.B. (Director of the Natural History Museum and President of the Zoological Society of London), are anxious to place a memorial of his great services to science in the Whale Room of the Natural History Museum—one of the departments in which he was most interested, and to which he devoted special care and attention. The memorial would, subject to the consent of the Trustees of the Museum, consist (probably) of a bust and a commemorative brass tablet. It is thought that Sir William Flower's many friends and admirers would be glad to associate themselves with this undertaking. In order to carry it out an influential Committee has been formed. Subscriptions may be paid to the Treasurer, Dr. P. L. Sclater, at 3, Hanover Square, London, W. It has been agreed that each subscription should not exceed £2 2s.

THE ZOOLOGIST

No. 712.—October, 1900.

SEA-ELEPHANTS ON KERGUELEN'S LAND.

BY ROBERT HALL.

IN the summer of 1897-98 I paid a visit, in the brig 'Edward,' to this island of the South Indian Ocean. I did so by the invitation of Mr. Hans Gundersen, and acted in the capacity of naturalist.

While doing research work I could not but notice certain habits in the lives of the enormous amphibious mammals, and a few general remarks thereon may prove interesting.

The southern Seals are not so strong in species as those of the northern seas. The distribution of the total twenty-five species, including a Walrus, is four in the southern hemisphere, and twenty in the northern. One is peculiar to both, and this is the one under present consideration, and specially called *Macrorhinus leoninus*. It is to be found in California, and is probably circumpolar in the Australis.*

Certain of the Seals are very local, and have reached peculiar places on the earth. One is confined to the Caspian Sea, and

* This animal was described and figured from the Falkland Islands in our last volume (Zool. 1899, p. 385). It was there referred to under the specific name of *Macrorhinus elephantinus*. In using the specific appellation *M. leoninus* Mr. Hall is in agreement with the late Prof. Flower, as pointed out in our pages (*ibid.* p. 387). Mr. Hall, in his opinion that the northern and southern species are identical, is in opposition to some other authorities. Mr. Allen, in his 'North American Pinnipeds,' treats the Californian animal as a distinct species (*M. angustirostris*).—ED.

another to Lake Baikal, each bearing characters apart from all others of the Pinnipedia.

A considerable trade in the skins of these animals annually passes through the sales-rooms in Europe, and Bears, Leopards, Lions, and Elephants are vernacular names with which the various markets are familiar. Seals are eared or earless. Of the former there are nine species; of the latter, fifteen species; and an intermediate mammal, familiarly known as the Walrus, completes the complement.

Kerguelen's Land is a large island of about ninety miles by forty miles, and full of fjords, on the coasts of which the Sea-Elephants congregate in number, more especially on the west coast, where they are secure, owing to its ruggedness, dangerous winds, and currents. It is thought they arrive to rear a family in August, and our observations lead us to believe the departure is timed for February and March. During these months they are very restless, and remain no longer the listless creatures of December. A Sea-Elephant is contrary in nature to a Sea-Lion, for, while the former on this island is docile and languid, the latter on the Aucklands is active and savage. The Elephant, on observing a stranger, shows a restless eye, but quickly goes to sleep again. You may then walk through a herd of fifty sleeping animals, and merely disturb one or two for a moment. These hot-blooded creatures vary in size from 6 ft. to 20 ft. 6 in., and we found a skeleton of a young one about 4 ft. in length. The largest were exceedingly difficult to handle; but, as the enterprise of our ship was principally a commercial one, the business faculty was quickly brought to bear upon any awkward and unwilling customer.

Many of the animals would weight approximately two to six tons. No five men could turn a large bull over without special levers, and it needed seven sealers to haul half a skin along the sand to the boat in waiting. As for dragging a whole skin, that was quite out of the question under the circumstances. For museum purposes we made a preparation of one, and this we feared would break the tackle while being drawn on board from the end of a tow-line. Its length was only 14 ft. 9 in., with a girth of 10 ft. 10 in. about the pectoral girdle. From shoulder to shoulder it measured 5 ft. 6 in. The circumference at the base of the flippers was 3 ft. 6 in.

To the great bulk there was a mouth, with a breadth, at the angle, of 9 in. only, and a tongue (which we found later to be excellent eating) quite filled it. Dr. Stirling has this specimen mounted in the South Australian Museum. While the blubber ranges from 2 to 6 in. in depth, it varies in weight. Six men were employed in changing the position of one fatty skin while on the skinning-board. This is a fair example of a male, which is always larger than the female. The congregation in harbours was generally systematic. The bulls occupied one part of the beach, and the cows formed a colony in another. There were always several colonies in a harbour, and they seldom appeared to intermingle, The young were not numerous. They had probably set out on their southerly migration before our arrival on Dec. 27th, or were scattered promiscuously along the beaches.

It is the general impression that these mammals lie in their rookeries for days or weeks together, and do not feed otherwise than on their fatty tissue. With this view I do not altogether agree, for most of the Seals are daily to be seen in the water, either coming in with the full flood, or going out with the early part of an ebb tide. That a young Sea-Elephant, 6 ft. in length, can live a month on its own fat was proved by one we brought to Melbourne, and which was lodged in the aquarium, but died a few months later.

One day as many as eighty may be counted ; the next day the same beach may only contain ten, with other heads poking above the floating-weed, and showing glassy round black eyes quite wide awake. Our men have often shot as many as sixty at one time, and found next day another twenty had come up among the dead, simply because it was their chosen lair. This species dislikes expending energy on land, and they will lie in a group of twenty to sixty in some grassy spot with a sandy landing. Some few will ascend to an inclined distance of one hundred and fifty yards, and there they are not so active as those below, and probably do not go out daily. The energy would be too much for them, as they are slow crawlers, using only two flippers, and the snake-like action of vertebræ and muscles.

The first anchorage of the brig was at Royal Sound, and before we removed from a beach of four miles in extent we had collected 426 skins. Our two anchors were lifted for a second harbour on Jan. 17th (Greenland Harbour).

During the first day sixty to seventy were killed, and similar results often followed. To shoot more at one time was inadvisable. An average of forty per day was considered good, and this allowed time to ship and "speck," *i. e.* take the blubber from the skin.

The finest herd we visited just before leaving the island. In all there were twenty-four magnificent animals, roughly averaging 19 ft. in length. For the first time, in 904 Seals, I saw the rugged nose of "Anson's plate," figured in Moseley's 'Challenger Notes' (p. 201). The plate of Leseur, reproduced on p. 202 of the same work, does not quite agree with the



Disturbed rest. The rear animal is in the act of roaring: the one with the convex back exhibits the inflated nose-bladder: the nearest animal is sleeping.

animals noticed by us in respect to the eyebrow bristles. The "Elephants" here have no conspicuous eyebrow, but rather have the cheek-hairs more developed than this plate exhibits. Before introducing ourselves I noticed one great "Elephant" take a short cut over another, and a quarrel arose. Both growled and stood partly supported by their shoulder flippers. Another disagreement arose elsewhere, but it seems to me there is more bark than bite, as animosity is quickly lost in sleep. One unfortunate animal had a badly torn nose, in all probability a dental evidence

of past troubles. One of the crew gave me a tooth some 7 in. in length, the greater portion of which lies within the gum (*e. g.* 4.9 in.). When disturbed the belching of each of these old bulls was objectionably strong, for it can scarcely be called a roar. So great is the exertion that blood appears in the pharynx, and this occurred when I was engaged near its head, measuring the trough in which it lay. This lair along the convex part part was 32 ft. in length, the breadth 7 ft., tapering towards each end. The depth of these, mostly dry mud holes placed among the grasses, ranges to about 2 ft., seldom deeper; but they were placed in natural depressions, *i. e.* extra to the artificial ones. Many of the troughs are continuous, and intersect each other, so that a large lair may appear netted, which is uncommon.* This place soon showed an unfortunate change. Rifles were presented within six feet of each bull, and the bullet sped through the brain-box, partly flattening on the blubber of the opposite side. Now, slits with sharp knives are run dorsally in the long direction, and out rushes venous-like blood to stain the little bay in a few minutes. From one Seal some sixty fountains of blood rose in oblique directions to a height of two feet, and all from the single cut on the back. Against the sky-line this miniature double line of fountains looked strange, and the spray of a city corporation water-van is not to be compared to its delicate and coloured sprayings. In the viscera I was surprised at the length of the small intestine, which I found to be 255 ft. in length, and capable of rough haulage. It stood the pulling over the grass from the carcass with only a small distension.

The method of procuring "Elephants" is a simple, though not an easy one. Three boats, each with a crew of five men, row from the anchorage to the shore, haul up their boats, prospect the field, and, with four loaded rifles, drive the animals down to within a few yards of high-water mark, and shoot them. There they lie for the coming of the tide, and get anchored temporarily in a few feet of water. Some of the Seals give considerable trouble before they will leave the high lands (one hundred yards from the beach on a medium incline), and as many as three hours

* In one trough there are very often two bulls or two cows, the broad part of one and the tapering part of another at one end, and the corresponding parts towards the opposite pole. This ensures the trough being well filled,

may be spent in annoying them with the lance before they decide to go. If the Seals carry their own skins down it saves much labour and time of the men. The boating is quite enough trouble to bear, as the harbour winds are treacherous and strong; so powerful are they, that I have observed half the body of a "waterfall" blown back many yards before it could leave the ledge where gravity was strongest. Should a gale prohibit the boats leaving the ship, the crew will sleep in during the day, and with the lull towards midnight leave for the scene of operations. Many a time they have had to row miles against a tempest to save being out all night, and many hours it has taken. Under such conditions boats have been swamped, the skins floated overboard, and a landing arranged for fresh efforts. I shall not be likely to forget one intensely cold night while going on board with my birds and cameras. The helmsman got a renewed attack of tropical fever, and, almost collapsing, I was given charge of the helm. For three hours mittens and oilskins seemed like miserable calico, and then I fully sympathised with the men who had their wellingtons partly filled with icy water.

Daily the boats wend their way in much the same manner, and in exactly the same way the skins are taken from the bodies. Roughly speaking, each skilful man can skin the smaller Seals—ten in two hours and a half, or fifteen minutes for each. This time is for animals which are not too large for a man to handle. The carcasses in our takings were generally of large size. The following is a case of quick work:—After a one o'clock dinner (of plum-duff) the boats were rowed three miles. Seventy-two Seals were killed, and all but fourteen skinned. Twenty-three of the largest were taken on board, and the last was upon the windlass at 9.30 p.m. Two skins of fair size are enough for a small boat, or one of a large bull. The last trip in the above raid took two hours and a half in rowing three miles; this wasted time and much more was spent in endeavouring to get round a certain point. We agreed without a dissenting voice to call this headland Cape Horn of Royal Sound.

This uncharitable point is the type of many another. To leave a harbour for a second one is the event most trying to the constitution, for one never knows until the anchor is safely dropped where the howling wind will drive you. Altogether we

tried six harbours, of which four were well worked. The fifth (Swains Bay) took us three days to enter, and, after being ten minutes inside trying to get up the channel, our clever captain put his ship about, and thanked his lucky stars he had got safely out of the treacherous "hole." Down this fjord the wind without notice struck the foresails, while the wind astern drove her forward. Here the trouble started, but fortunately quickly ended by good management and good fortune. Had we touched the entrance island the ship would at once have been broken into matchwood. From this place I carried pleasant recollections, more on account of the bold contour and strangeness of the island than because it pleased my friends to chart it as a tribute to myself. Strange as it may read, among the finding of shipwreck remains there were letters and bottles from a sealing captain mentioned in Prof. Moseley's 'Challenger Notes' twenty years ago. Capt. Fuller is an old hand at the business, and evidently has the indomitable pluck of the American in the making and losing of fortunes in rough waters! As for ourselves, we managed to quit the land safely on Feb. 18th, although for a few hours we could not get over a severe loss we made at the last moment. Having, on the 17th, killed, skinned, and anchored a batch of skins to the value of £250, all hands on board heaved anchors next morning to stand into a near bay to take them off. Two storms now showed their effects: one in driving all the skins ashore and burying them in the sand; the other in driving us off the bay altogether.

With a threatening sky our tight and dry little brig, the 'Edward,' now headed for Melbourne, and we started a direct homeward course of 3400 miles. This was duly accomplished in twenty-two days, and we experienced a phenomenal wind for the latter fourteen days, which was from the north instead of the prevailing one from the west, a circumstance of exceedingly rare occurrence.

ORNITHOLOGICAL NOTES FROM SOUTH-WESTERN EUROPE.

BY SURGEON K. HURLSTONE JONES, M.B., R.N., F.L.S.

It is particularly to be understood that in writing the present article no pretence is made at compiling a list of the birds for the localities mentioned. To do so would require much longer periods of observation, and fuller acquaintance with their avian fauna than have fallen to the lot of the present writer. It being therefore understood that these are merely rough notes, it only remains to make a few remarks concerning those portions of South-western Europe the birds of which are the object of this communication.

The Channel Squadron, in which the writer had the honour to serve, makes, as a rule, two visits annually to the South-west of Europe, one in the autumn, and the other in the spring. It has been in spare time during these cruises in 1898-9 that these notes have been jotted down.

The places in that portion of Europe under consideration which have supplied these notes are Arosa Bay and the neighbourhood, in the extreme north-west of Spain; Gibraltar, and portions of the adjoining Spanish mainland; Lisbon; and Sardinia. In the autumn of 1898, when, however, only Gibraltar and Arosa Bay were visited, not very many notes of the birds were taken, as at that time more attention was devoted to the Mollusca. In the spring and autumn of 1899, however, much fuller observations were made,

The country around Arosa Bay is widely and roughly cultivated, well-wooded, and thickly populated. It is hilly, but possesses no great elevations. The woods, which, though very numerous, are for the most part individually small, consist mainly of pines, firs, and small oaks. The country is full of elevations formed of old red sandstone, and often of most curious shapes, resembling strongly the tors of Dartmoor.

The mainland in the neighbourhood of Gibraltar is wild, mountainous, and for the most part uncultivated. Trees are mainly present in the shape of extensive forests of cork-oaks. The population is scanty, and for the most part collected in small towns and large villages, and not scattered over the face of the land in numerous small homesteads as at Arosa Bay.

Aranei Bay, in the north of Sardinia, where, during a short visit a few records were made, is a very wild and barren spot, mountainous, without any large trees, and covered with low-lying scrub.

Gibraltar is too generally well known to require any special description.

To one whose observations have mainly been confined to the British Isles, at first sight the number and boldness of the Raptorial birds is quite astonishing. This is of course explained by the fact that there are no gamekeepers, and practically no game-laws; so that birds of prey have every opportunity to thrive and multiply. It is also astonishing that, in spite of their abundance, Warblers and other small birds are very plentiful. Two familiar birds, however—the Rook and the Song-Thrush—are conspicuous by their absence.

Turdus merula.—Blackbirds are very common in all the localities mentioned above, with the exception of Sardinia, where I did not observe them. At Gibraltar they are especially common, and one often observed them singing on the wing as they flew in a long downward slant from some highly elevated point to another lower down the rock.

Saxicola œnanthe.—The Wheatear was first observed at Gibraltar in March, 1899, when a fair number were about the rock. They disappeared, however, at the beginning of April, and when the Squadron returned, after a month's absence in May, not one was to be seen. Probably they were birds on migration. Both at Arosa Bay and in Sardinia this bird was not uncommon.

Pratincola rubetra.—The Whinchat was only observed in the neighbourhood of Algeciras, on the Spanish mainland opposite to Gibraltar, where it was first noticed on April 8th. Apparently it was present in fair numbers.

Ruticilla phœnicurus.—A few pairs of Redstarts were noticed

at Gibraltar in the autumn of 1898, but at the corresponding season in 1899 they were extremely plentiful and very tame.

R. titys.—One pair of Black Redstarts was noted in November, 1898, but, like the preceding species in 1899, the birds were very much more plentiful than in the year previous.

Erithacus rubecula.—Robins are common both at Arosa Bay and around Lisbon; they are, however, much more shy and retiring than in England. A few occur at Gibraltar in the winter.

Daulias luscinia.—Several Nightingales were observed in the vicinity of Algeciras in April, 1899; and this bird was also noted in Sardinia. Spending a night on one occasion at Algeciras, and being unable to sleep on account of the mosquitoes, I was astonished to hear a Nightingale singing close to the inn, which was quite a quarter of a mile away from gardens of any kind, facing the sea, and surrounded on all its other sides by houses. Rather a strange place for this bird to sing in, I think.

Sylvia cinerea.—The Whitethroat is common everywhere excepting in Sardinia. In the north of Spain it is apparently more plentiful in the spring, and in the south in the autumn.

S. atricapilla.—The Blackcap-Warbler is fairly common at Gibraltar and in its neighbourhood during November and December, and around Arosa Bay in the spring. It bred in the latter place in some numbers. It also occurs in Sardinia.

S. hortensis.—The Garden-Warbler was noticed in the Alameda Gardens at Gibraltar in November and December. At Arosa Bay it was observed in May. This species was less numerous than the preceding.

S. sarda.—The Sardinian Warbler is much the commonest of its genus at Gibraltar, where great numbers breed among the coarse scrub clothing the upper parts of the rock. At Aranei Bay, in Sardinia, it was also observed in fair numbers.

Phylloscopus rufus.—The Chiffchaff was not at all common at Arosa Bay in the spring.

P. sibilatrix.—Wood-Wrens were observed in some quantities during the month of November in the Alameda Gardens at Gibraltar, and one was seen at Algeciras.

Acrocephalus phragmitis.—The Sedge-Warbler was common at Arosa Bay in May.

Accentor modularis.—At Arosa Bay, but not at all commonly. At Gibraltar a variety of the Hedge-Sparrow with very faint and indistinct spots occurs. This may be a local race, or without my knowledge may have been given specific rank.

Parus major.—The Great Tit was only seen twice, once at Gibraltar and once at Arosa Bay, and both times in December, 1899.

P. ater.—The continental Coal-Tit is very common about Arosa Bay, and also at Algeciras and Gibraltar.

P. palustris.—The Marsh-Tit occurs commonly about Arosa Bay.

P. cæruleus.—The Blue Tit is common at Arosa Bay, Gibraltar, and Algeciras. In Gibraltar, however, in common with the Coal-Tit, it occurs almost entirely in the Alameda Gardens. At Algeciras it is only found in the cork woods, as far as my observations go. It is rather more numerous, however, in the north than the south.

I did not notice any Paridæ in Sardinia.

Troglodytes parvulus.—The Wren occurs sparingly about Arosa Bay.

Motacilla alba.—The White Wagtail is a summer visitor to Arosa Bay, where a few pairs were breeding in May. Each pair had apparently a tract or beat of their own, for one never saw one couple very near another. At Algeciras a company of three birds were noticed in December, 1899, and a single specimen was seen on the North Front in Gibraltar in November of the same year.

M. lugubris.—A few Pied Wagtails were seen about Arosa Bay in May, but on Dec. 10th, when the Squadron put in for a day at that port, hundreds of these birds were seen, from which it seems probable that they were wintering migrants there.

M. flava.—One pair only seen at Rondo, a town 2500 ft. above the sea-level, and about seventy miles inland from Algeciras; and a single specimen at Gibraltar in December, 1899.

Anthus pratensis.—The Meadow-Pipit is common at Arosa Bay, and less so at Gibraltar in the winter.

Lanius pomeranus.—The Woodchat Shrike was very common at Aranei Bay, in Sardinia, in April. At Gibraltar and Algeciras it also occurred, but less commonly than at Aranei. It was first noted in the last-named localities in May.

Muscicapa grisola.—One pair of Spotted Flycatchers was noticed in some small gardens on the North Front at Gibraltar in May. A few specimens were also seen at Arosa Bay in the same month.

Hirundo rustica.—The Swallow was common everywhere, and, though naturally only observed at Arosa Bay in the spring, it was still present at Gibraltar in the first week of November. At Algeciras this bird was nesting, and had full clutches of eggs on April 8th.

Chelidon urbica.—The Martin was as common as the Swallow, and occurred for the most part with it; in Sardinia, as far as my scanty observation permitted, it seemed much the commoner of the two species.

Cotile rupestris.—The Crag-Swallow was noted in three localities only. First, it was seen on a hill on the Spanish mainland facing the North Front in the month of November, at an elevation of about 500 ft. At Ronda, a town about eighty miles inland from Gibraltar, having an elevation of 2500 ft., and divided into two parts by a deep narrow gorge called the Tajo. This gorge is about 1000 ft. in depth, and there, in company with the Common Swallow, this species was observed in hundreds. The birds seemed to be very tame, and, besides frequenting the gorge, flew in and out among the houses just as the Common Swallows do. At Aranei Bay, in Sardinia, a few pairs were observed at the end of April hawking about after their prey down at the sea-level, as well as up the sides of the hills, and in the valleys. This bird was plentiful at Gibraltar in November and December, 1899.

Carduelis elegans.—Many Goldfinches were noted at Arosa Bay in March, and all were then paired. In May they had apparently considerably diminished in numbers, probably, however, many having gone elsewhere to breed. At Algeciras, in November, a few specimens were observed, and a flock of five hung about the rock at Gibraltar for a few days in March.

Serinus hortulanus.—The Serin was fairly common at Arosa Bay in May, where it was then nesting.

Ligurinus chloris.—Greenfinches were very common at Arosa Bay.

Passer domesticus.—Though fairly common in the towns and villages about Arosa Bay and at Algeciras, Sparrows were scarce

by comparison with their numbers in England. At Gibraltar this species is very much more common than in the places mentioned above.

P. hispaniolensis.—In Sardinia this species replaces the Common Sparrow, and is fairly numerous.

Fringilla cœlebs.—The Chaffinch was common everywhere except in Sardinia, where I did not observe it.

Linota cannabina.—The Linnet was common at Arosa Bay in May.

Pyrrhula europæa.—One Bullfinch was observed at Algeciras in November.

Emberiza miliaria.—The Corn-Bunting was fairly common at Arosa Bay.

E. cirrus.—A few Cirl Buntings were seen at Arosa Bay.

E. hortulana.—The Ortolan Bunting was seen a few times at Arosa Bay in May, where it was nesting.

Sturnus vulgaris.—Starlings occurred at Arosa Bay, but in remarkably small numbers, considering how well suited the country appeared to be to their wants. Elsewhere they were not seen.

Pyrrhocorax alpinus.—One specimen seen at Ronda.

Garrulus glandarius.—Except at Arosa Bay—in the woods around which they were fairly common—Jays were not observed.

Pica rustica.—The Magpie was fairly common at Arosa Bay.

Corvus corone.—The Carrion-Crow was by far the commonest of this family seen at Arosa Bay, where it swarmed everywhere.

C. corax.—There was at least one pair of Ravens breeding on the rock at Gibraltar, and probably others were there also. At Aranei Bay these birds were very common.

Alauda arvensis.—Sky-Larks were extremely common everywhere except in Sardinia.

A. brachydactyla.—The Short-toed Lark was noted only at Ronda.

Cypselus apus.—The Swift was very common at Gibraltar, where it first made its appearance during the last days of March. It was also common at Algeciras and about Arosa Bay.

C. melba.—The Alpine Swift was only noticed twice—a pair at Ronda in April, and a single specimen near the signal station at the top of the rock at Gibraltar in May.

Alcedo ispida.—Two Kingfishers were seen—one on a piece of brackish water by the road which runs across the neutral ground to Linea, and another on a hill-stream some five miles inland at Algeciras.

Upupa epops.—One solitary Hoopoe was seen in the Alameda Gardens at Gibraltar in May.

Cuculus canorus.—The Cuckoo occurred at Arosa Bay, Ronda, and about Algeciras. It was, however, considerably scarcer than it usually is in England. The Spanish peasants call this bird by the same name as we do.

Buteo vulgaris.—Buzzards are very common both in the north and south of Spain, more especially in the former. At Arosa Bay a nest was found in March within twenty yards of a high road, along which constant traffic was passing, and close to a fairly large village. The nest was in a small pine-wood, and the birds were extremely tame.

Gyps fulvus.—The Griffon Vulture is very common, perhaps the commonest Raptorial bird in the south of Spain. As many as thirty birds of this species have been noted at one time soaring over the outskirts of Algeciras. The birds are very tame, and are seen quite close to the railway when trains are passing; and about Ronda some of their breeding places are in full view of the line, and at no great distance from considerable villages. It is interesting to see these birds soar to windward, which they undoubtedly can do.

Neophron percnopterus.—The Egyptian Vulture occurs in the hills about Algeciras, but is much scarcer than the preceding species, and much more shy and retiring.

Milvus iclinus.—Kites were only observed in the neighbourhood of Lisbon, where they were very common, and often seen sailing over the town itself, and attacking garbage on the Tagus.

Falco peregrinus.—A pair of Peregrines were seen at Gibraltar, and probably had a nest somewhere on the rock.

F. tinnunculus.—The Kestrel was extremely common in all the districts under consideration. About Arosa Bay every one of the little tors, and every church tower of any height, was tenanted by a pair of these handsome Hawks. At Santiago de Compostela at least half a dozen pairs had their quarters in the great cathedral, and it was a matter of surmise how they found sufficient

food, for apparently they did not hawk for prey outside the limits of the town. At Gibraltar this species breeds in dozens on the great precipice forming the North Front. At Lisbon, Ronda, Algeciras, and in Sardinia they were also plentiful, though not nearly so numerous as about Arosa Bay and at Gibraltar.

F. cenchris.—The Lesser Kestrel was fairly common at Gibraltar and Ronda, where it was associated with the preceding species.

Phalacrocorax carbo.—The Cormorant was common at Arosa Bay, Gibraltar, and Aranei Bay.

P. graculus.—The Shag was common on the eastern front of the rock at Gibraltar, and present also, but in less quantity, at Aranei Bay, in Sardinia.

Sula bassana.—Gannets were on rare occasions seen in the harbour at Gibraltar, and in the straits outside, more especially towards the African side, they were fairly common. Whilst coming back to England, in December, 1899, in fairly rough weather, numbers of these birds were seen on the coasts of Portugal and Spain, whereas at other times of the year I have not noticed them there. Off Cape Finisterre, in a strong north-west gale, and many miles from land, a flock of about a hundred were observed diving with great activity. One or two were noticed in Arosa Bay on Dec. 10th.

Ardea cinerea.—One Heron was seen at Arosa Bay in March.

Anas boscas.—A few Mallards were present at Arosa Bay, and at Gibraltar a large colony on a piece of artificial water just outside the gates, on the way to the North Front. These birds all disappeared with the exception of a few pairs in the spring, and the latter remained apparently to breed, as quite young ducklings were observed in the beginning of May.

Columba palumbus.—A few Ring-Doves were observed in the cork-woods.

C. livia.—One pair observed near Caldas de Reyes, at Arosa Bay, in March.

Turtur communis.—Turtle-Doves were first noticed at Arosa Bay in May, when they were fairly plentiful throughout that district, and where they were evidently breeding.

Perdix cinerea.—A few Partridges occurred at Arosa Bay,

Gibraltar, and Aranei Bay. Probably a few bred on the rock at Gibraltar.

Fulica atra.—A large number of Coots live on the same piece of water at the North Front of Gibraltar as the Mallards mentioned above, where they are apparently semi-domesticated.

Otis tarda.—The Bustard occurs not uncommonly in the south of Spain in the open country.

Gallinago caelestis.—Snipe are fairly common in the marshes at Arosa Bay in March.

Totanus hypoleucus.—Two Sandpipers were noted—one at Gibraltar in November, and another near Ronda in April.

Numenius arquata.—Curlew were plentiful on the shores of Arosa Bay in the autumn, and a few were also seen in the spring. The last noted was on March 18th, and probably they did not breed in the hills in the immediate vicinity.

Larus ridibundus.—Black-headed Gulls were common at Arosa Bay in the autumn and in the early spring, but all disappeared by the month of May. At Gibraltar this species occurs in great numbers in company with the next.

L. melanocephalus.—The Mediterranean Black-headed Gull was only observed at Gibraltar, and in the autumn of 1898.

L. cachinnans.—Herring-Gulls occur in very great numbers both at Arosa Bay and at Gibraltar. At Arosa Bay, in May, all the Herring-Gulls had disappeared, but probably they have a suitable breeding-place on the coast not far off, for on the weather becoming stormy great numbers returned to the bay.

Rissa tridactyla.—The Kittiwake is very common at Gibraltar, particularly in the winter. It is also observed at sea on the coasts of Portugal and Spain in all kinds of weather, in which it differs from the Herring-Gull. In December, 1899, several Kittiwakes followed the ship in heavy weather about a third across the Bay of Biscay, leaving her at Ushant. Off Capes Finisterre and St. Vincent they were also, in strong gales, both plentiful and active.

Fratercula arctica.—Numbers of Puffins were observed in small flocks in rather rough weather in December, 1899, off Capes St. Vincent and Finisterre, as well as in the stretches in between them.

Podiceps fluviatilis.—A pair of Dabchicks were noted on the

piece of artificial water by the road to the North Front at Gibraltar in November, 1899.

Procellaria pelagica.—A pair of Stormy Petrels, blinded by a search-light, flew through the port into an officer's cabin one rather dirty night at Gibraltar.

Alca torda.—Razorbills are occasionally seen on the western coasts of the Spanish peninsula.

Uria troile.—Guillemots occur like the above, and, if anything, less commonly.

These notes are admittedly very incomplete, and several more species have had to be left out from failure of identification, as during the time when most of them were made no guns were allowed on shore, and therefore complete identification was impossible.

