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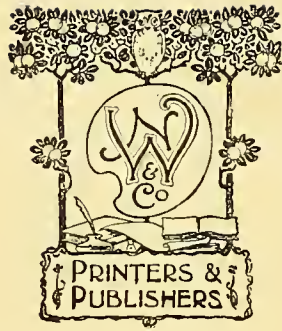
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P R E F A C E.

THE year 1907 will be remembered by British ornithologists; it has marked the passing of two great authorities—Professor Newton and Mr. Howard Saunders. It is also a year in which a number of county bird volumes have appeared. We have been able to draw attention in these pages to Mr. Patten's 'Aquatic Birds of Great Britain and Ireland,' Mr. Whitaker's 'Notes on the Birds of Nottinghamshire,' Mr. Davis's 'Birds of Kent,' Mr. Nelson's 'Birds of Yorkshire,' and Mr. Haines's 'Birds of Rutland.' Our "Notes and Queries" are still recognized as the storehouse for records on British Birds; while annual reports for Norfolk, Oxfordshire, and Surrey have received ample and able treatment.

Mammalia have not received quite so much attention as usual. The recent completion of Mr. Millais's great work may have probably, for the time, induced more reading than writing on the subject.

Pisces have been the subject of some excellent work in this volume. Prof. McIntosh's "Scientific Work in the Sea-Fisheries" is of national importance. Prof. Clark has commenced a valuable "Annotated List of Cornish Fishes," while other writers have given yearly records for their counties.

The Insecta have not been neglected. Two points of great biological interest have been described in Mr. Gahan's note on a "Luminous Insect from Brazil," and in Mr. Shelford's paper on "Aquatic Cockroaches." Economic entomology might

well assume a larger feature of our pages. The ravages of insects on crops and flowers are always problems to the farmer and horticulturist, and we greatly want a Miss Ormerod among our contributors.

A general interest in British Zoology has been maintained, from Mammals to Isopods; and 'THE ZOOLOGIST' may still be expected to fulfil its mission in authority, in the vanguard of biological record, and as the journal for the field naturalist. In the years to come it will probably inherit its full zoological status, and then include in its purview Anthropology and Palæontology.



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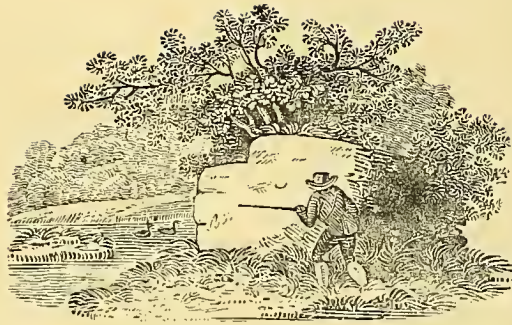
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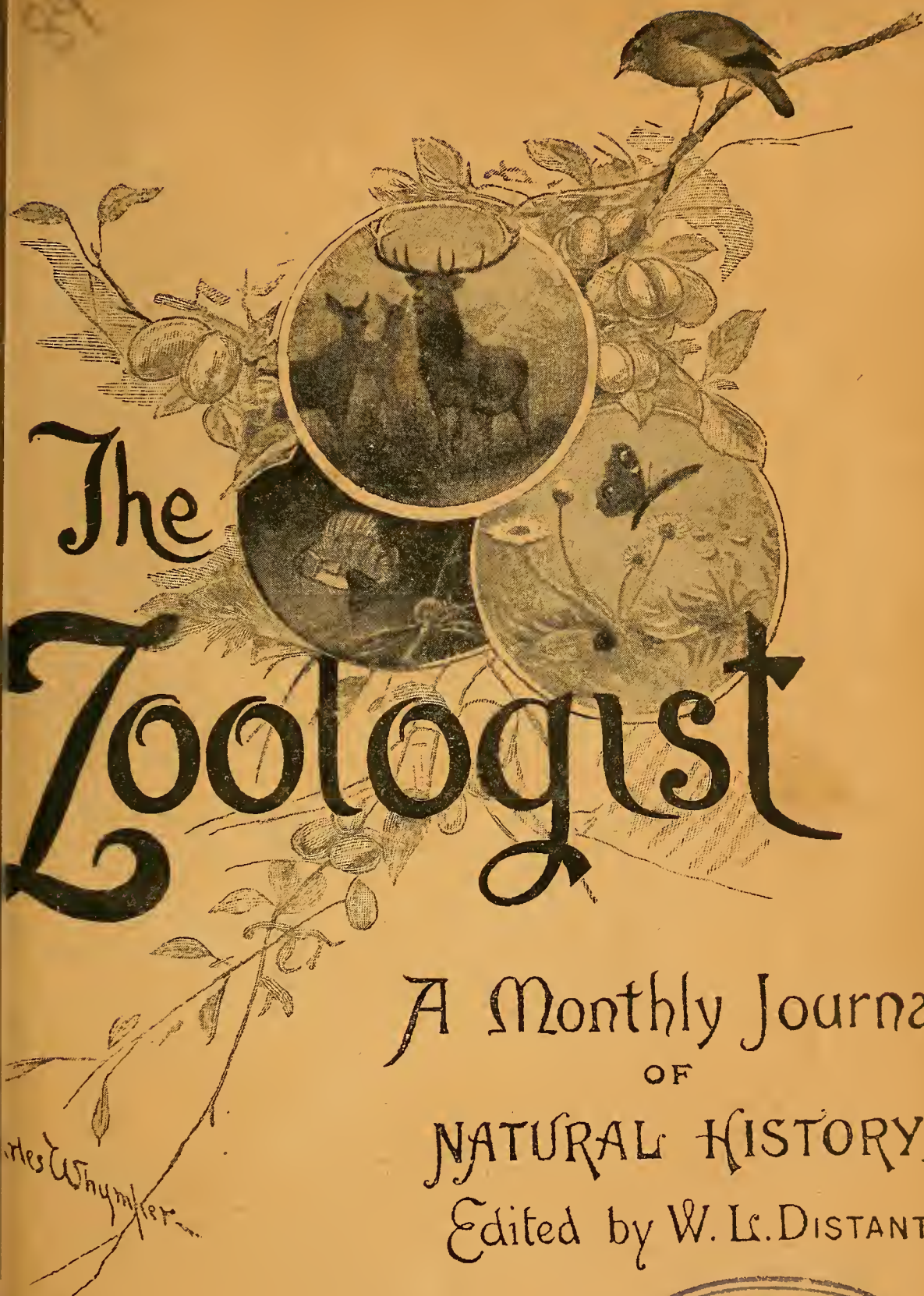
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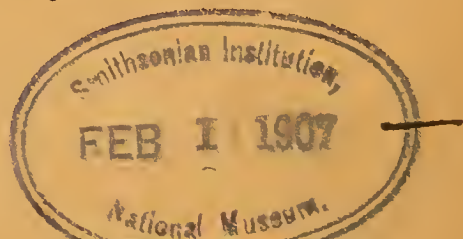




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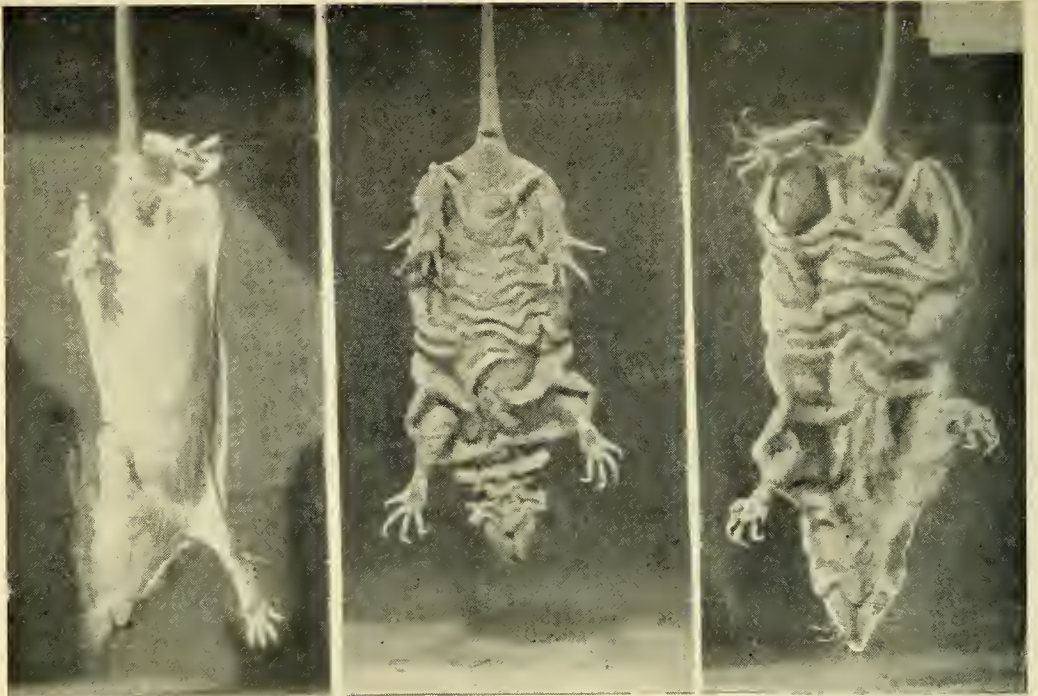
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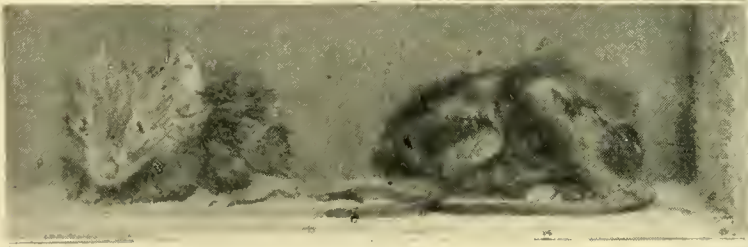




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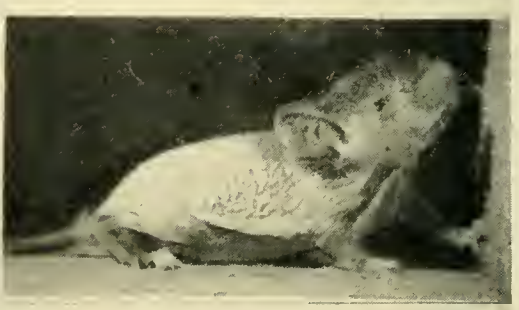


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MUS MUSCULUS var. M. NUDO-PLICATUS.

THE ZOOLOGIST

No. 787.—*January, 1907.*

MUS MUSCULUS VAR. *M. NUDO-PLICATUS.*

BY ARCHIBALD CAMPBELL.

(PLATE I.)

IN May, 1904, when in the shop of a local dealer, my attention was attracted to four Mice of this description. On making enquiries, I was told that they had been bought that morning from a man who said he had come from Australia, but my informant knew nothing more.

Of the four—one was a full-grown male, slightly smaller than a common wild Mouse, and the other three—two males and a female—looked, from their size, about six weeks old. They were all entirely naked, and the whole body a mass of wrinkles; in the old male especially they were very thick, and the skin formed a kind of flap which extended along the sides between the upper part of the legs. There was a thick fold of skin across the shoulders, and over the back behind the ears. On the face the wrinkles were very thick above the eyes—which were almost closed by the thick skin-folds above them—down the nose, and on each side of the mouth. The belly was also very wrinkled, the skin forming a cavity out of which the legs came. All trace of hair on the body was gone with the exception of a few dark coloured vibrissæ, which they all had, but the young ones still retained a few hairs on the legs and at the base of the tail. The corrugations on these were less pronounced than on the old one,

but with them the belly was quite smooth, though they had the fold of skin on the sides. The eyes were about the ordinary size, and the wrinkles had not developed enough to obscure their vision. In colour they were a dull white, with black eyes and dark ears and tail. They were to all appearance perfectly healthy, and, until they became blind, were as active as ordinary Mice. Two of the males died shortly after I had them, and the female, though she lived for some months, never bred.

After running the old male with two albino females I obtained a litter from each—one litter consisting of three, and the other of a single young one. These four Mice—a male and three females, the progeny of hairless and albino—were exactly like normal wild Mice in every respect. The male only had a small white spot on the face and belly. He was particularly large and healthy, and lived to be nearly two years old.

The result of crossing these wild coloured Mice, *inter se*, and their offspring again, produced normal wild, black, white, black and white, wild and white, and twenty-seven of this “corrugated hairless” type. These hairless were all for the first fortnight of their existence exactly like normal Mice, *i. e.* born blind and naked; then the hair grew, and the eyes opened—and, in fact, it was impossible from a litter of that age to pick out the individuals which would eventually develop these corrugations in the skin.

When from three to five weeks old—for some took longer than others—they began gradually to lose their hair. The nakedness begins about the eyes and on the belly, then shows on the back and head, and gradually spreads over the body until they are perfectly nude, which usually occurs when they are between two and three months old. These corrugations are quite visible on the skin as soon as the nakedness appears, and gradually, as the animal grows older, the skin-folds and wrinkles become thicker, until the eyes are completely closed by the thick skin above them. In colour, twenty-two out of the twenty-seven corrugated which I bred were the usual wild shade before they became hairless, four were black then hairless, and one was a pure albino, with pink eyes and white ears and tail.

With reference to the article by Gaskoin in the Proc. Zool. Soc. 1856, p. 38, plate—from which I have taken the name *Mus*

nudo-plicatus—he states that four corrugated hairless Mice, including a pregnant female, were caught at Taplow. Two of these died, and eventually the female “brought forth five young ones,” two of which died, and the other three were reared, but did not breed. This appears to be the only recorded instance that I can find, of a corrugated female breeding in captivity. It was most unfortunate that none of the hairless females that I raised ever bred. Again, as to the question of age, he remarks in the same paper that these Mice were four months in the possession of a man “Bond,” and six months in his; whereas five months and a half was the longest life of any of mine, and thirteen of them died when about two months old or less.

The plate also shows two large, full-grown, corrugated Mice, with bright black eyes; and any of mine that lived to be three months old were by that time almost if not totally blind; so much so, that on several occasions they overran the edge of the cage, apparently without seeing it.

I have quoted from this article to show where my specimens differed from the Mice he possessed.

All the photographs were taken from living specimens.

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|---------------------------|---|---|
| Fig. 1.—Six weeks old. | } | Showing corrugations on belly at these ages. |
| Fig. 2.—Three months old. | | |
| Fig. 3.—Four months old. | | |
| Fig. 4.—Three weeks old. | | Hair coming out round eyes. |
| Fig. 5.—Three weeks old. | | Nakedness showing near eyes, between the ears, and on back. |
| Fig. 6.—One month old. | | Corrugations showing under the hair. |
| Fig. 7.—Six weeks old. | | Hair at base of tail, and on head and legs.
Eyes still open. |
| Fig. 8.—Four months old. | | Quite blind, and corrugations very thick. |
| Fig. 9.—Seven weeks old. | | In this example the eyes are shut on account of the light, and not from the skin near them. |

THE ENCYSTMENT OF *MACROBIOTUS*.

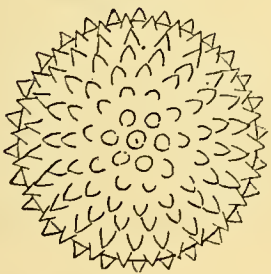
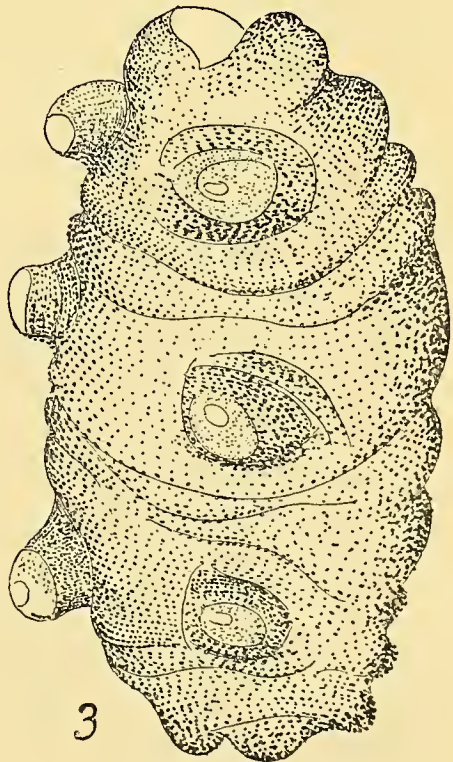
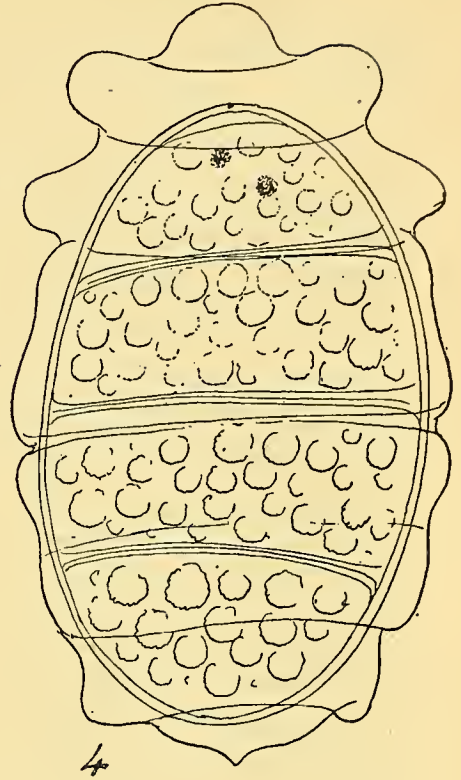
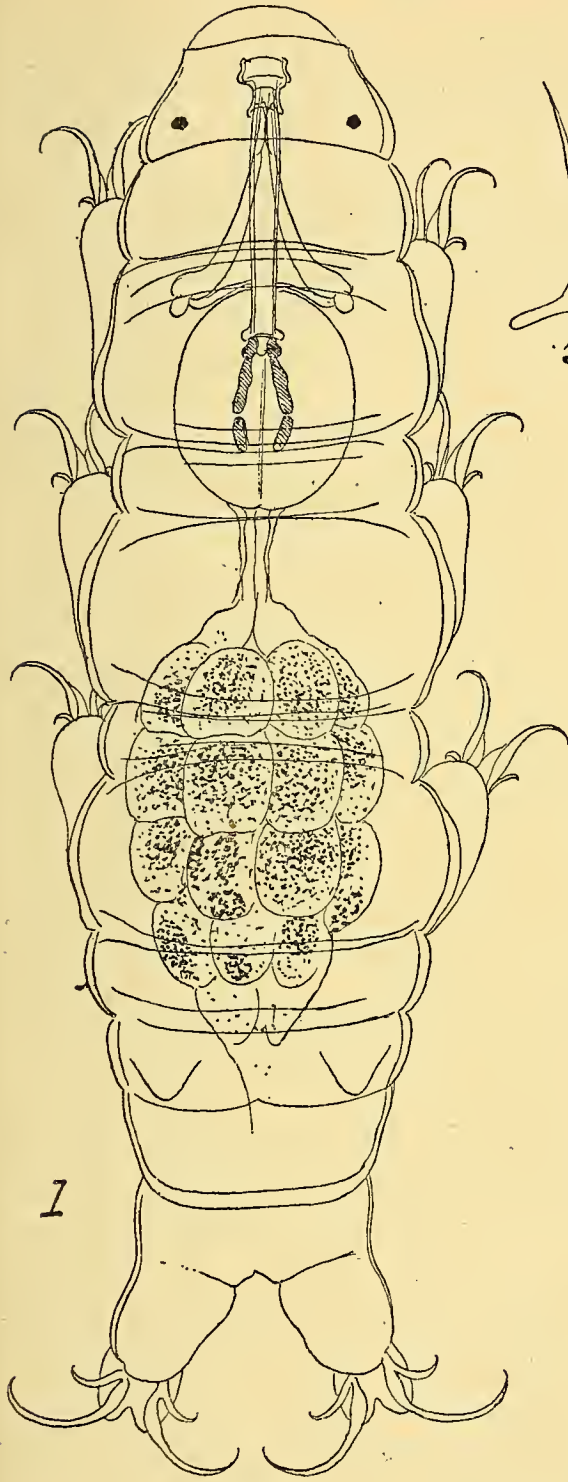
BY JAMES MURRAY. (Biologist on the Lake Survey under Sir John Murray).

MANY of the smallest animals, in common with some of the largest, experience regularly at some period of the year unfavourable conditions which threaten the destruction of the individual and the extermination of the race. This fate is avoided by one of two means—either the individual perishes, and the race is saved by the production of what are called winter-eggs or resting-eggs, or the individual protects itself in some way, and lies dormant till better times, or, as it is called, hibernates.

It is usually the cold of winter which constitutes the threatening condition, hence the terms winter-egg and hibernation; but it may be quite the converse, and it may be the heat or drought of summer which has to be guarded against. Similar means of protection may be used against either evil. Many resting-eggs are laid in summer, and many animals, including Water-Bears and Bdelloid Rotifers, lie dormant during droughts. Using the term in the wider sense to cover all means taken to tide over untoward seasons, large numbers of animals hibernate—Bears, Tortoises, Water-Bears, Bdelloid Rotifers, Nematodes, &c.

Bdelloid Rotifers resist desiccation by coating themselves with an air-proof varnish. Water-Bears (or Tardigrada) are equally well protected against desiccation, though the means by which they protect themselves are not understood. There is no coating of varnish in this case. The Bears are found among dry moss, rigidly extended as though in *rigor mortis*, but they quickly revive when placed in water.

The process now to be described is of a totally different kind. Its occurrence at the beginning of winter suggests that it is a sort of *hibernation*; the profound changes in the organization of the animals which characterize it suggest the name *encystment*.



For some years I have frequently seen, in the moss-washings where I seek for Water-Bears (*Tardigrada*), little yellow elliptical or sausage-shaped packages, from which I could squeeze out animals of the genus *Macrobiotus*, in a quiescent state, but alive. I thought to connect these in some way with imperfect moults, but the packages differed from the moulting animal in that the yellow skin tightly enclosed the animal within, suggesting a comparison with pupæ, or with mummies, and there were no limbs on the outer skin. The origin of these curious bodies was quite unknown, and the matter rested thus till I had recently the good fortune to watch the process of formation in one species which abounded in a shallow pond near Glasgow.

The species observed was long supposed to be *Macrobiotus macronyx*, but the eggs have recently been found, and as these are spiny and are laid free, while those of *M. macronyx* are smooth and are laid in the moulted skin, the species would have to be placed in a different section of the genus. Prof. Richters agrees that the species is one hitherto undescribed, and I now give a description of it:—

MACROBIOTUS DISPAR, n. sp. (figs. 1 to 5). — Large, hyaline, with yellow or brown stomach. Eyes dark. Claws of each pair very unequal, one very large, the other very minute, the disproportion less in those of the last legs. Pharynx large, shortly oval; thickenings three in each row—first a nut joined to the gullet, second a long narrow rod, third a rod half as long as the second. Teeth curved, with very wide furca. Eggs spiny, laid free; spines little sharp cones, separated by interspaces about equal to the diameter of the cones. Length up to 600 μ ; pharynx, 80 μ long; larger claws, 48 μ long; diameter of egg, over spines, 90 μ . There are generally two large conical processes on the back (fig. 1), between the third and fourth legs. These are variable, and may be apparently quite obsolete. There appears, however, to be always some trace of them when the animal moults.

This species was supposed by Prof. Richters to be *M. macronyx*, which the adult closely resembles, and under that name I have recorded it in various papers. That species lays smooth eggs in the moulted skin, and has not the conical processes so frequent in *M. dispar*.

Pond at Nerston, near Glasgow, 1904; Loch Tay, 1905; pond near Edinburgh; Shetland; Franz Josef Land; Spitzbergen.

Encystment. — The eggs of *M. dispar* appear to be very rare. They have only been seen on three occasions, and only once was the embryo seen in the advanced stage of development which led to the discovery of its connection with the adult animal.

While carefully searching for eggs in a very abundant collection of the animals from the pond at Nerston, I noticed many little dark-coloured skins, bearing six stumps of limbs without claws, which, to my surprise, proved to belong to the *Macrobotus*. I was thus led to study them carefully, and observed the remarkable series of changes which I now recount.

Most of the animals appeared to be moulting; the normal, smooth, transparent skin was loosened, and the animal in its new skin could be seen moving inside. This may be regarded as an ordinary moult, as many emerged from the old skins, and continued the metamorphosis outside. Very often, however, the whole process took place within the original skin. After this moult the skin of the animal differs from the original skin—it is yellow and punctate, while the old skin is hyaline, colourless, and smooth. The new skin appears also to be viscous dorsally, as there is generally much extraneous matter adhering to the back, which becomes of a rich umber colour. Gradually it contracts, till it is little more than half its original length, but remains relatively broad; it assumes a definite form (figs. 3 and 4), only slightly reminiscent of the adult form; the colour darkens till it becomes grey, purple, or well-nigh black; finally it becomes quite rigid, with brittle shagreened skin, and six little stumps of legs, without claws (fig. 3). This I call the *outer cyst*. The last legs have been drawn in before the hardening of the cyst, so that they do not show conspicuously like the others, and the claws of the other legs have also been withdrawn. If one of these cysts is squeezed shortly after its formation it breaks up and reveals a normal adult, having all the usual organs—claws, pharynx, teeth, stomach, eyes, &c. If it is examined at a somewhat later period it is found that it contains, instead of the adult

animal, an elliptical, thick-skinned, yellow body (fig. 4), which I call here the *inner cyst*.

This inner cyst is smooth, and has no trace of limbs. It is considerably less in size than the outer cyst, in which it lies loosely. Just after it is formed it contains a complete animal, possessed of all the normal organs. This may be squeezed out, and may be seen to move feebly.

When a large number of cysts were broken up, after the lapse of about a week from their first observation, it was found that a large proportion of the inner cysts had undergone further change. The cyst no longer contained a complete animal. Most of the conspicuous organs had disappeared—claws, pharynx, teeth, &c.—and the animal would not have been recognized as a Tardigrade had its antecedents not been known. Only the pigment-spots, commonly called eyes, and the fat-cells in the blood were recognizable. There was a faint segmentation within the cyst, three transverse furrows dividing the body into four nearly equal parts. The pigment-spots were very diffuse.

The animal contained in the inner cyst is so unlike a Tardigrade that I have entertained the idea that it might be some parasite—possibly a Turbellarian or other worm. The complexity of the series of changes by which the final cyst is produced, the constant form and size of the outer cyst, and the presence of all the organs till the last stage is reached—all tell against the theory of parasitism, and lead to the conclusion that we have to do with a normal process in the life-history of the animal.

What may be the meaning of these remarkable changes we need hardly attempt to guess till the further stages have been observed. Cysts of other species have been seen, in which there were active animals which I supposed were about to emerge, but in view of the history of *M. dispar*, partly traced above, we may rather suppose that these cysts had just been formed, and that the process of simplification had not yet taken place.

Till the full history is known it will remain inexplicable why the double moult should take place, the animal at each moult assuming a different form; and, finally, why the individual should undergo such a profound simplification. The curious outer cyst may be regarded not as the result of a moult, but as

the product of a secretion from the skin. Fragile though it is, it may be a sufficient protection to the inner cyst against the only enemies likely to be attracted by Water-Bears.

Extraordinary though it may appear that an animal so high in the scale as an Arthropod should lose all its internal organs in the course of encystment, a well-known phenomenon in the same group (Tardigrada) supports the belief that this really happens. Nearly all species of *Macrobiotus* are known to have what Richters calls "simplex" forms. The teeth in these are reduced in size, and the rods in the pharynx are absent. Prof. Richters appears to have seen no further simplification, but in Scotland it is common for the whole alimentary canal in front of the stomach, with all its adjuncts, to be absent. There is no mouth, no gullet, no teeth, but some trace of the pharyngeal bulb usually remains. We find large, strong, active animals whose stomachs appear distended with food, yet which possess no organs for imbibing food. No conclusion seems tenable but that reduction must have taken place since the food was imbibed, but this explanation is itself inexplicable, and we are further puzzled when we find that some eggs produce simplex forms.

The applicability of the term "encystment" to the process which has been described may be questioned, but the word "cyst" well describes the bodies formed; and, moreover, the formation of outer envelopes, within which the whole substance of the animal passes into an apparently simpler condition, offers sufficient analogy with encystment as we find it in the Protozoa to justify the adoption of the term.

The formation of the cysts was going on in the beginning of winter, in October and November. This may indicate that it is, like the production of winter-eggs by various animals, a means of preserving the species through the rigours of winter.

M. dispar is the only species in which the complex process has been traced so far as the simplex form within the inner cyst. Cysts similar to the inner cysts of *M. dispar* are known in several species. Among moss brought by Mr. W. S. Bruce from Spitzbergen in August, 1906, and examined in September, there were many cysts which were shown by the pharynx and claws of the contained animal to belong to *M. echinogenitus*, Richters. More recently the formation of the cyst of this species has been seen

in examples from a bog-pool in Scotland. There is no outer cyst like that of *M. dispar*. The cyst formed within the moulted skin resembles the inner cyst, and contains a complete animal. The reduction to the simplex state has not in this instance been seen.

M. dispar is one of the few Tardigrada which have their usual habitat in ponds. It is also the most boreal of known species, as it was found at an elevation of several hundred feet in Franz Josef Land by Mr. Bruce. Whether it is exclusively a northern species remains to be seen. At present its southern known limit is Scotland, but, in view of the close resemblance of the adult animal to *M. macronyx*, I suspect that some of the records made under that name really refer to *M. dispar*.

In this country it lives in ponds liable to freeze in winter, occasionally at the margins of lakes, and it may be that the encystment is correlated with its life in permanent waters. The case of *M. echinogenitus*, cited above, suggests the possibility that species which normally live in moss may be induced to form cysts when they find themselves amid the different conditions of a pond.

The publication of these observations in their incomplete state is made in the hope that other students of the Tardigrada may interest themselves in the "encystment," and that we may thus hope for an earlier solution of the problems involved.

EXPLANATION OF FIGURES (p. 5).

1. Adult, dorsal view, showing the conical processes.
2. Egg.
3. Outer cyst, showing shagreened surface, and legs.
4. Inner cyst, shown within outline of outer cyst; dorsal view.
5. Tooth, showing the very wide *furca*.

(All the figures are drawn to the same scale.)

Since writing these notes I have received from Prof. Lauterborn an interesting little paper, in which he describes a similar encystment of *Macrobotus macronyx* (Verhand. d. Deutsch. Zool.

Ges. 1906, p. 267). Prof. Lauterborn's observations differ from mine in many respects, and it may be that the cycle of changes is not identical in the two species. It is curious that these two species, which are believed by Prof. Richters to very closely resemble each other, yet differ profoundly in the details of reproduction, as shown by the recent discovery of the spiny eggs of *M. dispar*. Prof. Lauterborn also refers to this remarkable process as *encystment* (Encystierung). Both *M. macronyx* and *M. dispar* live in ponds, and we might find in this the cause compelling to the encystment, but *M. echinogenitus*, which also encysts, is not especially a pond-dweller.

PROVINCIAL NAMES AND RESORTS OF CERTAIN
BIRDS IN THE SOUTH OF SCOTLAND.

BY J. R. McClymont.

THE Blackbird is the most abundant of the birds which are *par excellence* singing-birds in that part of Roxburghshire which is situated between the Teviot and the Rule. Although it has several provincial names, not one of them is Lowland Scotch, for *Blackie* cannot be accounted a provincial name. The love-song of the *merle* is not easily forgotten. It consists of a series of crisp and harmonious phrases rendered with great precision and distinctness from a lofty branch. The pauses in the song are no less eloquent than the melody, and constitute an essential difference between its lay and that of other songsters of the fields and woods.

The Chaffinch is, next to the House-Sparrow, the most plentiful of the resident Finches; large parties of them are often to be seen in autumn and early winter, picking up a livelihood on country roads. The Chaffinch is called the *Shelfie* in the south of Scotland. The word is probably an abbreviation of *sheldapple*, and *sheldapple* is compounded of *sheld* and *dapple*; the name was doubtless bestowed on the Chaffinch because of the variety of colours in the body-plumage, and of the speckling on the wing-coverts of the male. In captivity I have found Chaffinches to be sprightly and intelligent birds, playful when two are together, assiduous bathers, much given to prying into every corner of their habitation, and keenly observant of their owner's movements.

In the southern Scottish counties the Sky-Lark begins to sing in April, and sings till August. In these counties, "If the lift were to fa' the laverocks wad be smooored" is a proverbial saying which is often quoted. It is, I think, not quite certain that the words *lark* and *laverock* have a common origin and history. *Laverock* has, I believe, been traced to an Icelandic

word *lava*, which signifies *lark*, and also *bird* in general, as if the Lark was the typical bird in Iceland; perhaps *lava* is connected with *lavy*, which is one of the names of Guillemots in St. Kilda. If so, we have an illustration of the fact that closely allied bird-names designate different birds in different languages. *Lark* is traced to the Anglo-Saxon word *lawerce*. Its remoter origin is, I believe, unknown.

Those who have wandered through the environs of Edinburgh know the woods to the south of Blackford Hill, which, with the return of May, the Cuckoo reanimates with mellow notes. At the base of the range of the Pentland Hills, Cuckoos are not uncommon. In that locality they place their eggs in the nests of Meadow-Pipits, and the young Cuckoos check the numerical increase of those birds. "You breede of the Gowk you have ay but one song" is a word of caution addressed to persons who always harp on one string. *Gowk* appears to be a word of the same origin as *gawk*—a simpleton or a clumsy person—and *gawky*. *Gauche*, and even *cuculus* and *cuckoo*, may be derived from the same root as *gowk*. That root, I believe, is not known, but, from the meanings of the derivatives, we may deduce the meaning of the root to be *left*—the contrary of *right*. The Cuckoo may have received the name *gowk* because it was supposed to be so clumsy that it could not build a nest. An allusion to its annual reappearance in spring may be found in the selection of the first day of April as All Fools' Day, and the expression "Hunt the Gowk," and the custom to which that expression refers, may contain an allusion to the alleged practice of prospective or possible foster-parents who are said to hunt adult Cuckoos from the vicinity of their nests. We are reminded by the custom of those games in which certain Australian tribes imitate the movements of wild animals.

From a shady dell watered by a small affluent of the Teviot, I have often heard the cooing of Wood-Pigeons. They are generally distributed throughout the southern counties of Scotland, in wooded localities, and "especially near the Moorfoot Hills, where they formerly nested (and perhaps still nest) in scores on the low branches of young larches and Scotch firs. In autumn they disappear from that locality. Their food consists chiefly of the seeds of docks and charlock, and of clover-leaves" (A. R.

Reid). Their name *Cushat* was with us contracted into *cushie*, and I have also heard *cushie doo*.

The Lapwing is called the *Peeseweep* in Roxburghshire ; it is the most common limicoline bird in that county, whilst in the adjacent county of Selkirk the Curlew is more common. Lapwings may be observed during the summer on unreclaimed land, and on hill-pastures, at an elevation of from 1000 ft. to 1500 ft. above sea-level, between the Rule and the Jed. Curlews frequent the hills which enclose the valley of the Yarrow—low, grass-covered, and almost treeless hills, on which Cheviots and other small sheep are depastured. The cries of the *whaups* are singularly in unison with the monotonous and solitary uplands in which they pass the spring and summer. An adage which runs “There’s a whaup in the raip” is almost unintelligible when written thus ; but if we write it “There’s a whaup in the rape,” the meaning becomes clear at once.

In winter Black-headed Gulls (which nest in inland places) may be seen in localities at least thirty-five miles inland. If, as is probable, they follow the courses of rivers—such as the Tweed and its tributaries—the length of their journey is much more than thirty-five miles. These Gulls are called *pick-maws*, a compound word in which *pick* may be connected with *pica* and *pie* ; *maw* is said to be a variant of *mew*. Thus the whole word may signify “pied gull,” and may have originally been employed to denote Black-backed Gulls, especially *Larus marinus*, and have been transferred to the Black-headed Gull.