AN OBSERVATIONAL DIARY OF THE HABITS OF
THE GREAT PLOVER (*ÆDICNEMUS CREPI-
TANS*) DURING SEPTEMBER AND OCTOBER.

BY EDMUND SELOUS.

(Concluded from p. 277.)

September 24th.—Left house at 3.20 a.m. It was bright moonlight, with a strong wind. Walked to the amphitheatre, and sat down on the edge of it at another place which I thought better suited for observation. Whilst on my way heard the cry of a Great Plover (the ground-note) quite near to the road. I must have been only a few paces from it when it went up, which would never have occurred in the daytime.

Whilst still moonlight, and before the dawn had broken, heard cry of Peewits in the air, and afterwards, in first grey of the dawning, that of the Great Plovers, and shortly afterwards these birds commenced to fly; first some half dozen, singly, or one following another irregularly, and with more or less gap between them. They flew from the direction of the river over the amphitheatre and, without alighting on it, continued, just topping the bracken, till I lost them over the crest of a rise. Have no doubt they went to their gathering-place amongst the heather. A rabbit, when just light enough to see, jumped extraordinarily high, several times in succession, shooting up from amongst the bracken in a wonderful way. Soon after sunrise a great number of Peewits flew together low over the ground on outer margin of amphitheatre, and then circled around and over it, high in the air, and getting gradually higher. Amongst them I now observed a Kestrel-Hawk. It was flying with them, the Peewits being close together (in a flock) at the time, and, shortly after, he had separated a bird from the body (at least the bird became separated), and the two were some time flying together; but I saw no active attack on the part of the Hawk. The latter I shortly missed, whilst getting them through the glasses, and the Peewit

soon after rejoined the flock. Here, again, and in a higher degree, it did not seem as if a serious attack was made, or even meditated, by the Hawk, for surely he could have struck one out of so many birds all around and close to him if he had intended to. Was it sport, therefore, or bullying, or affecting to do something beyond his strength? Afterwards, when the Peewits were walking about, I observed amongst them a Hawk (which I have no doubt was the same one, a Kestrel) springing about over the ground in an awkward and encumbered manner, which I at first attributed to injury, but soon saw that it had something in its claws which, I suppose, it was overpowering. Unfortunately, where it last settled down with its prey, a slight sandy ridge hid it from my view. The Peewits, both those which happened to be nearest to the Hawk and the flock generally, seemed not in the least alarmed, but wholly indifferent. I waited till near ten. Quite a small band of Plovers, not rising from the amphitheatre, but coming from some other place (not noted), flew over the bracken in the direction of the heath, but no further flight took place—no grand one, such as I had seen yesterday, and had hoped to see again from the moment of rising.

September 25th.—Rose early, and walked to same place as yesterday.

Small flight of Peewits (i. e. *for* Peewits—forty or fifty perhaps) observed flying, amongst which was a small bird, I think a Starling. It flew with them from one part of the flock to another, making, or appearing to make, little dives at particular birds. After a minute or so this bird flew back towards where the Peewits had risen from, and where a good many Starlings and other small birds were also feeding. Midway it was joined by another bird (either its own species or one somewhat smaller), which made wide, curving swoops or flights at it, sheering off on point of meeting, and again approaching. It is not easy to say what was the feeling—the mental attitude of the Starling (for I am pretty sure it was one)—towards the Peewits. Was it one of hostility? Was it sympathy? Or was it a joyous or a kind of fussy participation in the affairs of the latter? I incline to one of the latter explanations, or, as I think probable, to that of a mixture of the two. The attitude of the Peewits seemed one of mere indifference.

Compare, now, the two instances, observed by me, of a Hawk first flying with Great Plovers, then with Peewits. The Hawk being a bird of prey, an evil intention is, of course, the first and most natural hypothesis. He is a "suspect," and must take the consequences (which, here, will not be very serious for him). Yet I recall that, even with the Plovers, where this theory seemed most tenable, it did not impress me in that way at the time, though, on reflection, it seemed more and more likely. There (I believe) it was a Sparrow-Hawk, but in the other instance it was a Kestrel—and who can credit a Kestrel with having any serious designs upon Peewits? Afterwards, when it was on the ground, tearing prey, the Peewits all round and about did not betray the smallest apprehension. In the case of the Sparrow-Hawk with the Plovers, it may have been different; but with regard to their actions afterwards, these *may* have been due to myself, for though I lay as flat as I could, yet I was no doubt visible, the bank at that part not being clothed with bracken. Also, an incident, which I did not trouble to record, had just before occurred—*viz.* that some men with carts on the road, seeing me crawling flat in the heather, had thought I had broken a leg or otherwise hurt myself, and one of them (a delicious rustic) had walked up to me to make sure. This had put the birds up. The Hawk incident occurred later, after they had gone down again, with a small band of birds that had flown up to join them. But being put up once, and seeing me on the bank all the time, assuming that they did, *may* have caused the general disquietude I noted, and the Hawk *may* not have produced it. At any rate, here is one instance, as it appears to me, of a Hawk flying with a flock of birds for pleasure merely, and without a serious design upon them.

About 7.30 or 8 a small group of the Plovers rose from one part of the amphitheatre, and flew to another. In a few minutes they again rose, and, after circling about a little, flew away towards the heather, going straight towards the accustomed place. They numbered twenty-six, for, as they stretched out into a long irregular line, I was able to count them. They were followed shortly by another flight of thirty-three. But it soon appeared that they had not left the one gathering-ground to go to the other spontaneously (as I thought had been the case), but

that they had been put up, for, shortly after the last flight had gone, a large drove of cattle, driven by a boy, passed right over where they had been. As the time corresponds with that at which the flights came up whilst I was watching at the bank, I have no doubt that this is the accustomed cause—that the birds, having fed during the night, assemble at early dawn in some chosen place, where, if not disturbed, they would probably remain till the evening; but, if put up, fly to join their fellows at another such place, probably the nearest.

Yesterday, being Sunday, the cattle were not driven across, and on the stormy morning they may also not have been. Possibly it is a not quite regular occurrence.

I should note that there had been no “dancing” amongst the birds whilst at the amphitheatre.

At 5.30 p.m. (raining, and continued so more or less all the time) walked to the bank, and found the birds assembled in the heather as before. I wished to see if they performed the same antics here, before taking flight, as I had been witness of at the amphitheatre. Unfortunately, there are no facilities here for a close view, and it was, even from the beginning, difficult to make the birds out through the glasses. I assured myself, however, that precisely the same thing was going on, and, as I think, rather more so than usual,* so that I regretted much not being able to see better. I should not, however, speak positively, unless I had unmistakably seen some birds dancing in a very vigorous manner, and caught the “dreary gleams”—now more than ever so—very frequently. As the gloom darkened, they were difficult to distinguish from the white tails of the rabbits, but I do not think I ever confounded them. I now feel sure that these antics give expression to the anticipation of going and desire to be gone, which begin to possess these birds as evening falls. They are the prelude to, and they end in, flight. The two, in fact, merge into each other, for short flights, between the antics over the ground, are a part of the display (as I have described), and it is impossible to say which one of them will be continued into the full flight of departure. I also noted that the usual long-drawn wailing note which ordinarily precedes both dance and flight was, this evening, ushered in by a short, one-syllabled

* Possibly on account of the rain.

note of similar tone, several times repeated, but with well-marked intervals sufficiently long to take away its wailing character. I have not remarked this before.

September 26th.—Missed my way over moor, and did not get to bank till close on 4. With one doubtful exception, did not put up any Plovers during this wandering, though, as I got far beyond the bank and can only have passed it, as far as I can see, through the broad gap, I must have gone either right over or very near the place where they assemble. At 4.45 the first Great Plover flew over the bank (flying silently), and, a minute or two afterwards, I began to hear the cry. Another followed shortly afterwards. It was the very earliest twilight of the morning, the moon and stars quite bright, except in the eastern sky, where the latter were fading into dawn.

At 4.55 two more flew over. Then came in the following order and number:—1, 1, 2, 1, 1, 1, 2, 4, 1, 3, 1, 5, 2, 1, 2. One of the last two uttered a short single note of different tone to the usual one. It had a scrappiness in it, and was without the wailing character. One other bird—flying a little before these, the other way, and which, I think, was a Great Plover—uttered a short single note, repeated, which was again different, nor was it the “tir-whi-whi-whi-whi-whi.” Otherwise, all flew silently; but the ground-note was now frequent. I had noted a small flock flying (and, I think, going down) on the other side of the bank, and the cries which I had before heard I attribute to these or other birds on the ground.

It is 5.10, and some five minutes since the last bird flew by. Now come 1, 1, 1, the last making the full characteristic wail, but without the wailing trills and twitters which, I believe, are only uttered on the ground. Getting lighter and lighter, and birds beginning to avoid me as they fly over the bank, but one of last three went quite close by me, without seeming to notice me. Then come eleven flying together in a flock, quite silently. Then two more. Time 5.17. Forty-nine birds, therefore, as a minimum, have flown up to this resort between 4.45 and 5.17 a.m. I cannot at all say how many may have come invisibly from an opposite direction, or how many flying over me I may not have observed (though I do not *think* any).

5.30.—Is now clear daylight, stars invisible, though moon

still luminous. After a little, thinking the early morning flight home of the birds was now over, I rose to go. As I walked off the Plovers all rose from the heath, and I was astonished at their numbers. They flew round several times in a wide circle, and as they gradually, from the great cloud they had at first formed, spread out into something more resembling a line, I was enabled to count a considerable number of them. I counted 117, irrespective of a large section which separated itself from the rest and flew off to the amphitheatre, so grouped that I was unable to count them. The number of these last must, I should say, at least, have made up the balance of another hundred, which would make, as a minimum, 200 of them. But, I believe, they were more numerous—perhaps from 250 to 300 in all. I must have missed a great many in this rough counting, and the number that went off looked very great. At any rate, counting those that were certainly on the amphitheatre at this time, the whole flock cannot, I think, be much below 300.

On getting to my post at the amphitheatre I found, as I expected, that the birds had gone down there, for they rose again in another great flock, and again went down. At this same time (6) a small flock of Peewits swept over the barren ground between here and the river, and went down upon it.

At 6.35 a larger flock appeared, and began to sweep, circling around at a great height, uttering their cry. Noticed two of them chasing each other, apparently in sport.

7 o'clock.—Numbers of Peewits sailing about high up, and mingled with them a flock of Starlings. Two Peewits often chase each other, and there is, sometimes, in a sudden dip down and curve up again, a trace of the aerial evolutions of the spring. They “faintly imitate” them, as Gibbon might say. Peewits and Starlings spread over the open space, searching about (apparently) for food, though it is difficult to think what, exactly, they get on such arid, barren ground. One Peewit will often rise from the ground and fly at another one near, who will then also rise, and the two will pursue each other a little, when, as if by mutual consent, both will desist, and go on feeding as before. The Starlings seem to enjoy the company of the Peewits. When these fly off, they go with them; and I have noted the flock of Starlings mingled and flying with the flock of Peewits (each almost, if not quite, as

numerous as the other), as also the single one flying with them. I do not think it is the other way. The Peewits, I believe, are quite indifferent to the Starlings. They may, however, have a complacent feeling in being thus followed, and, as it were, fussed about, which does not show itself in any action. The constant motion and activity of the Peewits offers a salient contrast to the stillness of the Great Plovers, who stand or sit almost motionless.

At 7.30 cattle driven over, and all birds rise and fly away, the Plovers, no doubt, to their companions amongst the heather. After a time, Peewits back over the amphitheatre, and Starlings with them.

At 8.30 leave.

September 27th.—Fine morning, clear sky, rather windy.

Got to last place at 5.15. Dawn, at 5 o'clock, was only just breaking.

5.35.—First note of Great Green Woodpecker in distance. Ditto Pheasants.

5.40.—Note of Woodpecker nearer.

6.—First Lark heard.

6.10.—Just as sun breaks for first time through a cloud-bank, seven Peewits rise from amphitheatre as if to salute him, and are at once joined by two others who rise farther off.

6.30.—First see Peewits circling high in air, as though enjoying the sunshine.

A few more Peewits rise, and are at once followed by Starlings. I note carefully that the Peewits rise first.

6.45.—Two Plovers fly up and come down on clear space in front of me scarcely a dozen paces off, giving me a good view, except that the sun is a little blinding, and, in any case, it seems hardly ever possible to get the defined outline of these birds, especially the beak, which one might think would stand out sharply, but it is quite otherwise, and, generally, the outlines seems to blend with, or fade into, the air.

These two birds made a few little inquisitive runs about, after which they stood a little, and one ruffled out its feathers very loosely, becoming quite a different bird—a sort of limp, round, feathery mop on two little stilts, something like Tenniel's representation of the "borogoves," in 'Through the Looking-Glass' ("Mimsy," therefore), if the legs had been longer. After

a little, both the birds crouched and lay flat along the ground (a desert scene, one had the Sahara), one in the sun, another in slight shade. The latter, though in full view, became at once almost invisible, so that, when I took my eyes off him, I found it difficult to find him again. In a minute or two this one got up, and, making two or three short little runs forward, picked up something from the ground and swallowed it—*what*, I could not see. Both were now on their legs, and very shortly flew back to where they had come from.

Peewits circling about in the sky singly, or, if they can be called “together,” yet very widely spread out, and occupying a great area.

Peewits not nearly so much *en évidence* this morning.

One Peewit makes a little run forward up to another, and stands by, or rather over him, with both wings lifted above back to fullest height—brandished, as it were.

7.25.—Most of the Peewits rise and fly away (going in direction of the fens), but it is two or three minutes before the cattle appear, driven slowly towards the plateau, and then across it.

As they get nearer a few other Peewits fly after the first. Finally all the birds arise, the rest of the Peewits following their companions, the Plovers flying over bracken to the moor. Of these latter I count thirty-seven.

September 29th, 1899.—Leaving home, when crescent moon and stars were brightly shining (calm and still, sky clear, but slight mist over earth), walked to the bank, and, before taking up my station, purposely went all over just that part of the heath where the birds assemble (to the number of two hundred or three hundred). I did not put up any bird. At 4.10 took my place on the bracken-covered part of the bank, having now several times heard the ground-note of the Plovers. Probably on the arable land around; I had put up none whilst walking over the heath to the bank.

4.15.—Trumpet of a Pheasant.

4.30.—Several Pheasants trumpet.

4.50.—Cry of Great Plover close, on ground, and first one flies over bank. I hear it only—the wings. It makes no cry. Now keep hearing ground-cry of Plovers close, as if they were *walking* to their place.

4.55.—Hear another bird fly by. No cry. Think it was a Plover.

Then come 1, 3 (it is now 5 o'clock), 3, 2 (peculiar cry close by me. I think a Great Plover. If so it is a new note—at least, newly noted. Like cry of Moor-hen, but tone of Plover. Sudden, trumpety), 2, 3, 2.

5.10.—1, 1. (Great noise of Partridges.)

Very cold as the morning breaks; a hoar-frost on fern and heather. A mist hanging over the earth.

5.25.—There has been since 5.15, and still continues to be, a great noise of Partridges all about, and now great trumpeting of Pheasants.

5.35.—No more Great Plovers up till now, and yet the morning flight home must have ceased. Only twenty birds, therefore, as against forty-nine on September 26th. Yet I now command all points, and find it difficult to imagine that any great number can have flown up without my seeing them, or at least hearing the wings. A search with the glasses, however, reveals twenty-eight birds amongst the heather—as many, or more, as I could count one morning when there were a great number concealed in it. As I heard the ground-note of the birds, first some way off, and then much nearer, probably in the place itself, it seems as if some of them had walked, or rather run, home.

Wren hopping cheerfully about the frosty bracken.

Pheasants making a great noise and seem very active, which has not been the case on previous mornings. May have relation to the frost and mist.

Have now walked to my other post by the plateau.

A mist lies over everything, obscuring the sun. This seems to affect the Peewits (probably birds generally). No Peewits seen till 6.40. Then only two, flying, who soon go down. Later a small flock go past, but, from then till returning home about 8, I see no more. An entire absence of the joyous circling in the higher air which on the previous fine bright mornings I had seen.

No Starlings (I think).

Song of the Lark not heard till 7.

Note of Great Green Woodpecker at 6.45, but had heard it, I think, a little before.

September 30th.—About 3 p.m. walked to the bank and noted Plovers assembled in heather as usual. Could count thirty-three.

In the evening, walking along road skirting moor, many flew over it and on over the fields and cultivated lands. These—and perhaps the immediate shores of the river, mud, &c.—are, I have no doubt, their feeding-grounds during the night.

October 1st.—6.50 a.m.—Pigeon comes down on plateau and soon flies away.

One Peewit flew by at 6.55 a.m.

Some Great Plovers standing about on outer edge amongst the black (withered or burnt) heather, but no Peewits.

7 a.m.—Hawk flies by, pursued, or accompanied for a little, by a Starling.

First hear cooing of Wood-Pigeons.

Left house at 5 a.m., but am too late for the Great Plovers, who have evidently all returned. I did not see one flying, but noted them in the heather through glasses as soon as light enough to use them.

7.5.—Flock of Peewits go by flying fast and high.

6 p.m.—Great Plovers fly over road skirting moor, the greater number crossing river and keeping right on towards the higher lands on the other side. These are cultivated to some extent. Some few birds did not fly in this direction, but kept over the fields on this side of the river, and some must have come down in a ploughed field adjoining the road, as I heard their note there from behind the hedge. I was this evening nearer to the river when the birds began to fly, so probably met those that flew across it. Yesterday, when further from it, and nearer to the birds' resort, those I saw seemed to fly over the fields, keeping parallel to and on this side of the river. Probably, therefore, they fly off in all directions, like the spokes of a wheel from the nave to the circumference, and return in the same way, only reversed—which might account for my seeing so few from any one point—for both at morning and evening there is the gloom to contend with. These birds seemed like wild spirits flying out on a stormy sky, and their wailing note was all in unison. They flew high and strongly, and made one wish to be one of them, and have done with human pettinesses.

October 4th.—Going out at 4.30, when it was still dark,

walked to the crests of low hills forming boundary of one side of river valley. I soon heard the ground-note of the Great Plovers, who appeared to be spread about over the ploughed and stubble fields in all directions, where, no doubt, they had been feeding during the night. They must have flown back soon after my arrival. I heard the short wail, the latter part of the note divested of its preliminary trills and twitterings, which are uttered, as I think, only on the ground, and by 5.30, when it was only just daylight, all must have gone, for there was complete silence. I had seen none flying, so must have missed them in the gloom. None flew later, which would have been quite contrary to their custom.

October 5th.—Wishing to see the Plovers fly off for the night, I walked along the road skirting the heath a good deal further than I had done before, so that I was now on the other (not the river) side of their assembly ground. I sat down against a fir-tree. Did not note exact time, but heard their note, and they were soon in full cry. As dusk came on they began to fly, and in greater numbers than I have yet seen, not towards the river, as those I had hitherto seen had done, but towards me, and away from it (south, that is). I noticed, however, a tendency to curve gradually round, which may have brought them in time to the river. Forty-four flew away together (this was the greatest number); I could count them easily, as they were between me and that part of the sky which had the sunset glow in it. The flock of forty-four soon spread out into a long irregular line.

By 6.15 p.m. one hundred and fifty-seven had flown (or, more properly, I had counted this number), after which the cry ceased. Though I did not look at my watch, the probable time when I arrived was 5.40 or 5.45. So that the birds had taken half an hour to forty minutes to get off.

It would appear, therefore, that the majority of the birds fly not towards and across, but away from the river (south, more or less). I saw none fly in the former direction, but there I had not the light in the sky, and they would have been flying away from instead of towards me. These reasons would be fully sufficient, and I have no doubt that as many flew that way as upon other evenings.

October 6th.—Towards evening walked to the bracken-covered

bank, where I concealed myself as on former occasions. The birds that would now pass by me would be flying towards the river (north), and it would be as difficult for me to see those flying in an opposite direction (as yesterday) as it would, yesterday, to have seen these. The birds were never, now, between me and the light of the sky.

5.40.—First cry of the birds—faint and undecided.

5.45.—Note again heard, and soon swelled into the full wailing chorus, repeated from one part of the heath to another.

5.50.—Birds began to pass me, flying towards the river.

6.10.—Last note heard from the assembly-place, though heard it twice later from other parts (at 6.13 and 6.15).

I counted twenty-nine birds fly past me, but no doubt missed many in the gloom. The birds therefore got off this evening in about twenty minutes.

October 8th.—Walked up the road again this evening, and sat down just as before, but a little higher up (more to the landward side of the birds, and farther from the river) at 5.45.

On account perhaps of the fineness of the day—it was, I think, a little lighter than on previous evenings—there was no cry of the birds at this time, or at 5.50 (but, being a little farther off, I might not have heard a very slight cry).

5.53.—Heard the first note (I *think*) slightly uttered.

5.54.—First full decided cry.

5.58.—Note becoming constant, rising and sinking (nothing, however, compared to the evening of Oct. 5th).

6.3.—Two birds fly by me to the left, away from river (south). Hear note of others (or one other) flying on my right (riverside) hand, but quite near (north).

Then came three (right hand, near, north), and at 6.8 three, and then one on left hand (south).

Cry always continuing, but not very marked this evening.

6.12.—Cry has ceased. Recommences in few seconds, but soon subsides, and shortly recommences again, and again subsides.

6.15.—Silence.

6.16.—One bird flies by, left hand leaving river (north). I now left, and whilst walking down the road did not again hear the cry of the birds.

Compare above with evening of Oct. 5th. There was not, I should think, one hundred yards distance between the two places where I sat, and I commanded just the same view. I had walked up and sat down equally quietly in both instances, and, as the birds are some way off the road, and accustomed to people walking along it at intervals during the day, it is not likely that I disturbed them, and caused them to go off in a flock of forty-four on the prior occasion. Something else may, however, have done so, and it certainly differed from their usual habits as observed by me. I have, however, before seen them go off in smaller flocks at evening from the amphitheatre. I do not know how to account for seeing so few birds to-night as compared with the 5th. Possibly a certain number of them may have migrated in the interval.

Close on 6 p.m. walked up the road, and sat down at nearly same place as Oct. 8th. I heard the note of the Great Plovers as I came, but only a little, and after six it had quite ceased at the accustomed place amongst the heather, though once or twice it sounded again in the distance. Seven birds only flew by me after I sat down (*i.e.* I only noted seven). They were between me and the western sky, just as were those which flew by me to the number of 157 on Oct. 5th. I now think that on that night that number—being the greater body—migrated. All or most of the flying birds uttered the characteristic wail in the air.

October 10th.—Arrived at bank at 5.35, and sat down in a small pit on side of it commanding assembly-place. It was the very early dawn, some stars still visible, the very time when the birds ought, I think, to be in full flight back from their feeding-grounds. Heard the note once or twice as I walked (the ground-note, I think).

5.40.—One bird flies from the heather, and goes over the bank in direction of amphitheatre and river. It flies silently.

5.50.—Four or five birds fly over the moor, and come down in the heather.

6.0.—See first Rabbit, and great trumpeting of Pheasants, which continues. There has been before a considerable noise of Partridges.

It is now, of course, perfectly light, and long past the time for the Plovers' flying back, which should have been when I

arrived. No other bird has passed me. Beginning of a splendidly fine autumn day. Cloudless sky, but slight mist and hoar-frost. No Rabbits, though their burrows are all about me. Searching the heather very carefully with glasses, can make out with certainty four Great Plovers, and, I think, a fifth.

6.15.—A few Rabbits about now, but very little *en évidence*. Those that are, sitting quietly.

6.35.—Flock of twenty-eight Peewits, flying high.

6.45.—Wood-Pigeons flying high. I count twenty-three. Sun now just cresting the fir-trees, and beginning to make itself felt. Looking again, cannot make out the Great Plovers, or see anything but Rabbits.

At 6.50 (an hour at least after the latest period at which the birds would have flown back to assembly-ground) walked towards where I had noted the four or five, and soon put up nine. I then walked all about over the ground usually covered by them, but put no more up. Compare this with the large numbers on previous mornings, and on the evening of the 5th.

Walking immediately afterwards to the amphitheatre, put up two flocks of eleven birds, making, with the nine at the heath, a total of thirty-one birds. This is assuming that these nine birds had not flown to the amphitheatre. They had started in the opposite direction, and I did not see any flying towards it as I walked. Twenty-two birds on the amphitheatre, though a very much less number than that which flew up from it on some mornings in September, is not much, if at all, less than what it has been on some other mornings when I watched there. I now feel assured, however, that the great body of the birds (to the number, probably, of from 170 to 250) have migrated.

October 11th.—5.45 p.m. Along road by moor. Counted fifteen Great Plovers fly off. Saw some near road dancing. Note ceased shortly after 6 p.m. Was never very loud or continuous.

October 14th.—By moor for the Plovers.

5.50 p.m.—A flock of twenty-one birds flew off over the moor, but they did not, I think, rise from heath, but from the amphitheatre. A moment after they had flown by, six others rose from heath, and flew after them.

At 5.55.—Another flock of thirty-four (as I counted them) flew by, and these again seemed to come from amphitheatre.

This makes sixty-seven, and I still hear their cry over the moor.

At 6 come three more, also from amphitheatre. Still hear the note near on moor. It sounds like a single note. All these birds were flying south.

At 6.2 leave.

October 15th.—Between 5 and 5.30 p.m. walked to the amphitheatre, and, searching it well with the glasses, could see no birds. Leaving at 5.30, and taking no precautions to conceal myself, I did not put up any, and conclude there were none there, or only some few at a distance. I then walked to the bank, where I arrived at about 5.35 or 5.40. Searching the heather, I could see no birds there; but now very dark for the glasses.

Until a minute or two before 6 there was no cry, but it then began, though to a much less extent even than latterly. Half a dozen birds or less would have been quite sufficient for what I heard.

At 6.10 one bird flew by me over the bank (north, that is; I had seen none before) uttering its note, and from then I heard no more cries till 6.14, when I thought I heard one very faint one, but cannot be sure. From then till 6.20, when I left, I heard nothing more. (The last, I think, was a mistake.) I believe the notes for some time had been those of the solitary bird that flew by me.

October 16th.—Walked up road by moor, and arrived at usual place at 5.50 p.m.

In a moment or two three birds flew by, and shortly after a fourth. I heard the cry of a fifth bird flying farther off.

At 5.57 heard the note of another, and again a moment afterwards.

6.0.—A note from a bird, I think, flying.

Saw or heard no others up to 6.10, when I left.

October 17th.—Same place as yesterday at 5.40 p.m., and at 5.49 heard first notes of the Plovers.

5.45.—One bird flies by silently. Hear others in heath, but there do not appear to be many.

5.51.—Eleven birds fly off in silence. Still hear note in heather.

5.58.—Eight more, silently. Cry still from the heather.

6.2.—One more in silence. Still hear the ground-note.

Cry ceases shortly after 6.5, and at 6.10, when I leave. Have heard it no more.

October 23rd.—No Great Plovers on amphitheatre in middle of afternoon, as I walked all over it without putting any up. Afterwards walked to bank, and could see none, with glasses, in the heather. Waiting by the road, however, from a little after 5, heard their note amongst the heather till about 5.20. There was a mist, and I saw none fly.

October 28th.—5.10 p.m. At the old place on the road by moor.

I watched till 5.40, and during that time thought I heard once or twice the note of the Great Plover; but, if so, it was very low and subdued. Saw no bird fly off.

October 29th.—5.15 p.m. At same place. Quite dusk. Should have come a little earlier. Stayed till 5.30, by which time any bird there should have flown off. I saw none fly, and did not hear the note. Once or twice I had a suspicion that I did, faintly, and in the distance, but I do not think this was really the case. Neither, whilst walking up (when it was lighter) nor returning, did I see or hear a bird.

October 30th.—At 10.40 a.m. walked to the bank, and from it searched with the glasses that portion of the heather which, three weeks ago, had been the daily resort of some hundred or so of the Great Plovers. I could not see a bird, and upon walking right down upon and all over it, I failed to put up a single one.

Returning, I walked to the nearer part of the amphitheatre, and searched it with the glasses without discovering any of the birds. Being in a hurry, I had not time to walk over it, but had any been there I should certainly have put them up at this distance. At least, I have always done so before.

It would appear, therefore, that all the Great Plovers that were here have now gone—migrated in all probability.

4.55 p.m.—On road by moor, same place as yesterday.

At 5.20 thought I heard note of the Great Plover. It was the tone, but only a single note, not repeated, and very subdued. At 5.30 left, having heard it no more.

Do not now think that what I heard was the Great Plover. Believe they are all gone.

October 31st.—(Fine bright day. Sky almost cloudless.)

5.10 p.m.—On road by moor again; same place.

Saw no Great Plovers flying, neither had I seen any whilst walking up, nor did I when returning (though it would have been too dark to, unless they had come very near). I, however, again heard several times distinctly that note which, on previous evenings lately, I had thought might proceed from these birds. Whether it does or not I cannot feel sure. It is merely a short single note, but in tone and character resembling, or at least recalling, the Great Plover's. It may possibly be a less usually heard note of a Pheasant or Partridge. If not, then (unless to the Great Plover) I do not know to what bird to attribute it. But, as for nearly a week now I have seen none of these birds flying, nor put any up whilst walking over their former assembly-grounds, I think they must be all gone.

November 1st.—At 5 p.m. I was at the bank, and walked all about that part of the moor near it where the Great Plovers had been wont to assemble. It was quite deserted. I did not put a bird up or hear the cry of one. Daylight was only just ceasing, and I should have seen any bird that I had disturbed.

Short résumé of the birds' habits during September and October, as observed in the foregoing.

The Great Plovers have regular places of assembly, where they sit or stand during the day in more or less close proximity to one another.

They prefer a place with some cover to one quite bare.* As evening falls they indulge in curious and excited motions, which may be called dances, or dance-antics. These are accompanied with their wild wailing note, which is of a peculiar character. It ends in a wail, but there is a prelude—often a long one—which begins with some high-pitched plaintive cries, and then passes

* By far the greatest number of the birds passed the day amongst the heather near the bank. I have not specially noted it, but it was the skirts of the amphitheatre which had more or less cover (grass, withered heather, &c.) where they rested, and there were generally some in the bracken itself, where this was thin. They spread over the open space as evening came on, or earlier if moths or other insects attracted them.

into wild, wailing trills and twitterings that seem part of the deepening gloom and sad sky; for Nature's own sadness seems to speak in the voice of these birds. These melancholy sounds swell and subside and swell again as they are caught up and repeated in different places, from one bird to another, and often swell into a full chorus of several together. This note in its entirety is only uttered by the bird whilst on the ground. That uttered during flight is a simple wail like the ending of the above. It is difficult to judge of the whereabouts of the birds by their cry, and they often seem to be much nearer than they really are.

The dance-antics are varied with little flights over the ground, if these may not rather be said to be a part of them. In one of these the bird takes its departure, thus dancing off, as it were.

Rain would seem, sometimes at least, to have an exhilarating effect, causing the bird to come out from its cover into it,* and begin the dance-antics earlier than it would otherwise have done.

When thus leaving for the night, they rarely or never fly silently, but utter the simple, short wail (short, that is, by comparison). This is more particularly as they leave the assembly-place, or are still near it.

During the night they feed over the general surface of the country, preferring, probably, the "fat," or cultivated lands.

In the very early dawn they fly back to their assembly-grounds, and this morning-flight is mostly in silence. Only rarely is a wail uttered, but the ground-note is now sometimes heard, though it is much less full and striking than in the evening. The birds may very likely feed towards home, and fly to it when at a certain distance. Some *possibly* may arrive on foot.†

Besides these two notes (the ground one and that of flight) the Great Plover has a few others, the most pronounced of which

* The birds when thus seen by me stretched (once or twice, I think) the wing up for the under part to get the rain, as does a Pigeon. I forgot to note this down, and also that on another occasion rain seemed to have no effect on them. But I was not there when it first came on, and could stay only a short time.

† My having heard the ground-note at early dawn, when the birds were flying back, very near to (as far as I could judge), but not quite at, the place of assembly, suggests this.

("tir-whi-whi-whi-whi-whi") may express distress, or, at least, perturbation.

The Great Plover pursues and catches moths certainly, and other insects probably, whilst they are flying, with great eagerness and dexterity, sometimes making jumps into the air after them, in doing which it aids itself, if necessary, with its wings. *Possibly* it sometimes *flies* after a moth, &c., that rises beyond its reach.

An abundance of insects about produces, in these birds, more diurnal activity than would otherwise be the case.

If the one word is to exclude the sense of the other, then the Great Plover cannot strictly be called either diurnal or nocturnal. It would seem to be more the latter than the former, but di-nocturnal would be a more fitting word (did it exist).

Migration begins early in October, but it is not till between the middle and end of the month that all the birds are gone.

The whole flock does not depart together, but in two or more bodies (the larger first), with an interval of several days between them. But stragglers (or rather laggards) are left, and these may go singly, or in small groups.

The Great Plover is an eminently social bird.*

* This does not apply merely to their congregating in the autumn. They show, generally, a liking for each other's society. The breeding season modifies this to some extent, but they begin to come together again as soon as it is over.

NOTES AND QUERIES.

MAMMALIA.

Wild Cat.—Will any one of the contributors to 'The Zoologist' refer me to the best *picture from life* of the Wild Cat—say, in the next number of 'The Zoologist'?—and I will be much obliged.—J. A. HARVIE-BROWN (Dunipace, Larbert, Stirlingshire).

Oared Shrew in Suffolk.—On Sept. 5th I met with a Water Shrew (*Sorex fodiens*), of the variety formerly known as the Oared Shrew (*S. remifer*)—*cf.* Bell—and considered specifically distinct from the ordinary white-bellied form. It was a pregnant female, and so large that before picking it up I took it for a half-grown Mole. It was found by a Dog among long grass in a meadow in this parish, some five or six yards from the nearest ditch. Hoping to have more time the following day to examine it thoroughly, I placed it for the night in a closely-wired Mouse-cage, with some water, a bed of dry grass, and some earth containing a plentiful supply of earthworms, one of which it at once seized and devoured. Next morning, however, the Shrew was nowhere to be found. It had managed in some unaccountable manner to escape from its cage. It was certainly a good deal larger than an average-sized House-Mouse (*Mus musculus*). The snout was rather broad and flattened, and there were no white hairs on the ears. Its climbing powers were considerable, for it not only ascended easily the upright wires of its cage, but even made its way along the top, clinging back downwards to the wires. The fact of its being with young at this season seems to denote that more than one litter is produced during the year. Many years ago, on the bank of a pond in this parish, I saw, but was unable to catch, one of these animals, which I believe to have been still larger.—G. T. ROPE (Blaxhall, Suffolk).

Hybrid Dog and Fox.—In the new Museum at Worcester, standing upon a shelf in the recess set apart for local mammals, there is a stuffed animal, labelled Wolf, which I suspect is a hybrid between a Dog and a Fox. Pasted up alongside is an old and, I think, dateless newspaper cutting, containing a sensational account of the behaviour of the "monster" during the time just preceding its destruction. The paragraph was too long to copy in full during the time at my disposal, but to the best of my recollection the pith of it is as follows: The animal entered a cottage in a village in Worcestershire, and quietly laid down under a table. Roused

from its rest by the crying of a child, it was making for the sound with the purpose of devouring its originator, when a Cat, with less discretion than is usually displayed by this feline, flew at the intruder, but in the tussle that ensued was torn limb from limb, and afterwards devoured piecemeal on the spot. The subsequent proceedings I forget, but the "Wolf" apparently continued to hang about the cottage, till some passing labourers, apprised of its doings and probable intentions, attacked and killed it. The alleged ferocity and unmistakable, albeit superficial, Wolf-like aspect of the animal, coupled, may be, with the circumstance that it was not recognized as the property of any of the farmers or Dog-owners of the neighbourhood, seem to have been the considerations which led the good people into whose hands the beast fell to settle offhand that it must be a "Wolf escaped from a menagerie," the expansion of the predicate being only justified as a corollary of the first part. Judging from the size of the teeth, the creature was adult. It is rather larger than a Fox, and has a bushy tail and erect ears. The legs and the head, so far as could be seen, except for a blackish patch in front of the ear, are a rich fawn-colour; the back is black, mottled with dark grey, the tail being much the same shade on the back, and without a white tip. Apart from its slightly superior size, it differs strikingly from a Fox in having the ears and feet fawn instead of blackish, and in the absence of white from the lips and throat. Of Wild Dogs, it is perhaps the Black-backed Jackal that it most calls to mind, although much stouter in build and smaller in the ears than that elegant species. It also resembles a small cock-eared colley, and might pass muster as such amongst a crowd of mongrels. A suspiciously "foxy" look about the beast, however, inclines me to the belief that it is the progeny of a Fox, and probably some country Sheep-dog. It would be interesting to learn if there are any authenticated cases of hybridism between the two species, and, if so, what were the characters of the "hybrids."—R. I. Pocock (Nat. Hist. Museum, South Kensington).

[In 'The Zoologist' for last year (p. 240) an abstract was given of a communication by the Rev. J. Conway Walter, which appeared in the 'Naturalist' for April of that year, on "Fox and Dog Hybrids near Horn-castle."—ED.]

A V E S.

The Bearded Tit: a Correction corrected. — Mr. Ridsdale's note upon this subject (*ante*, p. 422) is entertaining, but, if he wishes us to believe that Gesner really figured the Bearded Tit, I am afraid he will require to produce some further corroborative evidence. Belon figures the Great, Blue, and Long-tailed Tits, and refers to the Marsh-Tit, but not to any other that I can discover. Gesner, who comes next in chronological order, figures the Coal, Crested, and Marsh-Tits, as well as those figured by

Belon; but his seventh figure does *not* represent the Bearded Tit, as Mr. Ridsdale gives us to suppose. It represents one of two things—either his *Parus sylvaticus*, which was possibly a Fire-crest (from his description of the red colour of its crown, and its other tints), or else the bird with a black head reported to him from France as the Mounier. Aldrovandus refers to the Penduline Tit, if I understand him rightly; but I cannot make out that even Aldrovandus, with all his knowledge of European birds, had ever come across the Bearded Tit. For my part, I see no reason to doubt the correctness of Mr. Gurney's original statement; nor will anyone, I believe, who studies the text of Belon, Gesner, and Aldrovandus with sufficient care.—H. A. MACPHERSON (The Rectory, Pitlochry, Perthshire).

[Mr. Ridsdale's correction (?) was submitted to Mr. Gurney before publication for any comment he might care to make, but he naturally assumed that his critic *must* be correct.—ED.]

Movements of Starlings.—As an appendix to my paper on this subject (*ante*, p. 131), I should like to add that since writing it I have been told of another "roost" at Petton Park, between Shrewsbury and Wem. The roost consists of large clumps of laurels, rhododendrons, and other evergreen shrubs. The gardener, Mr. Tatton, states that the Starlings resort there in enormous numbers from December to March! This is most interesting, as at that period the other roosts in the county are nearly deserted. It would appear that the Petton roost is the last resort of the Starlings, because in these evergreens they find warmth and shelter when the trees in the other roosts are bare. The roost described by Mr. Corbin (*Zool.* 1879, p. 215) is of a similar character. He speaks of it as being still used at the end of March. During the present season I have not found a single case of the Starling rearing two broods.—H. E. FORREST (Shrewsbury).

Some Notes on the Swift (*Cypselus apus*).—May 5th. First Swift appeared. 6th. Four together on the wing this evening. 7th. The full complement of our Swifts for this village seem to be already with us. I believe there is generally little delay after the appearance of the first arrivals before the complete number are with us. 15th. With the cold east winds we had about this date Swifts seemed entirely absent upon the wing, remaining in their nesting-holes and other accommodation, evidently preferring warmth with starvation to facing the uninviting elements. 31st. Windy; very few Swifts upon the wing. 7 p.m., a Swift in the previous year's nesting-hole on the roof of my house. No eggs at present.

June 8th.—Having been from home since previous note, I have been unable to visit the nest before to-night at 9 p.m., when I found the Swift sitting on three eggs,* little doubt the laying of one female, as I have never

* The eggs are two in number.—Howard Saunders, 'Manual of British Birds.'

seen more than the one pair enter the nest. Last year the first egg was laid on June 5th. 12th. As the Swifts were ceasing their noisy gatherings, and after the males had evidently accompanied the females in many instances to their nests, they returned again to the gathering, and in their further manœuvres gradually reached a good altitude; here they seemed to eventually cease their screamings, and the flock to limit themselves more and more to a restricted area, until eventually they merely floated in company upon the wing—not in the so-called “night-flight,” but in their “aerial sleep.” Unfortunately, owing to the now fast decreasing light, these actions, even with a good glass, could not be studied for any length of time. 19th, 7.30 p.m. Six or more Swifts were circling around my house, and constantly flying up to the entrance of the nesting-hole, where the one was sitting, inviting, as it were, the sitting bird to join in their social gathering (if such a noisy concourse can be so termed) which was about to commence. 20th. The Swifts, whilst incubating, and, in fact, at all times whilst within the nest, seem absurdly tame, allowing me to handle them daily, and feel beneath to take particulars of the eggs under incubation, and not in any single instance leaving the nest, although the exit was always open. Occasionally I would be greeted by a flapping of wings, or the rubbing of the beak against my fingers in their attempt to peck me. 23rd. Eggs still in nest. 24th, 8.30 a.m. Two of the eggs hatched; one remains. Incubation lasts at least sixteen days. 26th, 6.30 a.m.; cold and windy. Both Swifts on nest, now containing three young.

July 4th, 9.5 p.m. Unless the nights are calm and warm, I do not think the Swifts ever sleep upon the wing. To-night was a perfect time for them, and they gave me a splendid opportunity of seeing them ascend. Several descended before the others rose to any considerable height; altogether about twelve remained in the company. One of the old birds remained with the two young (the third young one having died) throughout the night. 5th. The female (presumed in every instance) spends the greater part of the day with her young, and is now far more pugnacious than when with eggs. The feeding of the young does not take place continuously throughout, or at any particular part of the day; the female will leave the nest for some considerable time (even an hour or more), and returns with evidently sufficient food to satisfy the young for several hours at least. From present observation I do not think the male takes any share in providing for the young. 8th, 12 to 1 p.m. Female remains with young; 3 to 30, no Swift approaches the nest; 4.30 to 5.30, female absent from young, and did not return; 6.30, female on nest, and remained there all the evening. The male slept in company with the female. The one which I think was the female objected, as usual, to my intrusion, but the

male allowed me to remove him from the nest without protest whilst I satisfied myself of the two being there. In the majority of instances the female alone remains with young. When putting one's hand into the nest for investigation (which is always necessary owing to the total absence of light whence these observations are taken) the young open their mouths to be fed sufficiently wide to enable me to put my finger fully into their throats. 15th. Young are becoming very pugnacious, flapping at and pecking one's hand.

August 4th, 7 a.m.—Very windy. Both old and two young in nest. 10th. Young still in nest. 11th. The young left the nest previous to mid-day, and evidently remained on the wing throughout the remaining portion of the day. Time of young remaining within the nest: six weeks, six days. 12th. One Swift only at roost in nest. 19th. Swifts noticed in this locality for the last time, seemingly in their usual number. 23rd. One Swift seen in adjoining parish. 24th. Three together in another district two miles distant.—J. STEELE-ELLIOTT (Clent, Worcestershire).

Cuckoo breeding in London District.—In connection with the note on this subject (*ante*, pp. 438–9), it may be of interest to record that on June 6th, 1896, I found a Whitethroat's nest containing four eggs, one of which was a Cuckoo's. This was in a hedge within a few yards of a public footpath, and close to Hampstead Heath. On May 23rd in the following year (1897), I found a Hedge-Sparrow's nest in the same locality with one egg of that bird and a Cuckoo's. The latter was not blue, and not unlike eggs of the Sedge-Warbler in colour. Both these Cuckoos' eggs were quite unlike each other. I believe that in the collection of Cuckoos' eggs, with the nests and eggs of the foster-parents, in the British Museum, those that are laid in Hedge-Sparrows' nests are not blue. In each of the above records the foster-parent was observed on the nest.—BASIL W. MARTIN (Elm Lodge, Hampstead).

Observations on the Cuckoo in Aberdeen.—There was a continuation of the singing of this bird (*Cuculus canorus*) up to July 15th. As near as could be estimated there were about ten young ones seen about my farm; certainly an increase as regards former years. They exhibited a variety of colours, from blue to rufous. A young one, which was rufous, with a large white spot on the crown of the head, was handled on June 17th. This one had either removed from the nest to be sheltered from the rain, or had flown from the nest in sunshine, and then had become unable to fly through the heavy rains accompanying a thunderstorm on the date mentioned. Its feathers seemed quite sufficiently grown for flying, but these birds are evidently much influenced by wet, especially if the weather becomes cold at the same time. I noticed, during cold days on and about Aug. 4th, that some young ones chirped on continually; in fact, their cries were pitiable.

Of course these were still attended to by the foster-birds, but whether the crying was for food or on account of the cold, I cannot say. Perhaps both. It might be surmised that the cold would awaken the appetite, provided it did not interfere with the health of the bird; and it is also probable that certain forms of insects were not so easily available in cold as in warm weather. There was a young one flying about on Aug. 10th, with a foster-bird in attendance; this being the latest date on which I saw them. The whole of the foster-birds were Mountain Linnets (*Linota flavirostris*).—WM. WILSON (Alford, N.B.).

The Little Owl in Flintshire?—In collecting materials for a fauna of North Wales, I have lately had occasion to look into old records as far back as the beginning of the century. One of the problems presented for solution was this—Has the Little Owl (*Carine noctua*) ever been obtained in North Wales? Yarrell and Morris mention it as having occurred in Flintshire, but give no particulars. Montagu, writing of it under the title of the Sparrow-Owl (*Noctua passerina*, Savigny), notices that the descriptions of plumage given by various authors show many discrepancies. He did not, apparently, perceive that three species had been confounded together under the title of Little Owl. These we now know as *Carine noctua* and *Nyctala tengmalmi*; the third—the form called *Strix passerina* by Linnæus—has never occurred in Britain. Traced to its source, the statement that *Carine noctua* has occurred in Flintshire appears to rest on the testimony of Pennant. Let us see what he says. In his 'Tour in Wales,' speaking of the detached hundred of Maelor in Flintshire, he states that that rare British species, the Little Owl, had been taken in some woods near Overton. In his 'British Zoology,' 1812, p. 270, he states, in general terms, the Little Owl (*Strix passerina*) "is sometimes found in Yorkshire, Flintshire, and also near London." The allusion to Flintshire probably refers to the Overton bird. Later writers have copied this statement without question. I think, however, that the *description* given by Pennant indicates that the bird was *Nyctala tengmalmi*, not the species now known as the Little Owl (*Carine noctua*). The editor of the fourth edition of 'Yarrell' was also of this opinion, for on p. 155 he writes:—"The 'Little Owl' figured in the folio edition of Pennant's 'British Zoology' was probably of this species" [*N. tengmalmi*]. Yet on p. 179 he still speaks of the Little Owl as having occurred in Flintshire. If it could be proved that Pennant's Overton Owl was *Carine noctua*, the much-debated question as to the admission of the Little Owl to the British list might be considered settled; at that period it is unlikely that it could have been an escaped or imported bird. Now, to sum up the evidence. So far as we know only one Little Owl has been obtained in North Wales. (Dr. Dobie records another at Gresford, but suggests a doubt as to species.) That one was apparently *Nyctala teng-*

malmi, and was taken at Overton, Flintshire. If so, *Carine noctua* has not occurred in Flintshire, despite the oft-repeated statement that it has.—H. E. FORREST (Shrewsbury).

Red-crested Pochard in Yorkshire.—A fine specimen of the Red-crested Pochard (*Fuligula rufina*) was shot on a marsh near Redcar on Jan. 20th, 1900, and is now in my possession. It is, I believe, the first recorded example of this rare Duck for Yorkshire.—T. H. NELSON (The Cliffe, Redcar).

Stone Curlew in Cleveland in Winter.—An example of the Stone Curlew (*Ædicnemus scolopax*) was brought to me on Dec. 16th, 1899, by a man who had caught it alive during a snowstorm on the sand-hills east of Redcar. The occurrence of this species in Cleveland is at any time unusual, but its presence here in mid-winter is so exceptional as to be worthy of record.—T. H. NELSON (The Cliffe, Redcar).

Curlew at Sea.—It is, I think, a rare occurrence for *Numenius arquata* to be seen any distance out at sea. On the last homeward voyage of the Union Castle Liner 'Norman,' in August, about eighteen hours after leaving Madeira, I observed a Curlew flying over the water, and making for the ship, evidently with the intention of seeking refuge thereon. Several times did this usually cunning bird fly up to within gunshot, but sheered off again each time, and ultimately disappeared altogether, frightened no doubt by the weird aspect of the ship—her huge white side, her red funnels from which streamed black smoke, her decks alive with passengers, and forging her way through the water at sixteen knots an hour. The bearings of the 'Norman' at the time were 40° N. 12° 1' W., or, approximately, fifty miles from land.—RICHARD CRAWSHAY (109, Jermyn Street, S.W.).

[It is probable that the ship did not greatly frighten the bird. We have already recorded capturing a Storm-Petrel (*Procellaria pelagica*) on board this very vessel, the 'Norman,' near the Cape Verde Islands (Zool. 1899, p. 557). On another vessel of the same line, the 'Norham Castle,' we found the ship to be a regular avian rendezvous (*cf. ibid.* 1898, p. 509).—ED.]

PISCES.

Sun-fish in the Yarmouth Roads.—A short Sun-fish (*Orthogoriscus mola*), about two feet long, was floundering about in the Roads on Sept. 5th, and was secured by some fishermen, who had little difficulty in effecting the capture. A friend purchased it for me, but, owing to the non-delivery of a post-card, I missed obtaining it before going wrong, and being thrown away among the offal.—A. PATTERSON (Ibis House, Great Yarmouth).

MOLLUSCA.

Molluscs eaten by Wood-Pigeons.—On Sept. 5th, whilst shooting on the confines of the Bog of Allen, Co. Kildare, I killed a Wood-Pigeon, in whose crop I found thirty-nine Snails, which appeared to me to be Water-Snails. An instance of this sort has never come under my notice. The bird was in first-rate condition, and corn in the neighbourhood at this time of year is easily obtainable. There was nothing else in the crop save two hawthorn-berries and one oat. I send you by this post some of the Snails, and shall be glad to hear whether this is an unusual occurrence. — H. MARMADUKE LANGDALE (Compton Vicarage, Petersfield, Hants).

[The specimens forwarded by Mr. Marmaduke Langdale represent the "Amber Snail" (*Succinea putris*), an amphibious species, seldom seen in the water except in the spring, when on its way from winter quarters in the mud. It is probable that its attack by Pigeons is not unusual. One of my sons keeps a quantity of pond-fish in a garden-tank, and, on my advice, introduced as scavengers a number of *Limnæa stagnalis*. These molluscs have steadily disappeared, while his Fantail-Pigeons seem to have a great attraction for the sides of the tank. Mr. Langdale's communication perhaps offers a suggestion as to what hitherto seemed a mysterious disappearance. Mr. Collins Baker, who has recently written on the Mollusca of the Chicago Area, states that Passerine birds are fond of *Pupa*, *Vertigo*, and small *Limaces* (cf. Chic. Ac. Nat. Sci.—Nat. Hist. Surv. Bull. iii. p. 33).—ED.]

CRUSTACEA.

Meristic Variation in the Edible Crab.—I forward a sketch and examples of two different malformed claws of *Cancer pagurus*. I have obtained several Crabs with double and treble pointed large pincer-claws (cf. Zool. 1897, p. 340, and 1898, p. 220), but this is the first time I have met with malformation in the smaller claws. In one the two end claws are fused into one, in the other example they can be worked separately.—A. PATTERSON (Ibis House, Great Yarmouth).

MYRIOPODA.

Marine Centipede in Somerset.—There are two species of marine, or, rather, littoral Centipedes found in England—*Geophilus submarinus* and *Linotania maritima*. So far as I know, Polperro, on the coast of Cornwall, is the only spot in England where *G. submarinus* has been collected; *L. maritima*, on the contrary, has been found at several localities, and is evidently widely distributed. In the British Museum there are examples from Bexhill (H. Scherren) and Polperro (Mr. Laughrin), in England; and from Portmarnock, Co. Dublin (G. H. Carpenter), and the coast of Galway

(D'Arcy Thomson), in Ireland. The species has also been recorded from the south coast of Devonshire by the late Mr. Parfitt. Hence there is nothing surprising in my recent discovery of it at Portishead, on the coast of Somersetshire, some three or four miles to the south of Avonmouth, at a spot a few hundred yards to the north of the Nove lighthouse, where a small shingle beach forms a convenient bathing-place. I had hitherto looked upon this Centipede as a rarity to be picked up only by ones or twos. Great therefore was my astonishment when, turning over the line of seaweed marking the high spring-tide, to find specimens of all sizes swarming amongst the slimy decaying fronds, and wriggling away into darkness in company with hosts of scuttling Woodlice and hopping Sand-Shrimps; while here and there was a cluster of them feeding upon the remains of one of these crustaceans. I afterwards looked for this Centipede under the weed on the beach beneath Aust cliff, in Gloucestershire, some miles to the north of Avonmouth, but without success.—R. I. Pocock (Nat. Hist. Museum, South Kensington).

Vertebrate Fauna of North Wales.—I am preparing materials for a fauna of this district, which has hitherto been sadly neglected. Excellent local lists of birds have been published by Prof. Salter, Mr. F. C. Rawlings, and Dr. Dobie, dealing respectively with the districts of Aberystwith, Barmouth, and the counties of Flint and Denbigh. The Report of the "Parliamentary Commission on Land in Wales" contains notes on birds and mammals by my friend Mr. Ruddy, and others. Eyton's list, published in 1838, is the only one which deals with the whole district, and with all the vertebrates. It is now quite out of date, and of little practical use. Valuable notes have appeared in 'The Zoologist' from time to time, especially during the last ten years. Others, in the Reports of the Marine Biological Committee, Liverpool, and in various books, periodicals, &c. The labour of preparing the description of a fauna of such a wide district is evidently beyond the powers of any one man. I therefore venture to appeal to all readers of 'The Zoologist' to assist in this much-needed work by contributing notes of their own observations. Many practical naturalists in North Wales have already promised me their valued aid; but, in order to arrive at a just idea of the distribution of the common species, it is necessary to collect information from every district. I shall be glad to hear from anyone who is willing to fill up lists, especially as regards Anglesea and Carnarvon. Very little is known about the Fishes and Cetaceans of North Wales; information about these will be most welcome.—H. E. FORREST (Shrewsbury Museum).

NOTICES OF NEW BOOKS.

The Birds of Ireland. By RICHARD J. USSHER and ROBERT WARREN. Gurney & Jackson.

THIS is a book to be welcomed by ornithologists; its authors are naturalists of repute; it has received assistance from most Irish ornithologists; Mr. R. M. Barrington has supplied much unpublished information collected from light-keepers; the records reproduced have been well sifted, and the whole book exhibits a scientific method that may serve for imitation by some writers of county faunas. Thompson's 'Natural History of Ireland,' which still contained the greatest treatise on Irish ornithology, was published some fifty years ago, and the present book will naturally now succeed if for present-day information.

Of birds that have ceased to be residents are the Crane, the Great Auk, and the Capercailzie; on the other hand, the Magpie, first reported in Ireland towards the end of the seventeenth century, has spread rapidly, "and is now to be seen everywhere, except on the barest moorlands." The Starling has increased as a breeding species, and the steady extension of this bird's "summer range in Ireland is of a piece with what has taken place in Scotland"; Woodcocks have greatly increased in the Irish woodlands during the summer; and the Mistle-Thrush, of which the first Irish example known to Thompson was shot in 1808, is now "resident, common, and widely distributed." The Tufted Duck is also another bird which, during the last twenty years, has extended its breeding range, while a similar remark applies to the Stock-Dove, so that at least the feathered population of Ireland is not diminishing.

It is cheerful for English naturalists of our south coast to read that in Ireland no bird is more characteristic of the cliff-scenery than the Chough, and "in no country probably does it flourish in its natural strongholds more undisturbed." Although

the Chough and the Jackdaw are reported by Mr. Ussher as not apparently molesting one another, "still, the increase of the Jackdaw has been observed in many places to coincide with the diminution of the red-billed bird." The Crested Lark has been once obtained in Ireland, and it is interesting to read that it was shot by the well-known war correspondent, Sir W. H. Russell, then a boy of fifteen, who under the letters "W. R." communicated the fact to the 'Dublin Penny Journal' in 1836. It will probably not be known to all that the Stone-Curlew is in Ireland a "rare casual visitor, chiefly in winter, but never in summer," and that it has only been obtained in ten cases. Many interesting facts and suggestions are given respecting the Guillemot. Mr. Ussher remarks that as incubation proceeds the eggs become so completely covered with filth that he has seen many cemented thereby to the rock, which may account for the exaggerated statement that the bird has the power of gluing them to the rock to keep them from falling off. He also suggests that the beautiful varieties of colouring in the eggs "must help each bird to distinguish her eggs from others lying near, until they become all stained and soiled."

We could, but must not, extract other notes from this history of Irish birds, which is, and will long remain, the standard work on the subject. It is a story well told, and a treatise well written, embellished with the reproduction of some well-selected photographs, and with a coloured plate exhibiting variations in the tints and markings of the eggs of the Peregrine Falcon.

Fancy Waterfowl. By FRANK FINN, F.Z.S. Published by
'The Feathered World.'

THE purpose and scope of this publication is distinctly enunciated by the author. It is "to give such description and details as may enable anyone who becomes interested in these beautiful birds to recognise such species as he will see in collections on ornamental waters, like that of St. James's Park, or find on sale with the dealers, and to treat them successfully if he decides to take up the Fancy on his own account."

It is thus addressed more to the aviculturist than to the strict ornithologist, though the division between these two students is very difficult to maintain. A live bird must necessarily afford more information than a preserved skin; on the other hand, the opportunities of acquiring the first are infinitesimal compared with the vast available material of the second. Consequently we must look to the cabinet ornithologist for our general knowledge, and to the field naturalist and the aviculturist for bionomical information. Mr. Finn has provided an excellent help to those who wish to keep waterfowl—we must plead guilty to a strong dislike of the word “Fancy”; and his knowledge of zoology and position in the Indian Museum entitle him to write as one in authority, and not as the “Fanciers.”

Church Stretton: Geology, by E. S. COBBOLD; Macro-Lepidoptera, by F. B. NEWNHAM; Molluscs, by R. A. BUDDICOM. Edited by C. W. CAMPBELL-HYSLOP. Shrewsbury: L. Wilding, printer.

THIS is the first instalment of a series of monographs relating to Church Stretton, of which those on Botany, Archæology, Climatology, and Ornithology are in preparation, and will appear subsequently.