I am indebted to Mr. Arthur R. Reid (Hobart), formerly a resident of Easter Duddingston, near Edinburgh, for the particulars which follow relating to the local distribution of certain species. Mr. Reid’s communication relates to the eleven years extending from 1877 to 1887, and it is, of course, possible that some of the localities mentioned in it are no longer frequented by the species herein named :—

Mr. Reid observed Ring-Ouzels in Peeblesshire and Midlothian on various occasions during the period which I have defined ; Stonechats in the latter county ; Goldcrests frequently in Bute, and occasionally in Midlothian ; Spotted Flycatchers at Easter Duddingston, where, in 1887, they were plentiful, and

were seen nesting; Tree-Creepers frequently, and Tree-Sparrows and Bramblings occasionally, in Midlothian; Twites on the Pentland and Eildon Hills; Reed-Buntings rarely, and Snow-Buntings with some frequency, in Midlothian; one pair of Ravens on the Moorfoot Hills; Hooded Crows near Musselburgh; Wood-Larks nesting near Portobello, and, near Melrose, two Green Woodpeckers. Wigeon and Common Scoters frequent the Mussel Scaup near Musselburgh in winter; Rock-Pigeons nest on the coast of Haddingtonshire; Ringed Sand Plovers, Dunlins, Common Redshanks, and Greenshanks are plentiful on the southern shore of the Firth of Forth in winter, and Mr. Reid found a nest of the Common Redshank in Strathallan, in Perthshire, in 1884. The same observer shot a Purple Sandpiper on Craigentenny meadows between Leith and Portobello, and has seen a few Whimbrels at the Mussel Scaup, and Sandwich and Little Terns in the same locality. Three Great Northern Divers were shot in the Firth of Forth, near Portobello, in 1883, by Mr. E. Johnston, and a Great Crested Grebe has been shot on Duddingston Loch.

Of birds which are not known to nest in Britain, Mr. Reid has seen Fieldfares, Mealy Redpolls, and Firecrests in Midlothian, and the last-named birds in Bute also; a Firecrest was shot near Musselburgh in 1885 by Mr. W. Logan. Golden-eyed Ducks have been seen frequently at the Mussel Scaup; a Grey Plover was shot by Mr. Reid near Dunbar in 1887, and a Turnstone—one of a flock of about twenty—was shot near Musselburgh in 1885. Jack-Snipe and Bar-tailed Godwits have been observed in the same locality on several occasions.

I add a few corrections to my paper on "Names of Birds of uncertain Origin or Meaning" (Zool. 1906):—Page 272, line 11 and line 17, instead of "*alcatroz*" read "*alcatraz*"; p. 273, line 3, instead of "ductus" read "Auctus." In order to make the meaning clearer, read "moreover" instead of "however" in line 17 on p. 272.

Hobart, Tasmania.

HABITS AND DEVELOPMENT OF THE YOUNG OF
THE SPOTTED SALAMANDER (*SALAMANDRA*
MACULOSA).

BY G. T. ROPE.

THOUGH I have for years kept a few of these handsome and interesting batrachians, they have never, except in one instance, produced young ones until this summer, when a number of tadpoles were born.

As these were kept under pretty close observation, a slight sketch of their early life may not perhaps be unacceptable to some readers of 'The Zoologist.'

During April I received three adult Salamanders, two of which must, it seems, have been females. They were kept in a vivarium or reptile-case fitted with a zinc tank. The floor was covered with a layer of earth about two inches deep, on which were laid old mossy gnarled stumps and bits of branches, more or less hollow, rough stones, moss, &c. All three animals were in excellent health, and fed well.

On May 3rd I found three tadpoles in the water-tank, and at once removed them to another vessel.

Mr. Bateman, in his excellent and very useful work, 'The Vivarium,' describing the development of the young of this species, says:—"The fore legs of the tadpoles will be produced first, then the hind ones, and, lastly, the external gills are absorbed." Bearing this in mind, and having had but little previous experience of the breeding and development of *S. maculosa*, I was not a little surprised to find that my tadpoles were all born with four legs. They were kept in a large enamelled bowl with a two-inch rim of tin soldered round the edge, and slanting inwards, to prevent their escape; for towards the close of tadpolehood they become expert and persistent climbers, and can easily ascend a smooth enamelled surface, even where it is perpendicular. Their bowl was fitted up as an aquarium, with

an island in the middle, and a few plants of frogbit and water-cress.

On the 19th another young one was born, and on the 24th three more made their appearance. A further batch of four was produced on the 29th, followed by six more on the 30th. These last were found on land, or rather on wet mud, not in the water-tank, and were at the time all dead except two, which showed signs of life, and, being put into water, soon completely revived.

As there is an interval of nearly four weeks between the birth of the first and last batches, these tadpoles could not have been the offspring of a single mother, and even if two females had a share in their production, it is curious that the whole progeny of each should not have been born at or near the same time, instead of making its appearance in varying quantities at intervals distributed over a considerable period.

I find that, according to my notes, the total number of tadpoles on May 30th was twenty-three; I must, therefore, have omitted to jot down one birth.

This number of young ones being too large for the home prepared for them, some were put into a pond in a plantation near the house. Those retained in the bowl were supplied with food by adopting the ingenious method recommended by Mr. Bateman, *viz.* by procuring from a ditch some water containing minute forms of animal life in abundance, and then, by means of a syphon and some muslin, straining away a part of the water, and using the remainder for feeding purposes. A portion of this was given to the young Salamanders every morning.

On May 18th, there being then only three tadpoles just over a week old, I offered them some very small earthworms, which they at once seized with great eagerness, and in a short time succeeded in swallowing. After this they were supplied with worms whenever any could be found small enough. In taking their prey their motions were exceedingly violent and rapid; in fact, they went at it with headlong fury. They would follow and seize the point of a wire held in front of them, and two of them would sometimes make a simultaneous rush at the same worm, seizing opposite ends. In fact, their behaviour much resembled that of hungry Newts in the presence of their food.

At first it was no easy task to find enough worms small enough for them to swallow, but this difficulty gradually disappeared as they grew bigger.

When first born the young Salamander has a long fish-like body, but after a few weeks it grows stouter, and becomes more distinct from the tail.

These little creatures are very clever at concealing themselves, taking advantage, for this purpose, of the smallest shadows cast by such objects as weeds, stones, &c., and are very fond of lying close alongside some stone or bit of brick, or, if possible, partly under it; acting, in this respect, exactly as the Common Stone Loach does.

On July 2nd I noticed that some of them were beginning to acquire the adult colouring, both colour and markings, however, being at first indistinct, and only suggested, as it were. In fact, it is not until they have left the water, and entered upon a more or less terrestrial life, that the brilliant black and yellow livery is perfected. The change of form from the tadpole to the adult state is rapidly accomplished. The eyes of these creatures during the larval stage of existence are quite small and inconspicuous, but after undergoing their change these organs become large, black, and shining, as in full-grown examples. In spite of the small size of the eyes, however, these tadpoles are remarkably adroit in catching their very nimble prey.

For some days after coming on land the young Salamanders took no notice of worms placed before them, but would occasionally go into the water and feed rapidly on the small living creatures it contained, snapping right and left at those which passed within reach. They did not, however, remain in the water long.

On July 16th two more young Salamanders took to the land, and at that date only two were left in the water as tadpoles. On the 29th one of the latter was resting at the bottom of the bowl, and a small water-beetle about one-fourth of the size of a lady-bird was rushing wildly about, going at a great pace. The tadpole made a lightning-like grab at it as it swept past, and caught, but almost immediately let it go again.

On July 20th one young Salamander measured two inches in length.

A handful of chickweed (frequently renewed) was placed on the island, and in this the little animals were almost always to be found, climbing about the labyrinth of moist leaves.

On Aug. 8th the larger of the two tadpoles still living in the water finally left it, and climbed up to the top of the island to hide in the bunch of chickweed. This individual differed in some respects from its fellows. In size it surpassed them all, being nearly double that of the one remaining tadpole. The head was large and wide in proportion to the rest of the body, and, after completing its metamorphosis, this Salamander became of a dull pale yellow tint, with very little black, whereas the rest were brightly coloured, and prettily and distinctly marked. When in the larval state it would sometimes swallow two worms in quick succession, but as its change approached it became very dull and lethargic, refusing worms placed close in front of it.

On the 22nd the last tadpole—a very small one—was first noticed to show signs of entering upon the final stage of existence, the upper surfaces of the thighs having begun to turn yellow. On the 24th the characteristic dark patch between the eyes and the two dorsal rows of yellow spots or patches could be made out, but as yet only indistinctly. By the 29th the upper arms, as well as the thighs, had become yellow above.

On Sept. 3rd this young Salamander, having completed its change, came on land, and concealed itself in the chickweed. After a few days it was placed in the vivarium, to which the rest had already been transferred, and soon afterwards I found them all (the newcomer included) closely congregated together under the same piece of bark. At this period of their lives these little batrachians certainly appear to be socially inclined, for they huddle together in their hiding-places, one on the top of another, like pigs. Yet one or two of mine would sometimes be found lying up singly in a separate retreat.

I have not found any of their cast-off skins, but that the operation was generally performed very soon after the metamorphosis I have little doubt, judging from the sudden change from dull obscurity to great brilliance of colour and distinctness of markings. Before the old skin is shed, and its owner has as yet left the water, there is, as before stated, a faint indication discernible through its semi-transparent substance of the future

arrangement of black and yellow markings. In the case of a single young Salamander, born on June 6th, 1889, which acquired the adult form and colour about the second day of August following, the cast-off skin was found on that day *entire* and in the water.

The young animals born during the past summer hardly ever leave their hiding-places to roam about at night, or take a bath, as it is the habit of their elders to do at times all through the winter. They have also taken very little food since October, though up to Nov. 26th, when the smallest of them devoured a comparatively large worm, they have continued to feed occasionally.

The pale yellow individual described above measured, on Nov. 10th, exactly three inches, another of them being only just under that length. Assuming that these two were born on May 3rd, when the first tadpoles were produced, and which is most probable, their age would be just over six months and three weeks, but they may of course have been born later.

On lifting the piece of bark under which they now live, on the evening of Dec. 13th, I found one young Salamander hungry enough to devour a worm offered it. They do not seem to object to the light of a lamp or candle being suddenly thrown upon them, unless the source of light be brought nearer to them than a foot or eighteen inches. They greatly disliked being touched by a beetle which found its way into the vivarium. If, while rambling about, this insect happened to come in contact with one of them, the little Salamander would jerk itself aside as if much annoyed, and make off at a pretty quick pace.

THE OCCURRENCE OF THE GLOSSY IBIS AND LONG-TAILED DUCK IN NORTH DEVON, WITH OTHER ORNITHOLOGICAL NOTES.

BY BRUCE F. CUMMINGS.

ABOUT the beginning of September, 1906, a Glossy Ibis (*Plegadis falcinellus*) was shot on the River Taw near Fremington. I first learnt of the occurrence of this rarity from the Barnstaple taxidermist, who is preserving the bird. It seems that it was shot by a gentleman named Martin, living at Muddlebridge House, Fremington, but unfortunately my efforts in getting any exact details have so far been unavailing. It stands high on the legs, which are greenish black, with long slender toes. The bill is thick and stout, dull black, with the base of the lower mandible yellowish, as in the Whimbrel. The neck is long and slim, of a muddy brown colour, with white speckles. Head coloured ditto. Whole under surface muddy brown. Back, rump, upper tail-coverts, and tail black, with a beautiful greenish gloss. Wings similarly coloured, but more of a dull black, I thought. I believe it was as long ago as 1869 that the last specimen occurred in North Devon.

On Nov. 13th of the same year an immature specimen of the Long-tailed Duck (*Harelda glacialis*) was shot on our river, after heavy weather, off Instow. The two elongated tail-feathers were in this specimen only half an inch beyond the end of the rest of the tail; ear-coverts greyish black, crown of head blackish, forehead black, with a black line running from the base of the bill to the crown. Bill greenish, with blackish tip. Total length, 16 in. When first seen it was by itself on the river in some narrow guts. On being flushed it made for the open river, where it long eluded its pursuer by diving.

This autumn (1906) has been remarkable for the large flights of Terns that have appeared on the estuary from time to time, roughly, between the end of August and end of October. I saw

large numbers near Barnstaple, but they did not venture far up the river as a rule. They were mostly, I believe, Common Terns—at all events, those which were shot and shown to me were Common Terns, although, from descriptions given me by fishermen of others shot, a few Sandwich Terns would appear to have been secured. One Little Tern was also shot. I am sorry to say that they were killed in great numbers for ladies' hats, and other reasons equally foolish; a few certainly did escape!

Grey Plovers have also been very common. First seen on Oct. 10th, and at the time of writing (Nov. 3rd) they are still with us, but in diminished numbers.

On Nov. 7th a Hooded Crow, which Mr. W. S. M. d'Urban states to be a rare straggler to this coast, was shot on the Taw near Barnstaple. It is a fine full-grown bird, and is being preserved. It was first said to be a "black and white Rook."

April 1st.—A Mistle-Thrush found with its legs entangled in some wool, with which it was going to build its nest. Since, I have discovered a young Greenfinch hanging to the outside of its nest, with one of its legs caught up in a horsehair-loop. Accidents of this kind to birds which line their nests with wool and horsehair seem to be so frequent that one wonders that their use as nesting materials has not been ere now discarded.

14th.—For several days past I have been watching a pair of Common Wild Ducks courting and nesting among the marram-grass on Braunton Burrows. Peewits nesting in hundreds.

18th.—Saw a fine male Shoveler or Spoonbill Duck. This species was first brought to my notice by a gamekeeper some two years ago. He said he had a couple of "Spoonbills breeding over yonder." Spoonbills! Imagine my surprise. "Have you?" I eagerly asked; "by Jove, they're rare birds." "Yes, sir, they are"; and then, as if attempting to show a little sympathy with my excitement, "and 'tis a beautiful duck." "Duck?" said I; "why, yes, of course, a—er—er—duck!" I have it on good authority that a pair have bred in Devon on a secluded pond for the past three years. On one occasion the female was observed sitting on her nest, so there could have been no mistake. However, this spring no nest has actually been found, but a pair, I have been told, are in the neighbour-

hood, though I myself have not yet noticed the female. As a breeding bird I believe it is a new species for Devon.

30th.—Yellow Wagtails in large numbers on Braunton Burrows. With us it is only a passing visitor, and not particularly common. Also distinguished one or two White Wagtails near the sea. The Grey Wagtail breeds here pretty commonly, in holes in bridges and walls, &c. During the early morning, amid very grand and imposing scenery, I watched an interesting skirmish between a Peregrine Falcon and a pair of Ravens. *Corvus corax* got served rather roughly. The daring little Falcon, calling angrily, kept stooping, but the old Ravens always managed to flop out of the way somehow. Eventually the Ravens were defeated, but they did not exactly retreat, or surrender—they lazily faced out the fury of the Peregrine, without attempting to retaliate.

May 15th.—A nest of the Short-eared Owl found on Braunton Burrows. Probably a pair breed there every year, but the nest is often destroyed. This is a great pity, for, as is very well known, it is a most useful bird, and a very beautiful one, too. As you approach the nest the hen bird flies off it, and, joining the male, which has by this time put in an appearance, both “bark” and scream and hover over the head of the intruder in a very threatening way. This nest contained seven eggs. The young hatched out, but were taken and apparently killed before they were half-fledged. Ring-Plovers are breeding on all the inland pebble-beaches on the Burrows. I have not found one, this year, on the shore. I obtained a very curious egg from one nest situated on a small mossy mound. Its ground colour is very pale blue, with one big black blotch at the larger end; the rest of its surface nearly spotless. All four eggs in the clutch had this faint blue ground colour, and were somewhat larger than the ordinary Ring-Plover’s egg.

28th.—“A white Blackbird seen at Santon” (‘North Devon Journal’).

29th.—Two Nightjars’ nests among the bracken on the sand-hills at Santon. Of the two eggs laid by this bird, one is generally larger than the other. Is there any foundation for the statement that the large egg contains a male bird, and the smaller a female? The adults do not vary in size, I believe.

Goldfinches are becoming much commoner in North Devon, according to my observation of the past eight months. This evening I saw a caged Peregrine, which had been found in almost a dying condition beside a dead Pigeon, which it evidently had been tearing abroad. On examination, the feathers of the Pigeon (a worthless Homer) were discovered to be smeared with poison. No doubt it was sent up by a Pigeon-fancier, in hopes of getting rid of some of his winged vermin; but this victim was found in time, and has completely recovered. I hope to induce its owner to release it. Buzzards can be seen in the woods near Ilfracombe, Lynton, Barnstaple, and along the sea-cliffs at Baggy Point, Hele, and Combe Martin.

31st.—Watched a brood of Sheld-Ducks. They were about the size of Little Grebes or smaller, white, brownish black on the head, and dull brown blotches on the body, with the chest white, and bill lead-colour. They dive with ease, much to the discomfort of the attentive hen-bird. When under water they only use their feet, the wings being kept close in to the body; the legs and feet are worked forwards and backwards, reaching far out beyond the extremity of the tail in the backward motion. To an observer watching their movements when diving, these little birds present a weird appearance. They look perhaps more like Hippocampi, or Sea-Horses, than anything else, or like huge Frogs. As soon as they reach the surface they become, as if by magic, transformed into little Sheld-Ducks again.

June 4th.—At Croyde Bay picked up a fresh specimen of the Manx Shearwater, washed in by the tide. The colony of Herring-Gulls at Baggy Point is in a very thriving condition, and large numbers of Gulls are now nesting there. We noticed also a pair of Lesser Black-backs on the cliffs with a nest and three eggs, which the hen-bird was brooding. Apparently the eggs of the Lesser Black-back and those of the Herring-Gull are exactly similar.

9th.—Red-backed Shrike with six young birds in a thorn-bush at Braunton.

July 18th.—Golden-crested Wren sitting on five fresh eggs in a larch-tree.

August 22nd.—Visited Lundy Island. Puffins have gone,

Guillemots and Kittiwakes numerous, and a large flock of Terns.

28th.—At Lundy again. All the birds except the Herring-Gulls departed.

September 14th.—A few Whimbrel on the Taw; also a pair of Greenshanks—a rare bird in North Devon. Rescued an exhausted Guillemot from the river to-day. It could not move any part of its body except its neck, which it feebly turned round when I approached it from behind. Three weeks after this a Heron was brought to me, which had been caught when in apparently the same helpless condition. It was extremely emaciated. I cannot account for this, as the weather has been very mild here up to the present.

18th.—Common Gulls in some numbers on the river. A Curlew-Sandpiper has been frequenting the Taw for some weeks past. It was very tame, allowing me to examine it well. Redshanks and Bar-tailed Godwit fairly plentiful this year, but the former is never common, and is much rarer than it used to be.

30th.—A Little Stint has been shot on the river near Barnstaple, and a Puffin in the bay near Appledore. Razorbills and Guillemots are seen commonly in the summer months off the north coast of Devon, but Puffins rarely, and none of them so late in the year as was this specimen. Little Grebes and Kingfishers returned to the estuary to winter.

October 12th.—A Cormorant shot at Black Torrington, about twelve miles from the coast; it was discovered by some local gunners perched on the church-tower, some sixty feet high.

13th.—A Green Sandpiper for a fortnight past has been observed continually on the ponds and guts in the marshes adjoining the river near Fremington.

14th.—The Kingfisher has to alter its tactics when fishing in the estuary. There are no convenient boughs where it can sit and watch, so it hovers over the water after the fashion of the Kestrel, and on seeing a fish darts down in the usual manner. I saw a pair off the coast at Down End Point, Santon, fishing in this way. They were very noisy, screaming continually, and seemed to be quite unaccustomed to the big waves. They often had to move suddenly to escape a severe ducking. It was strange

to see this inland bird at the seaside, but North Devon scenery is noted for its wonderful combination of sylvan beauty with the splendour of the beetling sea-cliffs. At Heddon's Mouth, where a little mountain stream empties itself into the sea, I have seen even Dippers perched about on the boulders on the shore.

21st.—Two Little Stints on the river. They remained till about Nov. 12th.

November 18th.—Stormy. Four Grey Phalaropes on the mud-flats off Pottington Point.

December 27th.—A rather heavy fall of snow, causing an immense number of birds to seek the shelter of the valleys. Peewits were in thousands, and hundreds were shot. Golden Plover, Thrushes, Redwings, Starlings, and Fieldfares in very large flocks. The latter bird is not often seen here except after extreme cold. Several Bramblings with the Chaffinches at Tawstock Woods, and there were one or two small flocks of them near Knowle, Braunton. A few Wild Geese seen flying westwards over the estuary of the Taw.

NOTES AND QUERIES.

MAMMALIA.

An Apparent Instance of the Hereditary Transmission of a Mutilation in the Domestic Cat.—When lately on a visit to a connection of mine, who lives at Penn Grove, Hereford, I noticed a yellow tom-Cat, apparently tailless, but found that there existed a short stump, scarcely noticeable. On enquiry I learned the following particulars:—His mother was of a tortoiseshell colour, and belonged also to my friend, and was born at the house with a full-sized tail, which was bitten off when she was a kitten of from twelve to fourteen days old. His father's tail was of full length, but was broken in a door, and, though not truncated, became thenceforward limp and trailing. In due course of time the tortoiseshell-Cat gave birth to a single kitten (the above yellow tom-Cat that I saw), which when born had only a mere vestige of a tail as at present. The mother was then lost, so that no particulars can be given as to any subsequent progeny she may have had. The owner of these Cats is unaware of there having been any Manx strain in either parent, both of whom, however, as I have above stated, had been provided with the normal appendage; nor was it known that any Manx Cats had lived in the neighbourhood. Further than this, it is a remarkable fact that I find the yellow tailless tom-Cat to which I refer, son of these two mutilated parents, was the father of three kittens last year by a Cat who is provided with a proper tail, two of which kittens were born without tails, and the third, like its mother, with a tail.—W. F. DE VISMES KANE (Drumleaske House, Monaghan).

Stoat and Ferret Hybrids.—Mr. G. T. Rope will find his queries (Zool. 1906, p. 468) to some extent answered, if he will refer to P.Z.S. 1899, p. 2. Portraits of a specimen (in my collection) are published in 'Eton Nature-Study and Observational Lessons,' by Messrs. M. D. Hill, M.A., and W. M. Webb, F.L.S. (London: Duckworth & Co., 1903), vol. i. p. 87, from photographs specially taken for that work, under the direction of Mr. Webb; and these portraits are reproduced in an article by Mr. Webb in a magazine entitled 'The World's Work and Play' (Heinemann) for April, 1906. In March

and April, 1899, I sent specimens which had died to Mr. F. G. Parsons, F.L.S., &c., of St. Thomas's Hospital, who was good enough to take a great deal of trouble in the endeavour to arrive at a conclusion as to their pedigree by dissection, but unfortunately without any very definite result. So far as it goes, however, it is against their hybrid origin. In September of the above year, Mr. Parsons wrote:—"I have carefully examined the soft parts of several Stoats, Polecats, and Ferrets, as well as your suspected hybrids. Unfortunately the anatomy of these animals is so much alike that I have only negative results. Once or twice I have thought that I had found a definite anatomical difference, but on dissecting other animals of the same species I have found that it was merely an individual variation. The result of all this work so far is that I have acquired an accurate knowledge of the anatomy of these Mustelidæ, and am impressed with the near relationship between the Stoats and Ferrets. In consequence of this I am quite ready to believe that these animals might breed together." Mr. Parsons goes on to say that he was in hopes that some result might be obtained from the osteology, and was therefore having skeletons prepared. In November of the same year Mr. Parsons wrote:—"I have now had the bones of your specimens prepared, and have carefully compared them. The hybrids you sent correspond in every particular to Polecats, and have no Stoat-like characteristics. I have taken the skull to Mr. Oldfield Thomas, . . . who compared it with a large collection, and was quite of my opinion. There is one point in which the soft parts of Stoats and Polecats differed materially, and that was in the proportionate length of the intestine to the body length. In three Stoats the intestine was 3·5, 3·75, 3·4 times as long as the body. In two Polecats it was 4·8 and 4·7 times as long. In one Ferret it was 5·7 as long. In your hybrid (one was too decomposed) it was 4·7, again corresponding closely with the Polecat. Of course this does not disprove the fact that a Stoat may have had something to do with their origin, only that no Stoat-like characters (as far as I can tell) have been transmitted." A great number of people, including some thoroughly "competent naturalists," have seen specimens in my menagerie in the course of the last nine years, but I should not feel at liberty to quote, even if I remembered accurately, the opinion of each; but I may say that I have received many most eulogistic "unsolicited testimonials" concerning examples which I have sent away, while only in four instances has any doubt been expressed as to their being really of hybrid origin. If Mr. Rope, or any other brother "naturalist," can find his way here (when the days are somewhat longer and more genial), I shall be delighted to let them form their own opinions from

such examples as I may then possess. — ALFRED HENEAGE COCKS (Poynetts, Skirmett, near Henley-on-Thames).

Is the Weasel a Native of Ireland?—A period of twenty-nine years has now elapsed since this question was discussed in the pages of 'The Zoologist' for 1877, and yet, up to the present date, has not been decided in the affirmative, because none of the persons who alleged they had seen Weasels in Ireland have sustained and corroborated their statements by the production of an Irish-killed specimen in the flesh, with an authentic record of the dates and localities of capture. While in proof of its not being a native, we have the fact of there not being a specimen in any of the public museums, nor, as far as I am aware of, in any private collection either; and also our best naturalists did not believe in its being a native. The late Dr. Ball, (I believe the first) Director of the Dublin Museum, never saw an Irish specimen. Neither did the late William Thompson, of Belfast, who, writing to me as far back as Sept. 28th, 1851, says: "The Weasel is not known as an Irish animal." My old and valued friends, the late Dr. A. Carte and Mr. A. G. More, both for many years Directors of the Dublin Museum, never saw one. Neither did my old friend Dr. J. R. Harvey, of Cork, who during a long life accumulated the finest collection of natural history specimens in the South of Ireland; and he, writing to me in September, 1877, says: "I never saw the Weasel in Ireland, and I don't believe we have it. I have had over and over again to prove to people that what they thought to be Weasels were in reality Stoats, and, like yourself, have still to look for the pleasure of beholding an Irish Weasel." So the matter rested in 1877. However, in 'The Zoologist' for 1894, the question again turned up in a very interesting article by Mr. J. E. Harting, "On the Weasel and its Habits" (pages 417 and 445), when, after speaking of it in England and Scotland, he quotes from letters of various correspondents asserting they had seen Weasels in various parts of Ireland—some promising specimens, but, as far as I am aware, none were produced in evidence of their statements. I have never met a specimen myself, and have questioned shooting men, keepers, rabbit-trappers, &c., in various parts of the country, but never could obtain satisfactory proof of a Weasel being obtained by any of them. However, as rabbit-trapping has become so universal and widespread for the past thirty years throughout Ireland wherever there are burrows of any extent, it is manifestly impossible that this little animal could exist in the country without some specimens being taken along with the numbers of Stoats trapped every season.—ROBERT WARREN (Moy View, Ballina).

Otters in the Hampshire Avon.—Twice during 1906—*viz.* spring and autumn—the Otter-hounds visited this neighbourhood, and, although comparatively unsuccessful in their quest, as far as “killing” is concerned, it must not be supposed that Otters have become scarce. Possibly the river is unsuitable for hunting, either from its depth or width or currents, but for some reason best known to the “craft” the waters of the Avon are not hunted, and it is the smaller streams or brooks to which the “sport” is confined; but the banks of the main stream often bear unmistakable traces of the so-called “sly, goose-footed prowler,” and it is not long since two young Otters—larger than terriers—were caught in a garden near the river, and their “holt” was discovered not far off underneath one of the bridges close to Ringwood. During August and September I knew of three Otters—two males and a female—having been either shot or trapped within a mile of each other, the smallest weighing eighteen pounds, whilst the largest turned the scale at twenty-seven pounds, and measured fifty-one inches in length; and on one occasion a duck-shooter, whilst waiting in the “gloaming” for the evening flight, saw two large Otters swimming and diving in the water only a few yards from him. A short time ago a local newspaper contained an account of a prolonged and fierce battle which took place, one morning in October, between two large Otters, in the river at Fordingbridge, and was witnessed by a number of spectators, who watched the fight for nearly an hour, the combatants still continuing the encounter as they passed down the stream, beneath the bridge on which the people were standing. These were stated to be two dog Otters weighing twenty-five pounds each, but how the sex or weight was ascertained it saith not.—G. B. CORBIN (Ringwood).

Common Seal on the Coast of Somerset.—On Dec. 17th last I saw a full-grown Common Seal (*Phoca vitulina*) close into the rocks here at high tide. Seals on this part of the Somerset coast are, I believe, of very rare occurrence.—H. MEYRICK (Clevedon, Somerset).

AVES.

Ring-Ouzel in Surrey.—With reference to Mr. Mouritz’s note on the Ring-Ouzel seen in Richmond Park on Sept. 10th, 1905 (Zool. 1906, p. 434), my own records of the bird’s appearance in Surrey during that year may be of interest. They are as follows:—On April 29th I noticed a Ring-Ouzel on the common-land in the neighbourhood of Chart. The bird was very wild, and on my approach flew away into some pine-woods, where I lost sight of it. On Sept. 24th I again met

with the species, when a single bird was observed among some tall bushes growing near a mill-pond at-Oxted. A week later two birds (I think a pair) were noticed on the North Downs, near Woldingham. These autumn migrants were quite as wild as the bird seen near Chart in the spring, but those on the downs I was able to watch through a glass for a considerable time, owing to the open nature of the country they were frequenting. Very rarely did any of these Ring-Ouzels turn the white breast-band towards me when they alighted, as if aware of its conspicuous appearance. I agree with Mr. Mouritz that this Thrush is a very rare visitor to Surrey, for, although I have rambled about a good deal in different parts of the county, until last year I had never met with the species. Although I have watched carefully for the bird during the present year (1906), I am unable to record a single instance of its appearance.—C. H. BENTHAM ("Keymer," East Hill Road, Oxted, Surrey).

Chaffinches, Greenfinches, and Yellowhammers.—With reference to Mr. Robert Warren's interesting account of the "Disappearance of many of our Home-bred Birds in Autumn" (Zool. 1906, p. 459), I have for some years observed the disappearance in autumn—generally about the latter part of September—of local-bred Chaffinches, Greenfinches, and Yellowhammers in this part of Northumberland, to be followed later by an influx of others, evidently of a more northern race. I have also noticed that during the winter months there are far more male Chaffinches to be seen than females, and I believe it was owing to this that Linnæus named it *calebs*, or "bachelor finch." About the latter part of October we often have large flocks of Greenfinches, but they soon disappear, or become dispersed.—J. S. T. WALTON (Sunnyside, Stocksfield-on-Tyne).

Arctic Redpoll (*Linota hornemanni*) in Midlothian.—On Dec. 29th, 1906, I had a brief but clear glimpse of an Arctic Redpoll as it flew northward over a clearing on a wooded hill near Edinburgh. The lower parts were white, the flanks unstriped, and the upper parts, when they came into view, had a greyish white appearance. The occurrence of this representative of an arctic species, coupled with the unusual arrival of some Mealy Redpolls at the same place, after a period of northerly gales and severe snowstorms, is not without significance.—J. M. DEWAR (24, Lauriston Place, Edinburgh).

Short-eared Owl in Staffordshire.—Authentic records of the Short-eared Owl in Staffordshire are few. Mr. E. Brown says (1863), "Many killed in the Burton district at beginning of winter" ('Nat.

Hist. of Tutbury,' p. 92). Garner only says, "frequent" ('Nat. Hist. of Staffordshire,' p. 272), and Dr. McAldowie gives a few instances only ('Birds of Staffordshire,' p. 88); so that a recent occurrence of this bird in the county is worth recording. On Dec. 19th last, when cover-shooting at Whiston Eaves, near Cheadle, a bird of this species was flushed from off the ground by one of the beaters, and identified by Mr. E. W. H. Blagg and myself as a Short-eared Owl (*Asio accipitrinus*, Pallas). The bird was, I am happy to say, not shot at.—JOHN R. B. MASEFIELD (Rosehill, Cheadle, Staffordshire).

Pernis apivorus in Montgomeryshire.—An immature female Honey-Buzzard was inadvertently shot by a keeper at Kerry, near Montgomery, on June 21st, 1906. This is the only example recorded in the county, and in the whole of North Wales the species has been known to occur only seven or eight times.—H. E. FORREST.

Gadwall (*Anas strepera*) in Shropshire.—On Dec. 9th last there was a drake Gadwall on the lake in Hawkstone Park. It was swimming with a small party of Mallards about fifty yards from where I stood. At that distance the close wavy markings on the neck, mantle, and sides of the body suggested a general dark cinereous coloration, with which the intense black of the upper and lower tail-coverts contrasted strongly. Whilst the bird was on the water the white speculum was not noticeable, concealed as it probably was by the cinereous feathers of the flanks, but as it got on the wing the white spot showed very clearly, and the black rump and tail-coverts, being then more exposed, made a still stronger contrast with the general plumage than they had done before.—CHAS. OLDHAM (Knutsford).

Hybrid Pheasant.—That the Common Pheasant often interbreeds with other or closely allied species is well known, but the following note may be of interest. During a shooting on an estate near here a peculiar looking bird was killed, which was, I suspect, a hybrid between Pheasant and ordinary fowl, although the gentleman who shot it had an idea that Pheasant and Black Grouse were indicated in the bird, but I could see no traces of Grouse, and the feet and legs were decidedly Pheasant or fowl. The bird in question was a very small immature male, and the plumage was too tattered for setting up. The front of the neck, breast, and under parts were black, many of the feathers having buff edges and shafts, whilst a few were barred alternately with buff and black; back, wings, and back of neck were of varied shades of brown, some feathers having the dark central brown mark so observable in the hen Pheasant, but the cheeks were conspicuously red. The

shape of the tail was the most remarkable, as it was short, like that of an ordinary bantam hen, and resembled the back in colour, or perhaps a trifle darker. It probably would have been a singular looking bird if it had been allowed to live and attain its full plumage.—G. B. CORBIN (Ringwood).

Larus melanocephalus in Cornwall: unrecorded Examples.—Recently, when visiting the collection of birds from Hawkstone (now in the possession of Mr. Beville Stanier, of Peplow Hall, Salop), I came across two examples of the Mediterranean Black-headed Gull. They are described in the manuscript catalogue by Harry Shaw as follows:—"The pair of birds in this collection were killed near Fal-mouth in March, 1851; the only specimens of their kind recorded as obtained in this country." It is strange that Shaw never communicated this rare occurrence to the editors of the later edition of 'Yarrell,' in which book the specimen obtained near London in 1866 is mentioned as being the earliest record. Similar statements appear in Mr. Howard Saunders's 'Manual,' and other recognized text-books on British Birds, whilst the name of this species does not appear in Mr. Rodd's list of the Birds of Cornwall.—H. E. FORREST.

Westward Movement of Birds during Snow.—The late snow, with harsh wind, commenced in Co. Waterford on the night of Dec. 25th, 1906, and for the next four days flights and single birds passed all through each day, consisting chiefly of Redwings and Fieldfares, with many flocks of Sky-Larks and Lapwings. They were all hastening to the west. The frost was terminated on Dec. 30th by rain and a thaw, and the movement of birds ceased. I should like to know if a similar rush of birds has been observed along the south coasts of England towards Devon and Cornwall. I have repeatedly observed such a wholesale westward movement of birds here on the occurrence of severe frost and snow, which is an irregular, if not an exceptional, event in the South of Ireland. Our synclinal valleys run east and west, and thus lend themselves to the passage of birds towards Kerry, a county more affected by the Gulf Stream and the westerly winds, and consequently less frost-bound in winter.—R. J. USSHER (Cappagh, Co. Waterford).

PISCES.

Sea-Lamprey at Shrewsbury.—A specimen of the Sea-Lamprey (*Petromyzon marinus*) was taken in the Severn below the Welsh Bridge, Shrewsbury, on July 23rd, 1906; it is now in Shrewsbury Museum. It weighed just two pounds, and measured $2\frac{1}{2}$ ft. Before the construction

of navigation weirs lower down the river the Lamprey used frequently to ascend the Severn even beyond the Welsh border, but it is now of very rare occurrence, though another was taken in exactly the same spot as the above in June, 1899.—H. E. FORREST.

INSECTA.

The Mole-Cricket (*Gryllotalpa vulgaris*) in Dorset.—In response to the request, on p. 437 of the last volume of this magazine, for records of the occurrence of the Mole-Cricket in England, I may mention that specimens have been brought to me very occasionally from various parts of the Isle of Purbeck, Dorset, in which it is evidently widely distributed. The last example I received was captured therein on June 1st, 1903, and caused some excitement, for, after gnawing a hole through the stout piece of cotton-rag covering the glass jar in which it arrived (the jar had been laid on its side), it jumped off the top of a cabinet, four feet high, on to the floor, and was rapidly making for a sanctum behind the furniture when its recapture was fortunately accomplished.—EUSTACE R. BANKES (Norden, Corfe Castle).

NOTICES OF NEW BOOKS.

The Mammals of Great Britain and Ireland. By J. G. MILLAIS, F.Z.S. Vol. III. Longmans, Green & Co.

THE completion of this great work marks an epoch in British zoological literature ; it brings the subject up to date ; is written by one who as sportsman and naturalist has seen much of what he records ; and it has set the standard of illustration. These three huge volumes are, as many will find, somewhat expensive in cost, but are at the same time, according to our view, in actual artistic value, exceedingly cheap. No future work on British mammals is possible without a reference to Millais.

The Hare receives full treatment, and its aquatic habits are fully recorded. We should have been glad to have found such material when studying the swimming capacities of these and kindred animals a few years back. But many other peculiarities of this creature are not of general knowledge, especially to those whose experience is principally related to shooting or coursing. "Farmers can always tell whether Hares or Rabbits have been attacking turnips. Hares will peel off the outer skin and leave it on the ground, but Rabbits will eat skin and all." The Irish Hare is treated as a subspecies of the Mountain Hare, under the name of *Lepus timidus hibernicus*.

In discussing the distribution of the Rabbit, Mr. Millais inclines to the theory of Prof. Scharff, that the animal originated somewhere in or near North America, which necessitates the consideration of "the lost Atlantis," a postulate receiving much support at the present day from other arguments than those of zoology alone. Lost continents with their lost civilizations have a most important evolutionary signification, and are the burial-places of many "keys" and many "links." With the Mammoth we get back in England to some fifteen thousand years ago, and in Ireland to a later date, where it "still lives in legend and story among the more superstitious." Of the drawings of this beast,

made by prehistoric man on cave-walls at Combarelles, in France, some twenty thousand years ago, Mr. Millais adds a note that they "are a good deal better than many pictures of wild animals by modern artists, although they are not 'as good as Landseer,' as one art critic described them."

The Deer occupy many pages, as might be expected from one who has already written on 'British Deer and their Horns.' Mr. Millais joins issue with the opinions of Mr. Lydekker and the late Sir William Flower, "that when the growth of the antler is complete, the supply of blood to it ceases, the skin dies and peels off, leaving the bone bare and insensible, and after a time, by a process of absorption near the base, it becomes detached from the skull, and is shed," &c. Mr. Millais writes:—"Having given much attention to this growth of antlers, and having killed many Stags at all stages of their horn-growth, I must differ entirely from this view, and can state definitely that it is erroneous." The reader will also find much argument as to the subspecific splitting of these animals, which merit the deepest consideration, whatever opinion may be ultimately held; in fact, we find ourselves in Wild Deer exactly in the crux of Wild Geese, so far as taxonomy is concerned. We can only give one paragraph from Mr. Millais:—"No deerstalker, for instance, who has been much associated with Red Deer, whether in Eastern or Western Europe, would found specific or subspecific distinctions on local variation in bodily size, colour, or antlers, being well aware that these are all exceedingly variable characters, not only among individual Stags in the same neighbourhood, but even in the same herd. It is clear, however, that Dr. Botezat's classification of Red Deer in Carpathia has been wholly based upon such characters, selected incidentally, no doubt, from a few specimens in which they are more or less strongly marked. I feel quite sure that in the Scotch island of Jura, thirty miles long, I could select three Stags which, to a zoologist of Dr. Botezat's school, who had never previously seen a Scotch Stag, would constitute quite as good sub-species as the 'short-faced Red Stag,' 'black mountain Stag,' and 'large grey lowland Stag,' " &c.

The *Bovidæ* are beyond the limits of our space to adequately notice, but we may draw attention to a reproduction of Sir E. Landseer's well-known "Chillingham Cattle."

It is, however, with the description of the Cetacea that this volume is almost unique. Mr. Millais has gone to sea to observe them, and, what is almost more, to illustrate them. We are introduced again to a great industry which has produced skilled and hardy mariners based on the old human instincts of sport and adventure. Of the old whaling days, in sailing-ship with hand-harpoon, little remains, and little is recorded; now we have the steamship and the gun! Almost as great a contrast as between the old 'Victory' and the modern 'Dreadnought.' But whatever might have been written then, could only have been adequately illustrated by the modern methods of to-day. We have seen these creatures during the last forty years in all parts of the world; we have, however, only just seen in this volume a reproduction of a photograph by the Earl of March of Common Dolphins at sea, and have at last on our bookshelf a faithful representation of an old experience.

The Aquatic Birds of Great Britain and Ireland. By CHARLES J. PATTEN, M.A., M.D., Sc.D., &c. R. H. Porter.

ONE of the greatest difficulties experienced in the composition of this interesting book must have been connected with its title. What really constitutes an aquatic bird? There are several included in this enumeration which would probably not receive universal acceptance in such a category. Thus we have the Bustards, which to some will appear as little entitled to the character of aquatic birds as would have been the Kingfisher had that bird been inserted. We make these remarks in no captious spirit, but as showing that the title of the book as applied to some birds it includes appears to be very elastic.

Dr. Patten has written this book from the bed-rock of much personal observation, and has consulted considerable trustworthy authority; it is amply illustrated, and contains some characteristic views of the haunts of shore-birds. Many of the records relate to Ireland.

EDITORIAL GLEANINGS.

THOUGH the tropical heat and drought of the summer often greatly interfered with sport, and water and weather conditions at other times have been unfavourable, anglers have made some notable captures in the past year in river and lake, and large fish have been met with in salt water.

In the Thames numbers of good Trout and other fish have been taken. Landed by Mr. A. E. Hobbs in the Henley waters, the largest Trout scaled 9 lb. 1 oz. Pike up to 22 lb. have been captured, also Chub of 5½ lb. and 5 lb. 5 oz., an 8¼ lb. Carp (Egham), and some fine Barbel, the season for these fish showing an improvement on 1905. Thames Roach fishing has not been up to the average. The largest authenticated Roach of the season—one of 2 lb. 7 oz.—has been captured in the Lea at Ponders End by Mr. Strickland.

One of the finest Salmon landed in Scotland was a specimen of 43 lb., which was secured by Mrs. Arthur Sassoon, in the Earn. The Wye and Usk have furnished some good Salmon this season, and near Ringwood (Hampshire), Mr. A. G. Campbell established an Avon record for one day by landing six fish scaling 143 lb.

The best Pike hail from Ireland and Wales—two thirty pounders; one was taken in the Wye. The past year will be memorable among Chub anglers as yielding the largest specimen of this fish ever known to have been taken with rod and line. It fell to the rod of Mr. F. W. Smith, fishing in the Avon (Hampshire), and now ornaments a glass-case. It scaled 7 lb. 6½ oz.

Wargrave-on-Thames and the Witham, near Boston, Lincolnshire, have each yielded specimen Bream of 6 lb. 2 oz.—fine fish—and some large Perch and Dace have been met with in various waters. Grand Roach up to 2 lb. 4 oz. have been caught by London anglers in the tidal Arun at Amberley, Sussex.

With reference to big fish caught by sea anglers, the Californian waters are an easy first. One angler at Santa Catalina Island has landed a black Sea Bass of 327 lb. on a light rod.

Mr. Holcombe, of the British Sea Anglers' Society, has probably taken the largest fish in our waters—a huge Skate of 183 lb., landed at Ballycotton, Co. Cork coast. Here a splendid Cod of 30 lb. has fallen to the rod of Mr. J. N. Hearn, another member. Fine Pollack, Bream,

and Bass has been taken in Sussex and Kentish waters, and one of the catches here was a 34 lb. "Angler" Fish (*Lophius piscatorius*), which fell to the rod of Dr. FitzGerald at Folkestone. The autumn and winter Silver Whiting season has been a disappointing one in a general way.—(*Daily Chronicle*, January 7th.)

WE have received No. 1, vol. i. of 'The Hastings and East Sussex Naturalist,' dated November 1st, 1906. In some Annual Notes on the Local Fauna, &c., by the Rev. E. N. Bloomfield, we read:—"Mr. Butterfield has informed me that a very large Fox Shark, *Alopias vulpes*, Penn., 12 feet long, was exhibited in Hastings some months ago, and a Torpedo, *T. nobiliana*, Bonap., was taken in August by one of the Hastings fishing-boats."

IN the 'Bradford Scientific Journal' for this month, Mr. H. B. Booth gives the following record:—"During the third week in December a large fish, on view at the game shop of Mr. W. L. Blakeley, Horton Road, Bradford, attracted considerable attention. It was supposed at the time to be a Salmon hybrid, and it was stated that none of the fisher-folk at Grimsby had ever seen one like it before. The local evening papers of December 17th described it as a large fish, with the head of a Salmon, the body of a Porpoise, and the tail of a Shark. I recognized it as one of the larger species of the *Scombridæ* (Mackerels), and with the aid of 'Our Country's Fishes' I was able to identify it with certainty as the Short-finned Tunny (*Oreynus thynnus*), a rare fish in British seas. Its length was 45½ inches, greatest girth about 30 in., and weighed nearly one hundred pounds. Mr. F. King, of Grimsby, who sent the fish to Bradford, writes to say that it was caught on Dec. 10th, five miles to north-east of the Dogger Bank."

IN the Ann. & Mag. Nat. Hist. (7), xviii. p. 327, Lieut.-Col. Durnford has published a second paper on the "Flying-fish Problem." He refers to a recent article in these pages as follows:—

Lionel E. Adams, B.A., writes in 'The Zoologist' (April 4th, 1906) an article interesting throughout. I quote from p. 146: ". . . I was often able to see them against the sky. . . I could see quite distinctly that their tails were vibrating very rapidly from side to side during the whole flight, and that the wings would vibrate with an intensely rapid shivering motion for a second, then remain outspread motionless for one or two seconds, and then vibrate again. This vibration of the wings is not up and down as in the case when birds fly, but in an

almost horizontal direction." That is a quite possible explanation of the mode of flight, provided that a sufficient speed be acquired in the intermediate flappings, but this the known speed of the fish shows to be not commonly the case.

Again, on p. 148: "I am perfectly well aware that a casual glance at Flying-fish from the lofty deck of a liner gives the impression that they soar like birds with motionless wings, but watch them at close quarters from the deck of a low-waisted tramp, and the vibratory motion of the tail and fins will be quite plain."

Interesting as is Mr. Adams's paper, I cannot but think that he is partly mistaken in his views, and that the wing-vibration which he discerned was really less rapid than the movement in the period following which he believed to be one of stillness, just as the liner-passengers mistook his vibrations for stillness. I do not say that the fish could never arrive at a speed by which a very short aeroplane flight could be attained even with their low ratio; but I do say that such is not their common speed, and that in any case their disregard of wind-direction disproves such flight. Therefore another way must be looked for, and we are driven back, perforce, to continuous wing-action, the manner of which may be here examined as carefully as our information allows.

Premising that the flight varies greatly on different days and under different conditions, the following is probably a fair description of their methods in an ordinary flight:—

1. The tail-impelled, visibly (to many) wing-assisted jump from the water to a height where the wings can work freely.
2. The flight continued by an intensely rapid and laboured wing-movement—one easily mistaken for stillness, and usually seen, if at all, as blurr.
3. Short periods of slowing down of wing-speed, during which the wing-movement becomes again visible. (These are the "vibration" periods, representing to aeroplanists loose wing-trailing, or dragging like a flapping flag—an impossibility; and, to Mr. Adams, periods of wing-assistance—with limitations a possibility.) These periods often precede a special spurt such as is required to lift the fish over an on-coming wave.
4. Either sudden cessation of wing-movement and consequent immediate drop into the sea, or a short slow down into visibility (No. 3) previous to such drop.

It is to be noted that this vibration so often seen before the fish enters the water is one of the many pointers to continuous wing-movement, for such a time is a proper one for slowing down, but an absurd one for renewal of wing-effort.

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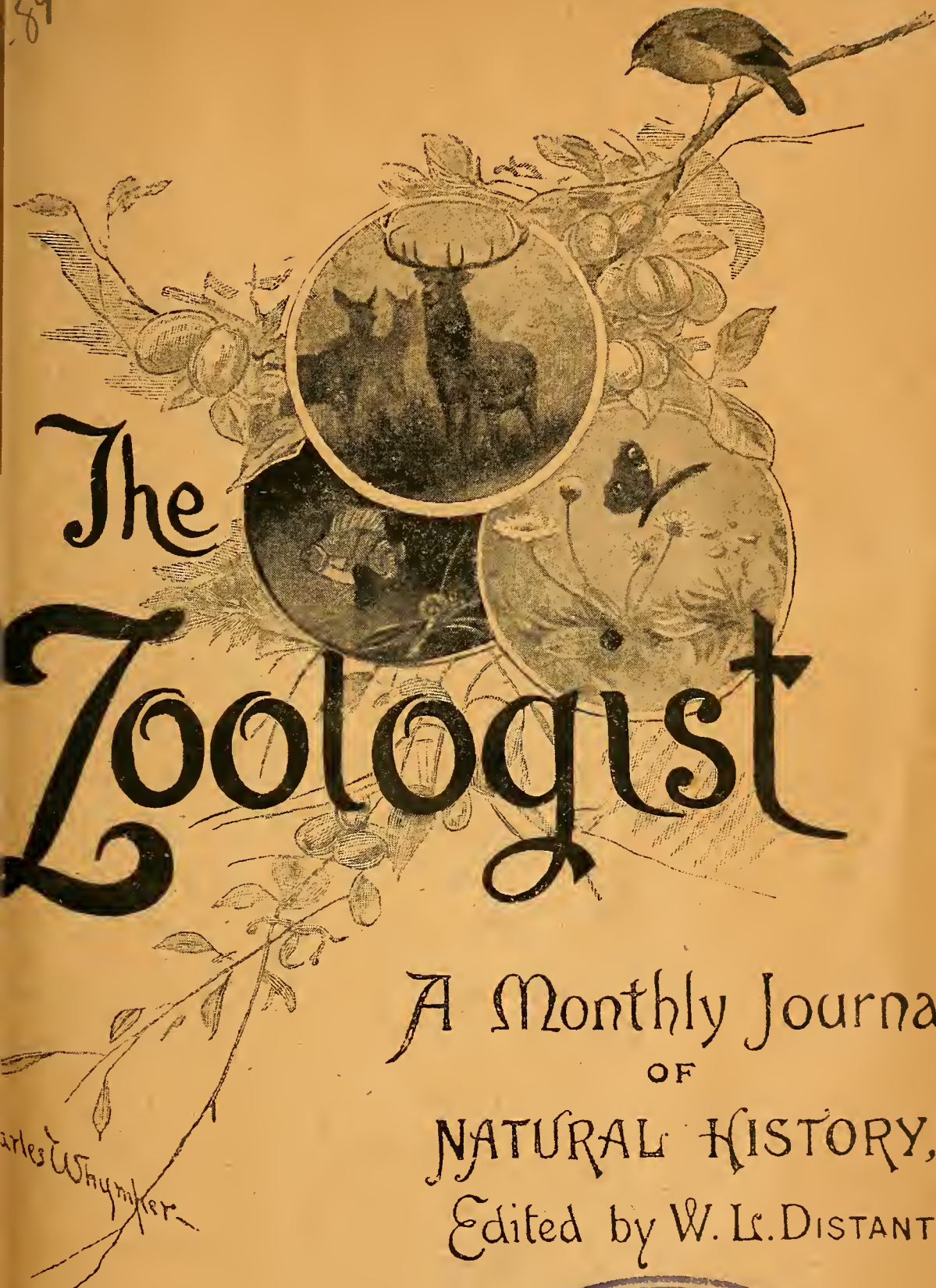
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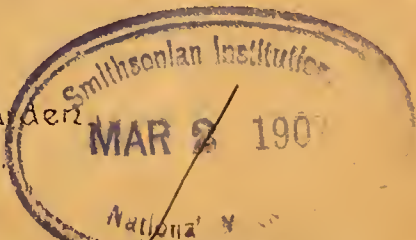
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1



2



3



4



(From drawings by Miss Barling).

1. Contour feather from breast of Sheld-Duck.
2. Down of Sheld-Duck.
3. Contour feather from breast of Mallard.
4. Contour feather from breast of Shoveler.

THE ZOOLOGIST

No. 788.—*February, 1907.*

THE BIRDS OF NORTH KENT.

By THOMAS HEPBURN.

(PLATE II.)

IN a previous article on the birds of this district (*Zool.* 1904, p. 161), I stated that the observations of the field naturalist as regards birds would fall naturally into three categories—either as being connected with the coast-line, or the marsh-levels, or the upland districts. In the article in question I dealt with the birds to be observed along the coast. In the present paper I propose to give the result of observations, extending now for some years, on some of the birds to be seen in the marsh-levels.

There is a strip of this low-lying, so-called marsh-land, extending right round the whole of the district I then defined, wherever the tidal estuaries of the Thames and Medway are touched by it. The tracts above Gravesend, and between that place and Woolwich, are either of such small size, or so encroached upon by buildings and factories, as to be of only waning interest to the ornithologist. The same remarks apply, although perhaps in lesser degree, to those portions lying on the Medway close to Rochester. But between Gravesend and the point where the South Eastern and Chatham Railway terminates at Port Victoria, and along the lower reaches of the Medway, there are long stretches of marsh-level, sometimes broadening out to a

width of two miles, sometimes diminishing to a narrow strip, which, except upon rare occasions, are only disturbed by sheep and cattle, and those who tend them.

The preservation of Hares in this district for purposes of coursing also has a decidedly beneficial effect so far as the birds are concerned. The owners of the land are all animated by the desire to keep a quiet sanctuary for the multiplication of these rodents. Trespassers are therefore warned off, and so a place of refuge is given for many birds during the spring and the summer months.

I make no apology for attempting first of all a short description of this marsh-land, because physical geography must, or should, always be one of the foremost considerations of a field naturalist, whatever class of life he may be observing, determining as it often does the species he is likely to meet. In the present case the extent and area of the waters of the marsh-land, the amount of cover afforded by aquatic and other vegetation, the denseness of human habitations, or the nearness of factories and towns, are the determining factors of the ornithological fauna of the district.

In order to appreciate the present features of the country it is worth while to attempt to consider its condition before the river-walls were thrown up, and when it was still subject to the encroachment of every tide. The saltings yet unenclosed give one the opportunity of doing this. In them you have some large stretches of land that have evidently been formed by the deposits of the rivers which run through them. They are, practically speaking, level, but much cut up by large creeks and lesser natural gutters and runnels. By supposing such a tract to be enclosed by a wall so that the sea could no longer flow over it, you might then surmise how the marsh has come to its present state. The large tidal creeks, some of which are fifty yards or more across, have formed in the process of time what are locally termed "fleets"—large winding lagoons bordered now at the edges by reeds, bulrushes, sedges, and other vegetable growth. Many of the smaller runnels of the one-time salting have become filled up, and present at the present day winding hollows in the otherwise flat meadow-land, filled only after heavy rains. Others of the small creeks have been kept open by

clearing the mud out of them at intervals, and heaping it up on their banks. That is the history of many of the tortuous ditches which wind their way between the meadows. Then, in order to assist or complete the system of surface-water drainage, straight ditches have been cut connecting the natural ones already existing. So that the waters of the marsh-land fall roughly into three divisions. There are the wide fleets, once the main creeks of the salt-marsh, now getting gradually narrower and shallower with the encroachment of their own vegetable growth. Then there are the narrow winding ditches, formerly the smaller runnels of the salting in which the silting process of nature has been prevented by the intervention of man. And, finally, there are the straight ditches, which are quite evidently, in their entirety, the work of men's hands. Some of the land has been enclosed within fairly recent years. It is called "new land" by the residents, who nevertheless cannot recollect the actual enclosure of it. But, according to the documentary evidence of ordnance maps, there are evidently several large tracts which have been enclosed between the survey upon which the present maps are based and the survey upon which the older maps were based. But both these surveys were spread over such a long time that I have found it impossible to get exact dates.

There is an interesting fact to note in connection with the silting up of creeks. It appears that those creeks which are still open to the tide, but in which there is no through scour, will shrink more quickly in width than those which have now been shut up from the sea for many years. The channel gets narrower although it remains deep. On the other hand, the fleets inside the wall get shallower, but remain their ancient width. The evidence on which I base this statement is that in the year 1840 a winding portion of Dartford Creek was shut out of the tide-way by the cutting of a new straight channel. But this winding portion, although it missed the scouring of the direct current, has never been entirely shut off from the tide. Presumably its channel was as wide at the time of making the new cut as the rest of the creek—say, some eighty to a hundred feet. At the present day the winding portion of the old creek is scarcely twelve feet wide. All the fleets in the marsh are much wider than the creeks outside the wall, of which they were once a part.

They are, however, much shallower. The reason seems fairly clear. The filling agent in the tidal waters is the matter in suspension. In the case of the inland fleets it is the erosion of the surface of the land by rain and weather. The volume of the first must be greater—and, of course, more frequent in its application—than that of the second. In the case of the inland fleets the settlement will be an even and gradual spreading from the edges to the centre, because there is no current, and they will therefore get shallower without quickly getting narrow. In the case of the tidal creeks there must always be a wash in the centre of the channel, both in the rising and the receding of the tide, which would tend to cut chiefly the centre of the channel, while not preventing its gradual narrowing from the edges. The daily deposit of suspended matter by the tide also accounts for the phenomenon (which I wondered at in my former article) of the level of the salting outside the wall being higher than that of the marsh-land within. If it were necessary to bring actual evidence to prove that the sea once flowed over the marsh, one could point to several beds of cockle-shells in the existing fresh-water fleets, and to the dead shells of periwinkles, and mussels and other bivalves, in soil dug out of the bottom of the ditches.

Such a district as this, which I have attempted to describe—with its nearness to the wide reaches of the estuaries, with its quiet stretches of inland waters and lagoons, and with their dense growth of reeds and rushes—makes an ideal haunt for members of the Duck family. My notes include observations on eleven species of this family, three of which nest in the district, and five of which, from their late appearances in spring and summer, I am always hoping—perhaps against the *dictum* of high authorities—to include in my list of nesting birds. A gunner would doubtless add several more to the eleven species that I have noted; for, whatever may be said against the practice of shooting wild birds, it is the one certain and indisputable method of identifying a species. The quickest observer, with glasses or without, in the hustle caused by a rising mob of startled birds, may be excused for missing the distinctive points of the one or two birds which look different from the rest of the string, and so lose his opportunity of adding a fresh name to his

record; while the large flocks floating on the river, or standing on the mud-flats a mile or more from the hard ground, are quite beyond the resolving powers of the best eyes or glasses. A list, therefore, of wildfowl made by a man who does not shoot, but who only observes, is not likely to be by any means a complete one.

In my former article I already gave a provisional list of the names of the Ducks observed on the waters of the estuaries of this district (Zool. 1904, p. 166). Of three of the species there mentioned—*viz.* the Pintail (*Dafila acuta*), the Common Scoter (*Ædemia nigra*), and the Scaup (*Fuligula marila*)—my notes are extremely scanty, the only observations of them being on the tidal waters, and during the winter months. All my winter notes of the Sheld-Duck (*Tadorna cornuta*) point to its being resident all the year, but, during that season, confining itself to the tidal waters and mud-flats. But in the winter the wild weather makes the quiet waters of the fleets pleasant resting-places for the birds after the buffetings of the wind in the river, and a walk along their edges will generally result in the disturbing of several strings of Mallard (*Anas boscas*), and most likely also of Wigeon (*Mareca penelope*), and Teal (*Nettion crecca*). Less common, but still sufficiently often seen at that time of the year to be looked for with expectancy, are small parties of from three to half a dozen of Tufted Ducks (*Fuligula cristata*). My only notes of the Shoveler (*Spatula clypeata*), the Garganey (*Querquedula circia*), and the Pochard (*Fuligula ferina*) are in the spring and summer, and always on the inland waters of the marsh. The three species which I know to nest, from having handled the eggs *in situ*, are the Sheld-Duck, the Mallard, and the Shoveler. Five others, which I hope some day to record as nesting in the district, are the Common Teal, the Garganey Teal, the Wigeon, the Pochard, and the Tufted Duck. The shepherds of the district declare that the three first mentioned of these five species are nesting birds; but still, since I have been watching the district, they have never been able to show me the nests.

In the early days of spring the marsh seems simply alive with Ducks of all sorts. The mature Sheld-Ducks come in from the estuaries and the mud-flats, and may be seen standing about

in pairs, striking and conspicuous objects upon the green meadows. Pairs of noisy Mallards rise from ditches and fleets everywhere. They are, of course, the commonest and most obvious of the species present. But almost as common at this time of the year, and perhaps more striking—and certainly more interesting—are the Shovelers. There will still be Mallard, Wigeon, and Teal—possibly many of them migrants—collected in large flocks, which will rise and fly away in scattered strings. And you may have the added interest of seeing odd *pairs* of Wigeon and Teal, and of disturbing, as I have during the last two years, a small party of Garganey, or half a dozen Pochard, male and female, easily distinguishable as they fly.

In dealing with my notes of these birds more in detail, I will take first—of the breeding species, or possible breeding species—those which are least likely to become included in the latter category. As far as my own observations go, the Tufted Duck at present gives me the least evidence of nesting in the district. Up to the year 1903 my only notes of this species are in the months of October and November—generally, as I have indicated, in small parties of from three to half a dozen birds, put up from the quiet open spaces of water amongst the reeds and flags of the fleets. But in 1904 I have a note of a pair disturbed on March 14th; and in 1905 and 1906 I have notes of pairs seen as late as April 24th, at which date Mallards' eggs may be found hard sat. This bird is not distinctively known to the shepherds, and I am therefore inclined to think that it has only recently commenced to frequent the district in the spring. And it is not unlikely, considering its spread as a nesting bird in various parts of England, that it may presently stay, in such a suitable locality as this, throughout the breeding season.

The Common Teal is often enough seen all through the winter. But I have also notes of pairs of the birds as late as April 17th and 24th, in different years. This gives some countenance to the shepherds' repeated assertions that they have found this bird nesting, though not during the last three or four years. The Teal is a bird thoroughly well known to them, and I am inclined to think that the statement they make of its having nested may be believed. A mob of these small Ducks, disturbed in September of the present year (1906),

consisting of young birds of the year, and old together, seems to go towards corroborating their statement. But for myself, I can only say that I have not noticed any single birds or pairs later than the latter end of April. Concealed by my usual cover of the river-wall, I one afternoon (March 13th, 1904) quietly watched a large party of these Ducks playing and feeding in the shallow water of a wide fleet. It was a mixed flock of male and female birds, and the drakes were already decked in their breeding colours, and looked very smart as compared with the more soberly coloured ducks. They were a most lively party, continually on the move, turning tail upwards in the water as they tried to reach the bottom of the fleet, and every now and then breaking off the business of feeding to chase one another. Their most favourite action seemed to be to fly up into the air two or three feet, and then to fall into the water with a flop and splash, going right underneath. All the time they were playing they kept uttering a short sibilant whistle, and male and female joined in the play.

The Wigeon, again, is a bird which, according to the shepherds, has nested formerly, but not of late years, in the district. It is a bird which they know thoroughly well by sight, and of which also I have seen young ones of the year amongst mobs disturbed in early September. I have similar notes, as of the Teal, of flocks seen along the fleets in the winter; and also of a small party of them swimming on the estuary at high tide one February day. On the same day I heard the shrill, long-drawn cry of the male on one of the fleets several times; and I have heard a mob, when flying, uttering all the time a soft whistling note. But, again, my notes in the spring do not take one further than the end of April, through which month I always come across one or more pairs in various parts of the marsh. I am aware, of course, that all authorities rule out any portion of the South of England as a nesting habitat of this bird. But given pairs already mated in the district in the early spring, and sufficient quiet and want of disturbance, there seems nothing inherently impossible in the idea of the bird becoming a breeding species.

With regard to the Garganey and the Pochard, I feel absolutely certain that there were more than one pair of each of these species nesting in parts of the marshes last year, and that it is

only a question of having longer time to give to watching them, or perhaps the assistance of a good dog, in order to have the confirmation of seeing their eggs. Taking the Garganey first, I believe one of my shepherd friends has already found this bird's nest; for such I take to be a nest of eggs laid by what he described as a "small pale blue duck about the size of a Teal," which he found one year in the rough grass near the edge of a fleet. Apart from this, however, my own notes of the bird through last spring make me quite certain that it was breeding somewhere in the district. My first entry is dated April 16th, when I disturbed three of the birds from amongst a bed of reeds. On May 13th, and again on May 18th, I saw *single* birds, swimming on two different waters of the marsh—an observation pregnant with possibility of a sitting mate somewhere near. There is one field covered with a good bit of coarse tussocky grass, which I have in my mind as being the nesting-ground of one pair. My exploration of this meadow was prevented by a very obstinate shepherd, with whom I could not manage to get upon friendly terms; and, rightly or wrongly, I lay the blame to his door of not having been able to confirm my suspicion as to the nesting of the bird. I am hoping next spring, either by diplomacy or strategy, to get the confirmation required.

The Pochard is a bird that seems also to be unknown to the shepherds. It is, however, a sufficiently distinctly marked bird, and, although I only noticed it for the first time to any extent last year, I then had some very good opportunities of watching it. But I have an egg, hurriedly taken (April 19th, 1904) when bound by time to catch a train, which I believe to be a Pochard's egg. The nest was in rushes close to the edge of the water of a wide shallow dyke. There were seven eggs in it, but no downy lining. The duck, as it flew off, had the appearance of being dusted over the back with flour. The peculiarity of its appearance made me take one of its eggs as I hurried along to catch my train. Unfortunately, I was unable to get back to the site of the nest again that spring, and so did not get any more definite observations concerning it. But my notes of this year are definite enough to prove the bird to have been nesting somewhere in the district last spring. In the middle of April I

watched for some time a party of about half-dozen males and females. Although disturbed twice, they returned again to the sheet of water on which I first found them. A thick-set duck, somewhat smaller, or shorter than a Mallard when in flight, its red head, black gorget, lavender-grey body, and black tail-quills make the drake an easy bird to identify. The ducks flying with them looked a very sombre brown in their contrast to the light grey body-plumage of the drakes. In flight the birds utter a curious note, bearing no resemblance to the quack of a duck. My own attempt at the phonetic spelling reads "quer-r-r-k." To see one of the drakes on two later occasions, when I again visited that particular sheet of water, the second or third weeks in May, dozing peacefully on the surface of the centre of it, seemed to me sufficient proof that its partner was sitting in some secluded corner near by on a full clutch of eggs.

Passing from these possible breeding members of the Duck family to those three species of which I have actually handled eggs, the Mallard, as may be supposed, is the commonest of them. A resident species all the year round, it may nevertheless be an open question whether those flocks seen upon the river and the marsh waters during the winter necessarily contain amongst them the birds which pair in the spring. Whether that be so or not, there are at any rate many more birds about at that season than have ever nested in the district, and a large proportion of the flocks must be winter visitors which scatter and leave in the early months of the year. It is not necessary to go much into detail as to the nesting of this species. There is a considerable breeding population, which does not by any means confine itself to the marsh-levels. Indeed, one keeper informed me that more pairs nest on the uplands than on the low ground. A good many take shelter for this purpose in one or two rough pieces of woodland, making their homes under bushes, in much the same sort of site you would expect a Pheasant to choose. I had one quite startling experience of the variety of positions chosen by them. A very bulky Magpie's nest at the top of a tall stout blackthorn (a characteristic feature of one piece of woodland) excited my curiosity by the wide openings at each side of the canopy of sticks, and by some white feathers projecting over the edge. The blackthorn was something like twenty feet high,

and the nest was in the very topmost twigs. Without a thought of Wild Ducks in my mind, I made my way to the top somewhat painfully, on account of the strong, large, and very sharp thorns which covered the tree in profusion. As I put my hand over the edge of the nest the bird flew off almost in my face, seeming such a giant of a bird as it flapped about, that it was not till it had got clear of the tree that I collected myself sufficiently to see what it was. The nest contained ten eggs already very hard sat on April 24th. Of course, there is the old problem to solve here, as to how these young ducklings would reach the ground in safety. A shepherd living in a house on the marsh-levels told me this year (1906) that for two successive seasons a pair of these birds had nested on the ridge of a haystack near the house. He is confident that their method of getting their ducklings down from such places is of the simplest. The day after all the eggs are hatched the duck, according to his account, leaves the nest, flies down to the ground underneath, and starts calling to its progeny. The latter hear the call, and, in obedience to the instinct to follow it, or go to it, simply tumble down over the edge of the stack on to the ground. He says that he has watched the duck standing on the ground calling like this, and, although not near enough to see the ducklings fall, has shortly afterwards seen the brood following the parent bird down to the water. Falling over the edge of a haystack on to grass or litter is, however, a comparatively easy method of making a start in life for the young ducklings as compared to tumbling through the numerous prickly branches of an old blackthorn-tree. My sympathies certainly go out to the brood in the Magpie's nest, which must have had a most thorny introduction to the struggle for existence. The most usual site chosen, taking my own experience as a basis, is the centre of a tussock of grass or rushes close to water. One somewhat unusual nest I found was right in the centre of an open space covered with the stumps of cut reeds. A raised platform had first of all been made with bits of reed, and on the top of this had been formed a circular wall of down fully nine inches high. With the bird sitting on it this structure looked like a mound raised some twelve or fourteen inches above the flat ground. It is also somewhat unusual to find the nest, when made, on the marsh-levels, anywhere except

near to margins of water. The nest just described was some distance from water. Another one of quite a different type I found in the centre of a meadow of rough grass. In this case the bird had scratched out a hollow in the ground in the centre of a very thick bunch of grass. The hollow was lined with grass-stems, and the down formed a thick top covering. The bird was off this nest when I found it, and the down was drawn right over the eggs. It was exceptionally dark, almost black, in colour, and on that account was very far from being an aid to concealment, looking, in fact, like some black furry animal lying in the grass. The bird, however, when sitting on this nest, was very difficult to see, as it sat low in the grass, which drooped over it so much as in a great measure to conceal it. Favourite nesting-places also are certain floating islands of aquatic vegetation, which are numerous in some of the fleets. The nests made in these spots are somewhat after the type of the last one described. I think it is fairly certain that the bird does not start to make the downy portion of its nest until after the full clutch of eggs is laid, and it has begun to incubate. I have watched the layings in many nests, and they have always borne out this theory. The down is really just an outer covering quite separate from the nest-hollow, holding itself together by the nature of the filaments, and worked by the duck from the outside margin of the nest to the centre. If you find a nest with a covering drawn over the eggs, which is the natural way for the duck to leave it, you will always be able to separate the down from the centre without breaking its coherence, and you can push it back round the outside edge into a circular ring. You can then draw it together again with your fingers into the exact state in which you found it; and there is little doubt that in doing so you are doing with your fingers exactly what the bird does with its bill. My notes on the laying of the eggs point to one egg being laid each day until the clutch is completed. In the late spring you may often come on broods of the ducklings feeding with the parent birds along the ditches. Upon such occasions the whole family will often lie absolutely still upon the surface of the water amongst the growth at the edge of the ditch, putting all their trust in their protective coloration. The old bird generally lies with its head stretched out along the surface of the water. When

they see for certain that they are observed, different tactics are made use of. The parent bird generally attempts the imitation of a wounded bird, while the young ones dive and scatter in all directions.