This neighbourhood was described by J. G. Jeffreys as “the picturesque locality of Stretton in Shropshire”; and Mr. Newnham refers to it as “a district of hill and dale, of moorland, wood, and stream.” Consequently it is a spot worthy of a local natural historian, and when a body of naturalists unite to describe its fauna, flora, geology, and other natural features, and do so in an exhaustive manner, we recognize a very useful addition to British natural history.

THE ZOOLOGIST

No. 713.—November, 1900.

THE BIRDS OF LLEYN, WEST CARNARVONSHIRE.

BY O. V. APLIN, F.L.S.

THE western part of the promontory of Carnarvonshire known as Lleyn is almost devoid of the mountainous features so characteristic of the eastern and northern parts of the county. After leaving the group of mountains lying south of Clynnog, and the triple-headed Yr Eifl, or "The Rivals" (the highest point of which rises no higher than 1849 ft.), and going westward, we see no more than occasional isolated semi-conical mountains (with supplementary hills) rising from the undulating plain. Of these Carn Bodfean and Carn Fadryn (1221 ft.) are the most remarkable. But the Rhiw hills, at the north-west end of the sweep of Hell's Mouth, cutting off the extreme west end of the promontory, and many other lesser ridges, break up the country; while the coast headlands grow bolder as we go westward, and reach their greatest height in Mynydd Annelog, a little to the north of the land's-end of North Wales, and Graig ddu and Penarfynydd, which run out from the Rhiw hills. The rushing mountain torrent is consequently wanting, and the little rivers, although quick in places, and clear as to their waters, flow often quite sluggishly through reeds and flags and lush green marshes, haunted by Snipes and Moor-hens and numerous broods of Wild Ducks, rather than by the Dipper. I cannot say that the Dipper is not found in the western parts of Lleyn; but, though I looked

casually on many bits of stream, I did not see one during the time (June 15th to July 3rd, 1899) I spent in the district. Nor did I meet with more than one pair of Grey Wagtails (another bird one associates with the west). These seemed to be breeding under the arch of Pont Rhyd Gôch, on the Afon Erch. The Pied Wagtail was fairly common. I did not find Ray's Wagtail, but Mr. T. A. Coward (who has paid several visits to the district), to whom I am indebted for some most interesting notes on the birds of Lleyn, tells me he has seen it at Abersoch and Nevin. The Rock-Pipit is common about the rocky parts of the coast, and is found on some at least of the islands. It was more abundant on one headland than in any other spot I have visited—a charming grassy headland studded with grey rocks, and at that time gay with *Silene maritima*, *Armeria maritima*, and *Erythrœa littoralis*; the home, too, of the rarer *Scilla verna*. The Pipits had, I think, hatched their young, and would sit on a stone, with an anxious manner, and utter unceasingly their cry of alarm or distress—a very high shrill “chip” or “chick”—as long as one's patience lasted. The call-note “sneek” or “snik” sounded all around, and some birds were in full song. This is “tig tig tig,” &c. (rising flight), “swik swik,” &c. (first part of falling flight), and then numerous more musical “tinks,” uttered very rapidly, to finish up with. The plumage of these Rock-Pipits even at that date was worn and brownish; the head distinctly greyer; throat-patch light, a tiny eye-streak visible, and two bars on the wing conspicuous. The Meadow Pipit is very common—among sand-hills on the coast, on the headlands, moorlands, and mountains. When alarmed for the safety of its nest or young, the note is a very sharp quick “chittick,” somewhat like the sound made by a House-Cricket. Its rapid song always sounds to me very monotonous, there being usually only one change in it; it consists of a short quick “chewit” frequently repeated, followed by a still more rapidly uttered “chit” or “chee.” The name “Neighing-Bird,” bestowed by Charleton on one or other of the Pipits, seems an appropriate one for this bird (‘Exercitationes,’ 1677). I saw and heard the Tree-Pipit on several occasions. One near Llwyn-gwyn sat on a low flat-topped wall to sing the perching-song, then soared and returned to the spot.

Mountain birds were, of course, rarely seen. As I ascended

Yr Eifl to look at Carn Trer Ceiri, that wonderful ancient town of misty history, I came upon a pair of Ring-Ouzels carrying food; but a very long watch failed to reveal the exact place of their nest, which was either in thick bracken or a waste of grey rocks in the midst of it. The actions of the birds several times completely deceived me into making a descent on some spot, only to cause the birds to take up once more a commanding position, and resume their loud hard "tac tac tac." Late in the afternoon I heard a few wild whistling notes. Probably this group of mountains is the westernmost outpost of the Ring-Ouzel in Carnarvonshire, from which county it has been known since the days of Willughby and Ray. "It is frequent on the high mountains of Caernarvanshire and Merionydshire, where they call it *Mwyalchen y graig, quasi dicas, Merula rupicola*" (Ray's 'Synopsis Methodica Avium,' 1713). Although Ray distinguishes between the Rock-Ouzel and the Ring-Ouzel, it is obvious that his description and Willughby's, to which he refers, applies to the latter. The Song-Thrush was common, and the Blackbird still more so; to be found at the base of the headlands as far as a few bushes extended. The Mistle-Thrush I saw two or three times near Pwllheli. Mr. Coward has also met with a few. The Wheatear is a common bird. On the mountains and headlands and islands, as well as in some spots along the lower coast, the shrill highly pitched "ece" or "ees," followed by several hard "tacs" or "tecs," was a familiar sound as the pair of Wheatears, accompanied by their full-grown brood, flitted on before me. The only birds which enlivened the dry, stony, barren (the season had been unusually dry) top of Carn Fadryn were a family of Wheatears. I only saw the Whinchat twice—once at Abersoch, and once in a low pass among the hills near Nauhoran. Mr. Coward has seen a few near Abersoch. The "seet seet seet" (high), "chuch" or "gurch," or "seet-gurch," of the Stonechat was to be heard in all suitable places—among the gorse along the sandhills, on the moorlands, mountain slopes, the headlands, and about the drier edges of the marshes. Evidently the soft climate of Lleyrn enables this resident to increase as it never can when exposed to the severe winters of parts of England, or obliged to migrate. I saw one bird with the white on its wing unusually largely developed; so much so that, seen at a distance, the bird

formed a conspicuous white spot on the stretch of moorland it inhabited. It was probably a partly white variety, but it was wild, and I could not get very close to it.

Lleyn is thickly populated by small farmers, whose white houses are scattered all over the country, most of which is cut up into small fields. Inland we find hedges of blackthorn and hawthorn, hazel, rose, and honeysuckle; but these are less frequent as we go west, and west of the Rhiw hills, as well as in other exposed parts of this windy country, the high stone and turf banks which enclose the fields are topped with little more than low gorse and bracken. Gorse, indeed—wide stretches of it—is a great feature of Lleyn. The grounds of the country houses are well planted, and there are many small woods and belts of plantation; so that, although the country is not an ideal one for Warblers, there would be (except in the far west) sufficient accommodation for them. The Robin is very common, but I did not see a Redstart. The true Warblers, with one exception, are remarkable for their scarcity or absence. The Whitethroat alone is common. I never identified either the Blackcap, Garden Warbler, or Lesser Whitethroat; but Mr. Coward observed a pair of the last named breeding at Abersoch in May, 1893. This noisy bird, with which I am very familiar, must, however, be very rare. Once I thought I heard the alarm-note of the Blackcap; but, if it is present, it must be scarce. In the course of an afternoon's walk at Dolgelly, on my way home, I heard two in song; so that I do not think it would have been silent in Lleyn during the time I was there, although the period of song of birds does vary in different districts in Great Britain. The Wood-Wren could be heard in several localities in oak and mixed wood, at Carn Bodfean, Bodegroes, Llanbedrog, &c. The Chiffchaff I noticed in five localities, but neither this bird nor the Willow-Wren could be called abundant, although the latter was common, and sang at all times in the day right through the latter half of June (and at Dolgelly on July 3rd). The Sedge-Warbler is common about the bogs and wetter marshes, and Mr. Coward has noted the Grasshopper-Warbler in two years at Llanbedrog. I did not consider the Hedge-Sparrow normally common, but this bird, like some others, is more in evidence earlier in the year. This remark applies especially to Tits, of which I only observed

the Greater and the Blue, both fairly common. The Wren is remarkably abundant. The Tree-Creeper I saw once at Bodegroes. I saw no Red-backed Shrikes, but Mr. Coward found a pair breeding near Llanbedrog in June, 1887; a very interesting occurrence. The Spotted Flycatcher is fairly common; I saw it in five localities on or near the south coast. But the Pied Flycatcher was looked for in vain. The Swallow is, I think, only fairly numerous, and the House-Martin rare. I saw one as far west as a pond between the village of Aberdaron and Braich y Pwll. The Sand-Martin is quite common, haunting the sea-coast so much as to make the name of "Shore Bird," bestowed upon it by some early writers, seem natural and appropriate. There are colonies of Sand-Martins in the sand-cliffs near Llanbedrog, and the wasting earthy cliffs of Porth Nigel (Hell's Mouth). The Greenfinch and Linnet exist in fair numbers. I watched a pair of Goldfinches feeding their young in a nest built in an old plum-tree in a garden hedge at Efail-newydd, and saw a pair at Llanbedrog, and other birds at Pwllheli. Mr. Coward has seen a few at Abersoch, so it is probably not uncommon. The House-Sparrow would not seem numerous to anyone coming from a wheat-growing country, there being too little corn for it; but it long ago extended its range into the utmost limits of Llyn. The Rev. W. Bingley, who travelled in Carnarvonshire in 1798, was told of Bardsey Isle:—"Till about four years ago no Sparrows had been known to breed here; three nests were, however, built during the same spring, and the produce has since completely colonized the place." The Chaffinch is common, and Mr. Coward adds the Bullfinch to my list. He has also seen a caged Lesser Redpoll, caught near Nevin in the winter. When I was on Yr Eifl, I noticed one or two birds which I thought were Twites from their notes; but I could not identify the birds making the note, as they were very wild. Mr. Coward, however, saw "flocks on 'The Rivals' and Carn Madryn" (in late summer); I could see no Twites about the latter mountain (in June).

To rear black cattle, tall white Pigs, and many grey Geese, with some useful low Horses, and a certain number of Sheep on the hills, is the occupation of the Llyn farmer, rather than corn growing; but many of the small fields right up to the foot of

Mynydd Mawr are cropped with oats and barley. It seemed strange at first, in a climate so mild and soft that myrtles, hydrangeas, fuchsias, and large bushes of escallonia flourish in the cottage gardens, to be told that wheat is hardly worth growing; but in Lleyrn almost every wind comes off the sea, and it must be rarely that it enjoys a summer so hot and dry as that of 1899, when haymaking was in full swing at Aberdaron at the end of June. But, notwithstanding the comparative scarcity of corn, the Corn-Bunting is an abundant bird as far westward, and as far on to the headlands, as the little fields extend, even unto the last of the fields before we climb the heathery slopes of Mynydd Mawr. I think the curiously local distribution of this bird does not depend on the presence or absence of corn; but the bird undoubtedly shows a liking for open cultivated ground near the sea-coast. The Yellow Bunting is a common roadside bird, and seemed richly coloured. I saw one with a particularly rich and brilliant yellow head. On June 28th I watched, and listened for some time to the song of, a male Cirl Bunting at Llanbedrog. I could hear another bird singing at a little distance. I noticed it again two days later (*vide* Zool. 1899, p. 322). The Reed-Bunting is common in the marshes. The Sky-Lark, as far as I saw, is not very numerous; and I do not think Lleyrn would prove a good Partridge country, although I happened to put up two some distance apart from the side of a field-path in one day, and one does not see much of Partridges in June. Pheasants are to be heard in the covers, and I found the broken shell of an egg on Pwllheli sand-hills. The Eifl group is probably the western outpost in Carnarvonshire of the Red Grouse. I did not expect to see any Grouse there, and was much startled, as I was looking among the bracken for the young of a pair of Ring-Ouzels, at springing a pair within a few yards of my feet. They went away with a loud "bek bek bek," just like that of the Willow-Grouse. They had been scratching in the peaty soil, and I picked up some dark and richly coloured small feathers.

The Corn-Crake is very abundant in Lleyrn, almost every field with suitable covers holding one. A Corn-Crake used to crake from a little close quite in the new town of Pwllheli. It has been so much less common of late years in Oxfordshire than was formerly the case that I quite enjoyed hearing so much of it,

and being able, as of yore, to hear its cry while I was in bed. The distribution of the Corn-Crake in the British Islands has been, and is, rather peculiar. It has always favoured the western parts and the north. The older writers on our ornithology (except Turner) seem to have been but little acquainted with it, and their knowledge of its identity even was not too clear. Turner described its habits, &c., well from observations in Northumberland (I quote from Ray's 'Willughby'), but the latter authors rely on his description, merely adding that, "although this bird be more rare in England, yet it is found everywhere in Ireland in great plenty." It is fairly well figured in the 'Ornithology' as "Ortygometra; the Rail or Daker Hen." Charleton (whose first edition was published in 1668) knew next to nothing about it. He applied the name Daker Hen of Turner wrongly, but has the bird under the name Ortygometra, the Raile. "Raro . . . est cursus velocissimi. Inter herbas & gramen sese abdit ut raro appareat" ('Exercitationes,' 1677). Ray's 'Synopsis' takes us but little farther. "Daker Hen or Rail. In Anglia rarior est. In Hibernia frequens habetur." Pennant writes:—"They are in greatest plenty in Anglesea, where they appear about the twentieth of April, supposed to pass over from Ireland, where they abound; at their first arrival it is common to shoot seven or eight in a morning. They are found in most of the Hebrides, and the Orknies." The Corn-Crake seems to have been always somewhat local in England. In White's day it was quite rare at Selborne, though abundant in Wilts, and about Oxford, where it has become more scarce of late years. The name Corn-Crake (by which the bird is almost invariably known in spring) was not general a century ago. The bird is the Crake Gallinule of Pennant and Montagu, the latter giving Corn-Crake, Crek, or Cracker as provincial names. But Corn-Crake is an old name, and apparently originated in the north. We find "Corn-crek" as early as 1684 in the 'Pro-dromus H. N. Scotiæ' of Robert Sibbald, and "Corn-craker," in 1716, in Martin's 'Description of the Western Islands of Scotland' (Pennant). Forster, in his 'Catalogue' (1817), however, has Corncrake as his first English name.

Along some parts of the southern coast we find some grass marshes, noisy in June with the constant screams of numbers of

breeding Peewits, and from which you may, at the end of the month, put up small flocks of wary Curlews. And on the banks of the more sluggish streams there are other lush green marshes, adorned with great clumps of yellow iris, crossed by ditches grown up with marsh-plants, and flecked here and there with cotton-grass, which tells of places which in a less dry season would be deep and boggy. At Abersoch there is a nice marsh, with a lot of reed-grown water, where Moor-hens chuckle, and the Wild Duck's subdued quack may be heard in the evening; Reed-Buntings chant, and Sedge-Warblers chatter, and Herons come down to feed. Snipe, too, may be flushed from thickets of fragrant bog-myrtle (*Myrica gale*), where the spongy turf is full of bog-loving plants, and in June was gay with spikes of deep purple *Orchis incarnata*, pink *O. maculata*, and pale, sweet *Habenaria bifolia*. Moor-hens are common in the district, and haunt quite small streams. Herons are often to be seen in the marshes and harbour, or flying over. Snipes breed in the marshes, and I flushed one from a meadow of good grass, and saw another "drumming" over the high moorland on Cilan headland. Peewits are quite common, having a sufficiency of semi-waste ground to breed on. On the moorland at Cilan a mobbing bird came within a yard of my head as I was innocently gathering and washing a rare bog plant. In some of the narrow green marshes along the coast Peewits are very abundant, and their cries become most wearisome in time. Some were already in flocks at the end of June. The Ringed Plover is found all along the pebbly and sandy parts of the coast, their soft clear "pe-ip" (syllables hardly divided) or "peep" being a constant accompaniment to a walk along the beach. When two birds run together (perhaps to congratulate one another on their young having escaped observation), a chorus of "tooley tooley tooley" breaks forth from them. Oystercatchers are to be found all round the coast, at the base of rocky cliffs, on outlying rocks, and on the islands. I saw some, too, in Pwllheli harbour, and on the sands. Considerable numbers frequent one long raised pebble beach, in two terraces, which merges on the landward side in short turf or sand-hills. From the way they mobbed me (flying round rather high up, with a painfully monotonous cry, and anon coming straight at me) they seemed to have young.

The mobbing cries are a short squeaky "quik" and "que-ah," sometimes uttered together, "quik-que-ah," uttered quickly and peculiarly squeaky, and, under great excitement, fairly screamed; but the note is always a short one. There is no prettier ornament to a rocky coast than these Sea-pies, conspicuous from afar, and their ordinary high clear whistle "fy-feet" or "feet" is always a pleasing sound. I saw birds with and without the white collar, and six flying together (some of which were dull birds) might have been a family party, the young hatched early.

Lleyn is too well cultivated for much moorland to remain, but there are some little bits to be met with, inland as well as on some of the headlands, and at the bases of the mountains, where the soil has proved too barren for a race of farmers who wrest from every bit of land what goodness lies in it. I saw no signs of Curlews breeding when I was in Lleyn, but their nesting season was probably past. Curlews were there, both on the coast and on inland fields, in flocks; once I saw a score together. I did not often hear the breeding-call, but the ordinary resonant flying note "k'lyike" or "k'like," uttered about three times, could be heard frequently at Pwllheli, when they resorted to the harbour muds at low tide. I saw one Whimbrel. Four Dunlins, in the dress of birds hatched in the previous year, were so tame, on the sands at low tide, that I walked within three or four yards of them. Each one was resting on one leg, and they did not even trouble to put down the other one at first, but hopped away on one; so long did one bird remain thus that I began to think it had lost a leg. Afterwards they fed belly deep in the sea, and were occasionally lifted off their legs by the lap of a very gentle wavelet. Mr. Coward has seen flocks along the beach. This completes my list of waders. But Mr. Coward saw five Purple Sandpipers on St. Tudwal's Island on May 26th, 1893. Curiously enough, I received, a good many years ago, a pair of these birds, which were shot on May 14th on this island. A Turnstone was seen at the same time.

But, if Lleyn cannot boast of much in the way of mountains, few districts in southern Britain can match it for bold coast scenery; for, as Leland observes so quaintly, "Al Lene is as it were a pointe into the se." Many fine headlands stretch out into Cardigan and Carnarvon bays, and into St. George's Channel.

West of Pwllheli we have Llanbedrog Point, Trwyn yr Wylfa, Trwyn Cilan (or Penkilan Head), Mynydd Penarfynydd, Trwyn y Penrhyn, Pen y Cil, Mynydd Mawr, from which one looks across to Ynys Enlli, or Bardsey Island, and across to Ireland in clear weather; while on the northward shore are Braich Annelog, Penrhyn Mawr, Penrhyn Golman, Dinlleyn Point, Penrhyn Glas, and many minor points. On some of these headlands the graceful buoyant flight, with airy curves, of the Chough may still, though rarely, be admired; but the bird is getting very scarce, and it is seldom that one gets a chance of watching a pair feeding on a broken cliff or hillside, with their quick walk and hops, poking their bills into the earth and under the stones. We have few more beautiful birds on our list than the Chough, with its glossy purple plumage and elegant form. Choughs sometimes join Rooks and Jackdaws when feeding, but, as they rise together, their more highly pitched note, clearer and more melodious, as well as their widely separated pinions (upturned at the tips), looking like a fringe of feathers, at once distinguishes the Choughs, even at a considerable distance. They certainly do cry "k'chouf" sometimes, but their more usual cry is a clear ringing "k'chare." Another note, uttered on the wing, is "k'queue." I heard also some weak "kares" from five birds flying together (perhaps a family party), which were possibly the cries of the young birds. It is probable that upon observations made in Lleyn was founded the statement in Willughby's 'Ornithology' and Ray's 'Synopsis,' that the Chough was found not only in Cornwall, but also in Wales. It is certain that one of these authors (I think, Ray) penetrated Lleyn as far as Aberdaron, for they mention seeing there a Starling with a black head and the rest of the body white. It is at first surprising to meet with the name of Aberdaron in this early work on birds; for it is now perhaps as remote as any village in Wales, and it entails a drive of seventeen miles from the nearest railway station before you sight its housetops, its low Norman church, and its tiny bay, below a hill so steep and stony as to try the surefootedness of one of Lleyn's own horses. But Aberdaron was probably much better known in the days when Ynys Enlli was still accounted a holy isle. The Starling is numerous, but I only once noticed Jays; and Mr. Coward's experience is the same. Magpies are common.

I saw Carrion-Crows on "The Rivals," and about Pwllheli Harbour. A pair, much agitated for the safety of a young one which could barely fly, on the seaward face of Mynydd Mawr, afforded a study in geographical distribution; for, unless the eyesight of those Crows was inferior to my own (which is not likely), they could look out that day on a land which is not inhabited by their race. On that bright clear afternoon, across the blue channel, we could just catch sight of the Wicklow mountains; and, although the Carrion-Crow is recorded as breeding sparingly in some parts of the sister island, this particular bit of Ireland is, I believe, not one of them. And to this day the words of Giraldus Cambrensis, written in the twelfth century, hold good of Ireland: "Also there are no black Crows in this country, or they are very rare; they are all parti-coloured." The Hooded Crow is, I believe, uncommon on the Welsh coast, even in winter; but I have seen a hybrid between the two forms, which was killed in Merionethshire. A pair of Ravens were wheeling about the tops of "The Rivals," uttering a few "corps," and I saw another pair round one of the headlands. A pair is also said to swell the list of birds breeding on the stupendous cliffs of Pen Cilan. The Jackdaw is one of the most noticeable birds in this part of Wales. It breeds abundantly in the cliffs, as well as about buildings, and in the villages may be seen sitting on the houses and chapels. A pair were breeding in a chimney, for bits of nesting material were sticking out of an ordinary chimney-pot, on which a Daw was perched, and the cries of the young came from within. The Rook was in fair numbers. A little flock feeding on the upper slopes of "The Rivals," and wishing to descend to the lower grounds, flew out from the mountain side until they had a clear drop below them, and then suddenly whizzed down with short zigzag flights, making a rushing sound like a rocket.

Ring-Doves did not seem to be abundant. Stock-Doves are to be found round the coast, about the cliffs and sand-hills. Neither Mr. Coward nor I met with the Turtle-Dove. The Swift is numerous. Numbers were wheeling round Trer Ceiri, or one of the summits of Yr Eifl. Possibly they breed among the mass of grey rock forming the steep ramparts on the east side. I saw them nowhere on the mountain, except just over the ancient town. One afternoon some hundreds were flying over the craggy heights

above Pwllheli. Swifts were flying over the highest parts of Mynydd Mawr, some way from the most outlying cottage. Possibly most of the West Lleyn Swifts breed in natural sites. Mr. Coward has noticed the Nightjar in three localities. The Cuckoo was everywhere in average numbers, and a great many haunted the sand-hills at Abersoch, which are bordered on the inland side by a mass of bracken. Five were in sight at one time, beating over the fern. Whenever I passed I saw some, and one got up at my feet from under a bush. I noticed the Green Woodpecker several times, and saw some holes in an old ash at Llanbedrog. This is rather a common bird in suitable localities in North Wales, in my experience. For an early record of it in North Wales, we may refer to Giraldus Cambrensis, who, while travelling with Baldwin, Archbishop of Canterbury, in the year 1188, seems to have heard a Green Woodpecker in a wood near the Menai Strait. It is true that some of the party declared it was an *aureolus*, and Giraldus thought rightly so; but other people since those days seemed to have been unable to distinguish between a Green Woodpecker and a Golden Oriole. It is a pity that Giraldus, who tells us something of the birds of Ireland, has so little to say in this respect about Wales. He refers, indeed, to the large and generous race of Falcons at Pembroke, and casually mentions a Kite being killed by a Weasel on which it had pounced. Also, in conversation during his travels, the absence of the Nightingale was commented upon, causing the Archbishop (who evidently did not like Wales) to observe that the bird was wiser than they were!

Birds of prey were scarce. A female Merlin rose, not ten yards away, from a low turfy cliff on one of the headlands; and Mr. Coward has seen two or three, and mentions a nesting site. He has also seen the Sparrow-Hawk once, but I did not. Kestrels are to be seen along the coast, as well as inland. At least one pair of Peregrines (called simply "Falcon") breed on the cliffs. Their eggs escape on account of the difficulty of discovering their whereabouts, but directly the whitish downy young are hatched they are usually detected, at least so an old cliff-climber told me. A Falcon comes to one of the islands occasionally to fetch a Puffin. Cormorants are not uncommon about the harbour and most of the rocky parts of the coast. They breed on St.

Tudwal's Island (in April), where I saw empty nests ; but about fifteen birds, old and young, sat about the rocks. Some of the former were magnificent birds. A small double-headed point near Afon Wen is the resort of Cormorants. The smaller (west) point and a partly detached rock were slightly "washed"; but on the east rocks, when I came in sight of them, sat nineteen old and young birds. The upper parts of the rocks were strewn with fish-bones and bits of crustaceans, and the hollows were thick with wash, the stench being appalling. Possibly the birds nest on the lower rocks, which I could not see, the upper parts overhanging. I saw a few Shags on various parts of the coast ; they breed on St. Tudwal's. A few fine old birds in shining green dress sat peering out from the ledges in the little caves, and were unwilling to move. Wild Ducks seemed fairly numerous about the sluggish parts of Afon Penrhós and Afon Rhyd Hir, and in the marshes.

Adult Black-headed Gulls in full summer dress were not uncommon on the sands, and their laughing cry was sometimes heard, but I saw only two or three immature birds (not young of the year). I know of no breeding place anywhere near here. None breed at Mochras Island now, if they ever did. There is a colony in Merionethshire, forty miles away. It is difficult to say what adult birds were doing here in June. Herring-Gulls breed in small numbers on various parts of the coast. The mobbing cry of this bird, as the birds fly straight at you, rising with a curve as they pass over, rather high up, sounds like "ag-cag" or "ag-cag-cag"; it is not nearly so pleasant a sound as the ordinary "akow" or "kow-wow." Some Gulls breeding on a little island called Gull Island (Ynys Gwylan) are probably, partly at all events, of this species. A nest on one of the islands was on a broad ledge, close to the rock face, and not far above sea-level. It was a large thick-walled, cup-shaped nest, made of grass-roots and dead grass, with a few odd feathers worked in ; it contained only one egg. I only saw the Lesser Black-backed Gull twice, but it is said to breed on one of the islands. Mr. Coward saw them at one of the southern headlands, and plentifully on the north coast. One pair of the Great Black-backed Gull is said to have bred on one of the islands ; indeed, I have seen an egg which was taken on Mercrosse two or three years ago. I saw an

adult bird in Pwllheli harbour. The Kittiwake breeds on one range of very high cliffs; I saw the eggs. Mr. Coward mentions two other breeding stations. The Lesser Tern seemed scarce. I found two pairs some miles apart, and spent a long time watching these beautiful birds hawking over the shallows, with their beaks pointing straight down, to descend presently with a splash, and rise with a small fish held crosswise. The ordinary cry is "squek," uttered rapidly two or three times, or a single "kik," which changes to a loud angry "jek" when the birds are aroused. Mr. Coward has seen either Common or Arctic Terns off the coast.

Although the headlands of Lleyrn are bold and high (Cilan, 340 ft.; Mynydd Mawr, upwards of 400 ft.; Mynydd Annelog, 500 ft.; Graig ddu, 700 ft.), sheer cliffs dropping at once from the highest level, like those of Flamborough Head, do not occur. The way of these is rather to slope down—often rapidly, indeed, with a face more or less broken—for some distance, and end in a sheer cliff of, comparatively speaking, no great height, and perhaps an outwork of jagged rocks formed by the wearing of the sloping strata. Sometimes little rocky holms, parted from the cliff, lie just off shore. When these steep slopes are covered with heather or dwarf gorse, or much broken, with outcropping rocks, it is easy to approach the cliff-edge; but when, as is often the case, these great slopes are steep as a house-roof, somewhat hog-backed, and merely covered with short turf (doubly short and slippery when I was there after a long spell of dry weather), the risk of a slip, with small chance of a recovery, becomes too great. On one of these slopes I caught the Irish Burnet Moth, which Mr. Coward discovered there some years ago. Swarms of Puffins inhabit St. Tudwal's Island. As you approach the island you pass through great numbers scattered over the sea, and they sit in masses on the land; the turf in places is riddled with their holes, and the air is full of birds coming and going. Towards dusk many more come in from distant feeding grounds. There is also another great colony on Mercrosse, on the west side, and in a less degree on the grassy slope up from the landing-place. Puffins were sitting there, thickly gathered, on the flattened-down turf and sea-pink; perhaps a third as many more were on the sea, and at least another

third underground, incubation being in full swing. The Puffins come to the islands about March 28th or 29th (or, as another man said, "about the tail-end of the month") for a few days to look about them, but not many come then. They come in full force at the latter end of April, and come to land about May 10th; they leave about Aug. 15th, but late breeding birds will stay nearly a fortnight later for the sake of their young; but if the latter are not ready to go then they are left. Marked birds have been known to return, and it is believed that they return to their old holes. The burrow of one old marked bird was blocked up with small stones one spring before the Puffins returned. The same bird after a time removed all the stones to a distance, and occupied its old home. I noticed that the Puffins did not rise well from flat ground, unless they could get a clear run, or the wind was against them; but they get up very readily with the least slope in their favour, unless the grass is long. Stray pairs were breeding where there was long grass, and these, on emerging from their holes, brushed the grass with frantic efforts for some distance, striding out vigorously with their orange legs. They prefer a sloping spot and short turf, or a bit of ground covered with sea-pink; probably they keep the turf short when they nest in great numbers, for they trample it flat, and in some places it is brown and looks dead. Here they run quickly and well. A sour smell comes on the wind when it blows over the burrows in such places. The silence of the Puffins was remarkable; it was rarely that a hard "arr" was heard. Sometimes a grating guttural "go-ay" or "garr" could be heard from a bird below ground; but this is heard much more frequently when the birds have young. But when I stood close to hundreds of birds I did not hear a sound from them, until, as I approached within a few yards, they rose with a rattle and rush of wings, and filled the air like bees round a disturbed hive. A single bird will admit of an approach within two or three yards without moving, merely regarding you intently with its dark grey eye. On June 23rd the eggs (much discoloured with brown earth stains), some of which lay within arm's reach, were hard sat, and some young were just hatched. In this state, with the pip on the bill and the egg-shells under it, the young is covered with long down, black all over except the white belly. Bill dark horn-colour, and much

longer than it is deep. I think only a few young were hatched; I saw no old birds carrying fish. The nests I examined consisted of a small quantity of grass-roots and dead grass—never more than a little, and in some cases hardly any. Accounts given of a Puffin's bite differ. They bite hard, and can draw blood from the soft parts of the fingers if they nip up a small piece of flesh; otherwise the bite is merely painful, though it is said that if you snatch you hand away the flesh is sometimes torn. Puffins can scratch also. They are ferocious fighters; I saw two fighting at the mouth of a burrow, and they only left off when I came close to them. A keen observer told me he had seen them grapple with one another, and roll over and over down the slope until they fell over the low cliff and into the sea, still hanging on like bull-dogs.