My notes on the Shoveler are all dated between the beginning of April and the end of June. As far as my own observations go, the bird only comes into the district for the purpose of nesting. I should not care to say that the species may not be present amongst the big mobs of ducks on the estuaries in the winter; but I have never seen them at that time along the fleets. They are a duck easy at once to identify upon the wing by the difference in the proportions, as compared to other ducks, of the comparative size of the head and body. The drake Shoveler in the spring time may be further distinguished from the Mallard by the bright chestnut band across its lower breast showing up plainly against the pure white, and also by its deeper, more abbreviated, and rather subdued note, which might be syllabled perhaps as "t-o-o-k." In the first two weeks of April these birds become conspicuous in the marshes, almost invariably in pairs, standing on the banks of the dykes, or running in the meadows with alert movements. When disturbed they circle round with a very swift flight, and it may then be noticed that they have more sharply pointed wings than the Mallard, and swifter and less lumbering movements. Sometimes the first pair disturbed will be joined by another, and the quartette will circle many times round, coming down often as though to settle, then rising again and doing another turn before finally alighting. By the middle of April they have begun nesting operations, and are not then nearly so demonstrative or apparent. They evidently begin laying soon after the first week in April, for on the 19th of that month I have found a nest containing eight eggs, which would mean that laying had commenced at least eight days sooner. Close sitting possibly does not always follow directly the clutch is completed, because in the case of this nest, although eight eggs were the complete clutch, yet the brood was not hatched out on May 13th—*i. e.* twenty-five days later—the bird being at that date still sitting on the nest. On May 18th the brood had gone off. Summarising my notes on the nests of this duck, gathered from the examination of six

nests in 1905, and five more in 1906, it appears that the bird keeps to one definite method far more than the Mallard does. Nearly always at some little distance from water, out in the middle of a meadow, where last year's dry grass is still standing so as to afford some little cover, it will scratch a cup in the soil, some five inches in diameter and four inches in depth. This it lines thickly with grass. As in the case of the Mallard, it lays—at any rate its first few eggs—without making any covering of down. A nest with four eggs, found on April 16th, 1906, had no sign of down about it. The nest-hollow being made generally amongst the standing blades of last year's dead grass, as the spring advances, fresh grass grows rankly under the shelter of the old growth, and so helps to conceal the sitting bird. The downy covering is made after the same style of pattern as that of the Mallard. A peculiarity worth noticing is that both birds get a considerable amount of little short pieces of dead grass mixed up with the down. This grass appears as if it has been broken up into pieces by the bird itself, and, if so, this mixture with the down might perhaps not be accidental, because its entanglement is a distinct aid to holding the down together. Watching these nests, as I got opportunity—more especially during 1906—I found that the eggs were always covered by the down being drawn over them when the bird left its nest of its own free will. The eggs on such occasions were always very warm; in fact, the thick covering of down must be one of the best natural non-conductors of heat that could be improvised. Owing to the shadow cast by the long blades of grass these down-covered nests are not easy to see, passing, under careless observation, for rough clods of soil amongst the grass-stems. If the bird has commenced incubation it sits very closely on its eggs. I have stood right over one for some minutes, watching it; its head and beak were turned back over its shoulder, and its bright eyes were fixed upon me the whole time. It seemed to be able to depress itself amongst the grass-stems in quite a wonderful manner for such a comparatively large bird. The grass having already begun to get long, it might have been easily passed without being noticed. When the sitting bird is disturbed it invariably brings into play all those well-known devices of fluttering along the ground in pretence of

being maimed, in order to draw the intruder away from its nest. Then the characteristic proportions between the head, with the long wide beak, and the body are very apparent; and, further, as it flutters along with outspread wings, you can always see distinctly the patch of pale blue feathers on the carpal joints of the wings. When it is disturbed the bird stays a long while away from the nest. My own time is generally too limited to watch them back. I have, however, watched upon occasions for three hours in vain. After fluttering away the duck rises in the air, and is almost at once joined by the drake, both circling round together, sometimes calling at the same time, and finally disappearing to some other part of the marsh in order to allow time for the intruder to go away. In these marshes Carrion-Crows are the chief enemies of both this species and of the Mallard. In 1905 they seemed to be particularly unfortunate in this respect, as I found no fewer than four nests in which the eggs had been sucked. In 1906 they were more fortunate, in so far as they came under my observation. Four out of the five nests I watched were hatched out, because late in the summer, when I visited them, I found the egg-shells of the hatched eggs trodden down into the bottom of the nest-hollow.

The Sheld-Duck, locally called "Bar-geese"—a resident all the year round—spends the winter months generally on the estuaries, and on the mud-flats when uncovered by the tide. But while during spring the only individuals of the other species of duck which remain in the district seem to be occupied in the business of nesting, large numbers of non-breeding Sheld-Ducks stay in the vicinity all through the summer, still being seen feeding on the ooze in flocks at the same time as breeding pairs will be scattered over the meadows of the marsh-land. Doubtless this is one of those species which take two or more years to come to maturity, and the flocks in spring are perhaps composed of immature birds, only the older ones taking up the responsibilities of wedded life. It is worth while to mention an interesting observation which goes to prove that the very striking plumage of this bird does not necessarily make it so conspicuous as might be supposed. Roughly, it might be described as being a piebald bird. Its plumage is boldly patched with white and black and chestnut, but at a distance the markings do not

appear as colours, but simply as light and shadow. A party of a dozen or more of these birds which I was watching one winter's day swimming in the rough water at the edge of the tide was most difficult to distinguish, owing to the fact that the light and dark patches of plumage corresponded almost exactly with the bright lights and deep shadows of the broken water. The further fact that I was once deceived into supposing that some white pieces of stone lying on the bank were Sheld-Ducks illustrates another way in which this striking plumage is an actual aid to concealment ; for, if the bird happens to be standing with a dark coloured background behind it, the dark patches will blend, at certain distances and under certain conditions of light, with the background, and all that will be visible will be the light or white patches of plumage, which bear absolutely no resemblance at all to the shape of the bird. The contrary effect takes place when the conditions are reversed. The light patches will blend with the light background, and the dark portions of the plumage then show up in the same way, as something that does not look at all like a bird. This gives a working theory as to protective coloration which may be applied to many more birds than the Sheld-Duck, and it is one worth while keeping in mind by the student of bionomics. It is especially interesting because it points to the possibility of markings which at first sight might be considered as militating against a species, being really a protection to it under several distinct sets of conditions. But, notwithstanding all this, a Sheld-Duck standing in the centre of a meadow green with the spring growth of grass is a sufficiently striking object, and one which may be often seen on these marshes from the end of March onwards through the spring and summer while their nesting operations are in progress. In the raised banks formed by accumulations of bottomings from the ditches there are in many places rabbit-warrens of considerable size, and the burrows are what might be called the natural site in the district for these birds to choose for their nursery. During my first day spent on these marshes a shepherd informed me that Bar-geese nested in the rabbit-burrows, and, although I have not myself found any nests in them, several of my shepherd friends often do so ; in fact, they generally take a clutch or two of eggs every year for some of the neighbouring farmers, who hatch them out

under hens, and thus obtain an ornamental addition to the denizens of their farmyard. On an island in the old moat surrounding Cooling Castle, I have seen large numbers of wild Sheld-Ducks, attracted by a number of pinioned birds of the same species, sitting about quite fearless of the passers-by along the road within thirty or forty yards of them. But a much more interesting nesting-site than the burrows, showing as it does the adaptability of these birds to novel circumstances, is supplied them through the preservation of Hares for coursing. In order to give the Hare either a refuge or a chance of escape, long drain-pipes have been laid in some of the higher banks, or in any conveniently raised mounds in the meadows. These pipes, which measure from six to nine inches in diameter, are generally about eighteen feet long, open at both ends, but with a bend in the centre, so that one cannot look straight through them. Sometimes there are shorter ones, which run straight in with one end blocked. It is these blocked-up pipes which the Sheld-Ducks of the district more particularly favour. Of three nests which I examined during the spring of 1906, two were made in blocked-up pipes, at the end farthest away from the light; and the third one was made in one of the pipes open at both ends with an angle in the centre. The blocked-up end of the pipes is generally not very far from the surface of the ground, and with a little ingenuity or perseverance it is generally possible to make an opening near to the nest. The first nest I found on May 12th had fourteen eggs in it, three of which I blew, and found to be quite fresh. They were laid right on the bare earthenware pipe, with no down or feathers about them. This nest was quite close to a shepherd's house, where the birds have nested for several years in succession, although the shepherd often takes a clutch of eggs from it for his employers or friends. The remaining eggs of this clutch were taken by him a few days later for the same purpose. The second nest was in a pipe situated in a secluded part of the marsh. The bird was sitting on this nest when I found it, while its mate was standing in a meadow some hundred yards away. Looking in at the open mouth of the pipe I could see the white breast of the bird as it sat on the eggs at the far end. As it caught sight of me it started hissing somewhat after the manner of a goose. A few

sods moved at the back end made it take its departure very hurriedly, running along the ground some distance before taking wing, when it was immediately joined by the mate, both uttering the half-bark, half-cackle, which their cry resembles, as they flew out over the river. This nest had ten eggs in it, which were quite fresh, and were also laid on the bare pipe, with no feathers or down around them. The third nest I did not examine in the spring, but I was told of the bird having been seen going in and out of the particular pipe in which the nest was situated. In early September I looked at this pipe, and found a great mass of down at the bend in the centre of its length. It may be concluded from these observations that this bird, also, does not start to pluck its down for covering the eggs until after the full clutch is laid, and steady sitting has begun. The eggs in the two nests first mentioned differed enormously in size; three which I took of the clutch of fourteen measured as follows:— $2\cdot70$ in. \times $1\cdot95$ in., $2\cdot75$ in. \times $1\cdot95$ in., and $2\cdot70$ in. \times $1\cdot95$ in. The two which I took from the second nest measured only $2\cdot55$ in. \times $1\cdot75$ in., and $2\cdot50$ in. \times $1\cdot75$ in. I should be inclined to assume that the smaller eggs were laid by the younger bird. I believe the eggs of the Mute Swan and domestic Goose also vary in size according to the age of the bird. On June 15th, 1902, I came across a young brood of these birds with their parents, swimming along the centre of one of the widest of the fleets. My attention was drawn to them, as so often is the case, by the excited behaviour of one of the old birds which I took to be the male. It started flying round me in circles near the ground, evidently in a great fluster, every now and then settling in the meadow, and running quickly and actively away from me. I was walking along the edge of the fleet at the time, and of course I at once began to search in other directions than that of the excited bird for the cause of its behaviour, and then I saw the other old bird with seven youngsters swimming round it. The young ones had a most curious appearance, from the markings of the down looking at a distance like black and white transverse stripes. More close inspection with the glasses seemed to point to the patches of black and white of the down corresponding very closely with what would be the markings of the mature bird. My sketch of these young birds made at the

time differed somewhat from the sketch given in 'The Zoologist,' 1903, p. 131, by Mr. J. H. Gurney. Passing back in the afternoon of the same day, I again saw this interesting family near the same spot, and the male once more went through the same series of evolutions to draw me away as in the morning.

The members of these three species of ducks breeding in this district are, I think, on the increase. The Mallard has probably always been common as a nesting bird, but I believe that the Shoveler has only become a breeder here during the last five or six years. My first note of seeing the bird in spring was in 1902; they have certainly increased in numbers greatly during the last two years. The Sheld-Duck perhaps has bred in small numbers for some time. I have been told all along, by shepherds and farmers, of birds nesting both in the pipes and in the rabbit-burrows; but I am certain that the numbers of nesting birds, of the non-breeding birds, and of the winter flocks have all increased during the last three years.

A matter of some interest in connection with the nesting of various species of ducks is the identification of them by means of the down with which they cover their nests. Amongst this down there is always—I think one may say invariably—some admixture of small breast contour feathers. In my opinion these latter feathers are a much safer guide to go by for identification than the down itself. In the three species in question these small feathers from the breast have very distinctive markings, as may be seen from the accompanying Plate II. Of course, the Sheld-Duck's nest is identified easily enough without any such aid as this, but still it is interesting to compare the three feathers together. In the Sheld-Duck the feather is a very pure white, with the tip shaded with sepia, so dark as to be almost black. The depth of this coloured tip varies somewhat. Occasionally it is nearly lost through abrasion, and more rarely absent altogether, the feathers being then pure white all over. There are also a very few French-grey feathers of the same shape amongst the down. In the small breast-feathers of the Mallard the dark strip in the centre is deep umber in colour. This dark strip always runs out to the very end of the web. It sometimes widens out at the base so as to be hastate in shape. The rest of the feather-web is a dirty white. In the Shoveler

these feathers have a very deep umber or almost black spot in the centre of the web, leaving a pale margin all round. The fluffy part at the base of the quill is whitish grey, but the margin of the web surrounding the dark spot is a warm chestnut. As far as my experience goes, there can be no possibility of confusing the small feathers of the Mallard and the Shoveler, and I have never yet found a nest of either of these species which had not some of the breast contour feathers amongst the down. The average size of these feathers corresponds to the size of the bird, the Sheld-Duck's being largest, the Mallard's next, and the Shoveler's least. From an examination of the down itself, which, of course, forms the bulk of the covering of the nest, you find that every particle of down consists of a minute abortive quill, sometimes not much more than a scale of epidermis, from which radiate numerous filaments equivalent perhaps to the barbs of an ordinary feather. These are again branched through their whole length with what may be called barbules, the latter themselves being furnished with nodules, taking the place of the ordinary barbicels and hooklets. As regards colouring, the Sheld-Duck's down is a greyish white, with a touch of lavender. The Mallard's and Shoveler's downs are both a deep umber-brown, with a pale centre verging on dirty white. Normally the Shoveler's is of a much darker brown than the Mallard's, but in the case of a Mallard's nest, which I have described earlier (p. 51), the down was much darker than that of any Shoveler's that I have seen. Therefore, as regards colour, these two downs are very apt to be confused. There is still, however, another means of differentiating them. Each particle of down, if you lay it on a flat surface, will, roughly speaking, form a fluffy sphere. That of the Sheld-Duck is much the largest and most voluminous of the three, and measures approximately 1·7 in. in diameter; the Mallard's comes next, measuring 1·3 in.; and the Shoveler's is the smallest, measuring 1·1 in.

OBSERVATIONS TENDING TO THROW LIGHT ON THE QUESTION OF SEXUAL SELECTION IN BIRDS, INCLUDING A DAY-TO-DAY DIARY ON THE BREEDING HABITS OF THE RUFF (*MACHETES PUGNAX*).

BY EDMUND SELOUS.

(Continued from vol. x. p. 428.)

April 23rd, 1906 (cont.).—1.15 p.m. The brown bird and one other—a recognized *habitué*—is now back. The latter soon goes, but the brown bird stays on alone, and has now been here twenty-five minutes. Shortly afterwards he leaves too.

It is curious that with all the excitement—especially in the last instance—which the presence of the Reeve has caused, though there has been some desultory sparring, yet no prolonged or embittered duel has taken place in it. I cannot, from my own observation, thus far, say that she is the *teterrima causa belli*, though she certainly has been of general commotion.

Looking out, again, at 2.30, I see the brown bird, alone, on the meeting-ground. At 2.50 the other *habitué*, mentioned before, is back, these two being the only ones, till 3, when another, which I also recognize, flies in.

The brown bird, now, on the arrival of two or three other ones, not only flaps his wings, stretching up on tip-toe, as they circle round, but at last rises and hangs hovering in the air for a little.

3.45.—There are now some six or seven birds, when a Reeve arrives. All but one sink, forthwith, upon the ground, and remain there prostrate, whilst she stands in about the centre of them quietly preening herself. The one Ruff who does not prostrate himself, but stands indifferent, has his feathers hardly at all grown. Amongst the others, after a time, there is a little bustle about, and then another, but with no real fighting. After each they sink down again, but seem now to be pretty much at

their ease. Still it appears evident that they are in a state of real, though suppressed excitement, and the bustles are repeated, from time to time, without any independent cause—such, for instance, as the arrival of other birds—though when several more do fly in there is, naturally, a commotion. Amongst these there is the one that was caressed, several times, by a Reeve yesterday—whether she was the one now here I cannot say. He is not caressed now, however, nor is any other Ruff, and after a while the Reeve, followed by most of them—he included—flies off. In about five minutes she returns alone.

The fighting, on those occasions when the birds make their little bustles as I have called them—little runs or turnings whilst still crouched to the ground, and either close about the Reeve or yet, seemingly, with reference to her—is of very short duration—a spring or two, which is often hardly more than a threatening, and all is over.

Most of the Ruffs that went off, a little while ago, with the Reeve, have now come back, but, before long, she leads almost all the flock off again. There are now, at 4.20, only four remaining, the brown bird and his former companion making two of them. Several times, after a blank space, these two have come and stood or sat alone, and they must, I think, spend two hours to most of the other's one upon the ground, and an even greater proportion than that to the time that some of them spend there. The most interesting evidence of superior attachment to the meeting-ground on the part of some birds to others, was the persistency with which this same brown Ruff—he is the only one brown all over—stayed there, and returned again, shortly, whenever he left, when no other of them would, for a long time, alight, or stay more than a moment or two, if they did.

April 24th.—Get to my watch-house about 3.15 p.m., putting up four birds, two of which are the brown one and that other *habitué*. After a time a Reeve arrives, all the Ruffs sink down in the orthodox manner, but one rises very soon, and is now standing with head turned back, and beak amongst its back feathers. All at once two birds bounce up and dash at each other. It is over, however, as usual, almost ere well begun, and another sudden commotion hardly leads to a fight. All this might have happened without the Reeve, and a fight which took

place before she came was much more protracted. All now fly off with the Reeve, but in less than a minute most of the Ruffs come back without her.

At a little before four a Reeve flies in, and immediately, on alighting, runs over the course to the brown bird, who stands on the opposite side, and I believe touches him on the head or neck with her bill. This, however, I could not quite make out, but, almost immediately, she was crouched in front of him, and he, rising up,* the nuptial rite is either performed or attempted. I should say the latter, for, at quite short intervals, now, the same thing is repeated four several times (making five in all), after which there is a longer interval, the Reeve standing by her brown bird. When she moved on these occasions, preparatory to the rite being performed, all the Ruffs frowned about on the ground, turning to this side or that, but whilst it was actually taking place—at least on the earlier occasions—they lay still in the curious prostrate attitude which is such a feature of these gatherings. After the fifth coition, or attempt at it, another Reeve flew in, and, going up to a handsome blue-gorgeted Ruff, with just the same assured manner in which the other had approached the brown one, touched him with her beak upon the head. Neither, however, did he rise, nor did she crouch, as in the other case. She remained standing by him, and, a little while afterwards, went over to the brown Ruff, but whether with any design or merely as walking away I cannot feel sure, though I thought at the time that she had a motive, which, in itself, seems likely. At one time both the Reeves were close together beside the brown Ruff, and it was just then that two more pairings took place between one of them and the latter. There was so much bustling about of other Ruffs at the time that I could not say for certain which of these two Reeves it was that acted, on these occasions. I believe, indeed, it was the same bird throughout, but this is hardly more than an opinion.

After each of the last pairings the brown bird made a rush over the course, and sprang at some other one, but the fight was almost instantly over—a mere violent leap or two. At these times, also, there was general excitement and running about leading to some other encounters of a similar character. Harder

* He had, I suppose, sunk down at her approach.

fighting than this there was not, nor, as I say, was there any interruption, by any other bird, of the nuptial rite.

About 4.15 the two Reeves, with all or most of the Ruffs—some nine or ten perhaps—fly off, the Ruffs only returning, in a very short time. At 4.25, however, one Reeve returns, and, after standing for some time, quietly, always by the brown bird, the rite is again either performed or attempted. That it is the same Reeve who had first selected this bird I have little doubt, and I think, too, that I recognize her. She has yellower legs, and is a prettier bird than the other. Thus there have been eight pairings in all, seven of which were in quick succession, if we do not suppose that some, at any rate, were attempts merely. This I am inclined to conclude from the time occupied having been so extremely short, besides that the general appearance seemed often that of an unsuccessful attempt. This is not, I think, a matter of no moment, for the more difficulty there may be in the performance of the sexual act the more necessary becomes the co-operation of the female, and from a state of things such as this one would expect developments to be along the lines of the male's conciliating rather than hectoring over or bullying her. Only had the male special organs of prehension, or some other sure means of making his will valid, might we expect otherwise. However, we should assume nothing, but get evidence.

The attitude of the Ruff just before the performance of the rite was very striking. Bent almost in a semicircle, with head and tail touching, or nearly touching, the ground, his wings half outspread, and drooped, he seemed full of fire and conscious importance. This attitude was continued during the rite itself, and in its ample, proud cloak, so to speak, the little Reeve was covered up and almost lost.

4.50.—Four birds, after the usual stretching up and wing-flapping, in view of fresh arrivals, rise and hang fluttering in the air at different heights a little above the assembly-ground. The arrival having been delayed, this took place again, but with three birds only, one of the four having flown off. Then a Ruff flew in, and afterwards a Reeve, who, however, stayed but a minute or so.

I write the above outside my plaid, and, turning my head

inside it, again, I see a number of Ruffs, newly come in, and one Reeve, if not two. If two, however, one soon flies away. This Reeve goes to no bird in particular, and there is no rite. The behaviour of the Ruffs, during her stay, is interesting and significant. Pressed to the ground in the usual manner, they seem all to be awaiting in a state of suppressed excitement something that will, or may, take place. At intervals, however—sometimes owing to some slight motion on the part of the Reeve, sometimes without this incentive—they all frounce about, still hugging the ground, in the way I have described; then, rising, dart about over the course, sometimes springing at one another and sparring a little—but this is quite subordinate. Several may press about the Reeve in a way difficult to describe—indeed, it is all difficult. It indicates strong sexual desire, but the power of initiation seems wanting. In fact, they seem—and everything, up to the present, points to the fact that they are—governed by the consciousness of being able to do nothing without the co-operation of the Reeve—she must first signify her wish. Of display there is something, but it is not such a set or formal display as in the case, for instance, of the Pheasant or Pigeon—excitement seems to hinder this. The best example of it is when a bird, darting, first, right away from her, turns, and, darting back, again, right to her side, with ruff swelled out, and wing (I think on her side) drooped, seems, for a moment, as though he would overwhelm her with his gallant show, but, the next, sinks prostrate at her side, and remains thus glued to the earth. Though highly desirous, in fact, the birds seem to know that they must wait, and to fear to dare too much; there is a suggestion of enforced submission, an “*I would, an if I could*”—the tempest is contracted, each wave seems to fear to break. For the Reeve, everything about her, her every action—still more her inaction, her easiness, and unconcern—suggests that she is complete mistress of the situation, that every Ruff on the ground is absolutely dependent on her will. In fact, she seems the plain and unconcerned little mistress of a numerous and handsome seraglio, each member of which, however he flounce and bounce, can only wait to be chosen.

The pairing, then, has now commenced. Yet only two Reeves have come to the place from 3.15 to 7.30, and whether both or

only one of these (as I am inclined to think) has paired, in either case it is with only one bird out of some nine or ten, perhaps, that were there, at the time—fourteen or fifteen, I think, being the full number of the Ruffs that came in during the afternoon. If this is a criterion of the general course of things, one would think that the majority of the Ruffs must suffer from enforced celibacy, and this would account for such sexual aberrations as I have before mentioned, and a further example of which took place this afternoon, a certain male, upon three or four occasions, coupling, to all intents and purposes, with a certain other one. This was during the second visit of the one of the Reeves, and in the height of the excitement consequent upon it.

About 6.20 a Reeve—that one between whom and the brown Ruff the rite has several times been performed—flies in. This time the actual wooing of the males is more marked. Several press about her, ruffling their feathers, and one in particular—a handsome blue-ruffed one—the *habitué* I spoke of, and who has before been distinguished by female attention—presses more than once against her. She, however, is not moved by any, but when the brown bird comes up it is different. Now, however, there is interference, and the pairing, which I think would otherwise have taken place, is prevented. On one occasion, just when it seems about to be, a Ruff, almost devoid of nuptial plumage, runs up and gives the successful lover a peck. On another he has to fight with this or that bird whilst the general hurly-burly about the Reeve is greater. Thus things cannot reach their goal, and the Reeve, quite impervious to the charms of any other about her, stands, now, quietly, and looking quite unconscious, by the side of her own brown bird. At 6.40 she flies off, some of the Ruffs having gone before. I forget if any accompany her—one or two do, I think—but the brown one, at any rate, remains.

(To be continued.)

NOTES ON THE ARCTIC WHALING VOYAGE OF 1906.

BY THOMAS SOUTHWELL.

THE year 1905 being the twenty-fifth consecutive issue of these whaling notes seemed a convenient period for their discontinuance, but there are certain features in the venture of the past season which are of exceptional interest, and which induce me once more to ask your indulgence.

I may at once say that the voyage for the crews has been one of great hardship, and of heavy loss to the owners of the vessels. It is only the very high price of whalebone, of which there is a great scarcity both in Scotland and in America, which has in some degree helped to meet the expenses of the four vessels which have been partially successful.

In Davis Strait, which has for a long time been the only profitable resort of the Scotch whalers, only two medium Whales have been killed. This has been owing to the long-continued easterly winds having so compacted the ice that the vessels were unable, for the first time since the year 1878, to penetrate the pack in Melville Bay, and thus were excluded from the "north water," and the favourite resorts in the neighbourhood of Lancaster Sound. The summer fishery in the "middle waters," generally a sure find, was also rendered impossible. The result was that the 'Eclipse,' 'Diana,' and 'Windward' were clean, and the 'Balæna' and 'Morning' only procured one Whale each, yielding 15 cwt. of "bone" respectively.

From Hudson Strait the 'Active' reports that the month of July was characterized by strong winds, accompanied by rain and snow; she reached the mica-mines on 4th of that month, but was unable to force her way through Fox Channel, which was blocked by ice, and devoted the rest of the month to Walrus hunting, of which she killed some three hundred and fifty. On the 23rd she killed her only Whale, a small one of but 3 cwt. bone. The heavy ice preventing the vessel reaching the settlement in Lyon's Inlet, the men whose turn it was to be relieved

only reached the ship after five days' journey over water and ice, and the substitutes and stores landed on Sept. 12th in Repulse Bay had to be conveyed in the same tedious and exhausting manner on the return journey. After again visiting the mica station the 'Active' bore up for home on Oct. 7th.

Another remarkable feature in the past season is the fact that for the first time since the year 1899 Whales have been killed in the East Greenland Seas, Capt. Robertson, of the 'Scotia,' having captured four small fish, yielding in the aggregate 40 cwt. of bone. From this there seems reason to hope that these valuable animals are still present in these seas in greater numbers than was suspected; they are so dependent on glacial conditions that their absence may be more apparent than real. This was illustrated to a remarkable degree in the season of 1888, a most interesting account of which voyage, from the pen of Mr. (now Dr.) Robert Gray, appeared in your pages in the first three months of 1889. Although Whales were seen in abundance to the end of May, early in June the swell from the south-east broke up all the floes, and the Whales disappeared, only four being killed by the five vessels present (*cf.* Zool. April, 1889), three returning clean. Capt. Robertson remarks that "when we get a tight pack-edge from 80° to 77° N. very few Whales are caught, and when the margin of the ice is in west longitude it is nearly always hopeless"; and adds: "About the year 1891, Capt. David Gray told me he estimated there were seven hundred Whales in the Greenland Sea. In four seasons since then I have seen a great number of Whales, particularly in 1895, whereas only ten have been caught since that year. The race is certainly not getting exhausted in the Greenland Sea, and never will be. I consider the apparent absence of Whales at North Greenland (during some seasons) entirely due to ice conditions." This optimistic opinion of a man of Capt. Robertson's great experience is certainly very reassuring.

Seven vessels were actively engaged in whaling in the past season, three of which were clean; the ketch 'Queen Bess' is attached to the Hudson Strait station, and the 'Albert' is wintering at Pond's Bay. The total produce was: 7 Right Whales (4 from East Greenland, 2 Davis Strait, and 1 Hudson Strait), 8 White Whales, 534 Walruses, 1264 Seals, 189 Bears, 817

Foxes, 111 tuns of oil, and 73 cwt. of bone. The Seals, Foxes, and Walruses were killed in Hudson Strait, and by the vessels wintering in Pond's Bay. The present price of oil is £23 per tun, and the value of the bone about £2500 per ton. The total value of the produce may be roughly estimated at, say, £18,120.

In Mr. Haldane's account of the Finwhaling from the northern Scotch ports* mention is made of the interesting fact that six Atlantic Right Whales were killed in the past season by the steamers from Buneveneader (in Harris), and I am informed that a considerable quantity of this bone has come into the market, brought to New Bedford by an American whaler, but where obtained my informant knows not ; only a few years ago this species was regarded as all but extinct.

As usual, I have to express my thanks to Mr. Robert Kinnes, and to Mr. Mitchell's circular, for most of the above statistics.

* 'Annals of Scottish Nat. Hist.' January, 1907, p. 13. A large bull Sperm Whale was also killed.

NOTES AND QUERIES.

MAMMALIA.

Albinic *Mus rattus*. — On January 28th a Yarmouth fish-hawker, who is always on the alert to hunt up queer fish and other curious creatures, brought me a most interesting specimen of a freshly-killed albinic *Mus rattus*, the first of the sort I have yet met with. He assured me that he had just taken it from his cat, a procedure she did not much resent, for she had already, that evening, captured two normal-coloured examples of the same species, and had had her fill of them. The Rat was quite uninjured, and by lamplight the coat exhibited the palest *bluish*-white hue imaginable; with eyes, hardly yet dimmed, of the most fiery red. The tail was a creamy white, and slightly less elongated than in *M. rattus* generally, the ears being greyish. The same night I forwarded the Rat to Dr. S. H. Long, of Norwich, who has a fairly good representative series of *M. rattus* and its cousins, including one lately sent him with a patch of white on the breast. The albino (a male) measured as follows: Head, $1\frac{3}{4}$ in.; head and body, 6 in.; tail, $5\frac{1}{2}$ in.—ARTHUR H. PATTERSON (Ibis House, Great Yarmouth).

AVES.

Peculiar Nesting-site for the Wheatear on the Sussex Coast.—In June, 1906, whilst visiting the neighbourhood of Pevensey Bay, I observed several pairs of Wheatears (*Saxicola ænanthe*), which from their behaviour had nests in the vicinity. As there is nothing but long stretches of shingle beach, I could not locate the nesting situation, although I watched the birds disappear and then reappear as if from nowhere. I casually remarked on this fact to a lad who resided in the neighbourhood, and, greatly to my surprise, he informed me that *he* had “built the nesting-places himself, and would show me a nest then and there.” I accepted his offer with, I must admit, some doubt as to his veracity. However, after about a mile’s walk over nothing but bare shingle, he suddenly stopped, and, pointing to a small hole at our feet, not more than $1\frac{1}{2}$ in. square, said, “there’s the nest.” After carefully clearing away the shingle he disclosed three bricks—two laid

side by side about two inches apart, and one covering them, and upon lifting the top brick, there was a Wheatear's nest with four fresh eggs. He informed me that he had several of these "traps"—as he described them—on the shingle, which I understood had been built during the previous winter. I found several more nests later—one with young, in a disused drain-pipe. I think the foregoing tends to show that when birds favour a certain locality they will easily adapt themselves to the surroundings. — P. W. HARVEY (Kilmartin Avenue, Norbury Park, S.W.).

Great Grey Shrike in Dorset.—On the 29th of December last, when out with my son, E. C. Linton, in the parish of Edmondsham, I saw three birds looking rather larger than a Starling, which were quite strange to us, and unknown in the district; and, not being able at once to name them, I sent off descriptive notes to the Rev. W. R. Linton, who passed them on to the Rev. F. C. R. Jourdain. On Monday, the 31st, my son again saw the three birds, and got a nearer view of them, and could distinguish one as being of brighter plumage, presumably a male. With this clearer view of their markings we fixed on the Great Grey Shrike (*Lanius excubitor*) as the bird we had seen. During January E. C. Linton, who had once again, three or four days later, caught sight of one of birds, visited the South Kensington Museum for the purpose of identifying them, and was completely satisfied as to their identity with the Great Grey Shrike. Meantime I had received Mr. Jourdain's opinion that this was the bird we had seen. There are some eight records of this species in the 'Birds of Dorset' (1887), the last of which is dated 1872. At the time the birds we saw visited Edmondsham almost the whole of Britain except the south-west was under snow, and severe weather no doubt drove them to a district where the little snow that had fallen did not lie. — E. F. LINTON (Edmondsham Rectory, Salisbury).

Hawfinch at Ballinasloe, Co. Galway.—A former curate of mine, the Rev. W. Forster, kindly sent me a specimen of a Hawfinch (*Coccothraustes vulgaris*), which he shot near his house at Mount Bernard, Ballinasloe, on 31st December last. He tells me that he "saw the bird twice, with about ten days' interval. It was in exactly the same place each time, outside the drawing-room window on the gravel. There were perhaps two hundred Chaffinches with it, but none others of its own kind. There was a copper-beech overhead. It may have been picking the nuts, though I think it probable it was only picking gravel. I did not hear it utter any note." I sent the bird to my friend Mr. Williams, Dame Street, Dublin, who says that its

stomach contained haws. I have never seen Hawfinches here, but used often when lying in ambush to watch them at Copenhurst, Cheshire, some years ago. They bred there, and were not uncommon. They used to work destruction in the kitchen-gardens—shelling the peas, and ruining a whole row in an incredibly short space of time.—WILLIAM W. FLEMYNG (Coolfin, Portlaw, Co. Waterford).

Bitterns in Suffolk.—During the recent hard weather two Bitterns (*Botaurus stellaris*) have been shot in Suffolk—one at Bardwell, which was preserved by Mr. Travis, of Bury, and the other at Thorndon, near Eye, on Jan. 5th. The latter was shot in the evening by a farmer on his flooded meadows, and taken to the rectory to be identified. The parson, a naturalist-sportsman, was equal to the occasion, and by his good offices it came into my possession in the flesh. It was a female, and, as one might expect after the difficulty it must have found in obtaining food in ice and snow, in poor condition, but in perfect plumage. The rapid thaw on the night of Jan. 1st produced extraordinary floods, turning our low-lying meadows into lakes, and on the following morning I saw Gulls (probably *Larus canus*) where I never noticed any before. The attraction would doubtless be drowned worms. JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds).

Smew (*Mergus albellus*) in Cheshire.—On Jan. 15th Mr. T. Hadfield and I saw a Smew on Tatton Mere. The bird was swimming among a number of Mallards, but its association with them was perhaps only accidental, for when we put the birds up it separated from the others, and went off at a great pace by itself. When we came across it again in another part of the mere it seemed equally indifferent to the Mallards and other fowl which swam close to it from time to time. It was a duck or an immature drake, having a rufous crown, pure white cheeks, and a grey back. The bird swam low in the water, but the pure white of its breast and belly were very conspicuous when it rolled, as a Grebe does, to preen itself. This species is rare inland in Cheshire (*cf.* Zool. 1905, pp. 143, 144). — CHARLES OLDHAM (Knutsford).

Sabine's Snipe in Ireland.—Three specimens of this rare variety have been shot in Ireland within a fortnight—one near Ballina, Co. Mayo, on the 10th December; one in Co. Leitrim, on the 15th; and the third in Co. Clare, on the 20th. The Co. Mayo and Clare specimens are almost identical, having no appearance of the stripes on back and head so noticeable in the Common Snipe; under parts of wings and axillaries sooty black; breast, belly right down to tail,

heavily barred with dark markings; tail very dark, with rich brown bars. The Co. Leitrim bird has narrow stripes down back and head; breast heavily barred with brown, but not so dark as the other specimens; no appearance of white on breast as usual in Common Snipe; altogether an intermediate form between the Common Snipe and Sabine's. It is interesting, if this is a variety and not a species, that three specimens should have been shot within such a short period.—W. J. WILLIAMS (2, Dame Street, Dublin).

Tringa alpina in Northamptonshire.—I have just seen a Dunlin in adult winter plumage, which was shot near Brackley on Jan. 30th.—O. V. APLIN.