Guillemots breed at Cilan, on St. Tudwal's, and, as Mr. Coward tells me, near Nevin. Of thirty eggs which had been taken at Cilan for food, the dark green type, heavily marked with black, outnumbered all other varieties by five to one. At St. Tudwal's, too, this variety prevailed. The Guillemots, sitting upright on the ledges, had to be pelted with small stones in some cases before they would leave their eggs, and even then they shuffled the eggs carefully from under them, leaving the big end next to the wall, before dropping off the ledges. They dislike leaving the eggs for fear of being robbed by the Gulls; and, sure enough, a Lesser Black-back appeared on the scene almost at once, speering about the cliff. Two birds sitting on eggs only a foot apart were very interesting, for one was of the ordinary type, and the other a well-marked example of the Ringed Guillemot (as brown, though, as its neighbour). When at last I induced them to leave their eggs, I saw that both these had a green ground colour, marked with black.

Rock birds, I think, of all three species inhabit one or two small islands off the westernmost part of Lleyn. I hope to visit them next spring. Gulls breed there too, which is not surprising, as the Welsh names signify Great and Little Gull Island. Some Razorbills breed with the Guillemots about the great cliffs about Trwyn Careg y tîr and Mynydd Cilan. From above, the birds on the sea were only just visible to the naked eye; yet the cry, like that of an angry barn-door cock, came up fairly loud at

times. With the aid of the glass, I made out (judging from the birds on the sea) that there was about one Razorbill (easily distinguished by its neater shape, head drawn back and tail raised, from the paler and browner Guillemots) to every six or eight of the latter birds. A few Razorbills breed on St. Tudwal's, and at the date of my visit were sitting on eggs in shallow cracks and covered ledges for the most part, but one or two were on open ledges. They all occupied detached places, and did not sit two or three close together like Guillemots. In every case but one the birds sat or lay on the eggs in a semi-horizontal position; the exception was half upright, but, as I could see its eggs, it was probably alarmed. When sufficiently alarmed they shuffled their eggs from under them, stood up, and dropped off the ledges. As Mr. Coward found Razorbills plentiful at sea near Nevin, they probably breed on the north coast also. As to the Manx Shearwater, I am unable to add anything of importance to what Mr. Coward has already recorded in 'The Zoologist.' There is, however, no doubt that "Mackerel Cocks" breed on the mainland, and some of the islands of western Llyn. This is not surprising when we remember that a great breeding haunt of this species lies off the southern horn of Cardigan Bay. I saw remains of two or three dead birds, and when off in a boat one morning saw five skimming low over a rather lively sea; but they are chiefly nocturnal. They strike the light sometimes, and flutter down into the court. They are very stupid, and make no attempt to escape, but fly away when thrown up into the air. I was told that when the Mackerel come into one of the bays in July and August lots of Shearwaters were seen over the shoals.

I have only to add that this paper applies to the western part of the Carnarvon promontory, and that it is offered as a small instalment towards the history of the Birds of North Wales. During the spring of 1900 I hope to continue my observations.

BREEDING OF THE TUFTED DUCK (*FULIGULA CRISTATA*) IN SHROPSHIRE.

BY H. E. FORREST.

THE late Mr. W. E. Beckwith says of this species:—"The Tufted Duck is rather common on pools in Shropshire in winter, being often found with Pochards, and, though the females or young birds are always much more plentiful than the handsome adult males, I frequently see the latter on the Ellesmere meres. About the year 1855 a pair of Tufted Ducks bred near Shifnal, and several pairs now breed regularly in that neighbourhood. I have also seen one with young ones in June on a pool near Shrewsbury; and, in the summer of 1885, I saw a pair of Tufted Ducks, but without young, on Whitemere, near Ellesmere. Except in hard frost, this Duck is not often seen on the Severn."—The 'Field,' Dec. 19th, 1885.

Mr. W. H. Slaney writes that "the bird is common on the large meres of Stafford and Shropshire [in winter], and that he has known of one nest in the latter county."—A. G. More, "On the distribution of birds in Great Britain during nesting season," 'Ibis,' 1865. The nest mentioned is the one at Shifnal alluded to above. Col. Kenyon Slaney informs me that he thinks the nest was at Hatton, Shifnal. There have been one or two nests there during the last few years; the birds probably belong to the larger colony at Weston, to be next described.

Col. the Hon. F. O. Bridgeman informs me that at Weston Park, the Earl of Bradford's estate on the borders of Stafford and Shropshire, the Tufted Duck has bred regularly ever since 1880. Its numbers have steadily increased, till now there are about twenty pairs nesting on five or six pools. The birds here have lost the migratory habit, and become residents, although, like other *Anatidæ*, the Tufted Duck is normally a winter migrant; even here the colony in winter is increased by visitors.

On January 4th, this year, when visiting Ellesmere mere, in company with Mr. Brownlow Tower, I saw about two hundred

of these pretty birds swimming about. They are reputed to be very wild and wary, but, at Ellesmere, being carefully protected, they are unusually tame, and will often come within twenty yards of the observer. Like other diving Ducks, they sit low in the water. They are energetic divers; and the drake is a handsome bird, conspicuous at a distance, and easily distinguished by his white flanks and black back. The female is of a dark brown hue. Mr. Tower, who has observed the birds on the meres continuously for many years, tells me that, although the Tufted Duck visits Ellesmere regularly every winter in large numbers, not a single pair has ever been known to remain to breed. This is the more remarkable as there are so many suitable meres there, and they breed at Sandford only eight miles away.

Messrs. Coward and Oldham, in their new book on the 'Birds of Cheshire' (1900), also state that the Tufted Duck has not been known to breed in Cheshire, though suitable nesting places are abundant in that county.

At Sandford Pool, near Whitchurch, Salop, close to the Cheshire border, four pairs of Tufted Ducks came and nested in 1891, in the reedy marsh at the northern end, and they have continued to do so ever since. Strange to say, there have always been neither more nor less than four pairs, while—unlike the Weston Park birds—they have not become residents. They arrive each year early in March; nest towards the end of May; and leave, with the young, about the beginning of November. The young birds, which number about thirty each year, do not return to their native pool. There is no apparent reason why the birds should not *winter* here, and so become residents, as at Weston. We can only surmise that the hereditary instinct is so strong that, when the usual time of migration arrives, they feel impelled to depart, though they might just as well stay where they spent the summer. Although I have no proof to give, I fancy that the Ducks at Sandford only go away as far as Ellesmere, and join company with the crowds that are migrating just at that time. If so, the four pairs at Sandford are probably the same individuals year after year, whilst their progeny—instead of returning with them to Sandford—depart northwards with their Ellesmere companions.

We find, then, that the Tufted Ducks at—
 Ellesmere are winter visitors only.
 Sandford „ summer „ „
 Weston „ residents.

Wishing to observe these Ducks in their breeding haunts, I this year paid two visits to Sandford Pool, by kind invitation of Mrs. Sandford. The first visit was on May 10th, when all eight birds—four drakes and four ducks—were swimming about on the open water; apparently not yet nesting. [Subsequent events showed that the Ducks had already laid eggs, and they began to sit within the following week.]

On the pool was a Swan's nest, containing seven cygnets, and two eggs just hatching—an unusually large clutch—all afterwards reared successfully. I obtained several excellent photographs of these cygnets in the nest. On the approach of the punt, the mother Swan, who was sitting, got up and slipped into the water, where, joining her mate, the pair swam round in circles, only betraying wrath at the intrusion by an occasional hiss. This rather belies the reputed ferocity of the Swan in the breeding season.

Three weeks later the keeper at Sandford reported that he had found a Tufted Duck's nest with eggs, so on June 1st I paid a second visit to the pool. This time there were no drakes to be seen, but there was one duck swimming about. The eggs in the nest found by the keeper had hatched out the day before my visit, and both ducks and ducklings had disappeared. However, after a long search, the keeper found another nest with eight eggs in it. Of this I obtained a good photograph. Soon afterwards I found another nest with eggs, and an empty nest which appeared to have been vacated for some days. Close to this last was an egg which had evidently rolled out of the nest, for, when blown, it proved not to have been incubated. Thus all four nests belonging to the four pairs of ducks were accounted for—two with eggs in, and two hatched out.

The nests are hard to find, for they are placed on marshy ground beneath, and entirely concealed by, dead reeds and rushes. They are made of rushes in the form of a mound, with a deep cup in the centre. The cup is lined with down, intermixed with fragments of dead rushes. The down is very dark brown, with a dirty white fleck in the centre of each bit. It is

larger than Teal's down, and the fleck is not nearly so conspicuous or white. The eggs in the nest photographed were greenish, but in the second nest, off which I flushed the old duck, they were coloured like a Pheasant's. The solitary egg was of the latter type.

When the duck leaves the nest to feed—and she is then away for an hour or more at a time—she carefully covers the eggs with



Nest of Tufted Duck (*Fuligula cristata*).

down. The duck which I saw swimming on the pool was the owner of the nest photographed, yet, although she had been absent for nearly an hour by the keeper's observation, the eggs were quite warm. In order to photograph the nest it was necessary to push the rushes over it to right and left, as well as to remove the covering of down.

The ducklings, before they are twenty-four hours old, take to the water and go off with the mother. For the first week or so they keep hidden away amongst the rushes, &c., but afterwards appear on the open water, swimming about with the mother. They never return to the nest after once quitting it—not even to roost.

The drakes, as soon as their mates begin to sit, spend a good deal of their time at their “club”—a pool about half a mile away. They condescend to return to their families later on, when the latter are growing up, but they take no part in the sitting, nor in feeding the spouse on the nest, nor do they ever help to feed or look after the young. In short, they are not at all patterns of marital behaviour.

Although the pool at Sandford is private, and the ducks have never been molested, they are very shy, and would never allow me to get near enough with the camera to take a snap-shot of them on the water. They would rise while still sixty or eighty yards away, and, after flying round in wide circles for some minutes, alight on a distant part of the pool.

Since penning the foregoing notes I have heard from Col. Kenyon Slaney that the Tufted Duck still breeds at Hatton Grange, and has done so almost every year as far back as he can remember. The water there is but small, and only one, or perhaps two, pairs nest on it. Practically the Hatton birds belong to the Weston colony, although the founders appear to have settled first at Hatton, and thence to have colonized Weston.

THE ORIGIN AND MEANING OF THE NAMES OF BRITISH BIRDS.

BY A. H. MEIKLEJOHN.

ALTHOUGH the names of our commoner British Birds are more or less familiar to everyone, but little attention appears to have been given to their original source and significance. The subjoined list does not in any way lay claim to complete fulness, but it is put forward in the hope that it may possibly arouse some interest in this neglected side of our bird-nomenclature. In most birds' names special stress is invariably laid on some well-known or easily distinguished peculiarity either in cry, flight, or appearance. It is interesting to note how many names are imitative of birds' cries, as in *pipit*, *shrike*, *twite*, *crow*, *owl*, *crake*, &c., and more especially in *cuckoo*, *hoopoe*, and *kittiwake*. The origin of some of the names appears to be quite unknown, e. g. *gull*, *auk*, *garganey*, &c. In the list given below no attempt has been made to follow out the meaning of a name with a too great philological keenness, as in that case I should be exceeding the necessarily limited province of a paper of this kind.

FIELDFARE = field-farer, *i. e.* "the crosser (or traverser) of the fields"—in allusion, of course, to its migratory habits.

OUSEL is simply a variation of the German *amsel*, a Black-bird.

WHEATEAR, probably = white-erse (*arse*) = white-rump—the last a common name for the bird in Scotland and elsewhere. Compare the French, *cul blanc*. Another suggested, though far less probable, derivation is that it = whitty-er = whitterer, from whitter, "to complain"—a word still used, I believe, in some parts of Lincolnshire.

REDSTART = red-tail. (Compare WAGSTART for wagtail.) The idea that START may here have the meaning of "to twitch or

move involuntarily" should not be lost sight of. The construction "red-twitcher" certainly characterizes the well-known vibration of the bird's tail.

ROBIN is simply a familiar form of ROBERT (*cf.* MAG-pie, JACK-daw, and MARTIN). A possible connection with *ruby* has been suggested, but this is unlikely.

NIGHTINGALE = Anglo-Saxon *nihte-galle*, "the singer of the night."

DIPPER. This may either mean "the bird that dives for a short time" (dips), or it has reference more probably to the peculiar dipping "bob" of the bird while standing on a stone in mid-stream.

TITMOUSE; spelt by Spenser, TITMOSE. Both TIT (*cf.* tit-lark) and MOUSE have the same meaning, *viz.* "small." The proper plural of the word is therefore TITMOUSES—mouse, in this case, having no connection with the rodent of that name. In Suffolk the plural TITMOUSEN is still used.

NUTHATCH = nut^shacker.

ORIOLE = the golden bird (Latin, *aureolus*).

SWALLOW may possibly mean "the tosser about" or "mover to and fro," allied to the Greek *σαλευειν*, to shake. On the other hand, the Teutonic name, *swalgwon*, points to a possible connection with *ἀλκυών*, "a kingfisher," owing perhaps to the appearance of the Swallow during the fine weather of the "Halcyon days."

FINCH is probably imitative of the Chaffinch's call-note—a bird common all over Europe; but it is possibly a variation of the German *fnk*, "smart" or "gay."

SPARROW = the flutterer, from a root SPAR, to quiver. It is, however, not improbable that *spar* may here have its meaning of "to wrangle," in reference to the constant bickerings of these birds.

LINNET, so called from its fondness for the seeds of *linum*, flax or hemp.

BUNTING probably means "the little speckled bird," from the German *bunt*, "speckled," + *ing*, a diminutive ending. There is, however, some possibility of its connection with a Lowland Scotch word, *buntin*, meaning "short and thick." In Scotland *bunt* is still used for a rabbit's "scut."

CHOUGH is akin to "Caw," and is therefore imitative.

JAY (older spelling GAY or GAI) = a bird of gay plumage.

PIE is imitative, and signifies "a chirper." It is probably akin to Latin *picus*.

RAVEN = Anglo-Saxon *hraefn*, probably connected with *KRAP*, to make a noise; cf. Latin *crepare*. The word has absolutely nothing to do with RAVENOUS, &c., which is akin to *rapine*.

ROOK—in Anglo-Saxon, *hrôc*, "a croaker"—is imitative.

LARK is a contraction of LAVROCK or LAVEROCK; Anglo-Saxon, *lâwerce*. In Icelandic there is a word *lae-wirki*, "a worker of guile," and it has been suggested that *lâwerce* is another form of this. Should this be correct, it would appear that the Lark must for some reason have been a bird of ill-omen to our Anglo-Saxon ancestors.

OWL is imitative, and connected with HOWL, which appears in "howlet."

VULTURE = the tearer (Latin, *vellere*).

BUZZARD, formerly spelt BUSARD, which comes through Low Latin from the Latin *buteo*—a word used by Pliny to signify the Sparrow-Hawk.

HAWK, "the seizer." Root HAB, as in German *haben*.

KITE probably comes from a Teutonic root *skot*, "to shoot" or "go swiftly"; and the same root is seen in SCOTER, and in the American slang word "scoot."

FALCON, so called from its sickle- (Lat. *falx*) shaped beak and talons.

MERLIN comes, through the French, from the Latin *merula*, a blackbird; cf. *merle*.

OSPREY is a corruption of *ossifragus*, "the bone-breaker."

CORMORANT is a corruption of *Corvus marinus*, "the sea-crow." The Spanish name is *Cuervo marino*.

SHAG, so called from its crest. It is practically the same word as the Scandivanian *skägg*, "a beard," or anything that juts out.

GANNET, "little goose." Root GAN (as in gan-der) + diminutive suffix -ET.

HERON* is probably imitative of the bird's cry, and, in

* The form *hernshaw* is a variant of *heronsew*—a word still used provincially, and derived, like many other hawking terms, from the French.

this case, is connected with the German *häher*, a jackdaw, lit. "laughter." Cf. HEIGHAW, a provincial name for the Green Woodpecker.

BITTERN was erroneously supposed to be a corruption of *bos taurus*, in reference to the bird's bellowing capabilities. It is more probably a variation of the Latin *butio*, an imitative word connected with *bubere*, to cry.

STORK probably means "the tall bird," connected with Anglo-Saxon *stealc*, high.

SHELDRAKE. *Sheld*, flecked or variegated, simply = shield, in allusion to the ornamentation, with which these weapons were covered. Cf. SHELD-APPLE, a Chaffinch.

MALLARD = male-ard. The suffix *-ard* was frequently added to masculine names for the sake of emphasis. The word therefore rightly refers to the drake only.

GADWALL remains undecipherable.

TEAL originally meant "a brood," from *telen*, to breed; but as to the origin of its use in a specific sense nothing is known.

GARGANEY, a name first introduced, I believe, by Willughby from Gesner. Nothing is known of its meaning or origin.

WIGEON, Old French *vigeon*, has perhaps a connection with the Latin *vipio*, a small Crane with a whistling cry; but this is extremely problematical.

POCHARD is said to be a variation of POACHER. Apparently the name at first referred to the Wigeon, in allusion to its supposed habit of seizing (poaching) the food brought to the surface by the diving ducks.

SCOTER. See under KITE.

SMEW, and similarly SMEE and SMEATH, is probably imitative of the bird's "mewing" cry. The suggestion that the word is a corruption of "ice-mew" is untenable.

CAPERCAILLIE = Gaelic *capull-coille*, "great cock (or horse) of the wood." The word *capull* has probably some connection with Latin *caballus*.

GROUSE, curiously enough, has been falsely formed on the analogy of MOUSE. The original spelling is *grice*, from an Old French word *griesche*, grey, thus giving the meaning of "the grey bird." A derivation from the Welsh *grugiar*, a heath-hen (*grug*, heath + *iar*, a hen) has also been suggested.

PTARMIGAN is a French spelling of the Gaelic *tarmachan*. What the word means is unknown, though it should be noted that there is, in Gaelic, a verb *tarmaich*, to gather, with which *tarmachan* may have some connection.

• PHEASANT, the bird from the Phasis, a river in Transcaucasia (Colchis), now called the Rion.

PARTRIDGE, from the French *perdrix*, which, with the intrusion of a "r," comes from the Latin *perdix*—a word probably imitative of the cock bird's call.

QUAIL, lit. "the quacker." A contraction of Low Latin *quaquila*.

RAIL is imitative, from the Old French *raller*, to rattle in the throat.

COOT, "the shortened bird," is a Celtic word. The Welsh name is *cwtiar*, the short-tailed hen. Cf. *cut*, to make short.

CRANE is probably imitative, and connected with a root GAR, to call, as in *garrulus*.

BUSTARD is a corruption of AVISTARD = Latin *avis tarda*, the slow bird. Cf. Ostrich, which = *avis struthio*.

DOTTEREL, "the silly bird," comes from *dote*, to be foolish. Our slang word "dotty" has the same origin.

PLOVER, "the rain bird," comes, through the French *pluvier*, from the Latin *pluvarius*, belonging to rain. The restlessness of Plovers before rain is well known.

LAPWING was in Middle English *lappewinkë*. *Lappë* = *hleápe*, from *hleápan*, "to spring," and *winkë* means "a twitching movement from side to side." The connection between these meanings and the bird's irregular mode of flight is clearly seen. The word does *not* mean "wing-flapper."

SNIPE, at one time variously spelt SNYPE or SNYTE—in allusion to the bird's characteristic "snout" or bill.

DUNLIN = *dunling*, the little dun bird. *-ling* is a diminutive ending, and appears in gosling, duckling, starling, nestling, &c.

STINT = the stunted bird.

KNOT is traditionally supposed to mean "Knut's (Canute's) bird," though for what reason it is impossible now to say. However, this monarch had a berry (*viz.* the Knout-berry), so he may have had a bird as well.

WHIMBREL = *whimmerel*, imitative of its cry.

GUILLEMOT = *gull* (a Celtic word) + *mouette* (French), "a sea-mew."

PUFFIN probably means "the little bird with the puffed-out beak." The *-in* is a diminutive ending.

GREBE, "the crested bird," from the Gaelic *crib*, a comb or crest.

FULMAR = FOULMART (the polecat), in allusion, of course, to the bird's strong and persistent odour.

PETREL, or, more correctly, PETEREL = St. Peter's bird—so called from the appearance the bird has of walking on the sea.

NOTES AND QUERIES.

MAMMALIA.

CARNIVORA.

Marten in Cleveland.—On the 9th of February last an example of the Marten (*Mustela martes*) was trapped at Swainby-in-Cleveland, on the estate of my friend Mr. E. B. Emerson. Mr. Emerson's keeper informs me that it was caught in a Weasel-trap set in the hollow space of a double wall, on the edge of the moor, at the top of the valley known as Scugdale. It was alive when found, and was held by one leg that was badly bruised. The animal was placed in a Ferret-box, and feigned death while the keeper was present, but when no one was near it became alert, and looked around as if to find a way for escape; on the reappearance of the keeper it again "played 'possum." The next day it died from the effects of the injuries it received while in the trap, and Mr. Emerson has had it preserved by Mussell, of Middlesborough, who tells me it is an old male. It is difficult to account for the occurrence of this rare animal in Cleveland, a district so far removed from its last stronghold, although one well suited to its habits. T. H. NELSON (The Cliffe, Redcar).

Albino Stoat in Lincolnshire.—A pure albino Stoat (*Mustela erminea*) was caught in Lincolnshire in September. Even the tag at end of the tail was pure white; eyes pink. I consider this a most rare variety, and am glad to have been able to add it to my variety collection.—J. WHITAKER (Rainworth, Notts).

RODENTIA.

Black Rat in Forfarshire.—While fishing last month on the North Esk, I picked up a specimen of the old English Black Rat (*Mus rattus*), deposited apparently on the bank by a recent flood. A keeper who was with me at the time informed me that, although they used to be more common, this was the first he had seen for about fourteen years. I may add that it was on the Forfarshire bank, near North Water Bridge.—A. H. BARING (The Grange, Alresford, Hants).

CETACEA.

The Lesser Rorqual in the Essex Blackwater.—On the afternoon of Sept. 23rd young Mr. George Cardnell was out in his small punt, when he

saw a large animal, that he at first thought was a Sturgeon, in shallow water at the head of Mayland Creek, between Canney and Steeple Hall. He very pluckily attacked it, drove it on the saltings, and disabled it by means of a piece of old gaspipe that he had with him. He then fetched his father, Mr. Edmund Cardnell; they had then considerable difficulty in despatching it with large butcher's knives. I went to inspect the specimen while it was being cut up for manure by Mr. Nix, of Steeple Hall, and found it to be a young female Lesser Rorqual (*Balænoptera rostrata*). It measured just under 17 ft. in length, was black above, but paler on its ventral surface; the baleen was short, and with the bristly fringe was pale in colour. The flukes measured 6 ft. 3 in. across, and 1 ft. 2 in. wide in their widest part. The flippers, 27 in. by 6 in., were of a beautiful enamel whiteness on their central surface, but dark at each end. The head was 4 ft. in length, the lower jaws measuring 2 ft. 6 in. I also measured the gut, resembling a two-inch hose, for over twenty-four yards, and then did not get to the end. Mr. Nix estimated the carcase to weigh over two tons, as it was more than a load for two strong horses to drag.—EDWARD A. FITCH (Maldon, Essex).

A V E S.

Occurrence of the Melodious Warbler in Sussex.—On the 10th of May last an example of *Hypolais polyglotta* (Vieill.) was shot near Ninfield, and sent, together with some other birds, to Mr. George Bristow, Jun. I had the satisfaction of seeing the bird in the flesh, and I at once suspected its identity. On taking Dr. Ernst Hartert to view the specimen, he agreed with me in referring it to this species, and was able to match it with examples of *H. polyglotta* from the South of France. Mr. Howard Saunders also has examined the bird, and is satisfied that it is rightly identified. It proved on dissection to be a male. As pointed out by Mr. Saunders ('The Ibis,' 1897, p. 628), the Melodious Warbler may be distinguished from the Icterine Warbler (*H. icterina*) by being somewhat smaller, by the distinctly larger bastard-primary, the relatively shorter wing, and by the second quill being shorter than the fifth, the reverse being the case with the latter species. The present forms the second record of the undoubted occurrence of the Melodious Warbler in Britain.—W. RUSKIN BUTTERFIELD (4, Stanhope Place, St. Leonards-on-Sea).

The Sardinian Warbler.—To avoid possible confusion in the future, it may be well to point out that the proper name for the "Sardinian Warbler" (*ante*, p. 450), which is common at Gibraltar, is *Sylvia melanocephala*. I do not find the true *Sylvia sarda*, now known as *Melizophilus sardus* (Marm.), Marmora's Warbler, included in Col. Irby's 'Ornithology of the Straits of Gibraltar.'—O. V. APLIN.

[It is of course impossible to maintain a perfect uniformity in nomenclature in these pages. This is quite apparent even in the writings of the British ornithologists who contribute to 'The Zoologist.' We endeavour as far as possible, without unduly interfering with the views of our contributors, to conform the avian nomenclature with that of Mr. Howard Saunders for Britain, and with that of Mr. H. E. Dresser for the Continental or "Western Palæarctic Region." Surgeon Hurlstone Jones, the writer of the paper to which Mr. Aplin's criticism is applied, is now serving on the China Station, and could not be consulted on the point. The two names were therefore printed as in the MS., the popular name "Sardinian Warbler" being considered as sufficient to prevent any misunderstanding. —ED.]

Nesting of the Common Sparrow (*Passer domesticus*).— In the September issue of 'The Zoologist' (*ante*, p. 424), Mr. J. Steele-Elliott remarks:—"Yarrell points out that the Sparrow may occasionally be seen in winter carrying materials to the holes they inhabit; this is evidently only for sleeping accommodation." I hardly think Yarrell's actual remarks convey the idea that nesting material collected in winter is intended *only* for sleeping accommodation, and, as a matter of fact, it is not. In large factories and workshops where there is a sufficient warmth the Sparrow nests amongst the rafters all the year round. I remember one instance where, in a large engineering works, I found a young naked Sparrow at the end of January which had fallen on to a bench from a nest in the roofing. It is astonishing what apparent stupidity and ingenuity are combined in the construction of some of these nests. In a large warehouse in Glasgow, where bolts and nuts were being packed, I used to notice many Sparrows' nests on the wooden horizontal tie-beams. Sometimes the whole mass of rubbish would tumble off on to the floor, when another nest would be immediately commenced in the same place. In one case, however, I found that the birds had securely anchored their nest by actually winding seven or eight strings right round the beam, which was nine inches deep, and weaving their nesting materials into them. In this particular nest neither hay nor straws were used. It was a large mass consisting entirely of strings drawn from the packing-bags, cotton-waste, and feathers. Roughly speaking, it was about fourteen inches diameter, and eight inches deep, open at the top, where the eggs were laid in a small cup-shaped hollow about three inches diameter.—ROBERT H. READ (Bedford Park, Chiswick, W.).

Rooks in London.—A new colony of *Corvus frugilegus* in London in the year 1900 deserves to be recorded in 'The Zoologist.' During the early winter months I often observed one or two Rooks about the open space in Hyde Park, where the Great Exhibition stood between the Serpentine

and the high road to Kensington. I never saw them except in the early morning, and where they spent the remainder of the day I do not know. On March 28th I noticed that a pair of Rooks had completed a nest in a plane-tree in the Park close to the lodge at Prince of Wales's Gate. In the same tree there were some remains of an old nest, which had, I think, been occupied by a solitary pair some years ago. On April 6th a second nest was begun close to the first, but so far I never saw more than a pair of Rooks. Early in the morning of April 13th I saw five Rooks busy about the nests, but the second nest was not completed. I was away from London till April 26th; when, on my return, I hastened to see how the rookery was progressing, and found the original nest near the lodge was quite demolished, but the second one was still remaining. Across the Kensington Road, in the yard or garden of Kingston House, a large and flourishing settlement had sprung into existence. There were seven nests in a large elm-tree, and two in a plane-tree just beyond it. In Hyde Park there was a new nest in an elm-tree opposite 18, Prince's Gate. The second nest near the lodge was completed, and altogether there were ten nests, all occupied, as far as one could discover from below. The birds were all about the nests, and a most melodious chorus rejoiced my ears. So far as I can discover, there is no record of a rookery at Kingston House in former years. In May I visited Connaught Square, and counted twelve nests in the plane-trees there. The rookery in Connaught Square was deserted in the season of 1899.—HAROLD RUSSELL (2, Temple Gardens, London).

Number of Eggs in the Nest of Swift.—With reference to the note on the number of Swift's eggs in last month's 'Zoologist' (*ante*, p. 479), I can fully confirm Mr. Steele-Elliott's statement as to there being at times, and by no means infrequently, three eggs in a nest of *Cypselus apus*. I had some correspondence with Mr. Howard Saunders on the subject, and my notes appeared in my yearly natural history notes in 'The Zoologist' for 1898. I have found three eggs in a Swift's nest that was isolated, some miles from any other, so that there was no chance of two hens laying in the same nest. "Other places, other manners," you know.—OXLEY GRABHAM (Thornton Dale, Pickering).

Cuckoo's Egg in Song-Thrush's Nest.—On July 1st of this year I met a friend at Richmond who told me that a Song-Thrush had nested in a bush just beside his garden-door, and laid four or five eggs, but that it had deserted, and a Sparrow or some such bird had laid in the nest. I walked home with him, and examined the nest. It was an ordinary Song-Thrush's nest, built in a laurustinus-bush in the garden, a few feet away from the side-door, and contained three eggs of the Thrush and one egg of a Cuckoo. The nest and eggs were very wet and deserted. My friend told me it had

contained four or five Thrush's eggs originally; so that, as is generally the case, one or two eggs had evidently been turned out by the Cuckoo when depositing its own. This is the only egg of *Cuculus canorus* I have ever met with in a Song-Thrush's nest, and is at the same time the largest and heaviest. The weight was 62·5 grains; average weight of Song-Thrush's eggs, 104 grains. The smallest Cuckoo's egg I have ever found was in a Sedge-Warbler's nest, and weighed 37 grains; average weight of Sedge-Warbler's eggs, 22 grains. The usual weight of a Cuckoo's egg is about 48 grains.—ROBERT H. READ (Bedford Park, Chiswick, W.).

Partridges in Nottinghamshire.—Partridges vary very much in numbers in Notts; this season on the sands they only represent a fair year, but on the heavy lands they are better, and in large coveys. Notts is becoming one of the very best counties for *Perdix cinerea*, and very big bags are in good seasons made, and though in years gone by shooting over dogs and walking in line we considered forty to sixty brace a good day, now with driving and turning out Hungarian birds we get 150 to 250 brace, and do not think very much of anything under one hundred brace.—J. WHITAKER (Rainworth, Notts).

Pectoral Sandpiper at Aldeburgh.—I bagged a Pectoral Sandpiper (*Tringa maculata*) at Aldeburgh on Sept. 13th. I flushed it from a tussock in the Thorpe mere. It looked darker and a bit larger than a Dunlin, uttered a somewhat harsh double note, and flew more like a Snipe. The wind was north-east at the time.—E. C. ARNOLD (The Close, Winchester).

Great Skua (*Megalestris catarrhactes*) in Kent.—A female Great Skua was shot on Oct. 4th near the post-office at Dungeness by Mr. G. Bates, and forwarded to me in the flesh. It has been carefully mounted by Mr. Bristow, and may now be seen in the bird collection at the Hastings Museum. — W. RUSKIN BUTTERFIELD (4, Stanhope Place, St. Leonards-on-Sea).

Levantine Shearwaters at Scarborough.—On Sept. 13th I had brought to be preserved an immature specimen of *Puffinus yelkouanus*, which had been shot in the South Bay here upon that date. It is a bird of the year (a female), and its identity has been confirmed by Mr. Howard Saunders, who has examined the specimen. This is not the first occurrence of this species at Scarborough, an adult male, which was identified by Dr. R. Bowdler Sharpe, being killed here on Feb. 4th, 1899, although its occurrences upon our coasts are, I believe, of extreme rarity.—W. J. CLARKE (44, Huntriss Row, Scarborough).

NOTICES OF NEW BOOKS.

Life and Letters of Thomas Henry Huxley. By his Son,
LEONARD HUXLEY. 2 vols. Macmillan & Co., Limited.

MANY, very many, of us who are now growing grey will recall the days of early manhood when the voice of Huxley was regarded as that of a prophet both in science and philosophy. How the great lights of those days have disappeared! Mill, Carlyle, Darwin, Renan, Tennyson, and Huxley have vanished. We can almost remember the exact circumstances of our lives when each passed away, so profound was the impression created. Younger men see fresh constellations and rising stars, but we find the firmament growing darker as these planets fade; the days seem growing shorter, and the nights longer; the ocean to be encroaching on the shore, for the beacons are disappearing.

We possess Huxley's collected writings and lectures; his cold and cheerless marble effigy adorns the vestibule of our great Natural History Museum; but of the man himself little was known to most of his readers. He was too generally appreciated as only a great man of science, or a polemical writer of much power and wisdom. These volumes come as a revelation; we used to read Huxley, and now we know him.

Huxley was entrusted with a great talent, which he did not hide under a bushel; but even then his fight for position was a strenuous one, and he probably made a wise choice in adopting for a motto in his early days the well-known words of Danton: "De l'audace et encore de l'audace et toujours de l'audace." This struggle to many would be an abomination, but to Huxley it was a necessity; he was intellectually a gladiator, and it is probable that the arena developed his immense polemical powers, which rested on a sure and certain knowledge in continuous cultivation. As we read these pages we are in doubt as to which created or supplemented the other. Great as was the original work he did in zoology, we can never forget the philosophical

spell he cast over it, and to the reading public he is rather better known as the daring philosopher and metaphysician than by his biological discoveries. As an anthropologist and zoologist, he is appreciated by that small inner circle of scientific workers whose opinion alone carries any weight on these subjects; to the world at large, whose verdict is not worth too much, he is the successful foe of shams and quackeries.

Among the most interesting points in these interesting volumes are Huxley's opinions of other zoologists. He soon found out on board the 'Rattlesnake' that Macgillivray was not the "ignoramus in natural history" he had been told, and was at any rate "a very good ornithologist," and a zealous collector; William Macleay made a good impression, and was described in 1848 as "the celebrated propounder of the Quinary system." Owen "is an able man, but to my mind not so great as he thinks himself. He can only work in the concrete from bone to bone; in abstract reasoning he becomes lost—witness 'Parthenogenesis.'" The reference to the late Dr. Gray is delightful. "The dog-fox's cæcum is so different from the vixen's that Gray would have made distinct genera of them." But in a more judicial phraseology is the well-balanced verdict on his old friend Darwin: "I am not likely to take a low view of Darwin's position in the history of science, but I am disposed to think that Buffon and Lamarck would run him hard in both genius and fertility. In breadth of view and in extent of knowledge these two men were giants, though we are apt to forget their services. Von Bär was another man of the same stamp; Cuvier, in a somewhat lower rank, another; and J. Müller another."

This biography almost constitutes an abstract of the intellectual progress made during a recent fifty years, in which zoology plays a prominent part. Huxley had considerable sympathy with much that he severely criticised, and his attacks seemed often more severe because he kept in touch with the progress of the opinions he opposed. To the superficial he was a declared enemy, and they could not realise that far below the surface there may be much community of thought. His published letters now give a clue to this enigma.

And now we come to the most important consideration, the relation of Huxley the evolutionist, to Darwinism. In future

years, when this period will be alike termed the Victorian age and the Darwinian era, how will he be associated with this great conception? Was Huxley the Baptist or the Paul to Darwinism? In the light of these volumes we consider him both.

A Treatise on Zoology. Edited by E. RAY LANKESTER, M.A., LL.D., F.R.S., &c. Part II. The Porifera and Coelentera, by E. A. MINCHIN, M.A., G. HERBERT FOWLER, B.A., Ph.D., and GILBERT C. BOURNE, M.A. With an Introduction by E. RAY LANKESTER. Adam & Charles Black.

THE second volume has now appeared of this advanced well-named 'Treatise.' Vol. III., which appeared first, has already been noticed in these pages, and the present volume very fully maintains the excellence of the Oxford publication.

The Editor contributes an introduction on a subject of great biological importance, *viz.* the cœlom, a name proposed by Haeckel for the cavity in Vertebrate animals often called the "pleuroperitoneal cavity." This is a branch of technical biology of the profoundest interest, but one necessarily little discussed in our bionomic pages. This "introduction" can, however, be consulted as the last word in the investigation to date, and, as its writer has proposed, it is "the vindication of the cœlom as a morphological factor of primary importance in the animal series, and the maintenance of the conclusion that the cœlom by its presence justifies the separation of a higher grade of Enterozoa, the Cœlomocœla, from a lower grade, the Enterocœla, in which it is not differentiated as a separate cavity."

Prof. Minchin has written very fully on the Sponges. These creatures afford their evolutionary evidence, as do all other animals. "Many deep-sea sponges, especially those of the order Monaxonida, are to be regarded as having migrated downwards from the shore-line in comparatively recent times, and in such forms the influence of life in still water is seen in a great regularity of growth, resulting in the development of a secondary symmetry." The colours of Sponges are very varied, and often very bright; but Prof. Minchin states that green is a rare colour among marine Sponges, though it is the usual tint of the fresh-water *Spongillinae*, where, however, it is due to chlorophyll.

Dr. G. Herbert Fowler contributes the sections *Hydromedusæ* and *Scyphomedusæ*, organisms which were recently grouped together under the name of *Hydrozoa*. This portion of the work is distinctly of a character that does not adapt itself to quotation in 'The Zoologist,' though in a biological sense it is none the less valuable on that account.

The Anthozoa have been entrusted to the care of Mr. G. C. Bourne. The true nature of Corals and Gorgonians was first discovered by the observational method, and was accomplished by Peyssonel, of Marseilles, "who made a number of observations on Corals on the coast of Barbary, and kept several forms alive in aquaria." We are reminded of the old, old story, when we read that "Peyssonel's observations were laid before the Academy of Sciences of France in 1727, but his views were strongly opposed by Réaumur, whose authority was sufficient to condemn them."

A most welcome feature of this volume is the adoption of the historical method. Terms are traced to their proposers; the men who first extended the boundaries of knowledge are brought in line with the more advanced workers of to-day, and in the appreciation of present results the pioneers of the past are not forgotten. The evolutionary principle is emphasized on every page, without the reiteration of personal theories, or the infliction of complicated terms which lack definition and reflect too frequently only personal opinion. Whilst the work of Haeckel is recognised, we know that the true evolutionary spirit is present.

Another excellent departure is the provision of an index at the end of each section, and this in the day when the Bible and Shakspeare are still published without that necessary adjunct.

Origin and Character of the British People. By NOTTIDGE
CHARLES MACNAMARA. Smith, Elder & Co.

It is no disrespect to this book to regard it largely as a very useful compilation. Of course any attempt to discuss the origin of the British or any other people can scarcely be divorced from the question of the derivation of Man himself. Mr. Macnamara does not shirk this responsibility. He is convinced "that no animal whose skull is ossified according to the method which

prevails among apes could possibly acquire an intellectual capacity such as that possessed by man. The genus *Homo* differs from the anthropoid apes in that his skull possesses an innate power of growth, especially in its anterior part, which permits full development of the anterior lobes of his brain, and thus of his intellectual capacity and speech." He adopts the view enunciated in this country by Prof. Boyd Dawkins, and considers the Eskimos as "pure descendants of the glacial inhabitants of Europe"; nor does he hesitate to write of "the men living in Europe before and during the glacial period." Of the pre-glacial existence of man, we are reminded of a special anthropological discussion on this subject, held in London some years ago, at which the President, Sir John Evans, advised the attitude of "Caution, caution, caution." The racial origin of the people of England is accepted by Mr. Macnamara as "formed by the Iberian stock, who, until the mid-neolithic period, were the only human inhabitants of our island"; and the Iberian race is elsewhere defined as "the people who were directly descended from the aborigines of Northern Africa and Western Europe." Scotland, Wales, and Ireland have distinct summaries, and the volume is another evidence of the intelligent interest taken by the reading public in the fascinating study of British Anthropology.

EDITORIAL GLEANINGS.

THE recent Meeting of the British Association at Bradford, as usual, provided thought for the zoologist. Section D—Zoology—was presided over by Dr. Ramsay H. Traquair, and his address was devoted to the teachings of Palæontology, particularly as referring to fossil ichthyology. Dr. Traquair emphasized the necessary position of Palæontology in the domain of Biology, and pertinently remarked:—"As I have asked on a previous occasion, 'Does an animal cease to be an animal because it is preserved in stone instead of spirits? Is a skeleton any the less a skeleton because it has been excavated from the rock, instead of prepared in a macerating trough?' And I may now add—Do animals, because they have been extinct for it may be millions of years, thereby give up their place in the great chain of organic being, or do they cease to be of any importance to the evolutionist because their soft tissues, now no longer existing, cannot be imbedded in paraffin, and cut with a Cambridge microtome?"

IN this Section, Mr. Borchgrevink read a most interesting paper on the results obtained by the British Antarctic Expedition, organised by Sir George Newnes. On the coast of Victoria Land, and on an island which was discovered and named Duke of York Island, the Penguins literally covered the ground, their nests lying on the top of the guano deposits, and consisting of pebbles. From Oct. 15th one continual stream of Penguins waddled over the ice towards their summer residence; like so many people, they walked after one another. On sunny days the male bird stood erect in the old nest, his beak towards the zenith, and, while he moved his flippers backwards and forwards, he produced a hoarse suffocating sound. The female listened attentively to this antarctic love-song.

It was curious to see how some lazy Penguins picked those pebbles, which, through the care and work of years, had successfully been accumulated by one, when this one happened to turn his back; and the evident unconcern and innocent behaviour of these scoundrels when caught in the act was a source of great amusement. The rightful proprietor of the pebbles would pursue the culprit most energetically, running after it and hitting it with its flippers until both were quite exhausted and covered with blood. During these fights they generally seemed to remember the cause of the quarrel, but it was noticed that as a rule the one who first gave in walked off with the pebble, while the victorious one, blinded by success, was left

with the honour. Generally they lay two eggs; very seldom are three found in one nest. Both male and female divide their time on the eggs for a month. In the summer of 1899 they sat from the beginning of November to the beginning of December. When the mother Penguin feeds the young one, the latter puts the whole of its head into the beak of its parent, and stuffs its beak right into the mother's throat, which by a shaking movement brings the food up. It was curious to see when a gale suddenly surprised the colony; they all lay down with their beaks to the south-east, from which direction came the strongest gales. They looked like soldiers bivouacking on a battle-field.

THE following extract recently appeared in the 'Standard,' creating some sensation among the other daily papers, and showing the drift of public interest in scientific theories as now recognized by journalism:—

“ At the recent Congress of German anthropologists at Halle, Professor Klaatsch, of Heidelberg, read a paper on ‘ The Significance of the Bicephalous Muscle of the Upper Part of the Thigh,’ in the course of which he argued that ‘ the hypothesis of the direct descent of man from Apes can no longer be maintained.’ He based his belief on the following grounds: Man possesses a muscle on the upper part of the thigh, one strand of which proceeds from the *pelvis*, while the other, which is free and supplied with a special nerve, proceeds from the upper part of the thigh, and is attached to the *fibula*. After several years' investigation, Prof. Klaatsch came to the conclusion that the so-called ‘ short strand ’ is a rudimentary form of the biceps muscle, which is much more frequently found in mammals than has hitherto been assumed. Marsupials, Carnivora, many Rodents, and some American Monkeys have been found by the Professor to possess a thick ribbon-like muscle, supplied with the same nerve as the ‘ short strand.’

“ A whole family of mammals appears to have possessed this muscle to a very large extent, and it is only in man, anthropoid Apes, and American prehensile-tailed Monkeys that it has been modified to the ‘ short strand ’ of the biceps muscle. It was originally supposed that the erect walking gait of once climbing animals was connected with this muscle modification. Many such climbing mammals, however, as well as all the Lemurs, &c., of the Old World, have completely lost the muscle, so that its preservation in the case of certain primates and man must be due to some other cause. This cause is made apparent on an examination of the forms of man and the higher primates, whose limbs more closely resemble the original mammalian form than is the case with the majority of other animals. The supposition therefore of a direct descent of man from the Ape is no longer tenable. The now existing Apes are for the most part degenerate forms. The connection of man and Apes is to be sought at the root of the common family tree.”

THE ZOOLOGIST

No. 714.—December, 1900.

THE BIRDS OF GREAT YARMOUTH AND THE NEIGHBOURHOOD.

BY ARTHUR PATTERSON.

(Continued from p. 415.)

Bernicla leucopsis. Bernacle-Goose. — R. Recorded by Messrs. Paget as "not uncommon." At present a very uncertain visitor, several years elapsing without an example. Three on Breydon, June 13th, 1890; one also Jan. 19th, 1896. Three shot out of a flock of ten, Dec. 21st, 1899.

B. brenta. Brent Goose.—N. U. In severe winters, during continuous snowstorms, common at times in the roadstead. Very numerous on beach and Breydon, January and February, 1881. A flock on Breydon during south-east wind, Feb. 7th, 1897. Two hanging on Durrant's stall, Feb. 8th, 1899, locally shot, were conspicuous by their difference in size. I have observed this disparity before. Local, "Scotch Goose."

Cygnus musicus. Whooper. — F. On approach of severe weather small flocks pass over, and in protracted frosts frequent Breydon. Several examples in some seasons brought to market, usually in January. On Jan. 11th, 1879, I saw two flocks on Breydon relatively numbering twenty-one and thirty-two. On March 8th, 1891, twelve seen; and May 29th of same year, four more.

C. bewicki. Bewick's Swan.—F. Occurring under similar
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conditions to the preceding. Occasionally three or four are brought to market during winter, which seldom passes without any. Five shot and eight others seen, Jan. 1st, 1893. Several odd birds since.

C. immutabilis. Polish Swan.—R. I have observed three or four examples of this species or variety in the market, noting the green lines down the toes, the web of the foot being black. Three hung on a game-stall in the market on Oct. 24th, 1890. An example shot on Breydon, Jan. 20th, 1897. Mr. Southwell tells me that in the many hundreds of cygnets which have been received at the Norwich swan-pit, not one example in the white down, which is peculiar to the Polish Swan, has ever been met with. [Stray Mute Swans of various ages are not infrequently shot. Five were killed in two shots on Breydon, Oct. 25th, 1881.]

Tadorna cornuta. Sheld-duck.—F. A few pairs nest on the North Norfolk coast. During a severe rime-frost in the winter of 1879 an unusual number passed along the beach southward, almost within arm's length. Frequent on Breydon in spring, where it hunts for Mollusca amongst the *Potamogeton*. It affects the water much less than others of the *Anatidæ*. Seventeen on Breydon, Jan. 13th, 1897, twelve of which I saw hanging on Durrant's stall on the 16th. Local, "Bergander."

T. casarca. Ruddy Sheld-duck.—A. "On Aug. 18th, 1898, an adult female, quite perfect in plumage, believed to have been shot near Yarmouth, was sent to Mr. Cole for preservation for Mr. Connop's collection" (Nor. N. S.).

Anas boscas. Mallard.—C. Since the Preservation Acts has certainly become somewhat more plentiful, although local gunners are wroth because the landed proprietors make sure of many flappers even before the close-season ends. Frequently crosses with domestic Ducks on the marshes. A cart-load on a game-stall, Feb. 26th, 1881.

A. strepera. Gadwall.—R. "Two or three generally shot every year on Breydon" (Pagets). It is not the case now. Three shot on Breydon, September, 1881, and afterwards hung up at Thomas's shop, were apparently all immature.

Spatula clypeata. Shoveler.—F. An increasing number nest on the Broads, and young birds are occasionally brought to market in autumn. Those shot in winter are doubtless immigrants. This

Duck is uncommonly good eating, a friend comparing the flesh to that of the American Canvas-back. Under date, May 26th, 1818, Whitear refers, in his diary, to fifty-six eggs "this spring" being found by one man in the Winterton marshes (Nor. N. S. vol. iii. p. 247). Several lots seen on Breydon, August, 1881. (B. of S.). Sixty-five observed on Breydon, March 5th, 1890. Local, "Shovel-bill," "Spoonbill-duck."

Dafila acuta. Pintail Duck.—R. R. In January, the local "duck month" *par excellence*, if severe weather obtains, several may be brought to market. Several at Yarmouth, February, 1892.

Querquedula crecca. Teal.—L. L. Nests on the Broads. "Common; Mr. Girdlestone shot the young bird at Hickling, in July" (Paget). Small flocks of migrants on Breydon in the winter, and several in the market generally, although not so frequent as formerly. In 1891 Mr. Lowne received a variety with a thin white line or collar round the neck from Saxmundham. Number on Breydon, March 9th, 1898.

Q. circia. Garganey.—R. R. "Not uncommon, and occasionally breeding" (Pagets, quoting Girdlestone). A spring visitor nesting on the Broads, but, I fear, in decreasing numbers. It seems to be giving way to the Shovelers.

Mareca penelope. Wigeon.—C. Large flocks often visit Breydon during the spring migration; numbers also at the commencement of wintry season. Common also on the Broads during severe weather. On March 12th, 1888, five hundred Wigeon on Breydon; also three Pintails, two Whoopers, and one Scoter. March 16th, 1889, five thousand on Breydon. Local, "Smee."

Fuligula ferina. Pochard.—C. A common visitor in winter, the severer the weather the greater the numbers. I saw a "flapper," with the plumage of its wings quite stumpy, on sale, July 15th, 1880. Local, "Poker" and "Dunbird."

F. rufina. Red-crested Pochard.—A. The first recorded British specimen was shot on Breydon, July, 1818. Two at Yarmouth, 1826; and one or two others since. A female was shot at Hickling in December, 1867, with fifteen Common Pochards (B. of N. vol. iii. p. 200).

F. nyroca. Ferruginous Duck.—R. "Has in a very few

instances been shot on Breydon" (Paget). Over twenty occurrences noted in the county. A male shot at Potter Heigham, Dec. 30th, 1866 (Connop Catalogue). Another, same locality, Dec. 26th, 1886; and a third (a young male) shot near Yarmouth, Oct. 9th, 1894.

F. cristata. Tufted Duck.—C. Probably on the increase. Numbers shot in severe weather. Local, "Golden-eye."

F. marila. Scaup-Duck.—C. Sometimes abundant in January, during sharp weather, usually coming ahead of severe frosts. Twenty-three in Yarmouth market, Dec. 20th, 1890; between thirty and forty hanging there latter part of October, 1898. A female, shot in October, 1898, had the crop full of *Cyclas cornea*. Female generally known as the "White-nosed day-fowl." The species also known as "Hard-fowl," "Grey-backs."

Clangula glaucion. Golden-eye.—F. C. Common in sharp weather. An adult female on Fritton lake, April 6th, 1888. Adult males very rarely met with. Local, "Rattle-wing."

C. albeola. Buffel-headed Duck.—A. An adult male shot at Yarmouth in 1830. Now in Norwich Museum.

Harelda glacialis. Long-tailed Duck.—R. "Very rare; occasionally shot on Breydon in hard winters" (Paget). I have seen several immature examples. Male on Breydon, Nov. 30th, 1898.

Somateria mollissima. Eider Duck.—R. R. After severe winter gales odd birds are occasionally seen, mostly female. They are extremely tame in most instances, and easily shot or stoned. An immature male caught in a fishing-net off Yarmouth about November, 1859; female, Breydon, Dec. 12th, 1883; nine seen in one flock, Oct. 4th, 1891; female killed by a stone on Nov. 20th, 1897, in the surf at Hemsby; another female swimming a few feet from my houseboat during heavy gale, Nov. 29th same year.

[Messrs. Paget refer to a "King-Eider (*S. spectabilis*)—a female, shot on Breydon, July 25th, 1813." It is thought the authority is not sufficient to justify its being included in the county list. But three examples have been killed at Hunstanton.]

S. stelleri. Steller's Duck.—A. A magnificent male shot on the Denes near Caister, February, 1830; now in Norwich Museum (Nor. N. S.).

Ædemia nigra. Common Scoter.—C. Flocks every winter off the coast; sometimes by hundreds. Very restless during snowy weather, with east winds. In ordinary weather will feed and drift towards the shore, occasionally flying back to some favourite feeding ground. Often seen in the Ham (a kind of bay), Gorleston. During December, 1899, millions of *Mactra stultorum* were washed ashore, mostly living. This mollusc is found an inch or two below the surface of the sand. On this species, no doubt, the Scoter delights to feed. Local, "Mussel-duck," "Black Duck."

O. fusca. Velvet-Scoter.—R. R. "Occasionally shot in hard winters; several in the severe one of 1829–30" (Paget). The same description applies to-day. Mr. E. T. Booth met with flocks of Velvet Scoters and Long-tailed Ducks off Yarmouth, February, 1882. One entangled in a herring-net off Caister, Oct. 21st, 1893.

Mergus merganser. Goosander.—N. C. Messrs. Paget record it as occasionally met with here in sharp weather. A punt-gunner killed five, all females, Jan. 11th, 1871. Several of both sexes, January, 1881 (B. of S.). The crop of one killed a few years ago contained several small Roach. Fine adult male in the market, Dec. 20th, 1899, and a female equally as good near Potter Heigham, Dec. 21st, 1899. Local, "Saw-bill."

M. serrator. Red-breasted Merganser.—R. R. "Not uncommon in hard winters; several in 1829–30" (Paget). It is a very uncertain visitor; in some years several, in others none. Several, January, 1894.

M. albellus. Smew.—N. U. Occasionally met with in severe winters in varying numbers. A good old male now and again shot in January. On Jan. 15th, 1881, a curiously mottled male, which had more than half assumed the white garb, was obtained on Breydon. Several in January, 1891, and in January, 1894. Local, "White Nun," "Weasel-duck."

[*M. cucullatus.* Hooded Merganser.—A. Messrs. Paget state that one of these birds was killed in the winter of 1829, "which Mr. Selby has"; but subsequent enquiries have failed to substantiate the record, or trace the specimen.]

Columba palumbus. Wood-Pigeon.—C. Huge flocks occasionally pass over from the north-east at the autumnal migratory

period, as was the case on Dec. 22nd and 23rd, 1893, when thousands arrived, and the market was glutted. Thousands again coming over, Dec. 12th, 1898. They must have flown westward, as none appeared in the following Saturday's market. Local, "Ring-dow."

C. œnas. Stock-Dove.—F. C. Messrs. Paget in their time stated that it was "rarely seen." Now it arrives occasionally in some numbers in early spring, nesting in the county. Prior to the railway running across the North Denes (up to 1879) numbers came there at "haysel," seeking the juicy seeds of the sea-bindweed (*Convolvulus soldanella*). April 13th, 1895, saw thirteen in the market; Aug. 29th, 1896, six; Jan. 13th, 1898, ten, which had been baited with maize. Heavy bird in the market, Dec. 9th, 1899, weighing $15\frac{1}{2}$ oz.

Turtur communis. Turtle-Dove.—C. Decidedly on the increase. The Pagets recorded it as "rarely seen"; and Lubbock states that, although formerly but an occasional migrant, it had in 1845 become generally distributed. It nests at Fritton. Formerly often seen on North Denes.

Syrhaptus paradoxus. Pallas's Sand-Grouse.—A. During the invasion of this species in 1863 (when sixty were killed in Norfolk), several were obtained here. The North Denes and sand-hills were most frequented. The first Norfolk bird was found dead in the surf on May 23rd. A gunner named Nudd, on June 6th, shot a male out of a flock of nine. He mistook them for Plover, but described them to me as "running about like Rats." On May 27th, 1876, a flock was observed on the Winter-ton sand-hills; and in May, 1888, a second invasion occurred, when over eleven hundred were seen in Norfolk, and one hundred and eighty-six were killed. A male and female were seen on the Denes as late as Dec. 2nd (*vide* Stevenson's 'Birds of Norfolk,' vol. i. pp. 376-404; also vol. iii. pp. 392-396).

Phasianus colchicus. Pheasant.—C. And likely to remain so under existing conditions. Belated birds have occasionally been seen in the heart of the town.

Perdix cinerea. Common Partridge.—C. The curious chestnut variety, which has received the name of *P. montana*, has not yet been obtained in the Yarmouth district.

Caccabis rufa. Red-legged Partridge.—C. Before the North

Denes were encroached upon, not seldom nested among the furze. I have seen exhausted birds in spring run down on the Denes, and in the town itself. Lubbock refers to similar occurrences, and of the attempts to leave our shores; but Mr. Southwell (2nd edit. 'Fauna of Norfolk,' p. 71) thinks this rather "indicative of its wandering habits than of migratory instinct." Local, "French Partridge."

Coturnix communis. Quail. — N. C. "Not uncommon" (Paget). Lubbock noted a decrease in numbers in his time. In this district it is now seldom seen or shot. A female example shot at Scratby, Sept. 13th, 1893. Two in the market, Nov. 18th, 1899.