Colymbus glacialis in Gloucestershire.—A Great Northern Diver was shot on the Isis at Hempsford, near Fairford, about the middle of November, 1906. Mr. Darbey, who preserved it, informs me that it was in full summer plumage.—O. V. APLIN.

Some Rare Visitors to Bartragh Island, Killala Bay.—The great snowstorm, and three days' terrific northerly gale accompanying it, brought some rare and strange visitors to the island. On the morning of Dec. 30th last my friend Captain Kirkwood, of Bartragh, observing some Geese feeding on a swampy flat between his stables and the sand-hills—taking his glass to examine them more closely—was greatly surprised to see a flock of fourteen Snow-Geese, four white adults and ten greyish-coloured birds that he took to be young ones. Going down to the stables, and concealed behind the gables, he watched them for some time as they fed up to within two hundred yards of where he was standing; so he easily identified them, their black-tipped primaries denoting the species. Captain Kirkwood continued watching them with great interest as they greedily fed towards him, when unfortunately a young dog, suddenly rushing out of the yard, disturbed them, when they rose and flew towards the mainland. Captain Kirkwood suggests that they were two broods with their parent birds, and this is very likely, for some years ago, meeting a flock of Bewick's Swans when out in my punt, I failed to get a shot at them, owing to the watchfulness of a very large old bird accompanied by a pair of grey cygnets. The latter kept close to him, and whenever I approached with the punt he always drew off, uttering a low call, at once responded to by the cygnets swimming up to him, and keeping quite close while he called, while the other birds scattered widely as they swam away. So in this instance of an old Swan taking care of its young ones after their long flight from Siberia, is it unlikely that some old Geese would

not take similar care of their young after arriving in this country from the far north? These Geese had evidently only arrived that morning, driven before the northerly gale, and, reaching Bartragh as the first land they met, dropped down to rest and feed. Another rare visitor was a splendid Snowy Owl, that Captain Kirkwood saw standing on a little hillock among the sand-hills. He watched it for some time, and was amused by the queer appearance of its great yellow eyes as it turned its head from side to side, watching every quarter. He left for a few minutes to send for his gun, but the bird disappeared before his return, probably to conceal itself among the high sand-hills of the rabbit-warren, where it could feed at its leisure on the rabbits. On the 8th inst. Capt. Kirkwood sent me a very fine specimen of the Glaucous Gull in its first year's plumage, which was found dead on the shore, but uninjured, and evidently starved. On Dec. 9th an Iceland Gull passed close by me; and again on the 14th, walking near the shore here, another, or the same bird, passed by me again. On the 20th inst. my friend Mr. H. Scroope, of Ballina, saw an Iceland Gull, with two Herring-Gulls, flying about the river between the two bridges at Ballina; it pitched in a field close to the river, when Mr. Scroope remarked that it was smaller, and of much slighter build than the Herring-Gulls, thus proving that it was an Iceland and not a Glaucous Gull. This bird was in the creamy-coloured plumage similar to the bird I saw on Dec. 9th and 14th, and may have been the same bird that had wandered up the river.—ROBERT WARREN (Moy View, Ballina).

Birds observed at Grindelwald.—In 'The Zoologist' (1905, p. 129), I came upon an account by the Rev. A. Ellison of some birds observed at Grindelwald. I have just been spending a fortnight there, and so perhaps a few more notes might be interesting. It is curious that your contributor does not mention the Raven, a bird which appeared to be abundant. I several times got within fifty yards of them, and, as I am well acquainted with the Raven both in its wild state and in captivity, I do not think I can have made any mistake in identifying the species. They would sometimes feed with the Carrion-Crows by the river. With regard to Blackbirds, I saw three or four, as far as I could see, all cock-birds. I also saw by the river for a few moments a Pipit, but did not have time to identify it. Dippers were common there. I did not go up the Faulhorn, which, from Mr. Ellison's letter, appears to be the best locality. In the chalet in which I was staying there was a fine specimen of an Eagle-Owl, shot at Grindelwald by Herr Boss, one of the proprietors of the Bear Hotel, who also told me that Eagles (mostly Golden) were almost common, particularly in the

autumn, and that there were also Ptarmigan, Black-game, and—I think—Capercaillie to be got. I heard a Woodpecker drumming, the noise being identical with that made by our Spotted Woodpeckers; Chaffinches were common. I was struck by the unusual tameness of the Great Tits—they would fly about inside the balconies of the châteaux in search of food, and also by the number of nesting-boxes hanging up in the trees.—E. F. A. HAY (C. C. C. Oxford).

Westward Movement of Birds during Snow. — Replying to Mr. Ussher's enquiry (*ante*, p. 33), on Dec. 26th last a large number of birds passed south-west over this district, mostly in flocks; they were Starlings, Sky-Larks, and Lapwings. A few small birds (Chaffinches) were moving in the same direction, but only single birds. On Dec. 27th a few Starlings and Sky-Larks, and single small birds, presumably Chaffinches, all flying south-west. Dec. 28th, some flocks of Sky-Larks, besides single birds, and a few Lapwings were passing over.—ROBERT MORRIS (Uckfield, Sussex).

Iceland Gulls in Donegal.—On 30th December last (which was the first day of the thaw following the severe northern blizzards, accompanied by the heaviest falls of snow that have been experienced in Donegal for many years past), I visited Rosbeg, one of the Herring-fishing centres on that coast. Amongst the hundreds of other Gulls that were congregated in and around the small bay to feed upon the fish-offal, I noticed at least three immature Iceland Gulls, and there were probably several others. As to whether the species visits the locality so commonly every year, I could not gain any information.—J. STEELE-ELLIOTT (Dowles Manor, Salop).

NOTICES OF NEW BOOKS.

The History of the Collections contained in the Natural History Departments of the British Museum. Vols. I. & II. Printed by order of the Trustees.

A HISTORY of our great Natural History Museum, written by the officers in charge of the collections, at the suggestion of Prof. E. Ray Lankester, the Director, is a publication that will be read by naturalists in all parts of the world. It records the gradual accumulation of that vast collection of natural objects which it contains, both animate and inanimate, with the sources from which a large portion of it was obtained ; so that it is a clue to the domicile of very many once private collections well known by repute, and now available for examination by students. The receptive process is still in progress, and one wonders what the ultimate contents of this vast biological repository may attain in size and number ; one also cannot refrain from sometimes thinking what will be the condition of the present collection in a thousand years' time ! Will time have dealt so gently with the objects which we identify and study with such loving care, that they may be available to posterity at the termination of another millennium ?

The nucleus of our Museum was the collections of Sir Hans Sloane, and those known under the names of the Cottonian and Harleian, the three being brought together under the designation of "the British Museum," placed under the care of a body of trustees, and lodged in Montagu House, Bloomsbury, purchased for their reception in 1754, and opened to the public in 1759. We read:—"Admission to the galleries of antiquities and natural history was at first by ticket only, issued on application in writing, and limited to ten persons, for each of three hours in the day." Even these visits were limited to a

safe-conduct through the galleries by officers of the house; it was not until the year 1810 that the Museum was freely accessible to the general public, and then only for three days in the week, from ten to four o'clock. Since then progress has been continuous; the fine building in Bloomsbury was completed in 1845, its reading-room in 1857, and the present great Nature's temple at South Kensington was constructed and handed over to the trustees in 1880.

Vol. I. is devoted to the Libraries, and the departments of Botany, Geology, and Minerals. The collection of books, manuscripts, and drawings relating to natural history is certainly the finest and most complete in the world. Botany and mineralogy are outside the purview of 'The Zoologist,' but geology is not, and paleontology is rapidly becoming an equipment necessary to every well-informed zoologist. We can trace the evolution of the paleontological collection. In 1767 we read of the acquisition of some remains of *Mastodon americanus*, and a molar tooth of *M. humboldti*; then each year's acquisitions become more important, and reflect the steady progress of the science. In 1880, 50,000 non-British fossils were received from the Museum of Practical Geology in Jermyn Street. In that year the total number of acquisitions numbered 55,496.

Vol. II. refers to the various zoological departments, and here our interest centres, but our space contracts. In "Mammals" we are glad to see a well-deserved tribute to Dr. J. E. Gray, apart from the question of his taxonomical views. "To his indomitable energy and enthusiasm, in the face of much opposition and discouragement from officials more interested in the Library and Antiquities than in natural history, the early growth and position of the mammal collection is mainly due." We may add that it is not likely to suffer from an absence of these personal qualities under the direction of Mr. Oldfield Thomas. In the section devoted to Birds, Dr. Bowdler Sharpe has contributed at length, and his pages are of the greatest interest to ornithologists. The specimens procured during Captain Cook's voyages have perished; they were inadequately prepared, and "were always mounted." There is, however, apparently one relic—a Tree-Starling (*Aplonis ulietensis*). From similar causes much destruction has ensued to the Montagu

Collection of British Birds. A good story is told of George Robert Gray, described by Professor Newton as a "thoroughly conscientious clerk": "Being continually twitted about his ignorance of birds in the field, he one day hired a gun, and went into Hertfordshire to shoot birds. He was promptly arrested by a keeper for trespassing." The great collection of Reptiles and Batrachians has wonderfully increased even in somewhat recent years. Mr. Boulenger tells us that Dr. Gray, working at the Lizards in 1845, had at his disposal only 428 specimens, representing 152 species. During the years 1882-1886, when Mr. Boulenger revised this group and prepared a catalogue, the number of species recognized by him as valid was 1616, of which 1206 were represented in the Museum by 9820 specimens. The other groups have similarly increased in specimens. In 1858, when Dr. Günther commenced the arrangement of the general collection of Fishes, it contained about 16,000 specimens; "at the present day the total number of specimens in the collection amounts to about 73,000."

When we come to the Insecta the roll-call is astounding, and the amount of work still to be done in identification is enormous. These vast hordes of insect specimens are appalling in number, and it is to the credit of the entomological department that so many have been identified, and the general collection so well arranged by a staff never large, but always enthusiastic. Private collections are continuously finding a home in the National Museum, and when we reflect on the number of insects still unknown and uncollected, the increasing number of our colonists who take an interest in entomology, and the many travellers who collect insects and present them to the nation, approximate numeration fails to afford a conception of what is likely to appear on the stock-taking list of this department in another hundred years.

We await another volume devoted to the natural history collections of the British Museum, an institution of which all naturalists may be proud, and to which the much vexed and now lean taxpayer may give a grunt of satisfaction.

Catalogue of the Noctuidæ in the Collection of the British Museum.

By Sir GEORGE F. HAMPSON, Bart. Published by the Trustees of the British Museum.

THE author of this great descriptive Catalogue of the "Lepidoptera Phalænæ" has now completed his sixth volume, and the third devoted to the *Noctuidæ* of the world. This deals with the *Cucullianæ*, the third of the fifteen subfamilies into which the *Noctuidæ* are divided, 692 species belonging to 111 genera being described in it.

The moths enumerated and described in this volume are to a very large extent Nearctic and Palæarctic in distribution, comprising a number of our British species; and as a thorough revision of the classification and nomenclature has been made, and a full list of habitats given to each species, it demands the attention of British lepidopterists. This latter feature alone would make the book important, for in many, if not in most of the volumes relating to our fauna, the dispersal of the species is not traced beyond these islands, and thus a stunted and inadequate conception is given of their distributional position. At the same time affinities are shown to species lying beyond the limits of our fauna, and thus a greater biological interest can be afforded to a simple collection and identification of our British moths.

Sir George Hampson still maintains his standard of monumental labour and precision, and such labour, perhaps unrecognized by those who prefer some evolutionary speculation, has an importance beyond mere taxonomical technique, and affords the material on which a future evolutionary structure will be raised. We notice that in this series of coloured plates the three-colour process has been discarded, and a reversion to chromo-lithography has taken place.

A Synonymic Catalogue of Orthoptera. By W. F. KIRBY. Vol. II.

Orthoptera Saltatoria (Achetidæ et Phasgonuridæ). Published by the Trustees of the British Museum.

WE heartily welcome the second volume of this excellent catalogue, a compilation that will have the greatest influence in directing and assisting an increased study of the large order of

orthopterous insects. Mr. Kirby applies the name *Phasgonuridæ* to the "long-horned Grasshoppers" frequently referred to the *Locustidæ*, while he recognizes as true *Locustidæ* the "short-horned Grasshoppers," which are as often called *Acridiidæ*, and these latter will form the material for the third and concluding volume of the catalogue. The method and style employed are the same as elsewhere used by this veteran compiler of synonymic entomological catalogues.

A Synonymic Catalogue of Homoptera. By W. L. DISTANT.
Part I. Cicadidæ. Published by the Trustees of the
British Museum.

THIS is a catalogue of the genera and species of that well-known family of insects, so well advertized by the resonant males, and of which only one species is found in these islands. It would be out of place to say any more than that the material for the volume has been collected during many years, and that every endeavour has been made to reduce errors to the smallest compass.

Butterflies of Hongkong and South-east China. By J. C. KERSHAW,
F.E.S., &c. London: R. H. Porter.

WE have received parts i.-v. of this publication, which contains a large amount of observational matter, and is illustrated by coloured plates, which, however, have the dissimilitude of being much smaller than the size of the pages devoted to the text, probably owing to the limited extent in size to which the three-colour process can be applied. We reserve further notice till the completion of the work. It is printed in the East, but can be obtained from the London agency as above.

EDITORIAL GLEANINGS.

IN the 'Annals of Scottish Natural History' (January, 1907), Mr. William Eagle Clarke records a new bird to the British fauna, by the occurrence of the Siberian Chiffchaff (*Phylloscopus tristis*) in Scotland. The specimen was received in October, 1902, from the Sule Skerry Lighthouse, a lonely rock-station situated out in the Atlantic, and some thirty-three miles west of Orkney, where it had been captured on the night of Sept. 23rd in the above-mentioned year.

FROM the Report for the year 1905 of the Fisheries of New South Wales we extract the following information respecting edible Eels. The five species of economic importance are as follows:—

(1) THE COMMON EEL (*Anguilla venegalensis*).—This is found in all the rivers and estuaries of the eastern watershed of New South Wales, and is the principal Eel (because the commonest) of the Sydney fish-markets. It attains a length of over three feet, with a weight of at least ten pounds; three to four pounds is, however, considered a fair average. On the mud-flats of the harbours, rivers, and estuaries, and the creeks which debouch thereon, this species occurs in great quantities, and there is practically an inexhaustible supply.

(2) THE SHORT-FINNED EEL (*A. australis*).—This fish is, from an economic point of view, to be classed with the previous species, though it is found more particularly in the fresh waters.

(3) THE CONGER EEL (*Leptocephalus labiatus*).—This Eel is more essentially a marine fish. It attains a weight of about twelve pounds, and a length of about four feet. There is reason to believe that it exists in these waters in considerable numbers, but nothing regarding that point can be said with certainty, owing to the haphazard nature of the Eel-fishery.

(4) THE SILVER EEL (*Muraenesox cinereus*).—This large Eel attains a length of about five feet. It occurs in considerable numbers along the costal waters, but is of a roving predaceous nature. Owing to the many fine bones, this species is only used for smoking purposes (for which it is well adapted). The fish is split from beneath, and a piece of coarse cloth is rubbed along the cut surfaces, this "picking up" the bones.

(5) THE GREEN EEL (*Gymnothorax prasina*).—This species is very common along the coast of New South Wales, but is usually only captured by hook and line, as the fish lives in rocky situations. It attains a weight of several pounds, with a length of about two feet six inches.

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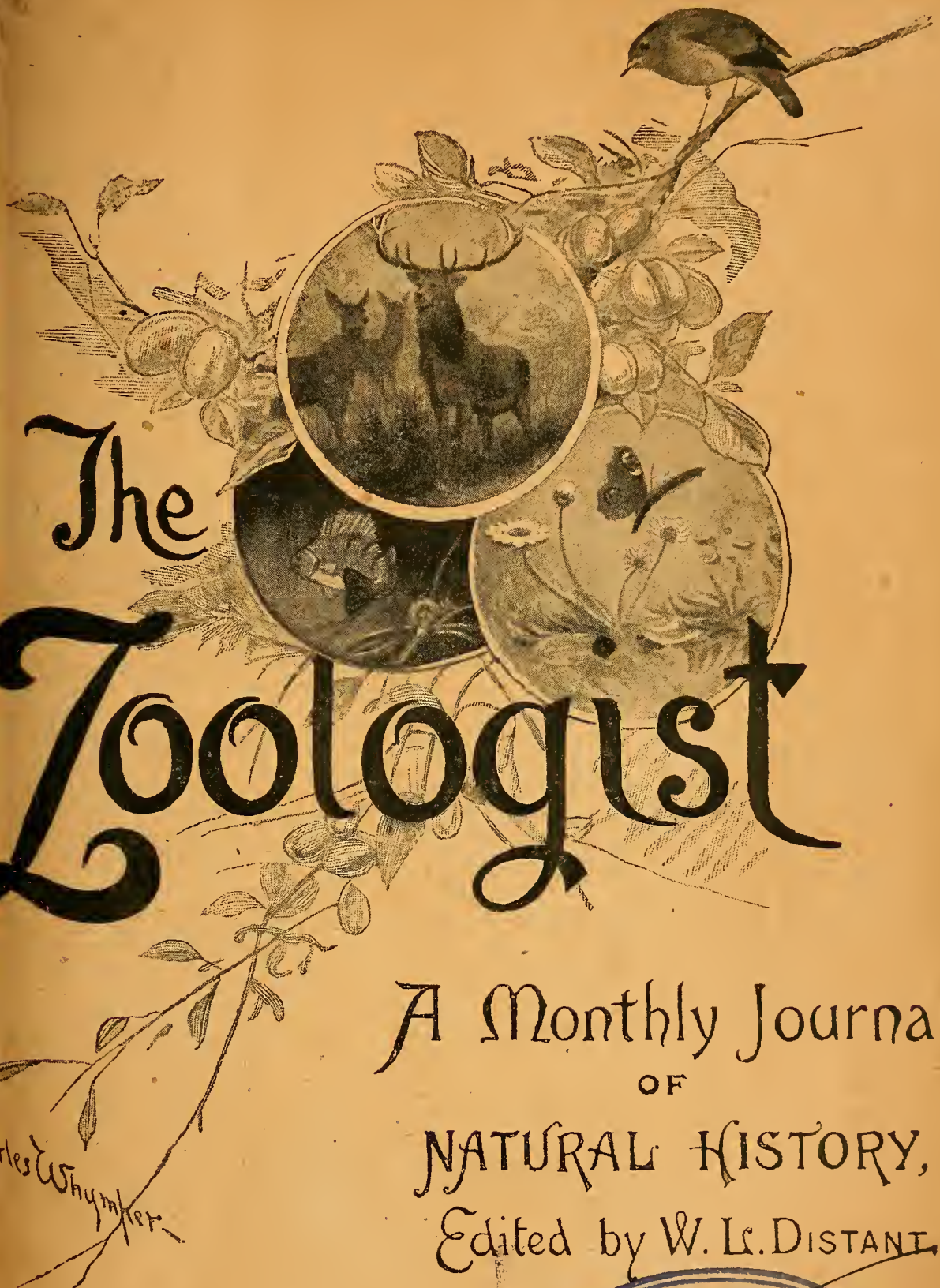
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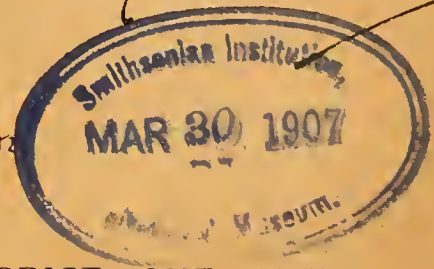
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THE ZOOLOGIST

No. 789.—March, 1907.

BIRDS AND THE GREAT SNOW.

BY ARTHUR H. PATTERSON.

THE great snowstorm which characterized the close of 1906 and the early days of 1907, and its effects on bird-life, will long remain fresh in my memory. I am amused sometimes by the prognostications of those who prophesy hard winters because of an abundance of hawthorn-berries, and Gulls flying inland, and the like ; it seems to me natural that hawthorns, like apple-trees, should, after a year's rest and unfruitfulness, bear well the following season, and that the birds should make short journeys for a change of food, or to avoid a breeze that might prove inconvenient. From many years' observations in the open, at the best I can foresee but a few days' *probabilities* ahead ; but from some—let me call it *intuitive*—*instinct* I am led occasionally to look for a sharp winter. I cannot explain this, nor have I tried to ; and by reference to my note-books I find that hard winters do not trouble us much oftener than once in nine years on the average. And I have many times observed that unless we get heavy snows before the second or third week in December, we do not often get any real winter to worry over, and wildfowlers may expect a poor shooting season, here, for the remainder of the time. I made a few observations during the stress of the severe weather, and will give them as I have dated them.

December 31st, 1906.—After a long spell of "open" winters, something akin to the "old fashioned 'uns" obtained during the

last week of this year. On the 22nd it rained heavily well into the night, and next day snow began to fall. Birds began to show signs of restlessness, and the Black-headed Gulls had been for two or three days feeding in the river, flying around the bridge, in the heart of the town—a fairly good sign of a change “of some sort” coming. The morning of the 23rd dawned with a fiery glow in the west, and shortly the red sky cooled into grey, and from out the deepening gloom snow began to fall fast and persistently, and in right good earnest. My first thoughts went out for “the poor birds!”—the birds that would die by want of food and the hail of shot.

On the 22nd and 23rd flocks of various wildfowl were observed trooping along the foreshore southwards, one bunch—presumably of Duck and Mallard—numbering quite five hundred; and a newspaper paragraph from Aldeburgh reported that “huge flocks of Ducks, Wild Geese, Wigeon, and other fowl are continually passing south to seaboard, indicating a continuance of the present severe weather.”

Such sights and reports naturally set every owner, or friend’s owner, of a shoulder- or punt-gun to work furbishing up his weapon, and laying in stores of ammunition; local ironmongers were loading cartridges by night and by day; and Wild Ducks began to fall to the guns of several frequenters of Breydon. Every amateur puntsman got afloat, and had I been an Excise officer I could have made a name by sorting over the regiment of those who, with every variety of gun imaginable—with, and mostly without, gun-licences—skulked around Breydon walls and the marshes.

On the 27th I went for a stroll to Gorleston pier-head, having heard that in their distress some Wild Ducks, “of a sort unknown,” were to be seen inside the harbour, but I saw none. A few score small Gulls were to be seen floating on the ebb-tide by the North Sand just off the pier, all the larger Gulls having gone—somewhere, and few indeed were seen while the severity of the weather lasted. But I noticed a few Thrushes (stray Redwings and the like), Finches, and a Pipit or two cross over the pier, almost within arm’s length, in that steady purposeful manner peculiar to them during the normal period of immigration. On the 28th I went for a walk round, crossing the North Denes,

sometimes wading through deep snow-drifts, with many a slip and stumble—for the undulations and sudden breaks of the sand-dunes were hardly traceable—and I finally reached the shore. A few out-flying *Turdidæ* and Finches passed over me as I floundered through the snow, but, when I reached the beach, I found Thrushes, Fieldfares, Redwings (in particular), Larks, Linnets, Pipits, Twites—and, indeed, *insessores* of all kinds, even including Goldfinches—flying due south, following the coast-line. Silently, like brown ghosts of birds, they flew—hour after hour—thousands upon thousands! I wondered whence they were trooping, and whether but for stress they would have still set at defiance the promptings that impelled many of their relatives two months ago on their migration southward. Surely these were they who had landed in Scotland, and would have stayed there! Bunches of five, ten, twenty, fifty straggled and struggled along—odd birds, fagged right out—alighting now and then to rest awhile. They passed almost within arm's length, many of them, and their line of flight lay between the sea-licked edge of the snowy plain and low-water mark, over a clear ribbon of sand some fifteen yards in width. The silent hosts opened on either side of me, as might a regiment of infantry, as I walked north; they did the same as I came back homeward, slightly closing their formation as they proceeded ahead of me. Unfortunately the morning was gloomy, and my trusty Zeiss glasses a little too powerful for their nearness; so that the smaller hosts, had they contained rarities, would have passed on unidentified. I longed to have my smaller "operas," but no gun, for I abominate that spirit which leads to the slaughter of hosts of little migrants for the sake of (reputedly) adding a new species to a county's fauna. I would rather spend half my life among the mud-flats, and not know that some rare and new species of wader was watching *me* daily, than know and name it, if it meant my taking away the life it is as much entitled to as I am to mine! Here the ichthyologist, however sentimental, scores, for all rare and most common fishes are *more or less caught by accident!* He may sit all day long for years angling from a rock, seeking in vain a *Balistes capriscus*, and to-morrow it may be cast up on the shore by the scornful sea!

The poor Black-headed Gulls fared badly enough; they left

Breydon *en masse*, and betook themselves to the lower reaches of the rivers. I surprised thirty or more of them by running unexpectedly—to them—up a river-bank, putting them to flight for a short time from ink-black sewage-water running from a sewer outlet. These birds swarmed the outlying gardens, and alighted on the public roads; persons fed them from the bridges, the kindly disposed fed them with table-scrap on their very door-steps in various parts of the town, and more than one brute made target-practice with them. One hapless bird would not make way for a cyclist, and was accidentally killed by his machine.

Two or three times I visited Breydon walls during the continuance of the snow and frost, but, having a fair knowledge of my own "fragility," I wisely, I think, kept off Breydon itself. Coots in miserable flocks slouched about on the mud-flats, demoralized by incessant slaughter among their ranks. Parcels of wildfowl flew affrightedly to and fro, for every man's gun was turned against them. "Strike" Sharman, a veteran Breydoner, remembering bygone winters, was tempted again to visit the mud-flats, and came home with the fore-deck of his punt covered with Mallard and Pochards. I visited his boat-shed on the 30th, and saw a row of Pochards and Scaups lying on a bench. "That poor Crested Grebe," said he, "I picked up exhausted out of a hole in the ice. The tide had fallen; it couldn't dive away, and it couldn't get on the wing."

The poor old Eel-pickers, and other water-side "spaniels," frozen out from drains and channels, hung dejectedly around the quay-sides, or crowded into their North Quay shelter, bewailing the hard times, and indulging in reminiscences of similar days in the long ago.

On the 29th I had a look round the Saturday's market. On Edmond's (late Durrant's) game-stall I saw a number of Mallard and Pochards, the latter still in the plumpest condition, and a few Common Snipe hung there too; they were fat enough, although not tempting eager purchasers, but scores (and hundreds later on) were turned away as thin and useless. On the countryfolk's stalls were numerous Tufted Ducks, Pochards, and others; they had been having a fine time on some of the Broads—Hickling in particular—before the fowl were frozen out. Only

one Jack-Snipe was noticed in the market, but numerous bunches of Fieldfares, Thrushes, Blackbirds, and other small birds were on sale, and these found ready customers, which wildfowl did not.

“So you’ve been killing your friends—the slug-eaters!” I said to a couple of different stall-keepers, touching the dead *Blackbirds* with my finger.

“Yow’d think them friends, ’bor,” said one, “if yow saw ’em in the summer!”

“Yow’d think so,” said the other, “if yow was jist to see ’em among our fruit!”

But neither could tell me where they got their fruit from in winter; but so vindictiveness had slain them, and petulance was exhibited even in referring to them. And as Blackbirds are esteemed uncommonly good eating in Yarmouth, no mercy is ever shown them.

On the 30th I dropped upon “Jigger” Halls, an intelligent young engineer, whose works throw their shadow into Breydon, and who is ever ready to show visitors this magnificent estuary in his motor-launch, and who also follows Breydon with a big gun, “when there’s anything about.” He was just sitting down to his Sunday dinner, after a week’s wild life on Breydon, sleeping at night in his snug, roomy houseboat, returning home only at intervals with his game, which had a fairly ready private sale.

“I closed down [the engineering shed] for the Christmas week,” said he, “and have had a week on Breydon—and *haven’t done so bad.*” Let me summarise his experiences.

He met with the first lot of fowl on the 23rd, getting several Mallard and seventeen Coots. On the 24th he killed twenty-five Coots at one shot with the big gun, and obtained altogether “two or three linen-baskets” of these birds. There must have been quite three thousand Coots on Breydon (frozen out from the Broads); they kept much in line, like soldiers in a regiment (as I have seen them here before in hard winters), and fed ravenously on the sweet, fattening stems of the *Zostera marina*. They make quite an audible scrunching noise in tearing it up. A wretched adult Crested Grebe sat miserably bunched up on the ice, literally starving; he knocked it over with an oar as he rowed along.

About sixty Swans visited Breydon. Sharman killed three; Halls killed one, which he believed to be a Polish Swan, and gave me a fairly representative description of it. It was quickly sold for eating. The majority of the Swans appeared to be Whoopers. Geese had been scarce; five Brents were seen, and a Grey Lag Goose been killed. Halls's game-list for the week was as follows:—1 Swan, 34 Mallard and Duck, 6 Pochards ("Pokers"), 5 Wigeon, 1 Teal (only one seen), 1 Golden Plover, 1 Crested Grebe, 60 Coots.

A few Golden Plovers hung about during the week, but were unusually shy. "Hard-fowl"—*i. e.* Golden-eyes, Tufted Ducks, and Scaups—were seen in small bunches, but they too were shy and wary. Never so many Pochards have been killed or seen for many years.

The few larger Gulls remaining here have been seen chasing unwounded Dunlins whenever they flew near them, but these quick-turning little birds were too swift for them; escaped cripples fared worse. The Hooded Crows forsook the Breydon flats and the marshes, and kept to the open reaches of the rivers, and to the shore. I saw a dead Gull clean picked by them—as much of it as was not frozen into the ice on a ditch. One hungry fellow was observed making strange efforts to get some viand down his gullet, but his heart failed him; prompted by curiosity, the rejected morsel was examined, and found to be a tablet of highly scented soap, much holed by his hard bill in trying to find, if possible, a sweeter kernel! Kingfishers have been observed miserably sitting about on posts and rails, looking abject in their hunger; and even those who usually have no pity were sorry for them. One came and tapped on the window of Halls's houseboat. While out shooting on one occasion he left the door of the houseboat open, and a Wagtail that had been hanging around for scraps went in and cleared the fragments off his dinner-plate.

And when killing a wounded Mallard by cutting its throat, so as not to damage its neck, as wringing will sometimes do, the blood dripped and congealed on the snow on the fore peak of the punt. While in the houseboat a hungry Starling flew down on the boat and ravenously ate the crimsoned snow, and when driven away returned again, and ate more of it.

Halls said the 23rd was a "wildfowl day beyond all memory." Some small return bunches visited Breydon on the 28th and 29th. The ice formed so rapidly on the night of the 29th that he had to return from the drain to his houseboat, having no ice-hook to cut a way through, but on the 30th he managed to hack his way out to open water.

Mr. J. H. Gurney wrote me on Dec. 26th, and remarked on "flocks of Sky-Larks going seawards." He saw twenty Rooks that day eating a dead sheep. They devour putrid dogs on Breydon, and seem to think nothing of it—indeed, they rather like it! The Rooks around Yarmouth kept much to the various outlying gardens, and, when not propping for a morsel, sat disconsolately on the topmost twigs of small trees, surveying the miserable outlook, and thinking of happier days. They hunted singly—every bird for himself. Chaffinches fared badly, and looked the most abject of all the Finches; on the 27th, as I stood near a rail on Breydon walls, one came to within ten inches of my foot to search a tiny patch of bare soil. The Meadow-Pipits seemed fairly happy, and hunted most of the time on the weedy edges of Breydon, and along by the river margins. Scamps of boys were to be seen catching here and there a miserable bird with a piece of herring-lint.

Many wildfowl were observed on the rivers, and at St. Olaves some good bags were made. One gunner shot a Goosander, and three equally harmless Dabchicks were killed—for no useful purpose. In the neighbouring villages all the berries had been stripped from the hedgerows. Two Snipe wandered into a cattle-shed on the marshes, where among the stable-refuse they probed and prodded, in hopes of finding some stray grub or worm; their footprints in the snow led to their discovery, and, on a person cautiously slipping in, they promptly and safely dashed out.

Wild Ducks were plentiful enough at Fritton Lake, and big bags were made at the decoys; as many as seven hundred birds, I am told, were netted therein in one day. Truly a neck- and an arm-aching record! To certain brackish ditches round the west end of Caister, on the edge of the marsh-lands, Ducks persistently resorted, which resulted in one individual, who has, since the conclusion of the Herring voyage, just before Christmas, done

nothing but shoot in that particular neighbourhood, obtaining unusually good sport. On one occasion he secured a Mallard in a most unexpected manner; hearing an unusual clamour among some tame Ducks kept hard by, he went out to see the reason of it. To his astonishment he at length discovered a Mallard sitting on the ridge-tiles of an adjoining house. It was but the matter of a few moments to slip back for his gun, and on his prompt return he shot at and killed that venturesome fowl.

When skinning a couple of Coots, after they had been feeding for about a fortnight on the *Zostera*, I found them exceedingly plump and fat; their stomachs and intestines were packed with doubled-up "grass"-blades in various stages of digestion. The fresher grass still hung from their bills. I found a couple of small winkles in one of them.

January 5th, 1907.—Yesterday a fine female Goosander was brought to me for identification; it was shot at Buckenham, where fowl during the past two or three days have been abundant. A few Goosanders and Smews—"Sawbills"—that only visit us in any numbers in very severe weather, appear to have kept off Breydon, although some Smews visited the upper parts of it, and frequented the rivers.

I went this afternoon to Belton and St. Olaves, and had a chat with one or two of my friends who like to watch birds, preferably down the barrel of a gun. In the washhouse of one hung some Coots and Ducks, and a bunch of Snipe—four Common and two Jacks. A young urchin, who had just left school to work in a cowshed, passed his noon hours during the bad weather near a ditch frequented by Snipe. He obtained three or four small spring-traps, and placed them in the water near where he saw footprints; these Snipe were the proceeds of a few hours' work. The boy's father—a Mr. Brooks—assured me that *thousands* of Snipe came to the marshes just before the snowstorm, and they had haunted also the ronds and saltings. They were so put out by its continuance that seven were seen with Dunlins on the mud-flats.

Brooks assured me he might have shot a pair of Smews on the river at Burgh, but, being eager to secure a Mallard swimming close by, in the end missed them all. Several Dabchicks frequented the river there. Geese in flocks of seventeen, twelve,

thirteen, and ten respectively, mostly "a darkish grey sort" (probably Bean-Geese, the most common species here this winter), passed over; and a large hawk, which I have reason to believe was a Buzzard, flew out of a stackyard with straws depending from its feet, and I have no doubt a rat was mixed in amongst them. A large "cloud" of Wood-Pigeons, containing some hundreds, passed over from the direction of Yarmouth, where another acquaintance of mine saw them a little earlier on the same date—no doubt the same flock.

To-day I saw three birds feeding near Breydon, which I at first believed to be the Meadow-Pipit. On putting them to flight, which they appeared very reluctant to take, I noticed an uncommon amount of white on the two outside feathers on either side the tail. It struck me at the time as being rather unusual, but, not being prepared to suspect anything rare, I paid no more heed to them, and let them be.

On taking up 'The Zoologist' of December last, I happened to read an article on the Water-Pipit,* and on further reference to Saunders's 'Manual,' I was astonished to find how curiously my birds corresponded with the descriptions there given of the species. I have been back to the spot since then, but, as I was prepared to be, was disappointed at not again meeting with these birds. On cautiously introducing the matter and my suspicions to an old and observant gunner, he, strangely enough, spoke of seeing *three* birds a few hours previously at the harbour-mouth near the piles of the breakwater, which he noticed "carried more 'an usual" white on their tails. There the matter for the present must end, for, were I to describe the species to any of those who prowl around with guns searching for "specimens," not a Meadow-Pipit would escape the general massacre "rarities" provoke. A "new" species had better remain unidentified; but there—

"P. W. D. J.," writing in the 'Daily Express' of Jan. 5th, 1907, commenting on the appearance of Wild Swans at Yarmouth, remarked:—"I am informed there were fifty of the birds, but whether they were Whoopers or the smaller Bewick's word has not reached me. Both species have been seen in the neighbourhood in fairly large flocks during hard winters, where

* By Michael J. Nicoll, F.Z.S.

they have been driven south by severe weather in their far northern haunts. Doubtless Mr. Patterson . . . knows all about these latest visitors."

As a matter of fact, I was extremely unfortunate with regard to seeing any of these Swans, alive or dead, and felt called upon to reply to the article in question; and, as my letter was given in almost its entirety, take the liberty of re-writing it as given by the editor:—

"Mr. Arthur H. Patterson . . . sends to the 'Express' an interesting account of an attempt to identify a Polish Swan after the bird had been placed in the boiling-pot. Mr. Patterson first of all refers to the flock of Wild Swans which were mentioned in the 'Express' as having visited Breydon Water, near Yarmouth.

'On very reliable authority,' Mr. Patterson says, 'I understood that about sixty Swans were seen on that delightful old backwater. Unfortunately I just missed seeing them, and I was equally unfortunate in not seeing the four that were shot—three by one of my acquaintances, and one by another punt-gunner. I have seen as many as fifty at one time, and I can assure you they were a sight worth seeing. The odd bird shot, from a description given me, I took to be a Polish Swan, and it was sold to a carnivorous publican for forty-two pence. I saw him just too late, for on visiting his bar he assured me that the "missus" had plucked it. Let me see but a foot, I begged; on which he called the "missus," who presently came forward. "Let Mr. Patterson see the head and the feet of that Swan," he said. She apologised, and said that both were in the saucepan, which she ran indoors and fetched, hauling out a foot on a huge fork; but I found boiled Swan's foot was an awkward thing to swear the bird's identity by, and would have defied Prof. Owen himself.'"

January 12th, 1907.—The weather and bird-life generally have returned to the normal. To-day's market was comparatively birdless. Only on one stall was there evidence of anything unusual having occurred for a day or two. A haberdasher named Youngs (the hero of the Whistling Ducks)* had suspended, amid stockings and underclothing, a large display of Coots tied in

* Cf. Zool. 1906, pp. 394-5.

couples, which he was selling—and freely, too—at sixpence a brace. I found they were exceedingly plump and in good condition; these birds appear loth to leave the *Zostera*, and to go back to the Broads. This is the way with them when they have once tasted this succulent vegetable. Youngs, the day before, had shot a Shag, an unusual winter visitor here.

The Gulls have now betaken themselves to their usual haunts, a few only frequenting the river in the neighbourhood of the town, and these the Black-heads. During the continuance of bad weather these birds made themselves extremely conspicuous in the heart of the town. An old lady carried a parcel of hare's bones, broken pudding, and vegetables to the St. George's Park, where they assembled in numbers. There was a great deal of squabbling over these coveted fragments, and Woods, the park-keeper, after they had devoured the softer morsels, smashed up the bones. In a very short time these were cleared away also.

As usual, the greatest sufferers were the Redwings, a fact remarked on by observers who, like myself, came to the conclusion that extreme cold, as much as shortness of food, seriously affects this species; and it was noticeable, too, how in an unusually short time they drooped and died, while in other years, in more protracted frosts, without so much snow, they did not so soon succumb. Numbers were found dead at Filby, at Belton, and other villages. Some Chaffinches were also found dead, but Larks, as they usually do, took to the cabbage-gardens, and fed freely on the cabbages, to the undoing of the gardeners, and in many instances to their own.

ORNITHOLOGICAL OBSERVATIONS IN SURREY: 1906.

BY L. B. MOURITZ.

THE most interesting event in Surrey ornithology during the twelve months ending Dec. 31st, 1906, is the appearance of the Hen-Harrier (*Circus cyaneus*) in what is probably an old haunt, if not a breeding-ground. As I hope to observe them again next year, it is not advisable to mention the precise locality, and will only say that it is situated in the south-western portion of the county. On referring to the diary below, it will be noticed that the female of a pair was shot at Shackleford in February, and it seems as if the survivor procured a fresh mate, and settled down in the area where subsequently observed.

The first occasion upon which I saw these birds was on May 28th, when I had a splendid view, both of the "Blue Hawk" and "Ringtail," as they quartered the ground in true "Harrier" fashion quite close to where I lay hidden amid rank heather and stunted firs. I spent the whole morning in the locality, and had my glasses in use nearly all the time. On Aug. 6th I took a friend to see them, and was again fortunate in having a good view, although on this day they were circling overhead the greater part of the time, only now and again descending to the heather. After a space of half an hour or so, during which they had been gradually working nearer to us, the female flew past the clump of pines in which we were concealed, and I think caught sight of us, for shortly afterwards both birds flew away, and, although we waited for a considerable time, they did not return. Between these dates several other persons noted them, among whom Mr. Gordon Dalglish may be mentioned as having seen the male on July 10th in the vicinity. When I discovered them, and after having shown myself, their behaviour certainly convinced me that a nest was not far distant; but, in spite of a long and exhaustive search, I regret that I am unable to verify

this conviction. Aug. 6th was the last time I saw the adults, but on the 28th of that month I found two large hawks, which I took to be immature *C. cyaneus*, near the old spot, but unfortunately was unable to identify them owing to their excessive wariness; on the same day I saw two more (possibly the same) some miles distant flying high overhead in a westerly direction. The appearance of these young birds is certainly suggestive, and it makes me deplore the fact that my searches for a nest were fruitless. Mr. C. H. Bentham saw either a female or young male on Oct. 27th at Frensham Little Pond, but it was mobbed and driven away by two Rooks almost before he could use his glasses.

Amongst other rare county species may be mentioned the Marsh-Warbler, Curlew-Sandpiper, Black Grouse, Greenshank, Lesser Tern, Blue-headed Wagtail, Spotted Crake, and the Golden-eye.

In point of rarity, the Marsh-Warbler (*Acrocephalus palustris*) and Curlew-Sandpiper (*Tringa subarquata*) are entitled to the premier position, as both are additions. With reference to the former, Mr. Bucknill writes:—"I cannot say that I have any confidence in including it in the list of the Surrey avifauna." I shared his opinion, for, excepting Mr. Blyth's (now discredited) observations during the early seventies in Battersea Park, the species had not the slightest claim to be included. As regards the Sandpiper, there is no authenticated record in 'The Birds of Surrey,' although the author mentions two or three which he presumes to have been taken within the confines of Surrey; but it is apparent to all that this wader has hitherto been admitted to the list on very meagre grounds indeed. It is therefore with great satisfaction that I record the Frensham example.

Alas! Surrey Black-game (*cf.* Saunders's 'Manual,' 2nd ed. p. 493) are on the verge of extinction, and I am sorely afraid that the present year will see the last of the species stamped out. I have received information—for which I am obliged—from Mr. G. W. Swanton, that in 1905 it still bred in a certain wild tract of country, although in greatly diminished numbers, only two pairs having been seen. I have not been able to examine this district personally to see if it is barren, but intend doing so during the present year. The only news of the species that

I have been able to gather during 1906 is unfortunately limited to one bird, and this (a Greyhen) I saw myself in the spring.

Both the Greenshank (*Totanus canescens*) and the Lesser Tern (*Sterna minuta*) are rare visitors, and it is surprising that no fewer than four of the latter have been seen during one year. All these visited Hedgecourt, which is a new locality for this, as well as for the Greenshank. The western lakes are generally the favoured stopping places for this class of visitor, but it seems that the ponds near Copthorne have been somewhat overlooked by the earlier writers, as very few records come from this district.

Since Mr. H. T. Booth saw three Blue-headed Wagtails (*Motacilla flava*) on Wimbledon Common in 1890 (Bucknill, 'Birds of Surrey,' p. 138), no others have been recorded, having probably been overlooked, although really I do not suppose it has occurred other than an extremely rare visitor.

The Spotted Crake (*Porzana maruetta*) has very seldom been observed in Surrey, and one has to go back to the eighties for records, although the species has no doubt visited the county since then, but, through its skulking habits, avoided detection.

After the Pochard, Tufted Duck, and perhaps the Wigeon, the Golden-eye (*Clangula glaucion*) is the most often seen of the *Anatidæ* in spring, autumn, and winter, and probably occurs annually on the western lakes. Although the records up to the end of 1905 are comparatively few in number, the times that this duck has passed without comment no doubt greatly exceed the recorded visits. Besides the occurrences noted in the diary, Mr. Dalglish informs me that a pair were shot by a keeper in Lea Park during the winter of 1905-6.

I have appended the observer's initials after each record; therefore C. H. Bentham's notes are designated "C. H. B.," G. Dalglish's "G. D.," and E. K. Ford's "E. K. F." In instances where initials are not given the notes are my own.

The year's diary is as follows:—

JANUARY.

7th.—Goldfinches feeding on burdock-seed; Siskins and Grey Wagtail at Oxted; Little Grebe on Barrow Green Pond; Hooded Crow in Titsey Park, which is a favourite haunt (C. H. B.).

Large numbers of Siskins and half a dozen Pochard at Richmond. The latter are quite common in winter, and are hardly worthy of note; although generally in small parties, sometimes over one hundred occur.

14th.—Large flock of Ring-Doves at Old Oxted (C. H. B.).

21st.—Tufted Duck on Hammer Pond, and Magpies on Royal Common (G. D.). The latter are very rare in Godalming neighbourhood, and during recent years appear to have ceased to breed there. Bucknill, however, was able to assert (1900) that it still bred annually at Northbrook and Royal Common. Hooded Crow at Godstone (C. H. B.).

26th.—Enormous flocks of Sky-Larks at Eashing (G. D.).

27th.—Flocks of Meadow-Pipits at Richmond, where Herons were repairing their nests a few days later.

31st.—Blackbird singing a little about 6.45 a.m. (C. H. B.).

FEBRUARY.

4th.—Fieldfares at Tandridge (C. H. B.).

11th.—Large numbers of Teal and Mallard paired on Hammer Pond, and flocks of Stock-Doves in Peperharow Park (G. D.). Several Hoodies and about one hundred and fifty Bramblings at Titsey; Kingfisher at Oxted Mill stream (C. H. B.). Lesser Spotted Woodpecker (E. K. F.), Siskins, Redpolls, and Goldcrests in Richmond Park. The last named have been very numerous, and I have several notes prior and subsequent to this of all three.

17th.—Gannet seen on the Wey; fifteen Tufted Duck and Little Grebe in breeding plumage on Hammer Pond. (The Dabchick may always be seen here—L. B. M.) Female Hen-Harrier shot, the male escaping, at Shackleford (*cf.* Zool. 1906, p. 114).

18th.—Stock-Doves, Great Crested Grebe, and a party of twenty Hawfinches in Richmond Park. The erratic way in which the Grebes appear at the Penn Ponds early in the year is peculiar. On Feb. 18th there was one, but it had gone on the 20th, to reappear on the 21st; then only staying for a day, as on the 22nd, 24th, 25th, 28th, and 3rd March no Grebes were to be seen. On March 4th and 10th there was one, on the 11th three, 12th two, 17th and 18th four, and 20th two; whilst on

the 24th there were again three, after which only the breeding pair.

19th.—Sky-Lark singing (E. K. F.).

20th.—Kingfisher on Penn Ponds (E. K. F.), and at Oxted (C. H. B.).

MARCH.

1st. — Rooks building at Milford (G. B.), and at Oxted (C. H. B.).

2nd.—Coots paired, and ten Tufted Duck on Hammer Pond (G. D.).

3rd.—Although several pairs of Rooks have commenced building at Oxted, the majority still roost near Woldingham, about three miles distant (C. H. B.).

4th.—Eight Crested Grebes—pairing—on Wimbledon Park Lake.

6th.—Wind S.W.* Male Wheatear on warren in Richmond Park (E. K. F.). This was reported in the 'Field' at the time, and I believe was the earliest for the year. Bucknill says in his book:—"Out of a number of records of its first appearance (the notes coming from all parts of the county), few are earlier than 30th March, and I think it may be concluded that its general period of arrival is about the week of which that date is the middle day." Of course the 6th is a very early date for Surrey, but in the neighbouring county of Sussex they frequently arrive at the beginning of March (*cf.* Borrer's 'Birds of Sussex,' p. 58). I have myself several early dates for Surrey, but none earlier than this.

10th.—(Golden Pheasant flushed by foxhounds from gorse on Winterfold Hill—H. Russell.)

11th.—Goldfinch at Broadham Green; this bird has not been so abundant as during winter 1904-5 (C. H. B.). Two female Wheatears at Richmond. Magpies and Great Crested Grebes at Virginia Water.

12th.—Greenfinch singing (G. D.).

24th.—A female Great Spotted Woodpecker "hammering" in Richmond Park. It is generally stated that the males alone "hammer," but this bird certainly had no crimson on the nape.

* The wind had been from the south or south-west for three days before this.

31st.—Reed-Bunting singing a little (C. H. B.).

APRIL.

1st.—Rooks sitting at Tandridge ; several Hooded Crows and Stock-Doves at Titsey (C. H. B.).

2nd.—Grey Wagtail at Oxted (C. H. B.).

7th.—Wind E. Wryneck at Eashing (G. D.). Sand-Martins at Godstone ; Chiffchaff at Tandridge (C. H. B.). Chiffchaff and Swallow at Esher.

8th.—Wind N.E. Kingfisher and Swallow at Oxted ; Starlings still in bands (C. H. B.). Sand-Martins, Willow-Warblers, male Yellow Wagtail, six Tree-Sparrows (and a Barn-Owl disturbed by Jackdaws, at 11.45, in brilliant sunshine, soared high overhead until lost to view) in Richmond Park.

13th.—Mallard, Teal, and two Crested Grebes on Hedgecourt Pond, and six full clutches of Lapwing's eggs in fields adjoining (C. H. B.). Whinchat—wind W.—two Common Gulls (*Larus canus*), Curlew-Sandpiper, female Golden-eye, seven Crested Grebes, three Tufted Duck, and a Curlew (which certainly kept up the bird's reputation for wariness) at Frensham. The Curlew-Sandpiper was running along the side of the Little Pond, and allowed a close approach. I saw it examine several *Limnœa stagnalis* and one or two Planorbes, but it did not swallow any. The characteristic bill was a shade shorter, and perhaps slightly less decurved than usual, and I presume therefore that it was a bird in its first spring. When it rose (the white tail-coverts being then conspicuous), and as it flew rapidly up and down the arm of the pond, it whistled several times. The bird was in winter plumage, but showed a considerable amount of chestnut on the head and interscapular region.

14th.—Pied Flycatchers at Bramley (*cf.* Zool. 1906, p. 313).

15th.—Curious eggs of the Blackbird, from Abrooke Common, Esher. The centre one is the first I have seen zoned round the smaller end, and must be very uncommon. (See illustration on p. 98.)

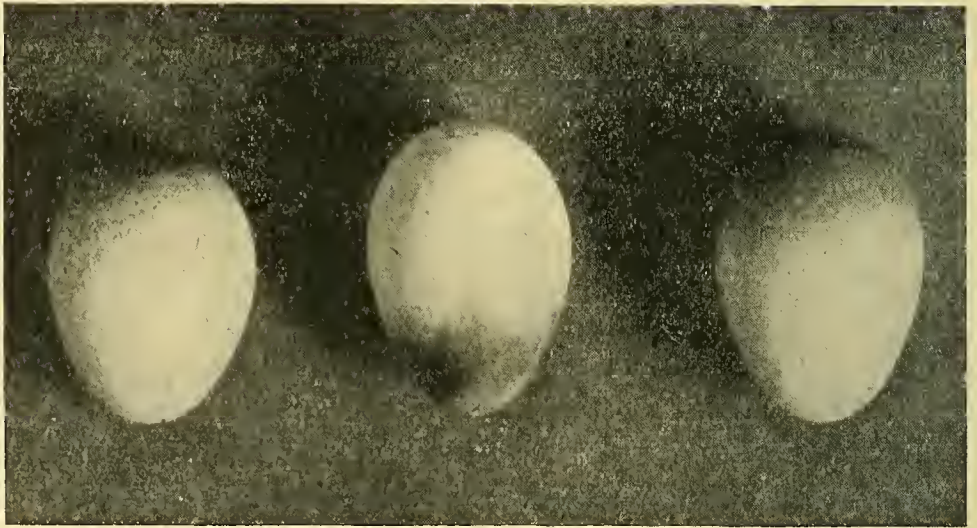
16th.—Wind S.W. Cuckoo heard at Oxted (C. H. B.). House-Martins at Eashing (G. D.).

21st.—Wind S.W. Several Nightingales heard and seen at Addington (C. H. B.) and Grayswood (G. D.). Pair of Tufted

Duck and a couple of Common Sandpipers in Richmond Park ; the latter stayed until May 7th. Mr. Dalglish heard Wood-Warbler at Brook.

22nd.—Wind N.W. Linnets still in flocks at Limpsfield (C. H. B.). Sandpipers at Thursley and Frensham ; also twelve Crested Grebes, Redstart, numerous Snipe, drake Golden-eye, and female Tufted Duck at the latter.

24th.—Wind W. Spotted Flycatcher at Thursley (G. D.). Marsh-Warbler (*Acrocephalus palustris*) at Penn Ponds, Richmond Park (E. K. F.). I print the following letter received from my friend with regard to this rarity :—“I first noticed this bird on April 24th, 1906, and watched it almost daily until May 8th.



CURIOUS EGGS OF THE BLACKBIRD.

Between these dates, no matter when I went up to the Penn Ponds, I was certain of finding it somewhere—either at the edge of the water, creeping up and down the shrubs, pecking at the stalks, or on the bank ; sometimes, but not often, in the nearest trees. It used to make curious little darts into the air, like a Dartford Warbler, and occasionally flew out and back in a circle, as a Flycatcher does. Its colour was uniformly olive-brown above, slightly darker on the head ; under parts buffy white ; the legs were so thin that it was almost impossible to see the colour, but, as far as I could judge, they were pale brown. I never heard the bird utter a note of any sort. On the 8th

May, whilst I was following it about as usual, it flew a few yards ahead on to the bank of the upper pond, where it joined a group of other birds, apparently Warblers, for they all looked exactly alike as they rose, and flew away. I never saw it again. I was a little in doubt about recording this bird for your report, but Mr. Warde Fowler's remarks at the conclusion of his article on the Marsh-Warbler in 'The Zoologist' (1906, pp. 401-9) confirms my belief that the bird I saw was one—the slightly darker head and entire absence of any rufous tinge on the body are almost positive proof." Mr. Warde Fowler states that this species is the latest of our summer visitors to reach its breeding-haunts, and he says that May 30th is the earliest he has seen them. It is therefore with some hesitation that I insert the above record and letter.

26th.—Snipe near Bramley (H. Russell). Nuthatches, Creepers, and Marsh-Tits together, and twenty-six Herons at Richmond (E. K. F.). The superintendent of the Park informs me that there are now between twenty and thirty *nests* in the Sidmouth Wood, and a solitary pair generally build in the Isabella Plantation.

29th.—Wind W. Blackcap heard at Oxted (C. H. B.).

30th.—Magpie's nest at Crowhurst (C. H. B.). Five years ago I knew of two nests at Oxshott, and since then they have bred at Wisley, Virginia Water, and one or two other places; but it is now one of our rarest breeding birds.

MAY.

1st.—Spotted Crake at Brook; was also seen subsequently. Pochard sitting in Lea Park, where Common Sandpipers were reported several times about this date (G. D.). The Pochard note is most interesting, as these are genuine wild birds, and I believe this to be the first time it has laid eggs in the county; unfortunately these were not hatched, and, whilst the female left the Park in late summer, the male stayed on, being last seen there on Sept. 8th.

2nd.—Wind S. Whitethroat at Thursley; Kestrel sitting in Lea Park (G. D.).

3rd.—Wind S. Grasshopper-Warbler heard at Wisley (G. D.).

4th.—Wind S.W. Turtle-Dove at Woldingham (C. H. B.).

5th.—Wind S.W. Lesser Tern, Swift, and some Snipe at Hedgecourt Pond (C. H. B.). Whitethroat and Swifts in Richmond Park.

7th.—Sedge-Warbler in Richmond Park (E. K. F.); also heard at Oxted on the 5th (C. H. B.).

8th.—Wood-Lark at Brook (G. D.).

11th.—Wind S. Nightjar at Brook (G. D.). Early.

13th.—Sand-Martins—which are exceptionally abundant about Oxted, Godstone, and Limpsfield this summer—have established new colonies on Limpsfield Common and near Barrow Green (C. H. B.); also in the sand-pits at Oxshott, where, as far as I can see, they do not appear to have been molested very much, in spite of the numerous picnic parties, “school-treats,” &c., which frequent this locality. Three pairs of Crested Grebes at Virginia Water, and twenty—pairing—at Frensham, where there were also a pair of Golden-eyes, an immature Blue-headed Wagtail which showed a few brownish feathers on the breast, and a Common Tern. This is very late to see adult Golden-eyes so far south.

14th.—Wind N.E. Red-backed Shrike at Thursley (G. D.).

20th.—Sparrow-Hawk's nest with six eggs in an unfrequented larch-wood at Chart (C. H. B.).

22nd.—Pair of Grey Wagtails at Oxted Mill; also seen the following day. Although this Wagtail is a regular winter visitor to this neighbourhood, it has generally left by the first week in April (C. H. B.).

23rd.—Wind S.E. Corn-Crake at Oxted (C. H. B.).

26th.—Drake Teal on Hampton Lodge Pond; also seen on the 28th.

27th.—Hobby on Royal Common. I had a good view of this bird as he flew hurriedly out of a beech quite close to where I was standing.

28th.—Chiffchaff's nest with eleven eggs at Brook (G. D.); evidently the produce of two hens.

29th.—Wood-Lark and Lesser Redpolls building in the Godalming district.

30th.—Hooded Crow found hanging on tree at Vachery Pond; it had been dead for at least three or four days. This is a very late date. Lesser Whitethroats somewhat numerous near Cranleigh.

JUNE.

1st.—Twelve Pintails hatched on Enton Mill Pond—parents pinioned (G. D.). I found Little Grebes, Snipe, and Teal all breeding in several places in South-western Surrey about this date, but for obvious reasons it is better not to mention exact localities.

2nd.—Immature Greater Black-backed Gull, female Tufted and Red-legged Partridges at Frensham Little Pond.

3rd.—Kingfisher and Heron at pond on Puttenham Common.

4th.—Linnet's nest with six eggs in ling about a foot from ground on Walton Heath (C. H. B.).

5th.—Kingfisher on Frensham Little Pond.

10th.—Drake Teal and brood of four Crested Grebes (three of which afterwards perished) on Penn Ponds. Nightjar "churring" at 6.40 p.m.

11th.—Sky-Lark perched and singing on top of hawthorn (G. D.).

16th.—Dartford Warbler seen by Mr. Dalglish.

17th.—Garden-Warbler and Sparrow-Hawk near Elstead.

18th.—Nest of Great Spotted Woodpecker with young in Godalming district (G. D.).

22nd.—Mr. Harold Russell informs me that Little Grebes are to be seen regularly in winter on ponds in the Tillingbourne Valley, and that there is always a pair nesting near Hascombe; that, although Grasshopper-Warblers are usually noticed on migration at Shere Heath, none have been observed this year; and that Stock-Doves are very rare; although a pair probably nested in Albury Park last summer.

24th.—Wood-Lark in Richmond Park; I heard this bird singing in the evening of the previous day, and, looking again the next morning, was lucky enough to obtain a good view.

JULY.

3rd.—White Wagtail at Penn Ponds (E. K. F.).

17th.—Heron at Godstone Pond, and four Goldfinches at Limpsfield on the 21st (C. H. B.).

22nd.—Pair of Grey Wagtails at Oxted Mill Pond; one also seen on the 29th (C. H. B.).

28th.—Barn-Owl heard at New Oxted; five Herons on the

wing at Westcott, and Red-backed Shrikes noticed to be very numerous on Ranmore Common (C. H. B.).

AUGUST.

4th.—Lesser Spotted Woodpecker on apple-tree in Elstead, quite tame, and allowed us to watch it for some time. Grass-hopper-Warbler seen and heard in the evening at Cutt Mill.

5th.—A Dunlin, having black gorget well marked, Common Sandpipers (others noted later), Blue-headed Wagtail, and several Black-headed Gulls at Frensham. Gulls are generally to be seen here during late summer and autumn. Numbers of Teal seen about this date.

8th or 9th.—Common Gull shot in Lea Park (G. D.).

12th.—Lesser Black-backed Gull and a single Ringed Plover at Frensham.

13th.—A party of Herons, said to be two old and five young, have been frequenting the neighbourhood of Shere for some time past. They were suspected of nesting in Albury Park, where there was a solitary nest a few years ago, but the nearest heronry is in Peperharow Park. Nightjars have been reported as unusually numerous on Holmbury Hill and Peaslake Common; on the other hand, the pair generally noticed on Shere Heath have not been heard or seen. Willow-Warblers singing well—(also in other districts up to Sept. 23rd—L. B. M.)—(Harold Russell).

16th.—The pair of Great Crested Grebes nesting at Wimbledon only succeeded in rearing two young.

19th.—Teal and Black-headed Gulls on Penn Ponds.

22nd.—Kingfisher and Heron at Barrow Green (C. H. B.).

23rd.—Lesser Spotted Woodpecker calling at Godstone (C. H. B.).

24th.—Two Green Sandpipers, fifty Mute Swans, and five Herons at Hedgecourt Pond; a small "charm" of Goldfinches near Lingfield (C. H. B.).

26th.—Ringed Plover, and Rook with large white patches on primaries of each wing at Frensham Great Pond.

27th.—Lesser Redpoll in beautiful plumage on Royal Common; Grey Wagtails at Thursley; Teal and Green Sandpipers seen on Forked and other ponds several times on and after this date.

28th.—Great Spotted Woodpecker, Wood-Lark, two Grasshopper-Warblers, and six Dartford Warblers seen near Hindhead. Over twenty old and young Grebe and an immature Cormorant at Frensham Great Pond. I saw the latter arrive and depart; it only stopped for about fifteen minutes, dived continuously, and, as far as I could see, caught some fish each time.

29th.—Greenshank (?) at Devil's Jumps. Little Grebes and Hobby at Frensham. I noticed the latter chase and strike down a Swallow—a most interesting sight.

30th.—Garden-Warbler at Thursley, and White Wagtail at Frensham. Jack-Snipe, Green Sandpipers, Teal, and plenty of Wild Duck in the evening at Devil's Jumps. The Jack is exceptionally early, but I had this bird under observation for a considerable time, being within ten feet of it (behind a screen of pine-branches), so am positive that I was not mistaken.

SEPTEMBER.

8th.—Brood of three Dabchicks just hatched in Lea Park (G. D.). Common Sandpiper at Richmond.

11th.—Kingfisher at Penn Ponds (E. K. F.). Flock of between fifty and sixty Swallows, apparently on migration, flying over Limpsfield Common (C. H. B.).

12th.—Small flock of Linnets seen, and Chiffchaff heard in Richmond Park (E. K. F.).

16th.—About one dozen Little Grebes on Barrow Green (C. H. B.).

22nd.—Some twenty-five or thirty Goldfinches on Itchingwood Common (C. H. B.). Three Teal and first addition to numbers of Mallard noted on Penn Ponds. I might here add that the Teal no longer breeds at Richmond (Hudson, 'Birds of London,' p. 263).

23rd.—About a dozen Goldfinches on Littleworth Common.

29th.—Heron, a single Snipe, and scores of Black-headed Gulls at Kew, and Kingfishers on Thames at Richmond.

30th.—Grey Wagtail at Godstone; several French Partridges on the North Downs near Oxted; these birds are not uncommon on the lower parts of the hills (C. H. B.).

OCTOBER.

6th.—Flock of about four hundred Lapwings, two Green-shanks, twenty Goldfinches, and two immature Lesser Terns at Hedgecourt (C. H. B.). Mr. Bentham writes:—"The Green-shanks were resting on the mud near the water, and permitted me to approach quite closely, so that with a good glass I could plainly discern the slight upward curve of their bills. I noticed that they jerked their heads backwards in exactly the same way as a Redshank or a Ringed Plover will do. The Lesser Terns were busily engaged in fishing, . . . and I had many opportunities of studying them closely."

7th.—Kingfisher near Limpsfield (C. H. B.).

13th.—One Lesser Tern (immature), four Herons, and one Hooded Crow at Hedgecourt (C. H. B.).

14th.—Many small flocks of Mistle-Thrushes on the hills, and two Redwings arrived at Barrow Green (wind N.). A good many Swallows and a few House-Martins still haunting the marshy fields near Oxted (C. H. B.). Five Pochard, Sedge-Warbler, Bullfinch, Kingfisher, and great numbers of Coot (but no Lapwings) at Frensham.

15th.—Mr. Dickinson informs me that Swallows are still in full force at Carshalton. Several parties of Goldcrests amongst the furze on Limpsfield Common; two Hooded Crows and a small flock of Redwings near Titsey; Kestrels have been of frequent occurrence on the North Downs near Oxted during the last two or three weeks (C. H. B.). A good many Fieldfares and Redwings have been seen in most parts of Surrey this year, although, at Shere, Mr. Russell informs me that only a few of the former (and no Redwings) have been noticed, and that these only occurred during the sharp frost in late December.

19th.—An albescent Redbreast in the Terrace Gardens, Richmond, with breast and back white, wings and tail brown, but rufous colour absent except for a small spot on forehead; the legs were flesh-coloured (E. K. F.). I saw this bird later, and gathered that it had been there since June, whilst it was observed up to about Christmas.

20th.—A single Goldfinch singing in a garden at Oxted (C. H. B.). Tree-Sparrow at Ham; six or seven Kingfishers, eighteen Mallard, seven Herons, Grey Wagtails, Dabchick, Snipe,

and Bullfinches near Leatherhead. Pied Blackbird on Great Bookham Common.

27th.—Nine Crested Grebes—at least three young—and two female Pochard on the Great Pond ; and a mixed flock of Pochard and Coot on Frensham Little Pond ; also a solitary Golden-eye—probably a young male—which dived repeatedly, never remaining on the surface for more than thirty seconds (C. H. B.).

Date uncertain.—Albino Pheasant on Ranmore Common (H. Russell).

NOVEMBER.

4th.—Six Lesser Redpolls on alders at Godstone Pond, and at Lingfield on the 17th (C. H. B.).

7th.—Very mild. Song-Thrush singing at Sanderstead, almost as well as in spring (C. H. B.) ; and elsewhere (L. B. M.).

11th.—Three Goldfinches at Oxted ; Carrion-Crow at Titsey (C. H. B.). About this date there seems to have been an influx of Hooded Crows, and Mr. Bentham sends me several notes of having seen parties of varying numbers in his district. Generally speaking, it is probable that since “ the good old days ” this member of the *Corvidæ* has never been more numerous than at the present time. Grey Wagtails at Virginia Water.

18th.—A female Shoveler on Penn Ponds, in company with the pair of pinioned birds kept there, which no doubt attracted it. This may have come over from Kew Gardens. Two House-Martins on Richmond Hill.

25th.—Goldfinches near Barrow Green, and large numbers of Pigeons in different parts (C. H. B.). Pied Jackdaw at Barnes ; Hawfinch at Blindley Heath, two Kingfishers at Godstone Pond, and great numbers of Teal, Lapwings, Snipe, and Mallard at pond near Hedgecourt. There were probably some two hundred and fifty to three hundred Duck, three-fifths being of the smaller species.

Date uncertain.—Mr. Russell writes :—“ I saw a Hawfinch in the garden during November, and the gardener tells me that numbers with young used to visit the peas. They must have bred in the neighbourhood. I am told that on Leith Hill numbers come to the peas ; they are very shy, but not, I expect, very rare.”

DECEMBER.

1st.—Sparrow-Hawk at Croham Hurst.

2nd.—Female or young Golden-eye at Penn Ponds. This was very wild, and would not allow a near approach, flying up every now and again to settle farther away. A few days later a friend got close to it two or three times by running along the bank whilst the bird was diving, but it always took fright on coming to the surface and seeing somebody near it. The bird's wildness certainly points to its being truly feral, and not a visitor from Kew.

9th.—A good many Teal, Snipe, and Mallard, two Herons, a Kingfisher, and three large Gulls—probably *L. fuscus*—at Hedgecourt, and Bullfinches in the neighbourhood.

16th.—Pair of Tufted Duck on Penn Ponds.

23rd.—Cold, hard frost. Wood-Pigeons cooing in many places about Oxted, and a Brambling on alders at Mill Pond (C. H. B.). Lesser Redpolls in small flocks reported from different parts. Seven Tufted Duck and Grey Wagtails at Hammer Pond.

24th.—Flock of Pochard, Coot, and Tufted Duck on Frensham Little Pond. A large number of Coot fell to the guns in the morning, but the ice stopped shooting to any extent. Woodcock flushed from heather on Stony Hill.

25th.—Numbers of Full and Jack (?) Snipe, but no Teal, by the River Wey at Elstead, having left the open country through the severe frost.

26th.—Flocks of Sky-Larks drifting over the snow-clad country, and immense numbers of Ring- and Stock-Doves in the woods.

30th.—Pied Blackbird at Titsey (C. H. B.).

In conclusion, I wish to convey my heartiest thanks to all correspondents who from time to time throughout the past year have so kindly forwarded me notes containing items of considerable interest. It is to them and through their unmerited kindness that the preparation of this report has been found possible.

DESCRIPTION OF WILD DUCKS' DOWN.

BY W. H. WORKMAN, M.B.O.U.

MR. HARVIE-BROWN, in 'The Zoologist' for October last, gives some most interesting descriptions and directions for dealing with the downs of various species of Ducks, which will prove very useful to many of us younger ornithologists who cannot get access to very early volumes of this Journal and the 'Ibis.'

When I read the above quoted paper I expected we should have a string of notes from collectors all over the country, with descriptions of the British breeding Ducks' downs; but, strange to say, nobody has taken up the thread. This made me look round my collection and amongst my friends for specimens of downs, and I am greatly obliged for kind help to Dr. Darling, Mr. Foster, and Mr. Malcomson—all experienced naturalists, and well acquainted with our birds. I have selected a few species from which the old birds were actually seen on or leaving the nest, and I think, with Mr. Harvie-Brown, it is much better not to give descriptions of downs from dealers, or not quite authenticated. I hope we will in time get together, in one journal, descriptions of all the British species.

I keep my collection in small glass-topped boxes, about two inches square, with a full description noted on bottom of each, *viz.*—name, locality, date, name of collector, and notes about parent bird being seen—then in the bottom I put a small piece of naphthaline to keep out insects. This plan, if one has not got down and clutches of eggs together, answers well, and the little boxes, when packed full, hold quite enough to show the colour in bulk, and look well kept in a cabinet drawer.

I examined the specimens given below in a good light, without sunshine, and I found the best way to hold the single sprays for Sommerfeldt's method was to catch the little shaft with a pair of forceps, or in the split at the point of a steel pen; this latter way I found very handy, as you can lay it down while writing

descriptions without its being blown away. The best method to hold the down is against a very dark background two or three feet away, when with a three-power pocket-lens the colour and construction can be carefully observed and noted. The pocket-lens suits much better than a microscope, which I found too powerful, giving too small a field; besides, putting the down between glass slips takes away from the natural shape and colour.

I find in Sharpe's 'Handbook of British Birds' a fair description of each down—probably in bulk—given after his note about the nest and eggs. The same is also given in Seebohm's 'Eggs of British Birds,' but not so good. I hope Mr. Dresser, in his new book, 'The Eggs of the Birds of Europe'—a work in which the three-colour process of photography has been so successfully applied to eggs—will make some attempt to adopt this beautiful printing to the Duck's down when he comes to describe their eggs.

I have included below downs of Mute Swan and Canada Goose, both found wild about here. I believe—at a lake in this neighbourhood—the keepers have tried without success to frighten away and shoot this latter species; it was, of course, originally introduced.

DESCRIPTIONS OF DOWNS.