Crex pratensis. Land-Rail.—C. Some captures in queer places made almost every autumn in the town. Of late years it appears to have been considerably on the increase. Several at one time sometimes hanging in the market.

Porzana maruetta. Spotted Crake.—N. C. "Not uncommon at Belton, &c." (Paget). May now occasionally nest on the Broads. Not so common as formerly. Several met with in September, 1881. Two hanging in the market, Dec. 13th, 1899.

P. parva. Little Crake.—R. Several recorded for district first half of the century. "Two were shot by Mr. Richers near Yarmouth, March, 1833. . . . One was preserved by Harvey, of Yarmouth, and sold for fifty shillings" (B. of N. vol. ii. p. 398). I have a pencil note of Harvey's on the margin of Messrs. Pagets' 'Sketch,' remarking, "Very rare, but has been met with."

P. bailloni. Baillon's Crake.—R. Two nests believed to be of this species found at Potter Heigham, June and July, 1866 (Nor. N. S.). Nest, same locality, June 9th, 1886.

Rallus aquaticus. Water-Rail.—C. This species is still fairly abundant with us. A number are shot in severe weather, and appear in the market. "In 1883 upwards of two hundred eggs were received by one dealer from Yarmouth, others being supplied as well—a traffic much to be regretted" (Howard Saunders, 'Manual,' 1st edit. 1889). I have seen many of its eggs brought to market.

Gallinula chloropus. Moor-hen.—C. Abundant on the Broads and marsh-lands.

(To be continued.)

CONSCIOUS PROTECTIVE RESEMBLANCE.

BY GUY A. K. MARSHALL, F.Z.S.

In the second portion of his "Biological Suggestions" (Zool. (1899) pp. 289, 341, 443, 529; (1900) p. 116), Mr. Distant has dealt at some length with the phenomena of animal colouration, generally described under the terms of Protective and Aggressive Resemblance. It is not altogether obvious why these phenomena should have been ranked by him under the term Mimicry. I am aware that this latter word, as first used by Kirby and Spence at the beginning of the century, included *all* cases of resemblance of what kind soever; but seeing that, with our increasing knowledge of the subject, students of animal colouration have found it both useful and advisable to discriminate between resemblance in order to attract attention (Mimicry) and resemblance in order to obtain concealment (Protective and Aggressive Resemblance), there seems to be no sufficient reason why we should revert to an earlier and less exact definition, which is only apt to cause confusion.¹ (*These numerals refer to some concluding notes by Prof. Poulton.*) In his review of the matter, Mr. Distant has brought together a large number of interesting facts and observations bearing on the subject of general and special resemblance (a distinction, however, which he overlooks), containing examples from all classes of animal life. A consideration of these facts has led him to offer the suggestion that "animals of their own volition, and in their efforts to avoid their enemies, place themselves where possible in such adaptation to their surroundings, that protective resemblance and some forms of mimicry are due to animal intelligence, and not so entirely to what is generally understood as the unconscious process of natural selection" (*l. c.* 1899, p. 465). It is proposed to designate this conscious action by the somewhat unsatisfactory name of "active mimicry";* it seems doubtful whether any special name is really required for this process, but, if it be so, I would suggest that "conscious resemblance" is more suitable and more in conformity with the recognised terminology.†

* The term "active" was not invented, but adopted from Kirby and Spence (*cf.* 1899, p. 464).—ED.

† "Conscious mimicry" was also a term stated to have been proposed by Prof. Henslow (*cf. ib.* p. 465).—ED.

This "active mimicry" is apparently regarded by Mr. Distant as something apart from natural selection, a separate factor in evolution, for he says: "If the process of natural selection was to be applied, according to a very frequent method, as universal, then birds arising from these white and prominent eggs would seem in course of time to be doomed to destruction. But we find nothing of the kind. Natural selection is here *replaced* by the evolution of intelligence or active mimicry. True, it may be argued that birds laying white eggs would become extinct without they had gradually acquired the intelligent or automatic powers of concealment through a process of natural selection. But this is only begging the question" (*l. c.*, 1899, p. 546). (The italics are my own.) Seeing that this attitude permeates the whole discussion, it is somewhat disconcerting to read in the concluding remarks that, "to fully understand mimicry, we must appreciate general animal intelligence, and then we shall probably comprehend how much activity has been displayed by animals seeking protection by adaptive and assimilative efforts. This in no way contradicts, but supports, the doctrine of Natural Selection. The animal survives which can best hide from its enemies, and this implies that the variations which tend to adaptive and assimilative efforts, not only succeed in the battle of life, but by the selective process become dominant, and more and more accentuated with a greater need" (*l. c.*, 1900, p. 124). It is scarcely necessary to point out that the latter position, which is essentially that of those very selectionists² whose views Mr. Distant is combatting, is quite at variance with the former. It will therefore be necessary, for the purpose of this discussion, to neglect this remarkable contradiction.

The whole question of conscious resemblance must necessarily depend upon our ideas of animal intelligence, and in the present state of our knowledge these are unavoidably hazy and obscure. It must be recollected that our conception of mind, even in our fellow men, is based entirely on analogy, and thus the further we depart from the human type, the lower we go in the organic scale, the weaker and weaker must that analogy become, and the more careful must we be to avoid the conception that any apparently purposive actions we may observe in these lower organisms must be due to trains of reasoning such as we find in ourselves. The whole subject is, at present, merely hypothetical; but, on the other hand, we must not forget that even our most definite scientific facts are only very high probabilities.*

* I observe that Mr. Distant has strongly criticised (*l. c.*, 1899, p. 361) a somewhat similar remark by Prof. Tyler, who says that "Natural Science does not deal in demonstrations, it rests upon the doctrine of probabilities; just as we have to order our whole lives upon this doctrine." To this Mr.

It is probable that no evolutionist would deny that there must be a certain measure of truth in the contention that some animals are capable of appreciating the protective value of their colouring ;³ for, apart from observational evidence on the point, we should antecedently expect a certain amount of reasoning power in this direction according to the ordinary principles of evolution. The question is, however, whether, in the suggestions under consideration, this power has not been considerably over-estimated. An examination of the examples referred to "active mimicry" would certainly lead to this conclusion, for the arguments used in these instances are equally applicable to every case of protective or aggressive resemblance. There would be little difficulty in demonstrating the untenability of such a position, but this is unnecessary, as we are expressly warned that the suggestion of active mimicry must not be made too absolute, although no suggestion is offered as to its probable limits.

It may, perhaps, be possible to define roughly certain limits within which such consciousness cannot be recognised. Resemblances have been aptly divided by Prof. Poulton into two categories, viz. : "*Special Resemblance*, in which the appearance of a particular object is copied in shape and outline as well as in colour ; and *General Resemblance*, in which the general effects of surrounding colours are reproduced" ('Colours of Animals,' p. 24); and in connection with this distinction it is interesting to note that in the most intelligent section of the animal kingdom, namely, the higher vertebrates, we find little but general resemblances, and the lower we go in the scale of intelligence, the more frequently do we observe special resemblances, that is, where colour is utilised for protective purposes.⁵ But, quite apart from this, it is evident that it is practically impossible to include cases of special resemblance under the term "active mimicry," as here discussed.

Distant replies that "This is a cardinal doctrine in natural and apologetic theology, but is the very antithesis of science, natural or otherwise. The man who orders his whole life on probabilities will probably arrive at the conclusion that hope is a very good breakfast, but a most indifferent dinner." Prof. Tyler's remark appears to my mind as a sufficiently evident truth, but I may perhaps be permitted to adduce in its support the opinion of so virile a thinker as the late Prof. Huxley, who says: "We find, practically, that expectations, based upon careful observations of past events, are, as a rule, trustworthy. We should be foolish indeed not to follow the only guide we have through life. But, for all that, our highest and surest generalizations remain on the level of justifiable expectations, that is, very high probabilities." ('Collected Essays,' vol. v. p. 204.)

On the other hand, Prof. Huxley, in thanking Bateson for his well-known volume on 'Variation,' writes how glad he is to see "that we are getting back from the region of speculation into that of fact again" ('Life and Letters,' vol. ii. p. 372).—ED.

For instance, in those wonderful cases which are found so frequently among insects, the habits of each species are so intimately correlated with its abnormal structure and colouring,⁴ that it is unreasonable to believe that these characters have been developed independently by different factors; the latter by natural selection, and the former by the "evolution of active mimicry," whatever that may mean. These special structures cannot be accounted for by "active mimicry," neither can they be explained by any general theory of internal or external causes, for, as the late Mr. Romanes has well remarked, "Were it not that some of Darwin's critics have overlooked the very point wherein the great value of protective colouring as evidence of natural selection consists, it would be needless to observe that it does so in the *minuteness* of the protective resemblance which in so many cases is presented. Of course, where the resemblance is only very general, the phenomena might be ascribed to mere coincidence, of which the instincts of the animal have taken advantage. But in the measure that the resemblance becomes minutely detailed, the supposition of mere coincidence is excluded, and the agency of some specially adaptive cause demonstrated" ('Darwin and after Darwin,' p. 318, note).

Thus a strong objection may be lodged against the whole suggestion of active mimicry, as opposed to that of natural selection, in that the former suggestion is essentially incomplete and cannot explain all the facts of the case. Let us take the instance of the leaf-butterflies of the genus *Kallima*, of which Mr. Distant says: "The partiality of this insect for settling on dry and withered leaves appears a true instance of active mimicry" (*l. c.*, 1899, p. 531).⁶ Upon the theory of natural selection (granted the undisputed facts of variation and the struggle for existence), it is easy to understand that any marked variations in the direction of leaf-like shapes or markings, which would afford better concealment, would tend to be preserved and further augmented, both by heredity and by the increased keenness of enemies, until the present admirable resemblance had been arrived at. "But, as Mr. Badenoch has well enquired, 'Of what avail would be the disguise were the insect prone to settle upon a flower, or green leaf, or other inappropriate surface?'" (*l. c.*). Quite true; and the fact that the insect is not so inclined is readily explainable by the Darwinian theory; for it is clear that a much greater proportion of those individuals which were prone to render themselves conspicuous by settling on inappropriate surfaces would be picked off by their enemies than of those which selected suitable resting places; and thus, by a gradual process of elimination, the progeny of those individuals, which possessed a well-defined instinct to settle upon withered leaves, &c.,

would eventually supersede those whose instincts were not so well in harmony with their colouration. On the other hand, for the suggestion of "active mimicry," it is contended that the actions of these insects are apparently so purposive that it is difficult to believe that they are not due to "conscious volition" on their part; and, in support of this contention, a large number of other similar cases are adduced, all, be it noted, equally, or more fully, I consider, explicable on the theory of natural selection. But when we stop to enquire why, or how, these butterflies have developed this peculiar colouration, the supporters of the suggestion of "active mimicry" can vouchsafe us no reply. According to this suggestion, the tiger selects the bamboo-thicket, the leopard the leafy forest, and the lion the open veldt, simply because they have individually discovered, by their own reasoning powers, that these respective localities are best suited to their particular styles of colouration;* and the question why one is striped, another spotted, and the third unicolourous, reverts to an open problem. Thus all the beautiful explanations of adaptive colouring, afforded us by Darwin's grand conception, are to be thrown to the winds if "active mimicry" be logically applied.

It will be thus seen that it is only among the most generalised types of resemblance that we may seek for signs of conscious adaptation, as opposed to quasi-mechanical instincts. But even here the foregoing objection also applies, though with less force, since the contention of coincidence may be put forward in some cases, as indicated by Mr. Romanes. But it must be borne in mind that this contention is nothing but an argument from ignorance, and, as such, is not scientifically permissible where any other reasonable and adequate explanation can be advanced. The mere citation of a number of instances of protective colouring, however purposive the actions of the animals may appear, are in themselves no *proof* of conscious resemblance; neither do they in any way weaken the theory of natural selection in this regard; for this theory not only consistently explains the reasons for, and the development of, the colouration, but also accounts for that very purposiveness upon the occurrence of which the former proposition is alone based. Again, in the case of special resemblances, if it be conceded, as a result of the arguments adduced above, that both the morphological and psychological characters have been contemporaneously perfected through the mechanical action of natural selection (and in fact the structural peculiarities cannot well be explained on this principle without the instincts), then this alone would form strong

* This is an apparent inference to Mr. Marshall, but no statement of the kind appears in the suggestions criticised.—ED.

presumptive evidence that, at least, the great majority of cases of general resemblance are due to the same factor. For it is evident that all cases of special resemblance must, at some time or other, have passed through a general phase, and therefore we must necessarily apply the same explanation in both categories.

Nevertheless, while the orthodox Darwinist may maintain that protective colouration, together with the appropriate instincts which are necessary to render it of any use, have been ultimately developed through natural selection (save, perhaps, in a very few exceptional cases),⁷ yet it is competent for him, without any contradiction, to admit that probably some few of the most intelligent animals may, in the course of their mental evolution, have arrived at such a standard as to be able to appreciate the value of their own protective actions, which were originally merely instinctive—a very different position, however, from that suggested by Mr. Distant.

But even for such an admission some definite proof is required. On looking through the large number of instances quoted by Mr. Distant in support of his suggestions, there appears to be only one case which affords anything like real *proof*, as opposed to mere suggestion. I refer to Mr. E. S. Thompson's account of the actions of a fox: "A fire had swept the middle of the pasture, leaving a broad belt of black; over this he skurried until he came to the unburnt yellow grass again, when he squatted down and was lost to view. He had been watching us all the time, and would not have moved had we kept to the road. The wonderful part of this is, not that he resembled the round stones and dry grass, but that *he knew he did*, and was ready to profit by it" ('Wild Animals I have known,' p. 193).⁸ This is a good example from Mr. Distant's point of view, but the fox is notoriously one of the most sagacious and cunning of animals, and, even if we believe that many of its actions are due to conscious intelligence, this does not in any way prove the occurrence of such intelligence in insects, fishes, or even other mammals, each of which cases would require independent proof. Further, it may be as well to point out that probably the process of reasoning in the fox would be quite different from that which would prompt a man to put on a khaki-coloured shirt when going out to shoot buck. It is improbable that any of the lower animals have any real conception of their own appearance, and it is likely that any consciousness they may exhibit in their protective actions consists rather in the general recognition that they are freer from attack in certain particular spots or types of country, than from any true appreciation of the optical phenomena to which they really owe their safety.

But it must be noted that a mere desire to hide, apart from any

colour consideration, cannot be regarded in itself as any evidence of conscious resemblance. For example: if we break a piece off a termite-heap and see that the inmates at once run back into the nest or avail themselves of the nearest cover they can find, we cannot assume that this is due to their intelligent recognition that their colours are out of harmony with their then surroundings, but we should rather attribute it to the instinctive avoidance of light shown by all such nocturnal creatures, an instinct which is preferably explained by natural selection.⁹

As a matter of fact, the most satisfactory style of evidence would probably consist in a careful and exact observation of the demeanour of protectively-coloured animals, which find themselves, by a natural accident or necessity, in an environment to which their colour is quite unsuited; or, conversely, of the behaviour of striking sports or variations of such species, when occurring in their normal surroundings. If, in such cases, the animals show a distinct appreciation of the danger of their position and alter their normal habits accordingly, then the suggestion of active mimicry will be sufficiently proved, so far as those animals and their immediate allies are concerned. But if, on the other hand, they show no such appreciation and merely adopt their usual attitudes of concealment, which in that case would egregiously fail in their purpose, then this suggestion will be very strongly discounted. It seems that a careful collection and discussion of all the authenticated observations of this description would add considerably to our knowledge of animal psychology. Perhaps, however, this has been already done, for it is impossible to keep abreast of scientific thought and work when living on the very outskirts of civilisation. I may here refer to one or two examples of this kind which tend to show that many cases of protective actions on the part of the higher vertebrates must be attributed to UNREASONING INSTINCT rather than to conscious volition.

The late Mr. Romanes very truly remarked, that "Every sportsman must have noticed that the somewhat rare melanic variety of the common Rabbit will crouch as steadily as the normal brownish-grey type, notwithstanding that, owing to its normal colour, a 'nigger rabbit' thus renders itself the most conspicuous object in the landscape. In all such cases, of course, there has been a deviation from the normal type in respect of colour, with the result that the inherited instinct is no longer in tune with the other endowments of the animal" ('Darwin and after Darwin,' p. 320). Again, to quote Mr. Distant himself, in reference to the crouching habits of the South African Francolinus, he says: "Subsequently I observed how this action

could become habitual without a suitable environment. I flushed a pair of *Francolinus subtorquatus*, one of which squatted in the same manner, but, by force of circumstances, among the short, black and charred remains of a grass fire. Here its colour stood out in bold relief, and I easily bagged it" (Zool. 1899, p. 545, note). I have on several occasions observed a similar behaviour on the part of this same bird in Mashonaland; and, indeed, the blackening of the veldt by grass fires not unfrequently gives one opportunities of realising that at least some protectively coloured animals have no mental appreciation whatever of the real relation between their own colouring and that of their environment.

There are few birds in this country which show a stronger apparent reliance on their protective colouring than the little Rufous-capped Lark (*Tephrocorys cinerea*) or the Cape Long-claw (*Macronyx capensis*); they will readily permit one to approach within a few yards of them, and will then merely run on ahead in their curious, crouching, rat-like manner. This action is certainly of considerable protective value in their ordinary surroundings, but they will do precisely the same on the open "burns," where it must be rather detrimental than otherwise. Did they really comprehend the contrast exhibited by their plumage in such spots, they would assuredly escape by flight instead of by running. Not long ago I noticed a similar case on the part of our common Side-striped Jackal (*Canis lateralis*). While travelling on a post-cart we passed a fire burning not far from the road, and strongly outlined against the burnt grass we saw the forms of two Jackals. They were a little distance apart, one sitting on its haunches, the other standing, and they were evidently watching for the rats, young birds, &c., which the fire would disturb. At our approach they merely looked round at us without concern, and so, without stopping the cart, one of my companions tried a shot with his rifle. The bullet whizzed close over the head of the standing animal, which promptly bounded into the long, unburnt grass; the other, however, which had only heard the report without feeling the shock of the bullet, merely crouched to the ground, when it was quite as conspicuous as before, and did not move until a second bullet knocked up the dust close by its side. I have further seen an identical instance of the misapplication of the protective crouching instinct on the part of the Aard Wolf (*Proteles cristatus*) in Natal; and, doubtless, such observations could be multiplied were special attention paid to them.

Anyone who has had many opportunities of observing animals must have been struck by the fact that even though they may possess a considerable amount of intelligence, this is curiously limited in many

directions. This may even occur in an unexpected way, as in the observation of Col. Pollok, cited by Mr. Distant, that the Tiger has not yet learnt that in pursuit of game nothing can be done down wind. Considerations such as these must lend a certain measure of support to the mechanical conception of natural selection. Thus, in the matter of conscious resemblance, although many animals may show undoubted intelligence in other directions, it is highly probable that, in the great majority of cases, their reasoning powers would not be sufficient to enable them to decide whether, or no, their own colouring would have a protective value in any new or unusual environment. It is far more reasonable to suppose that such knowledge as they may have in this respect would be acquired through their experience of their liability to, or immunity from, attack under such conditions, quite apart from any colour considerations. The former process would be a true instance of "active mimicry," as defined by Mr. Distant, but the latter cannot be included under that term; indeed, in such cases, experience in the individual is the equivalent of natural selection in the species.

In the preliminary portion of his paper, Mr. Distant has given us many excellent examples and arguments to show that mimicry and protective resemblance probably existed in very remote antiquity;¹⁰ and he has done well in drawing attention to the matter, which is apt to be overlooked. But I must certainly join issue with him when he states that: "The present attitude of many champions of the cause, who seek to find, or to invent, present factors for producing these phenomena, seems fraught with peril for the whole theory; and, with the same weariness and perseverance with which the original promulgators thought out the doctrine, we must go on searching for further proofs, which will necessitate our appealing to the Cæsar of the past—the ever-growing science of palæontology" (*l. c.*, p. 302). I must confess that this appears to me to be a very remarkable assertion. In the first place, the vast majority of cases generally referred to mimicry and resemblance are concerned with colour and movement alone, structure playing but a very subordinate part therein.* Mr. Distant has himself been at some pains to show the very evident futility of appealing to

* The point discussed was the *structural* characters of the Phasmidæ. The exact quotation requires this antecedent: "We still have abundant reason for believing that, though the protective resemblance of these Phasmidæ was already acquired in Carboniferous times, the presence of Amphibia in an evolutionary sense is quite sufficient to account for it. This prompts two reflections: one, that we ought to look a long way back for the origins of these protective and mimetic guises; and the other, that we may reasonably hope to find them" (p. 302).—ED.

palæontology for evidence as to these phenomena ; thus, if we are denied the right of attempting to explain them by causes acting at the present time, we shall have to abandon the whole question in despair. But, what is more important, mimicry and resemblance are only particular aspects of the principle of natural selection, and therefore if the factors of mimicry do not exist to-day, then, *a posteriori*, neither do those of natural selection. A single glance at nature is sufficient to justify the rejection of such a conclusion, and we must, therefore, admit that the factors of mimicry *are* in actual operation now ; were they not, we should have no grounds for assuming that they had operated in past geological epochs. If, therefore, we find that certain cases appear difficult of exact explanation in the present state of our knowledge, we are by no means justified in disposing of the difficulty by referring them to causes operating only in the dim past, which we can neither prove nor disprove. Rather must we continue the laborious search for further evidence, not by a study of the anatomy of extinct animals, but by seeking a deeper and more intimate knowledge of the real life-histories of living organisms ; for we are still profoundly ignorant of the immensely complex factors which go to make up the conditions of life of the very commonest animal upon this earth.

Nevertheless, it must be conceded as possible that there may be certain cases of mimicry or resemblance which cannot be attributed to exact causes acting at the present time ; but these would be only exceptional, and would probably be due to a recent change in the enemies or the general environment of the species. I say "recent" advisedly, for we have very good grounds for believing that complicated protective characters would gradually disappear soon after the need for them ceased, whether this disappearance be attributed to pammixis or to disuse.

Later on, in the papers under consideration, we find an excellent suggestion that all examples of mimicry and resemblance should be classified under various headings, such as—Demonstrated—Suggested or Probable—Disputed or Mistaken—Purposeless—or Active. If such an arrangement could be thoroughly and carefully carried out, it would be of considerable value to students of these phenomena. Mr. Distant could, of course, only give us a mere sketch of the subject ; but it is remarkable that there is not even a reference to the lengthy and important paper by Prof. Poulton, who has so thoroughly identified himself with this line of research, on "The Experimental Proof of the Protective Value of Colour and Markings in Insects in reference to their Vertebrate Enemies" (Proc. Zool. Soc. 1887, pp. 191-274), in which all the reliable experiments on British insects, up to that date,

are tabulated and discussed.* Unfortunately, however, the classification of several of the cases given by Mr. Distant is open to criticism. For example: in the instances of resemblances in birds, given by Mr. J. H. Gurney (*l. c.*, 1899, p. 460), every case relates to species of the same genus inhabiting different areas—in fact, representative species, or even local races; and the resemblances between them are simply due to close kinship, and have nothing whatever to do with the subject of mimicry. Again, a reference to the suggested mimicry of the Cape Hunting Dog (*Lycæon pictus*), of the Spotted Hyæna (*Hyæna crocuta*), is placed under the heading of “Suggested or Probable Mimicry” (*l. c.*, p. 449), although Mr. Lydekker’s remarks, showing the difficulty of accepting this proposition, are quoted. Indeed, I have always been at a loss to understand how such a strong and fearless animal as the former—of which Selous has recorded that it “is capable of overtaking and attacking single-handed such a powerful animal as a male Sable Antelope” (‘Hunter’s Wanderings in Africa,’ p. 357)—could be supposed to derive any benefit from resembling a cowardly brute like the Hyæna. To anyone acquainted with the two animals in nature, it is abundantly evident that, whatever mimicry there may be between them, it would be in just the reverse direction; that is, the skulking Hyæna would materially benefit by being mistaken for the bold and gregarious Hunting Dog.¹¹

I need only refer to one more example—namely, that of the Honey Bee (*l. c.*, p. 356). It is well known that various species of the dipterous genus *Eristalis* mimic Bees; and Mr. Distant quotes the experiments of Prof. Lloyd Morgan with Chickens, and Mr. R. J. Pocock with Spiders, which demonstrate the value of this mimicry. Yet this instance is not placed in the “Demonstrable” category, but in that of “Suggested or Probable,” on the ground that “the Bee itself is not absolutely protected by its sting.” If such a classification were adhered to, there never would be a case of demonstrated mimicry; but it must be noted that, on the same page, it is explained that: “By the term ‘Demonstrable’ is implied all those instances where protection, absolute or partial, has been, or can be, demonstrated by experiment or actual observation.”¹²

It now only remains to discuss the objections raised by Mr. Distant

* The writer may not have referred to every paper that Prof. Poulton has written, but he certainly did write (p. 451): “Poulton has focussed many observations respecting instances in the Insecta, largely augmented by information received from the well-known coleopterist C. J. Gahan” (*cf.* Journ. Linn. Soc. xxvi. pp. 558–612 (1898)); a much later paper than that referred to by Mr. Marshall.—Ed.

to certain cases which are generally referred to protective resemblance. After stating that "colour alone may prove a false analogy to protection" (*l. c.*, p. 350), and referring to the strongly protective colouring of a certain South American butterfly, *Ageronia feronica*, he says: "This observer, however, at the same time refers to the statement of Bigg Wither, that this very insect is called the Whip-Butterfly, owing to the sharp whip-cracking sound made by its wings when battling by its fellows in the air,¹³ and that this sound makes it the easy prey of a forest bird, locally known as 'the Suruqua,' who thus detects and secures it. Here the apparent protection by "protective resemblance" is invalidated by a peculiar and unusual sound-producing quality, which is as equally dangerous as its colour is reported protective. A similar remark may be made as to the musical *Cicadidæ*. How often have the usual green and brown colours of these insects been adduced as an example of protective resemblance; . . . but when we desire to capture them the shrill noise proclaims their retreat, and their assimilative colouration avails them little." Again, in commenting upon Mr. Tutt's graphic account of the protective colouring of the Lappet Moth (*Lasiocampa quercifolia*), he says: "Here the expression, 'trained eye,' of the entomologist, would suggest a more developed 'trained eye' of the moth's natural enemies, and hence any theory of protective mimicry is much discounted (*l. c.* p. 455). From these quotations it may be gathered that Mr. Distant's attitude towards the subject is somewhat as follows:—When we find that the colouring of any animal assimilates well with that of its environment, but, at the same time, that this animal is apt to render itself more or less noticeable by certain movements or noises, then we are not justified in regarding its colouration as an efficient protection, and the case must therefore be removed from the category of protective resemblance. Tempting as such a conclusion may be to the opponents of Darwinism,* it appears to me to be wholly erroneous. The fundamental fallacy lies in the gratuitous assumption that the protection afforded must be absolute; for otherwise there is no ground whatever for the objection raised. In the first place, I am not aware that such absolute protection has been anywhere observed in nature, and, indeed, were the above proposition a sound one, the principle of protective resemblance would have to be entirely abandoned. But, as a matter of fact, this principle predicates no such complete immunity from attack; in truth, the very essence of the theory of natural selection negatives any such

* Darwinism does not derive its sole support from theories of "mimicry," and the writer of the papers criticised was not aware that he was to be counted among "the opponents of Darwinism."—ED.

supposition ; for, according to this theory, protective resemblance, as we now see it, has been arrived at by the gradual accumulation and improvement of colour variations which make for concealment, and the protective value of such variations must essentially be, or have been, of only a partial character. Admitting that the gambols of the Whip Butterfly (presumably of a sexual character) lead the insect into a certain amount of danger, yet, to ask us to believe that it thereby "invalidates" the protection afforded it, when at rest, by its assimilative colouring, against other enemies, and perhaps even against the "Suruqua" itself, is, as Mr. Bateson puts it, referring to a different assumption, "to ask us to abrogate reason." Further, the not unusual fact, that animals exhibiting a very high grade of resemblance are yet subject to a considerable amount of persecution, in no way invalidates, but rather strengthens, this principle ; for it is evident that such a degree of resemblance can only have been developed in response to a similarly high degree of persecution, acting either now, or within recent times.

It will thus be seen that, on general considerations alone, the above objections to the principle of protective resemblance must be at once ruled out of court. It may be as well, however, to discuss the case of Cicadas in more detail. In the first place, I cannot agree with Mr. Distant that these insects are easily captured owing to their shrill cries. All high-pitched, vibrating sounds of this kind are very difficult to localise exactly, and with Cicadas I have noticed very frequently, both with myself and others, that the distance of the insect is invariably much underestimated.¹⁴ But even when the tree on which the Cicada is sitting has been ascertained, it must be very cautiously approached, for many species are able to detect one's presence at a distance of fifteen to twenty yards in open country, and, on so doing, they will at once cease their call ; and although they will generally permit a much closer approach than this, yet it is always extremely difficult to locate the exact position of the sound on the tree. Their habits, however, vary in this respect, and among the dozen or more species which I have observed in various parts of South Africa, I have found it to be a very general rule that their wariness is inversely proportionate to their protective resemblance ; those species which live on rough, knotted bark, or among dense foliage, permitting one to approach much nearer than do those that rest on bare, smooth trunks or small twigs. The above remarks apply to the calling of a single insect ; but, when a number are calling together, it is still more difficult to localise any particular cry ; and, indeed, I have on several occasions been driven out of a patch of machabel bush by the con-

tinuous ear-piercing scream of a number of the large *Pæcilopsaltria horizontalis*, Karsch, which seems to make the whole air pulsate, without betraying the exact locality of a single individual. Although in many cases I have actually tracked down individuals by their cry, in order to learn the calls of the different species, yet such a method is far too laborious for ordinary collecting purposes. So experienced a collector as Dr. Percy Rendall says: "In the Transvaal I have also taken them at rest on tree-trunks, but I do not think they were taken in consequence of their song having thus localized them. At Zomba I caught a large species by actually localizing its noise, but that was the only instance of the kind that I remember" ('Zoologist,' 1897, p. 520).

It must not be supposed that I do not recognize that the Cicada's cry must, under certain circumstances, be dangerous for individuals as, indeed, are many other secondary sexual characters; but Mr. Distant appears to have overestimated the danger, and the contention that this noise invalidates their admirably protective colouration appears to be an inverted way of looking at the question. It is more reasonable to suppose that the protective resemblance of these insects is so efficacious, that they have been able to develop these extraordinary cries through the process of sexual selection (or perhaps even natural selection, supposing æsthetic appreciation on the part of the female be denied), without unduly endangering the safety of the species. On this view, the Cicada's song, far from proving that the insect's colouring is inefficient for protective purposes, would stand as a testimony of its very high efficacy. In fact, I venture to think that, in the vast majority of cases in which animals produce conspicuously loud sounds, they will be found to possess either highly protective colouration or habits, or else distasteful or other qualities which render concealment unnecessary.

In conclusion, I can only hope that sufficient has been said to show that there are good grounds for opposing the suggestion that active mimicry is of any general occurrence in the animal kingdom; and, further, that the attempt to minimise certain phenomena of ordinary protective resemblance, in order to bring them within the scope of that principle, is not justifiable upon the evidence adduced. The subject, however, is such a wide one, that it is impossible to deal adequately with all its aspects within the limits of a paper such as this.

REMARKS ON THE PRECEDING PAPER.

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My friend Mr. Marshall has asked me to make any alterations or corrections in his paper. I find, however, that I so entirely agree with the whole of the argument that I have merely added a few confirmatory notes to certain passages in the paper, which are in each case marked by a number.

¹ H. W. Bates, in his classical paper, also used the term mimicry in the wider sense employed by W. L. Distant. The majority of naturalists have since followed A. R. Wallace in keeping Protective and Aggressive Resemblance distinct from Mimicry—a course which appears to be convenient, inasmuch as the distinction in terms corresponds to a real distinction in the modes of defence. In the former, an animal resembles an object which is of no interest to its enemy, and in so doing becomes concealed; in the latter, an animal resembles an object which its enemy knows well and fears or dislikes, and in so doing becomes conspicuous. Other superficial resemblances—such as those produced by protective resemblances in common, warning colours in common (Müllerian mimicry), and functions in common (analogical or adaptive resemblances of Darwin)—are excluded from mimicry as here defined.

² See the discussion on “Organic Selection,” reported in ‘Science,’ N.S. vol. vi. No. 146, Oct. 15, 1897, where this view was sustained.

³ Probably most evolutionists would hesitate before committing themselves to such a conclusion. Highly intelligent animals, such as birds, crouch and hide when very young at every unusual sound. This action is performed instinctively and unintelligently, and is apparently an automatic response to stimulus. When the stimulus has been repeated, and no danger is apparent, the young birds cease to crouch. We are not justified in considering that their intelligence has done more than enable them to inhibit an unnecessary response. There is no reason to think that they have any understanding of the meaning of the response itself. See Lloyd Morgan’s ‘Habit and Instinct’ (London, 1896).

⁴ It should be remembered that the structure and colouring are themselves made up of many complex factors, all of which must co-operate if the mimetic or protective resemblance is to be effective. See Linnean Soc. Journ., Zool., vol. xxvi. pp. 576–578.

⁵ That is to say, where the high cerebral development exists which would, according to W. L. Distant, tend to produce mimicry and protective resemblances, precisely there these adaptations are lowly developed as compared with *Insecta*, where we meet with far less intelligence and far more of the unvarying repetitions of pure instinct, incapable of improvement by learning, and, within their rigid limits, too perfect to require it. Where the conditions are most favourable for "active mimicry," mimetic and cryptic adaptations are least prominent; where they are least favourable, these adaptations become most conspicuous.

⁶ So far as I have been able to collect evidence, *Kallima* does not rest on dry and withered leaves, but in situations, such as trunks and branches, in which dead leaves would not attract attention. H. J. Elwes has stated that it freely expands its wings when settled, and looks anything but leaf-like; but this is probably when it is thoroughly on the alert, during the short pauses between successive flights. C. Swinhoe has informed me that it invariably rests head downwards, like a dead leaf hanging by its stalk, so that all the figures and preparations seen in this country representing its natural attitude are wrong.*

It is quite impossible to explain the protective attitude of this or any other insect on the principle of "active mimicry," unless we are going arbitrarily to assume that certain defensive activities are to be explained in this way, while others, equally necessary and equally elaborate, cannot be thus interpreted. Consider, for instance, the concealment often brought by the cocoon—the selection of an appropriate situation, the building into the walls of a part of the surrounding surface, &c., &c. Upon the principle of "active mimicry," "the view would be, I suppose, that the ancestral larva spun a cocoon which was not much of a success, and was in consequence attacked by enemies; that the larva observed these attacks, and accordingly improved its cocoon. But that is not the way in which the struggle for existence is waged with insects. If the larva failed, it failed, and that would be the end of the matter. It has no chance of improvement; it has no opportunity of learning by experience. Its only chance of survival is to avoid experience of foes altogether; experience is the most dangerous thing in the world for an edible insect. This becomes still more obvious when we remember that failure or success is almost always determined long after the cocoon is made. The caterpillar, perhaps, spins the cocoon in autumn, but the real stress of competition will come in winter, when insect-eating animals are pressed hard with hunger, and search high and low for food. But the caterpillar is by

* Cf. Eha, 'Natural Science,' vol. ix. p. 299.—ED.

this time a chrysalis, and of course has no opportunity of improving the cocoon. The selective test is applied long after the operation has been performed, and when there is no possibility of gaining by experience. We are thrown back, then, solely upon natural selection, which acts on the nervous system of the caterpillar, and thus compels it to make the cocoon in a certain way. In other words, those caterpillars which are impelled by their nervous system to make ill-formed conspicuous cocoons have no chance of living, and, in future stages, producing offspring. Hence the selection caused by the keen sight of foes first raises, and then maintains at a high level, the standard of cocoon-making."

"This contention as to the uselessness and danger of experience applies to the whole of those smaller defenceless animals which have no chance of fighting with their enemies, or of escaping when once they have been detected" ('Proc. Boston Soc. Nat. Hist.' vol. xxvi. p. 391).

It would be a most gratuitous indulgence in unnecessary hypothesis to insist that the appropriate attitude which gives a meaning to form and colour, and itself receives a meaning from these, originated in one way in the caterpillar, and in another and totally different way in the imago which develops from it.

⁷ See note (3).

⁸ The observation does not prove more than that the fox seeks cover and hides when he sees that he is observed by man. The burnt surface did not afford cover, and the fox sought it elsewhere. It would be very rash to assume from the observation that the fox knew anything about his own protective colouring.

⁹ Or the numberless examples of insects which fall motionless when their food-plant is shaken.

¹⁰ There are many reasons for considering that colours and patterns change very rapidly when no longer sustained by natural selection. When animals become cave-dwellers, or inhabit the greatest depths of the ocean, their colours are profoundly modified and often tend to disappear. This happens in forms closely allied to others which still retain the normal colouring and live in the light.

The majority of domestic animals have been immensely modified in this respect in a measurable number of years. In some cases these changes have been brought about without the aid of specially directed artificial selection. Thus a large proportion of our fowls produce white eggs instead of the brown of the ancestral species.

Again, the enormous difference between the colours and patterns of certain closely-allied species is evidence for ease and rapidity of change rather than stability in this element of structure. The argument becomes stronger when we consider the cases of sexual and seasonal,

and other di- or poly-morphism in the different individuals of the same species. A single instance will make this clear. There are certain genera of butterflies, such as *Dismorphia* (in the wide sense), *Pseudacraea*, and *Hypolimnas* (also in the wide sense), of which almost the whole of the numerous species are mimetic. Within the limits of each genus the most divergent models have been followed, so that utterly different colours and patterns have been produced in forms which are still closely related, and in other structural features exhibit no corresponding differences. In the most extreme case known to me, immense differences occur in the different races of a form which systematists consider as a single species, viz. *Hypolimnas bolina*. If we compare the Indian form of female with those of the Malayan region, Australia, and Polynesia, including Fiji (in which the local race itself contains the most widely divergent forms), and remember that no corresponding differences exist which would justify us in conferring specific rank in any of the cases, we are driven to the conclusion that colour and pattern are the most superficial of all specific characters,—of all the least likely to persist unchanged when the models upon which they were founded have long since disappeared.

In one special case which I have observed, there is evidence that changes in the nervous system have outlasted the markings which once gave a meaning to them. Some of the remarkable larvæ of the genus *Ophideres* have two eye-spots at the junction of the anterior and middle third of the body. They have the instinct of bending the anterior third so that it rests under the middle one, and thus the eye-spots are brought into an appropriate position apparently at the anterior end of a somewhat snake-like body. But a caterpillar of this genus which I found in Teneriffe assumed the attitude, on irritation, although the eye-spots were almost completely wanting.

¹¹ It is worth considering whether the Müllerian principle may have been operative in this case.

¹² Of course, no natural selectionist has ever been so unreasonable as to contend for *absolute* protection. In every species, whether defended by the most distasteful or dangerous qualities, or the most effective concealment, no more can be achieved than to keep up the average numbers under average conditions, and this means that an immense majority of individuals are doomed to failure. As regards concealment, success merely means that enemies have so far to work for their living that in the time at their disposal they cannot do more than reduce the number of individuals to the average. Warning colours and unpalatable or otherwise unpleasant qualities are more complex as a means of defence, depending as they do for their success upon the co-existence of other more desirable food. Their operation,

under favourable circumstances, is probably to reduce the number of enemies, this success being compensated, however, by the more persistent attacks of certain special enemies—the result being the same as in the cryptic colouring, namely, to keep up the average number of individuals.

¹³ Darwin remarks on the sound made by this species ('Voyage of the Beagle'), which he witnessed during his travels in South America. He believed that the sound was of sexual significance, and in his essay on sexual selection compared it to that made by the males of *Haliae prasinana* during courtship—a sound which I have myself once heard. The display or exercise of secondary sexual characters is probably often a danger to the individual, although I fail to see how it is possible to argue from this that the cryptic colouring and attitudes of other phases of life are thereby rendered inoperative and valueless. The sound-producing time is one of high activity and rapid movement in both the species of Lepidoptera mentioned; in the case of the common English moth it is indulged in so rarely, that comparatively few naturalists have ever heard it, while in *Ageronia* it is not likely to be produced during more than a very small proportion of the life of the male. As to its cryptic colouring and, of even more importance, the corresponding instinctive attitudes and movements, Darwin made special remark in the volume already mentioned.

¹⁴ I have noticed the same thing in North America. Not only was the distance very difficult to estimate, but the direction from which the sound came equally hard to trace.

[In closing this discussion, which has now extended beyond the limited space of 'The Zoologist,' as writer of the incriminated "Suggestions," I ought perhaps to make some rejoinder. This is unnecessary to my friend Mr. Marshall's objections, as they principally express an ably stated *difference of opinion*, and I have merely added footnotes to make his quotations from my suggestions a little more ample and representative. Prof. Poulton, in forwarding his "Notes," with his usual fairness, wrote: "My remarks are more of a reinforcement of Marshall's arguments than a direct answer to your paper, *which I have not seen*. I expect, however, from Marshall's MS., that they do affect the drift of your argument, and are therefore in the nature of a reply." This statement of course disarms any rejoinder. Besides which a comparison of Poulton's notes to Marshall's opinions also discloses a diversity of view, though the first named states he entirely agrees with Mr. Marshall's argument. Thus Mr. Marshall writes (*ante*, p. 538), "It is possible no evolutionist would deny," and Prof. Poulton to this adds the note, "Probably most evolutionists would hesitate before committing themselves to such a conclusion." Again, they both differ as to the active mimicry of the Fox (*cf.*, pp. 541, 552). A triangular discussion is therefore out of the question, and we may continue to differ in opinion and search together for facts.—ED.]

NOTES AND QUERIES.

MAMMALIA.

Wild Cat.—In reply to Mr. Harvie-Brown's enquiry in 'The Zoologist' (*ante*, p. 477), the best *pictures from life* of the Wild Cat with which I am acquainted are those published in the 'Badminton Magazine' for October, 1895; 'The Artist,' for July, 1897; and 'Autumns in Argyleshire with Rod and Gun,' just issued. These are from studies taken direct from life by Mr. Archibald Thorburn from a fine male then in the possession of the late Lord Lilford.—R. J. HOWARD (Shear Bank, Blackburn).

AVES.

Nesting of the Marsh-Warbler in Wiltshire.—My son (H. S. Hall, Jun.) had the good luck to find a nest of the Marsh-Warbler (*Acrocephalus palustris*) on June 18th of the present year. He was Trout-fishing on one of the tributaries of the river Wylde, near the village of Stapleford, and spent some time in searching for nests of the Reed-Warbler in an adjacent osier-bed. He brought home five or six eggs, taken here and there from different nests, and one of these I at once picked out as a typical Marsh-Warbler's egg. The next day I visited the nest, and, from a careful study of its materials, position, and surroundings, my first impression was amply confirmed. I may state that during the last few years I have examined several nests of the Marsh-Warbler in the neighbourhood of Bath; two of these have been recorded in this Journal (*cf.* Zool. 1894, p. 304; 1895, p. 304) by personal friends of my own, with whom I have spent much time in studying the Marsh-Warbler's nesting habits. It is therefore with the fullest confidence that I am able to record this species as having bred in Wiltshire; whether it has been observed in this county before I do not know, but I have found no mention of it in Smith's 'Birds of Wiltshire.'—H. S. HALL (Clifton, Bristol).

Is the Siskin an Autumn and Winter Songster?—Is it the habit of the Siskin (*Chrysomitris spinus*), in a state of freedom, to repeat its song in autumn and winter? Five Siskins happened to fly into some fir-trees in our garden to-day (Nov. 17th), and one of the male birds proceeded to rehearse his artless but inspiring strain, which I had not listened to since June last. Hence I venture to ask of those who have had better facilities for studying

Siskins than myself whether the Siskin is to be considered one of our regular winter songsters. Two pairs of Siskins passed the summer in the neighbourhood of Pitlochry, but I fancy that they nested in private grounds. At all events, we saw nothing of either nests or young, though both adult and immature birds were caught by a pointsman early in September.—H. A. MACPHERSON (The Rectory, Pitlochry).

Number of Eggs in the Nest of Swift (*Cypselus apus*).—The following incident may be worth mention in connection with this subject. In 1894 there was under the roof of the house where I was then living a Swift's nest containing three eggs, one of which had an imperfect shell, as if there had not been quite enough material to finish it. The following year the nest contained three eggs, all of which had perfect shells. This makes it probable that in the latter year the birds had just reached their breeding prime. Unluckily, in 1895 a ventilating shaft was run up close to the nest, in consequence of which the birds deserted the site.—A. BANKES (Leadenhall, The Close, Salisbury).

The Little Owl (*Carine noctua*).—At frequent intervals the Little Owl is recorded as having been obtained in some part of the kingdom, as if its occurrence was that of some rare straggler. The collectors of these birds are in reality, however, only thwarting the endeavours of those who for many years have been trying their utmost to establish this bird as an introduced species. Little Owls have been released in numbers in various parts of the kingdom for years past, and in some districts have bred regularly, and are in a fair way to becoming permanently established. If the stragglers from these colonies were left alone the species would speedily become general throughout the country, and we should have the pleasure of seeing this entertaining little bird frequently, for the Little Owl is not nocturnal, as is the majority of the Owl family, but is to a great extent diurnal, and a frequenter of comparatively open ground, rocks, orchards, &c. It is needless to add that it is harmless, and also that it is very useful. Introduced species are not always a success, but no harm and much pleasure is to be got by encouraging this bird; and the acquisition of the dead body of an introduced species, or of an escape, can be of no interest even to the collector of British birds.—E. G. B. MEADE-WALDO.

The Little Owl in North Wales (?).—In the October number of 'The Zoologist' (*ante*, p. 482), Mr. H. E. Forrest questions the occurrence of the Little Owl (*Carine noctua*) in Flintshire, and asks whether it has ever been obtained in North Wales. It may interest him and others to know that an undoubted specimen was shot in Anglesea by one of a Pheasant-shooting party in the winter of 1899–1900, and is now in the collection of Mr. Stevens, of this city. I am unable to say if it is likely to have been an imported bird.—W. HENRY DOBIE (Chester).

The Mode of Progression of the *Phalacrocoracidæ* under Water.—In the Cambridge Natural History volume on Birds, I happened the other day to come across the following statement, *à propos* of the method employed by the *Phalacrocoracidæ* in swimming under water: “Both wings and feet lending their aid to the performance.” As far as the Shag (*Phalacrocorax graculus*) is concerned—and it may, I think, be considered typical of the genus—this statement is at variance with my own experience in the Orkneys, where I had the good fortune to see the bird in the act of swimming below the surface. On the occasion to which I refer, we had rowed to a small cave, in and near which the Shags were breeding in considerable numbers. On the appearance of the boat at the cave-mouth, all the Shags (between thirty and forty) with one accord tumbled off the ledges, dived into the water, and made their way under the boat to the open sea beyond. The floor of the cave was composed of smooth white sand, and covered with about six feet of water, which made any mistake on our part practically impossible. Every Shag that passed under us swam with its wings close to its sides, and head and neck stretched well forward; the feet alone were used in propelling the bird forward. Under certain conditions—as, for instance, in swimming in a confined area where collision with some object is possible, or in doubling after an active fish—I do not doubt that the wings are occasionally employed; but in a straight “run” ahead I feel certain that, as in the *Colymbidæ*, the feet alone are used. — A. H. MEIKLEJOHN (Highworth, Ashford, Kent).

Gannet in Somersetshire.—I have lately discovered, in a friend's house, a fine adult specimen of a Gannet (*Sula bassana*), concerning which the following particulars may prove of interest:—As long ago as 1890 a labourer found the bird asleep about a mile from this village, and, thinking it was a strayed Goose, attempted to pick it up. The bird resented being handled, and the man therefore killed it. Subsequently my friend obtained the bird, and had it preserved.—CHARLES B. HORSBRUGH (Marstock, Somerset).

Early Jack-Snipe.—When Grouse-shooting with Mr. Assheton Smith at Vaynol, North Wales, we twice flushed one of these birds (*Gallinago gallinula*) on Aug. 28th. This is the earliest date I have ever seen this bird in Britain.—J. WHITAKER (Rainworth Lodge, Notts).

Pectoral Sandpiper in Suffolk.—Mr. Arnold may be interested to know that his Pectoral Sandpiper (*ante*, p. 521) is the fourth specimen of *Tringa maculata* obtained in the county, all of which have occurred in the same locality. The first, shot by the late Mr. N. F. Hele in Thorpe Mere, on Oct. 5th, 1870, is now in the Hele Collection in the Ipswich Museum; the second was shot by myself not far from Thorpe Haven, Sept. 14th,

1892, and is still preserved in our collection here; the third was shot by Mr. C. Clarke, of Aldeburgh, in what we used to call the "First Mere," Nov. 8th, 1883, but I am unable to say in whose possession it now is. Our specimen was obtained quite by chance; three birds flew low over the mere within a long shot of me, and I fired at them, thinking them to be Curlew Sandpipers. A good many years have passed since then, but I well remember the intense delight with which I recognized my prize. It is just possible that Mr. Arnold's bird may prove to be the Siberian Pectoral Sandpiper (*Tringa acuminata*), of which two specimens have been obtained in Norfolk (Zool. 1892, pp. 356, 405).—JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds, Suffolk).

The Names of British Birds.—Mr. Meiklejohn's notes on the names of British Birds are very interesting, but I am afraid that we must not allow it to be supposed that the name of the Fulmar has been borrowed from the Fomart or Foul Mart. That both the bird and mammal have a strong smell is true enough, but there the coincidence begins and ends. Fulmar is the Gaelic name of the bird, variously spelt, but derived from purely Gaelic sources (*cf.* Martin, 'Western Isles,' p. 283; Gray, 'Birds of the West of Scotland,' p. 499; Harvie-Brown and Buckley, 'A Fauna of the Outer Hebrides,' p. 156; Newton, 'Dictionary of Birds,' p. 295). References in support of this might be multiplied, but they are sufficiently obvious. This Petrel is the Ice Petrel (Eis-Sturmvogel) of German ornithologists, and the Pétrel glacial of the French; but in Britain it is always recognized by its Gaelic name.—H. A. MACPHERSON (The Rectory, Pitlochry).

The Origin and Meaning of the Names of British Birds.—Mr. Meiklejohn's paper revives the discussion of an interesting subject. A valuable paper on the meaning of English Bird Names, by Mr. H. T. Wharton, is to be found in 'The Zoologist' for 1882, p. 441; and the same volume contains a note by Mr. Wharton on the etymology of Wigeon. Prof. Newton's 'Dictionary of Birds' may of course be consulted with great advantage, the derivation of many of the names being therein indicated, although the meaning of some of our bird-names seems very obscure. I should like to remark that Nuthatch means Nutcracker—hatch and crack being really the same. Pie (*ante*, p. 513) has surely some reference to the pied plumage of the Magpie and other birds. The Pied Woodpecker has been called the French Magpie, and Pie-Finch is a local name for the Chaffinch with conspicuous white about it. The connection between Pochard and Poacher sounds slighter when we remember that the *ch* in the former is hard, and that another form of the word is Poker. Is it not possible that the Knot may have been so called from its short, thick, chubby shape? Gull and Guillemot have, I should think, different origins, and may be

traced through the Welsh Gwylan and Gwilym. Buzzard may be traced through the French word *buse*. In reference to the bird's stupid and sluggish habits, this has a second meaning of simpleton; hence, "On ne saurait faire d'une buse un épervier."—O. V. APLIN.

INSECTA.

LEPIDOPTERA.

Strange Hibernating Quarters for *Vanessa io* and *V. urticæ*.—The inside of a church-bell is a quaint hibernating place for butterflies, but I recently (November) found one of the former and two of the latter inside the bell at Colton Church, in Furness, North Lancashire. Their sleep must have been very deep to stand the sound caused by the clapper of the bell.—HARPER GAYTHORPE (Prospect Road, Barrow-in-Furness).

RHYNCHOTA.

Enemies of the *Cicadidæ*.—With reference to a recent conversation with the Editor on this subject, I can state that some of the large *Asilidæ* (Diptera) prey on *Cicadidæ*. At Trincomali (Ceylon), in November, 1890, I caught a specimen of *Microstylium apicale* preying on a small cicadan (*Tibicen nubifurca*). Among the Diptera taken by Mr. Ogilvie Grant in Socotra is a specimen of a *Promachus* sp. caught feeding on a small cicadan. Probably both the *Promachus* and the cicadan will prove new to science.—J. W. YERBURY (Army and Navy Club, Pall Mall, S.W.).

[These unfortunate *Cicadidæ*, sometimes advanced in argument as instances of the advantage of "protective resemblance," but which, as already pointed out (Zool. 1897, p. 160), are alike preyed on by Birds, Spiders, Beetles, Wasps, Hornets, Dragonflies, *Mantidæ*, are, as stated above by Colonel Yerbury, also attacked by Diptera. They are attacked in the egg condition by larvæ of ichneumons, and also sometimes afflicted by a fungoid growth. In Japan they are eaten by Trout. On the other hand, Xenarchus long since wrote the ungallant couplet—

"Happy the Cicada lives,
Since they all have voiceless wives."—ED.]

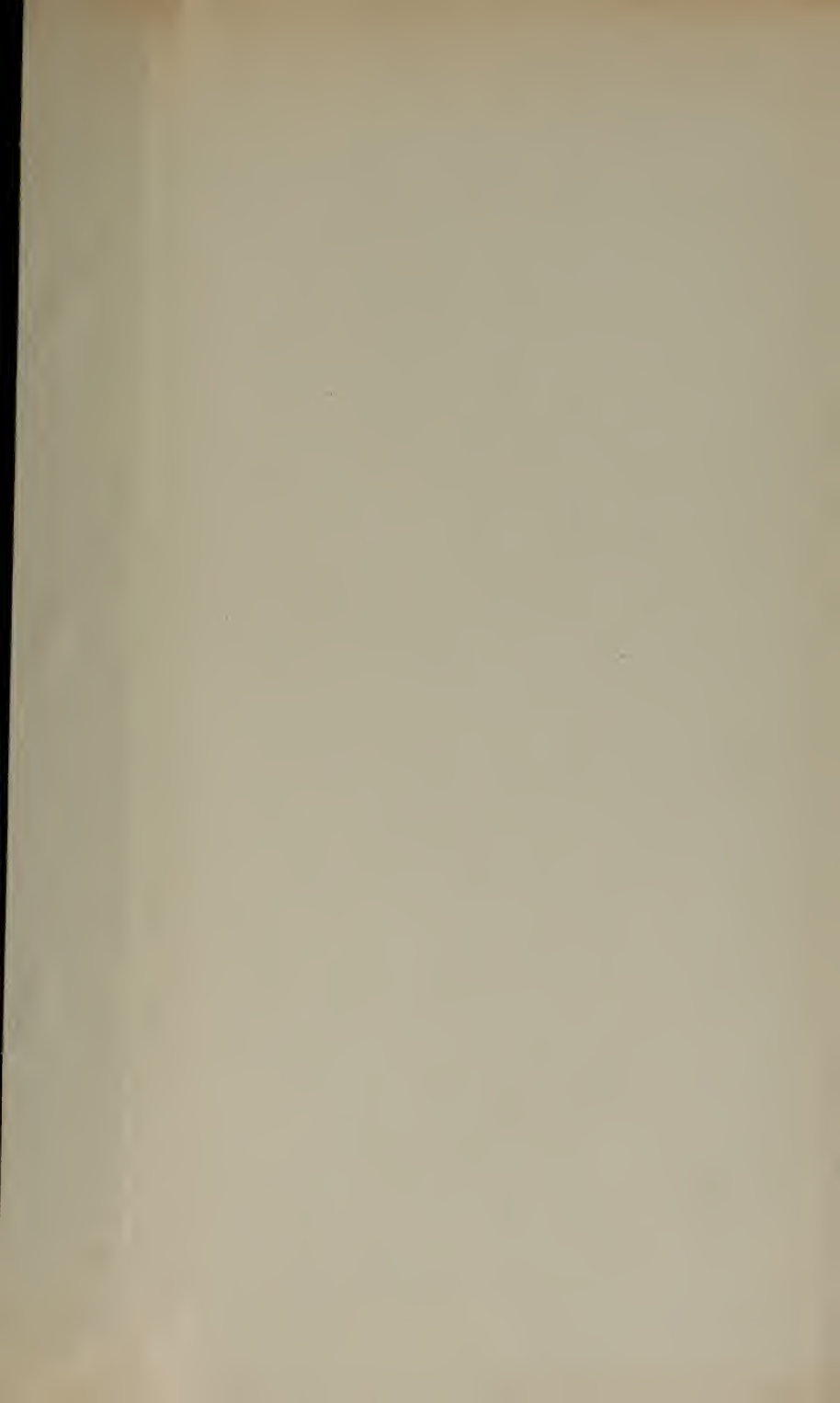
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Mammalia of Surrey. — As we are compiling a catalogue of the Mammalia of the above county, we should feel much indebted to any of your readers if they would draw our attention to any published or private notes relating to the subject, particularly with reference to the rarer species. Any communications may be addressed either to John A. Bucknill, Hylands House, Epsom, Surrey; or to H. W. Murray, F.Z.S., Woodcote Hall, Epsom, Surrey.

Index-Volume to New Generic Names in 'Zoological Record.'—The Council of the Zoological Society has given instructions for the publication of an Index-Volume to the new generic names mentioned in the 'Zoological Record,' vols. xvii.—xxxvii. (1880–1900). The volumes previous to vol. xvii. have been indexed in the 'Nomenclator Zoologicus' of Scudder, published by the Smithsonian Institution in 1882. The contemplated Index-Volume of the 'Zoological Record,' in order to increase its usefulness, will include names omitted from Scudder's list, and from the volumes of the 'Zoological Record.' Thus zoologists may have at their disposal (in the 'Nomenclator Zoologicus' and the new Index together) a complete list of all the names of genera and subgenera used in zoology up to the end of 1900. It is earnestly requested that anyone who knows of names omitted from Scudder's 'Nomenclator,' or from the volumes of the 'Zoological Record,' will forward a note of them, together, if possible, with a reference as to where they have been noticed or proposed, so that the new list may be made practically complete. Such information should be addressed to the Editor of the 'Zoological Record,' 3, Hanover Square, London, W.; or to C. O. Waterhouse, Esq., British Museum (Natural History), South Kensington, London, who is engaged in compiling the list.

British Snakes.—I should be very grateful to readers of 'The Zoologist' for their help in the preparation of a work I have in hand on our British Snakes. Particularly I would ask for the relative frequency of the Adder and Ring-Snake, and their average lengths in each reader's locality.
—GERALD LEIGHTON (Grosmont, Pontrilas, near Hereford).

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