SOMMERFELDT'S METHOD.	IN BULK.
<p>TADORNA CORNUTA. — A large white down loosely put together, with a very white centrum. Rami long and thin, with radii medium length, getting shorter as they approach the tip, where they lie much closer, and form into a hair-like ending; through the glass this appears to be made up of gradually shortening fine radii. (See Class A, No. 1.)</p> <p>CYGNUS MUTUS. — Down very large, all pure white; rami long; radii fairly short, lying close, and not getting much shorter towards the tip, as in Sheld-drake. (See Class A, No. 2.)</p>	<p>A. WHITE DOWN.</p> <ol style="list-style-type: none"> 1. <i>Sheld-drake</i>. — Down large and loose, of a dull grey white, impossible to pick out centres, which only seem a little whiter. 2. <i>Mute Swan</i>. — Down very large, not unlike No. 1, but tips not so fine; it is whiter. <p>B. WHITE-TIPPED DOWNS.</p> <ol style="list-style-type: none"> 1. <i>Mallard</i>. — Down dark brown, with fairly large white centres; the tips quite distinct, whitish brown; the down generally not compact, but feathery. 2. <i>Red-breasted Merganser</i>. — This down is light greyish brown, with

SOMMERFELDT'S METHOD.	IN BULK.
<p>ANAS BOSCAS. — A fairly thin light down of a dull brown; centrum pure white, fading through brown to the rami, which are long, with a greyish white tip composed of the rami and radii, which gradually get lighter at ends; radii medium length, lying close. (See Class B, No. 1.)</p>	<p>grey centres, and very decided grey tips.</p>
<p>MERGUS SERRATOR. — I cannot quite agree with Sommerfeldt's description, which may be quite correct for the down of a Northern European bird, but my specimen from Co. Down, Ireland, is a light <i>brownish grey</i>, not <i>bluish grey</i>; otherwise the description is very good. (See Class B, No. 2.)</p>	<p>3. <i>Canadian Goose</i>. — Down greyish brown, nearly white, about the size of <i>Mergus serrator</i>, with white centres and light tips; some centres much whiter than others.</p>
<p>BRANTA CANADENSIS. — This is a long loose down, with a general colour of light greyish brown to white. The centrum is white, with a dusty tinge. Rami long, and of a light brown, ending in a white tip. The radii are very fine, some having white tips; they seemed not so regularly distributed along the rami, but some may have got frayed off owing to their fine texture. (See Class B, No. 3.)</p>	<p>C. DARK DOWN, WITHOUT WHITE TIPS.</p>
<p>FULIGULA CRISTATA. — This medium-sized down is of a dusty brown colour, with a whitish brown centrum, not very distinct when viewed separately, more in evidence in bulk; rami fairly long, of a light dusty brown; radii, which are not long, mostly have a distinct white tip; this, I think, accounts for the general dusty colour. (See Class C, No. 1.)</p>	<p>1. <i>Tufted Duck</i>. — Down of a dull brown colour, with pale centres, nearly white just at the shaft. I think this could not be classed with white-tipped downs, although a few have pale tips.</p>

NOTES AND QUERIES.

MAMMALIA.

Notes on the Occurrence of Lesser Horseshoe Bat in Devonshire.— In view of the small number of instances in which the Lesser Horseshoe Bat (*Rhinolophus hipposiderus*) has been recorded as taken in Devonshire, and of the fact that none of these cases occur in the neighbourhood of Exeter, the following notes may be worth placing on record. Early in December of last year, being anxious to replace the existing old and faded Bats in the Royal Albert Memorial Museum, Exeter, I consulted a list of local mammals published in the 'Transactions' of the Devonshire Association, with the object of seeing what could be obtained locally, and there found a manuscript note stating that "both Greater and Lesser Horseshoe Bats were said to have been taken at Pocombe Quarry in 1879." This quarry is about a mile west of Exeter. Acting on this information, I visited Pocombe a few days later. There was no sign of either species in the quarry, but I took a male Lesser Horseshoe in the crevice of a rock near there, and on revisiting the place two days later found a second male not many yards from where the first was obtained. The second one I had alive for five days, but, although insects were placed in its box, it then died, apparently without having made any attempt to feed. My next expedition in search of Bats (Feb. 2nd) was to Duryard, not quite a mile north-east of the city. Here, in a large disused cellar, I found two males and one female, all hanging separately, but within eight or ten feet of one another. I was surprised at this, having always understood that the sexes usually, if not invariably, frequent separate retreats. These three were also kept alive, but one died on the ninth day, the other two on the tenth day. On February 16th I searched some limestone rocks about ten miles west of Exeter, and in a cave there found a male, which I replaced on the rock. It is curious that those kept should not have lived longer at this time of year, when they are supposed to be hibernating, unless under natural conditions they wake up and feed upon the insects in their retreats. There was certainly a large amount of insect life in the cellar, and in the cave visited yesterday, but, as far as could be seen, none in the rock where the first two were taken.

Those kept in captivity seemed hardly to change their position while I had them, and all died hanging to the rock which was tied to the top of their box. It is strange that in four outings in search of Bats I should have found six of this one species, which is nowhere considered common, without finding one of either of the reputed common species; and it probably points to the conclusion that—at any rate in this district—the Lesser Horseshoe Bat is not so uncommon as is generally supposed, for the fact that five males were found to only one female would lead one to suppose that several were overlooked, unless the proportion of males to females is very great. — EDWIN HOLLIS (Royal Albert Memorial Museum, Exeter).

AVES.

Fieldfare and Redwings in London.—On Feb. 7th last I saw a Fieldfare (*Turdus pilaris*) in Hyde Park. The following day it was still in the same place—among some shrubs near the band-stand, and several Redwings (*T. iliacus*) were there also looking for food. I do not think either of these are common visitors to London. — FLORA RUSSELL (2, Audley Square, London).

Smew and Mergansers at Yarmouth.—On Jan. 30th last a fine adult male Smew (*Mergus albellus*) was shot on Breydon. It is now fourteen years since the last old male was killed, which was shot on Breydon Broad, January 10th, 1893. This I purchased in the flesh (*cf.* Patterson's 'Nature in Eastern Norfolk,' p. 198), and, strange to say, both these birds were shot by the same gunner, Mr. F. Clarke. These birds are mostly met with during severe winters, like the present one, but then only sparingly. The sharp contrast in the male plumage makes it very conspicuous, while it is one of the most handsome, and also the smallest of the genus; but young birds are more often observed, and two were killed three days previously. A male Red-breasted Merganser (*Mergus serrator*) has also been shot in the neighbourhood, together with several immature Goosanders (*M. merganser*). — B. DYE (Row 60, No. 10, Great Yarmouth).

Eared Grebe in Belfast Lough.—I had the pleasure of examining, on Feb. 28th, a fine specimen of the Eared Grebe (*Podiceps nigricollis*), which was shot on the 28th by R. H. Leeke, Esq., of the Rifle Brigade, now stationed at Holywood, who brought it to Messrs. Sheals, of Corporation Street, Belfast, for preservation, where I saw it in process of setting up. It proved on dissection to be a male. This specimen was coming into summer plumage, the ear-tufts being well developed, and

the sides just beginning to change to chestnut-brown. This Grebe is now known to breed in England (*cf.* Zool. 1906, p. 315, where a most interesting note is published by Mr. O. V. Aplin), and, according to Ussher & Warren's 'Birds of Ireland,' it has occurred about twenty-one times in this country, but only about three records being stated for this part of Ireland, and so it may be considered a rare visitor to our waters. It was accompanied by two other birds, presumably of the same species. I hear a Snowy Owl was shot somewhere in the neighbourhood lately. This year Ducks of various species have been very common on Strangford Lough; they include Mallard, Wigeon, Sheld-drake, Shoveler, and Brent Geese.—W. H. WORKMAN (Windsor, Belfast).

Westward Movement of Birds during Snow.—As Mr. Ussher's request for observations from the south coast of England (*ante*, p. 33) has elicited but a single reply, and that from an inland locality (*ante*, p. 74), possibly the following notes from the Sussex coast may prove of interest, and lead to the publication of observations on this interesting subject from other localities. In this district the snow commenced during the night of Dec. 25th, and the following days witnessed a remarkable movement of birds along the coast. During the whole of the two following days there was an almost continuous stream of birds passing westward. My own observations did not begin until Dec. 27th, on which day the movement seemed to be mainly confined to Thrushes and Redwings; but I am informed that on the previous day both Golden and Green Plover were moving westward in considerable numbers. Snow fell again during the night of Dec. 27th, and I spent the whole of the following day on the coast in the vicinity of Rye Harbour. On that day the westward movement was still in progress, though to a much less extent, the species moving being chiefly Thrushes, Redwings, and Sky-Larks. I cannot say when the movement ceased, as I was unable to make any further observations during the next few days. I examined several Redwings that had been killed during the migration, and noticed that they were all in very poor condition. It may also be worthy of mention that at the same time there was a considerable influx of Bramblings in the Hastings district.—L. A. CURTIS EDWARDS (31, Magdalen Road, St. Leonards-on-Sea).

As confirming Mr. Robert Morris's observations (*ante*, p. 74) in Sussex, and in amplification of Mr. Ussher's suggestion (*ante*, p. 33), I desire to state that vast flocks of Starlings, Larks, Finches, and Lapwings passed over this town, flying due west, on Dec. 26th last. This flight was followed by a much larger migration on Dec. 27th, and the movement practically ceased on Dec. 28th. It is undesirable to

exaggerate, but I can truly state that this immense army of the feathered kingdom—flying from the bitter snow through the “hard froze fields of air” to lands of greater promise and of more genial climate—could only be estimated in numbers at hundreds of thousands; in fact, the flight was so remarkable that I have been much astonished that more notice has not been drawn to such a striking incident. The omission can only be explained by the fact that it is always easier to leave others to undertake an effort than to make it oneself. On the afternoon of Dec. 27th, I made an excursion to the fields some miles out of the town, and I found every patch of ground which was only slightly covered with snow comparatively alive with small birds, principally Larks, and along the seashore at the beach limit Finches—principally Chaffinches—were in large numbers. In the squares and enclosures of this town could be seen small flocks of Redwings and other members of the *Turdidæ*. An interesting question is—was this great movement at the end of December local only as regards the United Kingdom, or was it a vast influx of birds from Northern Germany and Holland? I am inclined to think that, considering the migration was such an extensive one, that it emanated from the Continent.—H. PETERS BONE (28, Adelaide Crescent, Brighton).

On Sunday, Feb. 17th, there was a considerable migration of what I think must have been almost entirely Song-Thrushes (*Turdus musicus*). I was walking home about midnight, and the whole time (some twenty minutes) frequently heard the well-known call-note; the birds appeared to be going from north-west to south-east, and must have been flying very low. I only heard once what might have been the note of the Redwing (*T. iliacus*). Since the cold spell birds—and particularly *T. musicus*—have been very scarce about here. The night of the 17th was very dark, with a westerly wind. Had this migration anything to do with the approach of the cold weather of the last few days? On Feb. 21st I saw eight Herons (*Ardea cinerea*) near here, standing together in a field away from the river. As we have no heronry to speak of within many miles, this number seems very unusual, and may possibly be accounted for by the gale then still blowing. On Feb. 22nd, though the ground was covered with snow, and a piercing wind blowing, a Chaffinch (*F. cælebs*) was singing, and a Wood-Pigeon (*C. palumbus*) was using its spring note; the latter are not at all common here this winter.—THEED PEARSE (Bedford).

Swiss Birds in July, 1906.—In my summer chaplaincy in 1906 I was not so fortunate in my observations as in the preceding year. My duty was at Thusis, at the entrance of the celebrated Via Mala, and, I
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might say, at the gate of the Engadine. The Hotel Via Mala, where we stayed, is delightfully situated just above the confluence of the Hinter Rhein, the Albula, and the Nolla, at a height of 2500 ft. above sea-level, and is about eighteen miles from Chur or Coire, the capital of the Grisons. It is surrounded by mountains, the highest of which is Piz Beverin, 10,000 ft. The scenery all round is of an enchanting nature, and until lately the hotels were crowded with tourists in summer; the number has, however, diminished since the Albula Railway to St. Moritz (thirty-eight miles) was opened, as many travellers prefer not to break the journey.

June 30th.—Arrived, and found many birds singing in the grounds of the hotel. In addition to our usual English songsters, I noted the Serin Finch and Black Redstart.

July 2nd.—Birds plentiful, but Crested Tit the only notable.

3rd.—Heard *Syrnium aluco* near Sils at 8.15 p.m.

4th.—Bonelli's Warbler very numerous; familiarized myself with its call-note.

6th.—Marsh-Warbler singing delightfully near the Albula. Cuckoos and Siskins also singing.

7th.—Beautiful morning. Charming bird-concert in the grounds—Garden-Warblers, Blackcaps, Blackbirds, Redstarts, Serins, and many more.

9th.—Whinchats near Canova; heard also *Picus canus* for the first time here. We often heard this bird at Schinznach and Strassburg last year.

10th.—Excursion to Bellagio *viâ* Splügen Pass. We occupied the banquette in the diligence which started from Thusis at 6.35 a.m., and passed through the Schamzerthal—"Schöne Wiesen, Wälder, Weisen." The only birds noted on the Pass—7056 ft.—were Alpine Choughs and Meadow-Pipits, though the Bernhardin close by was formerly called "Mons Avium" or "Vögelberg"—so many migrants passed by every year. We reached Chiavenna—"Schlüssel der Alpenwelt"—at 4.30 p.m., by those wonderful "zig-zags," and then went on by train and boat to our destination at Bellagio, on Lake Como, where we arrived at 9.10 p.m., after a memorable and delightful day.

11th.—Nightingales in full song close to our hotel, 'La Grande Bretagne,' and also near the Villa Serbelloni. A few Italian Sparrows also about, and the Black Kite, as usual, coursing over the lake. Bellagio is certainly a paradise, and if birds would sing anywhere, one would not wonder at them singing there, even though the time of the singing of Nightingales was past and over.

12th.—Left Bellagio for St. Moritz *viâ* the Maloja Pass at 8.42 a.m., and arrived at 7.55 p.m. The inscription on a house in Silva Plana took my fancy greatly—"Ille terrarum mihi præter omnes angulus ridet."

13th.—An almost unprecedented snowstorm, so that it was hopeless to search for birds, as I had intended. The hotels were crowded, and all the fires surrounded.

14th.—Left to return to Thusis. The country covered with snow, the mountains glorious, and the pines bending—some broken with the weight of the snow. As we slid down cautiously for about 3500 ft. in the wonderful Albula Railway, through avenues of pines, the sight was, indeed, marvellous. Some Americans in our carriage were loud in their admiration; one said, "it was an experience never to be forgotten"; whilst the Germans kept up constant cries of "Schön! Schön!" At Thusis we found shrubs, bushes, and part of the glass roof of our hotel broken down, and the director said that never in his experience had there been such a snowstorm in July before.

17th.—Crested Tits in the woods.

18th. — Kestrels—called here "Wanderli"—plentiful at Tarn, 5000 ft. We saw one Alpine Swift flying with the Common Swifts, and Herr Arpagaus pointed out to us a pair of Ravens in the field below the Pension Heinzenberg.

19th.—Heard notes which I could not for some time identify, but found afterwards proceeded from Alpine Swifts, high in the air; they seemed to be nesting in the Crapeig, about 5000 ft. high.

20th.—Rottanbrunnen. Sedge-Warblers singing, and Crag-Martins around the great rock over the Rhine.

21st.—Great fire on the Domeschleg nearly opposite; the whole village of Scheid destroyed save two houses.

26th.—Five Tits in evidence not far from the hotel—Great, Coal, Blue, Crested, Marsh.

As we left on the 30th, I was unable to add to my list of sixty-eight species on the whole tour to seventy-four in the year 1905.

It is remarkable that the following common birds at home were not observed:—Mistle-Thrush, Stonechat, Hedge-Sparrow, Sand-Martin, and Willow-Warbler. This last bird is very rare in most parts of Switzerland. — CHARLES W. BENSON (Rectory, Balbriggan, Co. Dublin).

N.B.—Perhaps some of your readers could mention localities in Switzerland where one would be pretty sure to observe the Alpine Accentor.

Marked Birds.—In the next number of our 'Annals of Scottish Natural History' (April) will appear a long list of numbers, which are those of soft zinc labels, which are attached to the *left* legs (for the most part) of Starlings, which have been caught, marked, and liberated during December, January, and up to the date of February 10th, 1907. I would be obliged by your giving this information a place in 'The Zoologist,' so that, should it meet the eye of any ornithologist, or other of your readers, who may succeed in recapturing any of the marked birds, the history of such may be traced—in part at least—since the date of their release in each case. I have sent a similar note of the facts to the 'Field.'—J. A. HARVIE-BROWN (Dunipace, Larbert).

PISCES.

Four-horned Cottus at Yarmouth.—For the first time, after many years' seeking, I saw a locally-taken *Cottus quadricornis*, a shrimper bringing me no fewer than three examples on March 3rd. They were all of tolerable size, the largest measuring $8\frac{1}{2}$ in. The ground colour was grey-brown, with lighter blotches on the upper surface, and an inclination to spottiness on the under parts, the lower part of the gill-covers being strikingly spotted with white. The eye, fresh as in life, was beautifully freckled with red. Considering the species is new to the county of Norfolk, three specimens coming in at one time is interesting. The head of one fish, which had been gutted for some reason by the shrimper, I forwarded to Mr. T. Southwell, who confirms my finding. One of the perfect specimens will go to the Norwich Museum, the other will be located in the Tolhouse Museum at Yarmouth. Along with *Cottus*, the shrimper also left me five examples of the Deep-nosed Pipe-fish (*Siphonostoma typhle*), a rather unusual number to be taken at one time.—ARTHUR H. PATTERSON (Ibis House, Great Yarmouth).

Fauna of North Wales.—This important work, on which I have been engaged for the last seven years, is nearing completion, and will shortly be published. I shall be glad to receive notes from observers who have not yet contributed to the work, so that they may be incorporated before drafting for the press. The area dealt with includes the six counties—Anglesey, Carnarvon, Denbigh, Flint, Merioneth, and Montgomery—and the entire estuaries of the Dee and Dovey. The mammals, reptiles, amphibians, and fishes (marine and fresh-water) are included, as well as the birds.—H. E. FORREST (Hillside, Bayston Hill, Shrewsbury).

EDITORIAL GLEANINGS.

PROF. THEODORE GILL has given us a real addition to the literature of bionomical ichthyology in his memoir on "Parental Care among Fresh-water Fishes" (from the Smithsonian Report for 1905). The writer remarks that the species which manifest care for their young are so numerous that in this publication he restricts himself to those inhabiting fresh water. To the question—"How did the parental instinct manifested originate?" Professor Gill considers it must be regarded as a development of an aptitude inherent in the fish itself; and the attribute of parental care is regarded as an "outcome of selfishness, or, if you will, self-love, a result of the sense of proprietorship. The eggs are the fishes' own, and therefore they and the resulting larvæ are to be cared for as such." Much information is reproduced from the publications of various societies, and from other sources little consulted by other than specialists, and very many illustrations are interspersed in the text. The memoir is well worthy of separate binding, and thus securing a place for handy reference among our other ichthyological volumes.

WE have received the first number of the 'Annals of Tropical Medicine and Parasitology,' edited by Prof. Ronald Ross, in collaboration with other well-known authorities. This part is largely entomological in matter, for, as well known, a knowledge of insects is now a most important factor in the study of many tropical diseases that attack mankind. "Insects and other Arthropoda collected in the Congo Free State" is the principal contribution, and is written by Mr. Robert Newstead, the late J. Everett Dutton, and Mr. John L. Todd. This paper must not only be consulted by the dipterous specialist—for new species are described—but the notes and observations relating to very many other species possess an importance far beyond what has hitherto been largely the entomological standpoint. From the technical description and enumeration of species (to which some of us must so largely devote our time), or the attractive speculation as to the meaning of so much apparent insect simulation (which claims the enthusiasm of other workers), it is a matter of the

greatest satisfaction and import to find entomology now a handmaid of medicine, and on the consulting list of anthropology.

PROF. POULTON, at a meeting of the British Association at Cape Town in 1905, delivered a lecture on William John Burchell, the materials of which, with a portrait of Burchell, appear in the Association Report, of which a reprint has been sent to us. As Prof. Poulton is preparing a fuller biography of this African traveller, nothing in the nature of a review need at present be contemplated. Burchell was both naturalist and traveller, and though, in a philosophical estimate, he cannot be placed with either Humboldt, Darwin, or Bates, he was a very distinguished observer and collector, and a great pioneer traveller. After a long life of scientific activity, he committed suicide when he had passed the eightieth year of his life, probably through mere weariness, as the work he had elected to do was then completed. Possibly he may have brooded on the absence of scientific recognition, but then his was a studious rather than a pushful nature, and he did not perhaps comfort himself with the reflection of Lessing, that "some people obtain fame, and others deserve it." Many interesting footnotes are added to the reprint of this lecture.

THE 'Bulletin of the Buffalo Society of Natural Sciences' (vol. viii. No. 4) is devoted to a review of the work done by the Society in co-operation with the Public Schools. We read that, "from the day of its inception, one fundamental principle has controlled the policy of the Buffalo Society of Natural Sciences. Realizing the important place which a great museum must eventually take in the educational system of its home town, we have always endeavoured to get into the closest and most effective relationship with the public schools of our city. Every facility which we had to offer to the student has been freely and continuously placed at his command. For years the science teachers of the city have been in the habit of bringing their classes to our building, and we have supplied them with room and materials for their work. In the study of geology, thousands of high school pupils have received great benefit from our collections of rocks and minerals, and our display of native birds and animals has been of the greatest help to the classes in zoology and natural history. At the beginning it was the custom for the teachers to accompany the classes, and take charge of their work while here, the museum offering simply its collections and rooms, no attempt being made to provide lectures or

instruction beyond what was displayed. In time, however, it was found that certain topics were of such universal interest that they would warrant special attention, and so the plan of special lectures for the schools came into being. A series of talks on 'Bees,' 'Birds,' and 'Insects' was arranged for Saturday afternoons, and were open to such of the grades as cared to come, and met with much success. The attendance at these talks was entirely optional with the classes, the Department of Education simply recommending that as many schools as possible take advantage of them."

THE 'Irish Naturalist' has made a most welcome innovation in publishing the issues for January and February in one cover, and devoting both entirely to the Natural History of Lambay, Co. Dublin. The island of Lambay lies in the Irish Sea off the coast of Co. Dublin, in N. lat. $53^{\circ} 29'$, W. long. $6^{\circ} 1'$, and has an area of 617 acres above high-water mark. With Mr. R. Lloyd Praeger were associated a number of other workers, and we have a full account of the Geology, Zoology, and Botany, with historical notes of this small island. It is beautifully illustrated, and we hope that this example may be followed elsewhere. No island is too small nor too near our coasts for this purpose, and the aggregate results of a number of these reports would probably afford some hints and data at present rather outside the purview of many of our local societies.

THE Director of the Zoological Gardens, Giza, Cairo, returned from the Sudan on the 25th December, 1906, and among the living animals he brought back were three young African Elephants (two males and one female) from the Blue Nile. One of the males has small tusks, the other is still quite a baby Elephant. These, together with the three female Elephants brought from the Blue Nile in 1905, now form a fine group of six African Elephants, a feature probably never seen before in any Zoological Gardens.

OBITUARY.

DR. J. W. STROUD.

WE have only just learned, and to our sincere regret, that Dr. J. W. Stroud died at Pretoria in November, 1905, in his seventy-third year. Dr. Stroud, who was a native of Bristol, had settled down in South Africa many years ago, in what may be called the pre-scientific days of that colony; and, although his name was little known in natural history circles at the time of his death, he had yet acted as a pioneer in days when to be interested in zoological pursuits and not in the quest for wealth was looked upon as at least an oddity. His two principal publications are to be found in the 'Transactions of the Eastern Province (South Africa) Naturalists' Society,' which was established at Port Elizabeth, and are entitled, "The Honey-Bee (*Apis mellifica*), its Natural History and Management" (1884), and "The Nervous System and General Anatomy of the Articulata, including Millipedes, Spiders, and Insects" (1885).

It was, however, in the almost nightly gatherings at his house in Pretoria that he did most to foster philosophical discussion. Men of the most diverse views gathered round a hospitable and versatile host, and evolutionary discussions were common in at least one Transvaalian homestead. We still remember with affection our old partner at almost nightly whist, and the manner in which the best hands were shattered by his tendency to shunt on to a biological or theological argument. In an atmosphere of embryonic millionaires, he seemed to strive for "neither poverty nor riches"; and, if Dr. Stroud left no great zoological publication behind, we can remember that in any cause the good that a man does lives afterwards.

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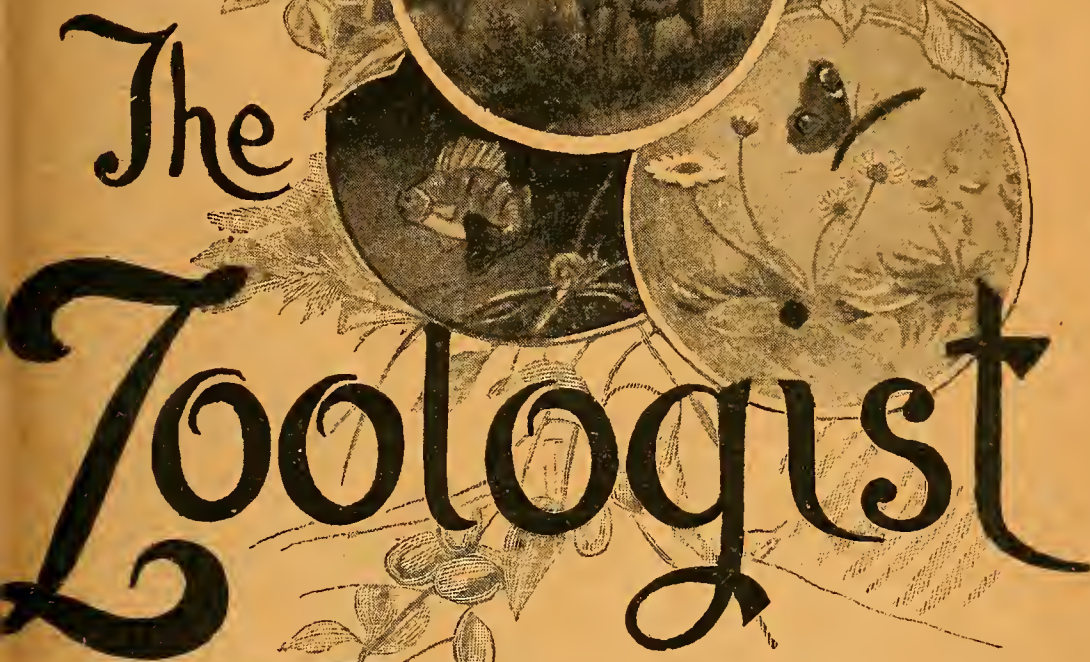
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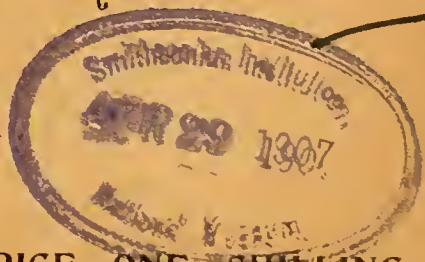
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THE ZOOLOGIST

No. 790.—April, 1907.

ORNITHOLOGICAL REPORT FOR NORFOLK (1906).

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

THERE is nothing very eventful in the Ornithological Budget of Norfolk Notes for 1906, or which calls for any special remark, except it be in connection with some rather abnormal movements.

Vernal Migration.—The spring migration of 1906 brought an unusual number of Black Terns, but only one Spoonbill. It also brought the customary flights of outward-bound Grey Crows. As a rule, in Norfolk, the flight of the Grey Crow, and of migrating Rooks also, takes place at less than a quarter of a mile high, but at Heligoland it is much higher. Gätke says these birds are often but mere specks in the sky, and sometimes only their calls are faintly audible from above when they themselves are out of sight. The visit of a small pack of Pallas's Sand Grouse to the east coast in June, though resting on imperfect evidence, may be accepted, and it is rather a matter of congratulation than otherwise that none were shot. It is now eighteen years since their great visitation to the west of Europe.

Autumnal Migration.—Certainly the presence of such a large number of Red-crested Pochards (*Netta rufina*) at the beginning of September was very exceptional, but the great heat may have been the cause of their coming, for it would tend to dry up

whatever lake or marsh they were using. If they had been immature one might have suspected them of being the produce of somebody's pinioned birds, but from their appearance they seemed to be adults. The great autumnal movement did not commence in earnest until Sept. 18th, but when it came it was far from being confined to Norfolk. In fact, the observations of Mr. W. Eagle Clarke, taken on Fair Island (Ann. Scottish Nat. Hist. 1906, p. 236), which is midway between the Orkney and Shetland groups, point to a wave of migration reaching from lat. 52° to lat. 59° . This extended front was chiefly made up of small birds (Passeres), but in Norfolk other Orders among birds were not unrepresented, as will be recorded further on.

The rarities for the year, so far as they have been communicated to the recorder, are:—January: Nyroca Duck (two). April: Stilt (?), Crane, Nyroca Duck (four). May: Ortolan Bunting, Bluethroat, Nyroca. June: Sand Grouse (?). July: Pelican. August: Purple Heron, Great Reed-Warbler. September: Red-breasted Flycatchers, Glossy Ibis (four), Red-crested Ducks (fourteen). October: Red-crested Duck. December: Whooper Swans (about one hundred and fifty).

As before, the letters "D. U." denote "date uncertain"; and the figures following the direction of the wind are used in the same sense as in the publications of the Meteorological Office—force 2 is a gentle wind, force 3 a breeze, force 4 a high breeze, and force 5 and 6 a gale.

My register for the rainfall was 25.43; that of Mr. Knight, which has been usually given, was 27.16. The effect on birds of the arctic weather which set in on Dec. 24th was very disastrous; very many perished.

JANUARY.

1st.—January, which opened with a sharp frost, brought a rarity with it—the Nyroca Duck, which the Rev. M. C. Bird has already alluded to (Zool. 1906, p. 75); while a still rarer one, if it had not escaped—the Baikal Teal—was taken in Essex.

5th.—A Water-Rail picked up at Tuddenham, with a Trout $3\frac{1}{2}$ in. long sticking in its mouth, which is by nature a small one (E. Gunn). About this time (D. U.) a Common Tern (immature) was, as I learn from Mr. W. Clarke, picked up dead on the edge

of Thetford Warren—a somewhat extraordinary place, and certainly a very extraordinary time of the year.

18th.—Received from Mr. Arthur Patterson a live Gannet, which, according to the fishermen's account, had been blown against the mainsail of a smack. Gannets are rather subject to accidents, especially when on the wing, and these misadventures no doubt generally happen in a fog; but in this case the bird may have seen some herrings on the deck. Though their sight is so acute at a distance, they have difficulty in distinguishing near objects, as I proved with this one, which, at the time of writing, is still alive on my pond. The usual buff colour on the head was barely perceptible when it came, but at the end of February it was recovering its tone, and in May this evanescent tint was fairly bright, but only to be lost again in October.

23rd.—A Nyroca Duck, shot at Culford, in Suffolk, after a gale from N.E., and shortly after another was obtained (Hon. L. Cadogan). Goosander seen at Hickling (A. Nudd).

29th.—Black-breasted Dipper at Snettisham (D. U.).

30th.—Goosander at Blickling (Miss Buxton), and some more about this date at Hoveton.

31st.—Some interest was aroused by the discovery, at this abnormal time of the year, of twelve young Partridges at Stratton Strawless, only a few days old. Of course there was not much chance for them. By Feb. 5th they were reduced to ten—as I learn from Mr. Birkbeck—and by the 22nd to two, and his keeper believes that these did not long survive. The temperature of the latter part of January was high, which may account for such early breeding.

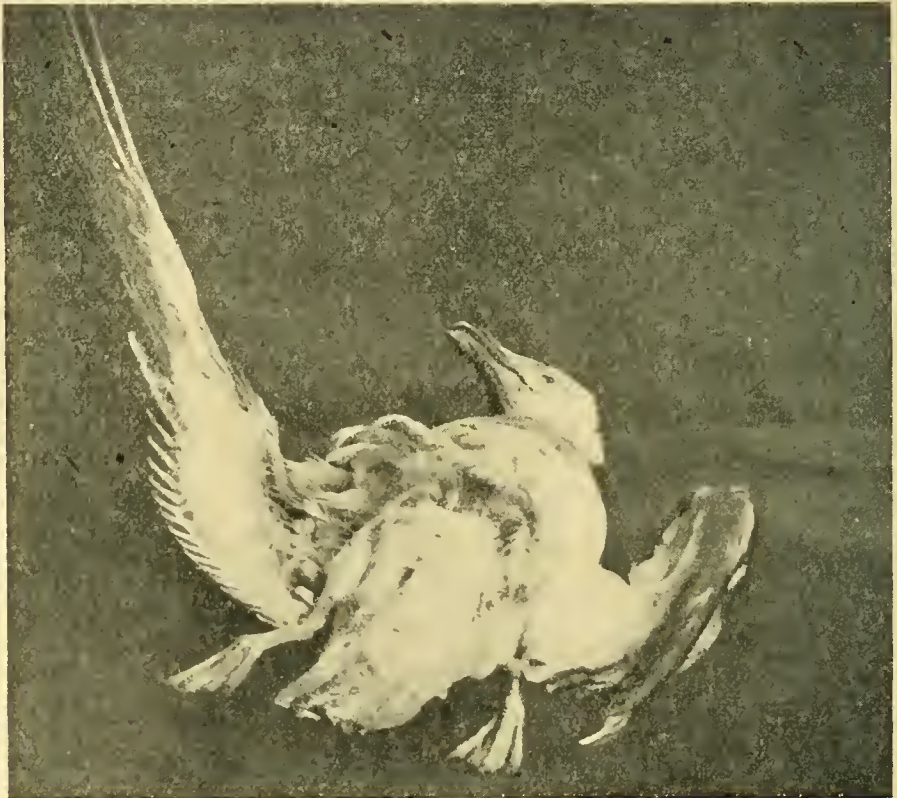
FEBRUARY.

1st.—February commenced with a sprinkling of snow, in spite of which there was a Thrush's nest with three eggs at Thorpe, and another with two eggs† at Eaton. The Pied Wag-tail returned with its accustomed regularity, and Mr. Nudd noted his first Redshank on the 3rd; but Mr. Bird had already heard of some at Irstead.

7th.—A beautiful day. All kinds of birds are now paired. The number of Thrushes on pastures is very large for the time of year; there must be many hundreds in Keswick and adjoining

parishes. Permanent pasture, especially in the vicinity of woods and gardens, is where they find worms, and here this thrifty bird may be seen at any time of the day, but especially after rain, quite motionless for some time, with head slightly turned as if listening, but in reality relying on their sharp sight which detects the slightest movement of the soil.

8th.—W.N.W., 4. *Birds killed by Lightning*.—About 2 p.m. a violent storm of snow and hail, accompanied by twenty minutes of incessant lightning, blew up from N.W. Such an



GREATER BLACK-BACKED GULL STRUCK BY LIGHTNING.

unusual combination caused a stampede among the horde of Pink-footed Geese—estimated by Mr. Alexander Napier at nearly four thousand—which every winter make the preserved marshes of Holkam their headquarters. These, flying about, exposed themselves to the electric fluid, with fatal results in several cases. Mr. H. M. Upcher says that altogether nineteen Geese were picked up in the adjacent parishes of Bayfield, Holt, Kelling, and Weybourne, which had been struck by lightning—*viz.* fifteen

Pink-footed Geese and four White-fronted Geese. Of the former, seven were lying more or less in a line, but in three adjoining fields, and these had possibly all succumbed to the same flash; in one† of them there was a rugged hole three inches long in the back, and I hear others were struck in the same place. Mr. F. A. Perkins states that the four White-fronted Geese, when found two hours after the storm, were lying a few yards apart, facing due south, three of them in a straight line down wind. In front was an adult gander, which had been struck on the back; one of the Geese was apparently uninjured, while another had been struck on the edges of both wings, but no doubt death was instantaneous to all of them. During the same thunderstorm a Greater Black-backed Gull† was struck at Lowestoft, of the *post-mortem* appearance of which Mr. Southwell has given an account (Norw. Nat. Trans. p. 326). A photograph taken after it had been stuffed by Mr. Roberts, in such a way as to show by the raised feathers the place where the lightning struck it, is reproduced (*ante*, p. 124).

11th.—Green Sandpiper at Intwood.

14th.—Red-throated Diver shot on the Little Ouse two miles beyond Thetford; when held up four Roach dropped from its mouth (W. G. Clarke). This was quite thirty miles from the sea.

16th.—Mr. H. Buxton saw four Green Sandpipers on the Dunston stream.

17th.—A female Ruddy Sheld-Duck shot near Thetford, as I am informed by Mr. W. Clarke—possibly an escaped bird; also a female Goosander the same week.

23rd.—Green Sandpiper at Keswick.

MARCH.

1st.—W., 5.—An exhausted Cormorant knocked over on Beachamwell Common (W. G. Clarke), where its presence must have been due to the gale.

3rd.—Bittern booming on the Broads (Nudd).

5th.—Another Green Sandpiper at Keswick, making seven in the same neighbourhood in less than a month.

6th.—W.S.W., 4. Grey Crows and Rooks going S.E. from 7 a.m. until 12 a.m. at Northrepps, about one mile from the sea (W. Burdett).

7th. — W.S.W., 4. Grey Crows going S.E.

8th.—W.S.W., 5. A party of five Goosanders on Gunton Lake—always a favourite place—seen by Miss Buxton.

16th.—W.S.W., 4. Grey Crows going S.E. at Northrepps from 6 a.m. to 12 a.m. (W. Burdett); the usual March emigration of these birds.

18th.—W.N.W., 4. Grey Crows going S.E. from 6.30 a.m. to 11 a.m., but the flight may have begun much earlier than 6 o'clock, when my gardener observed it.

APRIL.

6th.—N.N.E., 3. Grey Crows going S.E. in straggling flocks (Burdett).

10th.—Four Nyroca Ducks appeared on the Broads after a N.E. gale the day before (M. Bird). These southern ducks would certainly become commoner in the east of Norfolk if protection could be assured them.

11th.—E.N.E., 3. One flock of Grey Crows going S.E.

13th.—Several Gadwall, fifteen Sheld-Ducks, two Ruddy Sheld-Ducks (possibly turned out), and some Garganey Teal seen on Foulmere, in West Norfolk, by Mr. W. Clarke; and two Garganeys and a Sheld-Duck seen at Hickling by Mr. Nudd. There are a good many Wigeon still at Breydon, but Jary says they are beginning to pair off.

14th.—Hoopoe at Holkam (L. Mouritz), and another at Belton (W. Lowne). [Two were reported a few days earlier in Kent.]

15th.—For the last three weeks a fine Crane, but not adult, has frequented Ormesby marram-hills and adjoining fields in Caister, as I learn from Mr. Knights (*cf.* Zool. 1906, p. 194).

17th.—A pair of Garganey Teal on Breydon Broad (Jary); eight Common Teal† at Hempstead.

20th.—A Woodcock washed up on the beach (A. Patterson).

22nd.—An Osprey seen on the Broads (M. Bird). A Great Crested Grebe, photographed by Miss E. L. Turner in the act of removing in its beak a hatched-out egg-shell from its nest, which contained two young ones hatched on the 19th.

28th.—One Spoonbill came to Breydon Broad on a gale from S.E., but a high tide the same night drove it away (G. Jary).

29th.—W.N.W., 4. A Black-winged Stilt reported on the Broads, and also an Osprey (Nudd). I hope they were not shot, even though it leaves the identity of the former uncertain.

MAY.

3rd.—Six Great Crested Grebes† and seven pairs of Shovelers† on Hoveton Broad, and four Teal, one of which, by her actions, evidently had young ones. Last week (D. U.) Mr. Hewitt found two Teals' nests at Stow Bedon, one with ten eggs, the other with five. The number of Shoveler Ducks breeding at Hoveton is estimated by the keepers at nearly thirty pair.

4th.—Discovered a pair of Wrynecks building in an old Woodpecker's hole in a greengage tree, and close to the house. They were very noisy at first, their querulous "qui, qui, qui" being heard continually; but subsequently their cry was less loud and much less frequent, and had almost ceased by June 23rd, when the young ones were hatched, and could be heard hissing. Unfortunately, on the 29th an inch of rain fell, which, penetrating through a crack, drowned most or all of the young birds. The old Wryneck, in spite of their size, carried three of them out of the hole and to a considerable distance, one—and that the largest—being found at fifteen feet from the hole. These nestlings did not exhibit the thickened heel-pad studded with tubercles, described in the 'Ibis' (1890, p. 411), probably because they were too old, but the length of their tongues was remarkable.

5th.—Mr. Lowne had an Ortolan Bunting† (male), which had entangled itself in some netting in a garden on the outskirts of Yarmouth, and was brought to his shop alive. It was naturally very wild at first, but, being put into a small cage, it soon became steadier, and lived until the winter.

7th.—*Utility of the Barn-Owl.*—I do my best to encourage the Barn-Owl by putting up tubs for them to nest in, but unfortunately they are generally forestalled by Stock-Doves. From the recesses of a hollowed oak, which they frequented but did not nest in, there were to-day abstracted nearly half a pail of pellets, which, soaked in water, gave the following results:—Eighteen Finches (apparently Sparrows), two young Thrushes, eleven young Rats, twelve Field-Mice, and four Shrew-Mice. No

remains of game. It always makes my blood boil to see this useful bird proscribed by the unthinking gamekeeper. A few weeks afterwards another incident happened, which shall be related to the credit of Owls. A boy at Northrepps, noticing a young Long-eared Owl on the ground, concluded it had fallen out of its nest, which he searched for and soon found. The nest contained seven young Rats, which in a few weeks would have been full grown, and ready to prey on the young hand-reared Pheasants, of which these woods are full.

7th.—Eight Black Terns seen on Breydon Broad (B. Dye).

10th.—A gentleman photographed on the Broads a Garganey Teal's nest of eleven eggs; incubation already commenced. Two pairs had been seen a few days before (Bird).

11th.—A Water-Rail's nest with six eggs, and three Pheasant's eggs as well, found by a reliable observer on the margin of one of the Broads (Bird).

13th.—N., 2, stormy. Twelve Black Terns on Breydon Broad (Jary).

14th.—N., 4. Four Cormorants at Hickling.

15th.—N.N.W., 5. A good flock of Black Terns at Wells (D. U., Cringle).

16th.—Blue-throated Warbler at Potter Heigham (M. Bird).

17th.—Fifteen Black Terns on Breydon Broad (Jary).

24th.—A small boy found a nest of three eggs at Sculthorpe, near Fakenham, which are apparently those of the Marsh-Warbler (*Acrocephalus palustris*). The nest was on the bog, on the side of one of the big tussocks which grow to the height of about two feet. The boy brought the eggs to Mr. A. P. Macklin, by whom the photograph of them was taken. Mr. Macklin has compared them with continental eggs of *A. palustris*, and finds that they agree both in ground tint and markings (*cf.* illustration on opposite page).

29th.—An Osprey seen by Mr. H. Buxton on Fritton Lake, and on the same day two were seen on Hickling Broad (Bird); fortunately none of them were shot.

31st.—A Swallow which is building in our verandah was to-day rounding the inside of its nest with its breast, after laying on several good beakfuls of mud.

JUNE.

2nd.—Grasshopper-Warbler hatched (Bird), about the usual time. A pinioned Teal at Keswick has six eggs in the grass, which she carefully covers up with down when she leaves them (Knight).

4th.—Young Cuckoo in a Reed-Bunting's nest, two whole eggs and one broken one lying outside (F. Barclay). During this week a pair of Bitterns were flushed at Ranworth, as I learn from Mr. S. H. Long, who adds that one of them remained a considerable time.



EGGS OF THE MARSH-WARBLER.

6th.—A duck Shoveler leading seven young ones on Hoveton Broad (Barclay), and the following day, in a burrow at Wells, a Sheld-Duck's nest† containing two rotten eggs and several recently hatched-out shells. The old birds were in a creek not far off, but we did not find the young ones. This Duck has been steadily increasing from Wells to King's Lynn during late years.

8th.—Visited the Tern settlement at Wells with Mr. Hamond, which by his care and that of Lord Leicester has been for some years well protected. We found plenty of eggs, one nest† on the shore containing two Common Tern's eggs and a Ringed Plover's

egg, as shown in Mr. Philip Hamond's photograph. Mr. Hamond thinks there are not half as many Lesser Terns breeding here as at Blakeney, but more Common Terns. Mr. Napier thinks the latter have decreased at Wells, because during the last few seasons so many young ones of the first hatch have perished owing to inclement weather. I cannot hazard a guess as to how many nests there were, but Mr. Hamond counted one hundred and seventy on the beach (*cf.* illustration on opposite page).

10th.—Bearded Tit's nest with five young ones at Hoveton (Barclay).

11th.—Mr. R. Vincent, who is familiar with all our Broadland birds, writes to the Rev. M. C. Bird of his having seen a flock of about twenty Sand-Grouse on this day, "chattering as they flew over him." [Whether or not this identification was correct, there seems no doubt that six were seen in East Lothian at the end of May ('Field,' June 2nd, 1906). In July some more were reported to Mr. T. W. Nelson in Yorkshire, and two in Holland, on August 23rd at Scheveningen, to Mr. Blaauw, but in neither case were any killed. The loud "kutt-kutt" of Sand-Grouse as they fly in is sure to attract attention, the only similar note—and that hardly a comparable one—being the "teerp, teerp" of a flock of Bee-eaters.]

14th.—Expedition of the Naturalists' Society to Merton and Thompson Lake, where the members saw about twelve Tufted Ducks,† evidently breeding.

15th.—Four Grey Plovers, one of them in fine summer plumage, seen at Wells by Mr. Philip Hamond.

17th.—Ten Sand-Grouse seen by Mr. D. Annison at Somerton, as I am informed by Mr. Bird, probably a part of the same flock seen on the 11th; and Mr. Annison, being familiar with them in 1888, was qualified to identify them again. A Hooded Crow seen by Mr. Patterson, and a few days afterwards (20th) no fewer than ten were seen on Yarmouth north denes by Mr. J. E. Knights.

18th.—Black Tern on Breydon Broad (Jary).

21st.—Another Grey Plover at Morston (P. Hamond), and many Sheld-Ducks and several Turnstones.

24th.—Oystercatcher's nest at Blakeney, three eggs, examined

by the Duchess of Bedford and Mr. Hamond, the latter of whom also identified three Arctic Terns. It is some years since I have heard of an Oystercatcher's nest on the north side of the "Bar." A pair of Greenshanks also remained there during a part of this month.

JULY.

[5th.—The "Pagets' Pochard," which was taken at Saham in 1897, and which has been several times mentioned in these pages, died from eating some bread which had been doctored with "Vims" poison for rats. Every year it changed its plumage with great regularity, but it has unfortunately died in

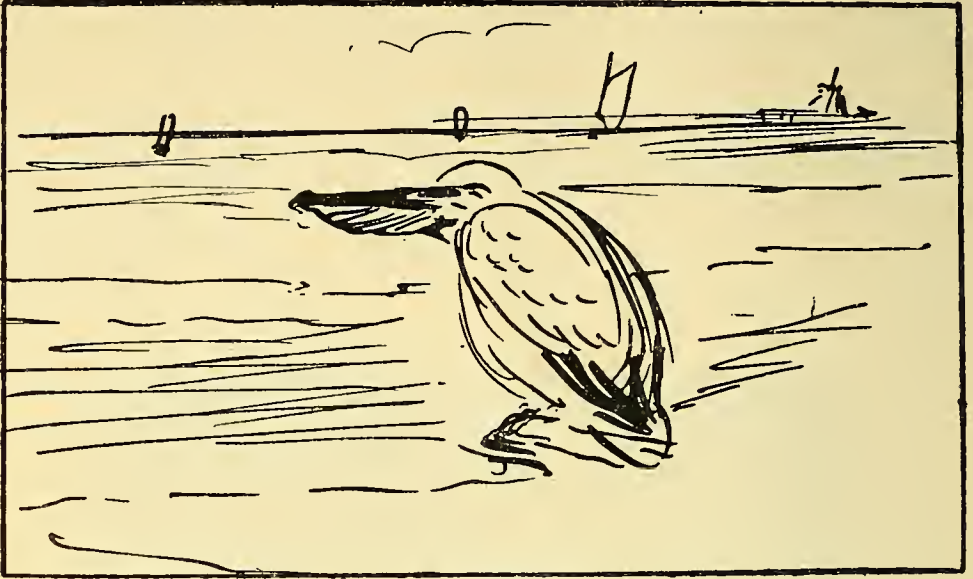


EGGS OF THE COMMON TERN AND RINGED PLOVER.

moult, when the characters of its hybridism were not shown at their best.]

21st.—S., 4. About 5 p.m. a Pelican was seen by the watcher on Breydon Broad, slowly winging its way from the sea. It was soon observed by Mr. Patterson, who made a sketch of it dozing at the edge of Duffell's Drain (*cf.* fig. p. 132). Four hours after arrival it was joined by a Spoonbill, both of them probably impelled by the same wind. It may have escaped from somewhere (*cf.* Zool. 1906, p. 193), but notices in 'The Zoologist' and 'Field' failed to find an owner; and it had not been turned out on the lakes at Woburn, although I understand from the Duchess of Bedford that the Duke has on previous occasions lost two or three. It took flight

the next morning, about 9.30 a.m., in an easterly direction, and four days afterwards was to be seen at Whitstable (R. M. Presland, *cf.* Zool. 1906, p. 431), where, in spite of being once or



PELICAN ON BREYDON BROAD.

twice shot at, it remained in safety until Nov. 20th, if not longer, as I learn from Mr. S. Saunders.

27th.—Black Tern on Hoveton (Barclay) ; adult in change.

28th.—Five Common Sandpipers and two Tufted Ducks seen on Hoveton Broad by F. H. Barclay.

AUGUST.

1st.—A Great Reed-Warbler (*Acrocephalus turdoides*) seen at Horning by Mr. Bird. As it was only fifteen yards away, and a good view was obtained of it clinging to some reed, with tail and wings half-spread, he can hardly have been mistaken. Mr. Bird also believes he saw a pair on the River Bure in July, 1886, about a mile from where this year's bird was seen. But even this is probably not its first occurrence in Norfolk (*cf.* Saunders's 'Manual of British Birds,' ed. i. p. 75). As it is a fairly common visitor in summer to the North of France, it is singular that it has not been identified more often in England.

2nd.—A young Great Crested Grebe drowned in a tunnel-net, into which it had squeezed itself through a hole not more than three inches in diameter (Barclay). The following temperatures

of Grebes' nests were taken this summer by Mr. Barclay :—First nest (three eggs) : air temperature, 59° ; water temperature, 61° ; nest temperature, 65.5° . Second nest : air temperature, 58° ; water temperature, 61° ; nest temperature, 62° .

8th.—Purple Heron† (immature) shot at Barton, where there is a broad (E. C. Saunders). It proved to be a male.

9th.—Garganey† (male) shot at Hoveton Broad (Barclay).

15th.—W. to S.W., 4. Spoonbill on Breydon; seen again on the 17th, 18th, and 20th (Patterson). This or another was subsequently shot at Aldeburgh, in Suffolk, where I learn from Mr. Clarke of five being seen (D. U.).

20th.—A Flamingo, with a fractured leg but perfect wings, captured near Dereham, was kept alive for a few days by Mr. Dillistone (W. G. Clarke).

21st. — Little Gull and Black Tern on Breydon Broad (Jary).

22nd.—Saw a Bearded Tit in its peculiar first plumage, and heard several others, which my companion imitated, as they will sometimes answer to a call.

23rd. — Another Flamingo, which, as already announced (Zool. 1906, p. 393), had been previously seen in Suffolk, shot on Morston sands. A third was reported later in the 'Aldeburgh Times' on the Woodbridge River, and yet another on the coast of Holland, where also one was shot in November ('Field,' Dec. 15th, 1906). It is possible that all these had escaped from the lakes at Woburn, where the Duchess of Bedford informs me the Duke turned out some full-winged Flamingoes during the summer, which the great heat at the end of August may have driven to the coast. One, if not more, was known to have flown away from Woburn. Baron van Schauburg also informs me of one having been lost from Lady Dunleath's park in Ireland. If turned-out birds were ringed on the leg, with the owner's initials stamped on the ring, their identity would be, comparatively, easily established. White metal interlocking rings can be made of any size to fit birds' legs.

30th.—Thousands of birds of all sorts on Breydon Broad, but the close-time ends to-morrow (Jary), when there will be plenty of gunners after them.

SEPTEMBER.

(The rainfall during September was only 1.15 in.)

1st.—Therm. 88.4°. Grey-headed Wagtail at Blakeney (H. Pashley).

2nd.—Six Black Terns on the Broads (R. Gurney), and two on the coast (A. Ritchie).

3rd.—S., 2. A little flock of four Glossy Ibises seen on Breydon Broad were, Mr. Patterson assures me, well identified. There must be some connection between their advent and that of the thirteen Red-crested Pochards on the 4th, and the great heat-wave we are having—93° was registered to-day by Mr. A. W. Preston on a screened thermometer, and 92.2° yesterday. These Ibises were soon disposed of, for I presume they are the same which were shot in three different places in Ireland and one in Sussex shortly afterwards. Another was also killed in Devonshire (*ante*, p. 21).

4th.—N.W., 4. Immediately following the party of Ibises—and impelled no doubt by the same cause—came a misguided flock of thirteen Red-crested Pochards, which settled on Breydon Broad (Zool. 1906, p. 394), never to return. Eight† were taken to Mr. E. Saunders, who, from the worn state of their tails, and their abraded plumage (particularly on the breast and lower parts), justly formed the opinion that they were all old birds. They certainly are in complete eclipse of plumage, even the drakes being quite dun-coloured all over, but with darker heads.

8th.—As announced in the 'Field,' another pair of Red-crested Pochards met their fate on our principal Broad; the remnant of the flock already mentioned.

12th.—S.E., 1. A second pair of Red-crested Pochards on the same Broad as the last, but, more fortunate than the pair on the 8th, they escaped.

18th.—N.W. [E.N.E., 6, at Yarmouth.] Mr. Pashley considers that the first of those "rushes" of small birds which come to our coast almost annually commenced with the northerly gale on this day. As usual, the tide of little migrants ran strongest on that portion of Norfolk which lies between Wells and Sheringham, where more migrants make land than probably in any other place in England.

19th. — E.N.E., 5. The passage of birds continuing, the following species were among those recognized by my correspondents, Mr. E. C. Arnold, Mr. Power, and Mr. Napier, who, I may say in passing, seldom use the gun where binoculars will serve for identification:—Lesser Whitethroats, Pied Flycatcher (one), Red-backed Shrike (one), Tree-Pipit, Wryneck, Red-breasted Flycatchers (two young birds), Blackcap (one female), Garden-Warbler, Sedge-Warbler, Goldcrest, Bramblings (three), Snow-Bunting, Reed-Buntings, Redwings (five), Wheatears (many), Redstarts, Bluethroats (immature and adults in change). Mr. Arnold, who was watching the movement from a boat at the mouth of the Glaven, never remembers seeing so many small birds cross the estuary, most of them being Wheatears, and it seems that they were moving in a south-easterly direction.

20th.—N.E., 5. The passage continuing, many Redstarts, three Bluethroats (Power), a Redwing, and one immature Red-breasted Flycatcher—a species which is now an almost annual visitor—were among the birds recognized. Mr. Arnold met with a Little Gull, which he describes as a very young one, and an immature Buffon's Skua was caught on the River Yare (Lowne). [It may be mentioned that on this day Mr. Eagle Clarke saw several Red-breasted Flycatchers at Fair Island (*cf.* Ann. Scott. Nat. Hist. 1906, p. 236), and that in North Lincolnshire a Buff-breasted Sandpiper was shot by Mr. Caton Haigh.]

22nd.—Ring-Ouzel at Northrepps, Solitary Snipe at Briston, Buffon's Skua at Potter Heigham (Lowne). [Rustic Bunting seen in Lincolnshire by Mr. Whitaker (*cf.* Zool. 1906, p. 392).] During the next few days two Dotterel and a Greater Spotted Woodpecker were reported (E. Saunders), as well as a Common Buzzard at Heacham (R. Clarke), a Honey-Buzzard at Stratton Strawless, and two Harriers (?) at Yarmouth. Also a Fork-tailed Petrel.

29th.—N.W., 3. A young Gannet picked up by a railway porter on the line at Thursford, which is eight miles from the sea. It was very thin when I received it, but with careful feeding was brought round, though an injured wing, which seemed to have received a blow, never recovered its normal position.

OCTOBER.

(A fine month ; temperature exceeding 60° on eighteen days, A. Preston.)

2nd.—S.W., 4, raining. Observed a good many Thrushes, Starlings, Sky-Larks, &c., moving against the wind. The plaintive wails of a pair of Red-throated Divers were quite audible from the shore, and while watching them a Buzzard passed with a flock of some seventy Rooks, with which it had joined company.

23rd.—S.E., 3. Received from Mr. Patterson a Red-throated Diver,† which retained quite a third of its red-neck patch, and a few days afterwards (30th) he showed me another which had moulted every primary and secondary quill in its wings, so that for two or three weeks it must have been much at the mercy of the tide. A Red-crested Pochard,† a male assuming its adult plumage, shot at Potter Heigham (E. Saunders).

24th.—Four Pink-footed Geese shot by Mr. Hamond.

25th.—Thousands of Fieldfares coming in at Wells (P. Hamond).

29th.—N.W. to W.S.W., 5. At 10 p.m. a Woodcock passed through Howard Street, Yarmouth, and settled on one of the Town Hall windows, being ultimately captured (B. Dye). Many migrants watched arriving (Ramm).

30th.—S., 6. Mr. Pashley was informed by shooters of their seeing from one hundred and fifty to two hundred Black-birds (which were unable to make headway against the gale which was blowing) round or near to an old railway carriage which had been placed for shelter about two hundred yards from the sea.

NOVEMBER.

2nd.—Little Gull at Cley, and a very late Wheatear ; also some Shore-Larks and Lapland Buntings (Pashley).

3rd.—Two Gadwall and a Golden-eye shot on Hickling Broad.

5th.—Mr. R. Gurney shot a drake Velvet Scoter at Hickling, as well as some Scaup, Shovelers, Pochard, Wigeon, and Mallard. Seven more Scoters were seen (Nudd).

7th.—A Little Grebe picked up in St. Swithin's Alley, which

is in a crowded part of Norwich (T. E. Gunn). These little birds have been more plentiful than usual; a day or two ago there was one in a garden-pond at Keswick, and close to a large house.

8th.—Eared Grebe on Breydon Broad (J. Knights).

9th.—A Great Crested Grebe† caught on a small pond at Siderstrand (S. Hoare); very thin, the stomach packed with its own feathers, which were apparently the only thing it had had to eat for some time.

10th.—Mr. Pashley received a Little Gull.

19th.—Little Gull at Yarmouth (Dye), the fifth this autumn—perhaps from Denmark, where they breed.

20th.—Mr. R. Gurney saw a Goosander and a Glaucous Gull on Hickling Broad.

23rd.—Three Bean-Geese out of five shot by Mr. F. Clarke (Dye).

24th.—A young Whooper shot at Hickling by Mr. R. Gurney (D. U.).

DECEMBER.

2nd.—A herd of eleven Whooper Swans seen on Hickling Broad by the keeper (Bird).

3rd.—W., 5. A great passage of Bramblings at Holkam, near the sea, where thousands mingled with other small birds, watched coming in by Mr. A. J. Napier, who informs me that they remained in Lord Leicester's park for several days. The direction and force of the wind—"west, 5"—which they had been flying against probably accounted for their not having made land before daybreak. About this time or soon afterwards considerable flocks were reported at Rollesby, St. Faith's, Hanworth, and Wroxham. We have not had what may be called "a Brambling year" for some time.

24th.—A very sharp frost set in. Hundreds of wildfowl reported by the Yarmouth naturalists to be going south.

26th.—Heavy snow fell during the night, and by 12 a.m. it was thirteen to fifteen inches deep on the level, exceeding, in the opinion of Mr. A. W. Preston, who has studied meteorology for many years, all snowstorms since January, 1881.

27th.—Frost very sharp; thermometer in my garden down to ten degrees. The Rooks—poor things—very hard pressed,
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even driven to eating a dead sheep, which, with the help of one or two Grey Crows, they reduced to a skeleton. A general movement of starving Redwings, Sky-Larks; and other land-birds reported by Mr. Patterson and Mr. Knights to be taking place to the shore, where the frost is much less penetrating.

28th.—*Effects of the severe Frost and Snow.*—To-day, between the edge of the snow and low-water mark, troops of birds were seen by Mr. Patterson passing incessantly, consisting of Fieldfares, Blackbirds, Redwings, Thrushes, Sky-Larks, Rooks, Tit-Larks, Linnets, Twites, and even Goldfinches; but I did not hear of any Wood-Larks. So close were the flocks, writes Mr. Patterson, that no sooner had one lot passed than another was in sight. Hour after hour, some of them almost within arm's length, they struggled on silent and weak for want of food. It would be interesting to know what became of all this host—whether they crossed the mouth of the Thames, and whether after that they attempted the English Channel, or were they among the thousands seen on the coast of Sussex ('Field,' Jan. 5th, 1907). One effect of this severe weather was to bring us a larger number of Whooper Swans than Norfolk has had for sixteen years, but they went almost as rapidly as they came. One flock which passed over our largest Broad is said to have numbered one hundred and fifty Swans, and about the same quantity were seen at Blakeney (Upcher). Probably they were the same, and it may have been the breaking up of this large herd which accounted for five at Northrepps, five at Ingham, seven at Lowestoft (H. Bunn), thirteen at Surlingham, twenty-five at Calthorpe (R. Gurney), twenty-five at Caister (Knights), sixty at Breydon (Patterson), thirty-four at Fritton (H. Buxton), and twenty at Hoveton. No Bewick's Swans were shot, but I learn from Mr. Bird that at least one flock belonged to this species. In three days' time all these Wild Swans had passed on, and, as a matter of fact, I believe the greater part of them did not remain in Norfolk forty-eight hours.

Various other wildfowl of sorts were seen, including several Geese and some good drake Golden-eyes, but between the frost and the gunners they had a hard time of it. Mr. Arthur Patterson reckons that not less than three thousand hungry Coots were feeding on the roots of *Zostera marina* on Breydon

Broad, which were a great attraction to the shooters; they kept much in line, and made quite an audible noise in tearing it up. One Coot† found its way to Keswick, and a Dunlin† was driven inland to Ranworth (Long). The poor Redwings were in great straits, and, I am afraid, Barn-Owls suffered; Sky-Larks fed on cabbages (Patterson), and Kingfishers moped on stakes or died of starvation. A Bittern was caught by a dog, but humanely released (Davies). Near Fakenham a Heron was seen holding down a live rabbit, and pecking at its back.

It appears (from the notes I received from Mr. E. C. Saunders and Mr. Patterson) that this Siberian weather had a disastrous effect upon the Great Crested Grebes, many of which, frozen out of the Broads, betook themselves to the tidal water of Breydon, where Mr. Patterson speaks of the falling tide leaving one in a hole on the ice, from which it could neither dive nor fly away. Another was knocked over with an oar, and another found dead on Horsey Warren (Saunders). One birdstuffer in Yarmouth had no fewer than eighteen brought to him!

VARIETIES.

January 9th.—Pied Blackbird at Keswick.

February 3rd.—Pied Blackbird at Keswick. 12th. Hedge-Accentor with a mealy tail.†

March 2nd.—Hedge-Accentor with white under parts at Overstrand (Davy). Brambling with black throat (Lowne).

September 3rd.—Partridge, grey variety, at Catfield (M. Bird).

October.—Pied French Partridge at Brandon (Gunn).

December 7th.—Another pied French Partridge shot near Brandon, and a third seen (Gunn). 11th. Cream-coloured Lapwing at Eaton (Gunn). 24th. Fawn-coloured Lapwing (Lowne).

Liothrix lutea.—With reference to an example of *Liothrix lutea*, recorded on the coast in November, 1903 (Zool. 1904, p. 215), the Duchess of Bedford informs me that about that time large numbers were turned out at Woburn, and this was probably one of them; several were seen about the fields at Woburn a year or eighteen months after being turned out.

SOME FISH NOTES FROM THE NORTH DEVON COAST.

BY BRUCE F. CUMMINGS.

I HAVE lately kept a record of any interesting fish that are caught from time to time off this coast, and have attempted to grasp the main facts of the distribution of fish in the Bristol Channel, as far as possible, from the catches which are landed on our shore at Clovelly, Ilfracombe, and Appledore, and elsewhere.

It seems that the fishing industry, as a whole, is not as good as it used to be, and the boats employed are not of a size sufficiently large for remaining at sea for any length of time, or weathering any of those sudden storms that so often arise in the Channel, and frequently prove disastrous to small craft unprepared for them.

The Herring gets scarcer every year, and during the season just ended (1906) fishermen have found it hard to get a living at all. Mackerel-fishing also is on the wane; the majority of the fish caught of this species and of the Herring are landed at Clovelly. Salmon, Bass, and Grey Mullet are in plenty at times in the River Taw, but of late years fewer Salmon seem to have been netted by the Barnstaple fishermen than were formerly.

The rocky nature of our coast no doubt accounts for the large numbers of Conger and Skate. One day, last autumn, off Lynmouth, on a single spiller, twenty-four Conger and nine Skate were taken, one of the Congers reaching a length of 77 in. Cod, Ling, Sea-Bream, Pollack, Plaice, and Whiting are among our characteristic fish.

Hake, Haddock, and the Red Mullet (var. *surmuletus*) are rare, and I do not think *Mullus barbatus* has ever occurred here. It is said that the steam-tractors from Wales catch them up before they reach us, although the Haddock appears to be generally rare off the Devonshire coasts.

Picked Dogfish, Small Spotted Dogs, John Doreys, Brill,

Flounders, Red and Grey Gurnard, and Soles are all common. Soles are sometimes taken in some numbers in the Taw river.

A Turbot (*Rhombus maximus*) taken in South Devon off Berry Head weighed 23 lb., and realized £1 9s. It is very rarely seen in North Devon. In 1905 one hundred and ninety-three Sharks were caught in Bideford Bay by the river fishermen within two or three days. One—carted to Barnstaple—was a small specimen of the Blue Shark (*Carcharias glaucus*).

A Torpedo Electric Ray (*Torpedo hebetans*), weighing nearly a hundredweight, and about five feet in length, was found stranded on the banks of the River Taw, near Barnstaple, on June 8th last year. It was in an advanced stage of decomposition, but was carried to Barnstaple and exhibited. Shortly after another was found floating dead on the water, also in our river, making the third captured here in three years, the one recorded in 'The Zoologist' (1905, p. 112) being the first. All three were picked up dead several miles from the sea. Possibly it was the foul water that had a fatal effect on them. It is considered a rare fish at Clovelly, where it is known as the "Numb-fish."

I saw an immense specimen of the Sea-Angler (*Lophius piscatorius*) a year or so ago, lying in a hand-cart at Teignmouth. It is often taken at Clovelly. In June, 1906, one was caught near the Salmon-fishing weir at Lynmouth. In the following July a man landed, with a boat-hook, a small one about 1½ ft. long, which was swimming just below the surface in our river, above Barnstaple. The man called it a "Bellows" fish, and said he had never seen one so far up the river before. It was very vicious, and a large rope placed in front of its nose was promptly seized by the teeth, and it allowed itself to be lifted off the ground rather than release its hold.

The Sunfish (*Orthogoriscus mola*) is frequent. Several seen in the little harbour of Clovelly in the summer of 1905. A large specimen was taken at Ilfracombe last year by a fisherman, who passed a rope under its big body, and so hauled it aboard. Another was captured in the same year at Lynmouth with a boat-hook.

Montagu's Blenny (*Blennius galerita*) and the Shanny (*B. pholis*) are common among the rock-pools at Santon.

In the summer of 1906 a Sturgeon (*Acipenser sturio*), weighing 124 lb., was caught at Clovelly, and also a Porbeagle Shark (*Lamna cornubica*), locally known as the "Bottle-nosed Shark," about 6 ft. long, in the Mackerel-nets. Three more of this species were brought ashore at Ilfracombe during October, and which were taken in the Herring-nets. The first measured 5 ft. 3 in., the second considerably smaller, while the third and largest was 8 ft. 2 in., being 3 ft. 11 in. around the girth. This monster played havoc with the nets. One man remarked that had they caught it in August, when Ilfracombe is full of visitors, they would have earned more money by turning showmen than by Herring-fishing all the winter!

A small specimen of the Sting Ray (*Trygon pastinaca*) occurred at Ilfracombe last year. I did not see it. A small Swordfish also is said to have been caught at Lynmouth. It is not safe, however, to accept the latter as a record, although it is probably correct.

The Broad-nosed Pipefish (*Siphonostoma typhle*) is common in the weedy parts of the Barnstaple river.

At Teignmouth, in South Devon, two Fox-Sharks (*Alopias vulpes*) were taken in the Sprat-nets and brought ashore during the early part of November.

During the early part of 1905 a Skipper (*Scombresox saurus*) was captured in the River Taw, and shown in the fishmonger's shop at Barnstaple. It is thought to be the first specimen ever captured here, at least in the river.

The Garfish (*Belone vulgaris*) is taken in the Mackerel-nets more or less frequently every season.

SPECIES, SUBSPECIES, &c.

BY J. A. HARVIE-BROWN, F.R.S.E., F.Z.S.

THERE can be no great harm—and there is assuredly a good deal of usefulness—in all this new subdivision of species into subspecies, forms, varieties, or geographical races by means of trinomial extensions. It has been done before, and no doubt will be done again and again. But it ought to be remembered that the greatest Innovator—Brehm—many years ago did the same for *species* binomially, and described as new to Europe some two hundred and odd “species,” but of which at the present time—A.D. 1907—scarcely a dozen are now recognized. In those days the knowledge of the plumages and simple seasonal changes even were not known, to say nothing of ages, nothing of geographical races, and nothing of the opportunities *then*, as compared with *now*; but surely that ought to have afforded Brehm more cause for caution than the vast stores of cabinetted specimens in our museums afford to more recent investigators. The practice is quite in keeping with what we know of Darwinian “evolution,” “survival of the fittest,” “variation,” &c., and of the teachings of Wallace in his ‘Distribution of Animals,’ and what we possess from many other recent authorities. But the question still—it seems to *me*—forces itself to the front place in all such considerations, *viz.*—Do we, with all our great series of specimens—hundreds and thousands of specimens of subjects from all parts of the world—do we *yet* possess an all-sufficiency of material? In even our largest collections, for instance, do we find we have a sufficient series of specimens of subjects from all parts of the world, male and female “after their kind,” and of every age from nesting, through all the moults, to maturity, and again on the down-grade, from maturity to old age and decrepitude? I ask for information. Well, if we *do* possess such treasures, why is it that there is no great general work which thoroughly treats of all these (innumerable?) stages of

youth, growth, maturity, and decline, or which give us satisfactory coloured plates of the same? If we do *not* possess these in all-sufficiency, and in large enough series at *every* intermediate stage, from *every* locality whence they can be obtained, why, then, should synonymy be further burdened, as it was burdened on the broader basis of *species* by Brehm? It is true we have many great works on British and European, American and other lands—birds, for instance—and it is true that in some of these we have *adult males* and *females figured*, and in some the “*young in down*” of Ducks and Waders. And it is true also we have many illustrations of certain species in some one or more of their immature plumages; but in how many—or any—of these great and splendid works has any attempt been made to efficiently illustrate a *full succession* of such plumages? Where, indeed, have any of such as have been given appeared, except as “*taking a back seat*,” so to speak? Why have we *never* had presented* those various stages of plumage of all localities, seasons, ages, &c., in intelligible foregrounds? Is it because the materials are still wanting in sufficient quantities to make sure? It would almost seem so, judging from the fragmentary records which are published. It seems to me that there are other questions, too—yet undetermined—which require further time and experience. Only a few of these need mention in order to show that some initiatory investigations are still required before—even with all the great collections in the hands of specialists—risks should be run in *multiplication of synonyms and trinomials*.

What do we yet know—or rather, what do we *not* yet know—about the extent and power of flight of migrants under scores of varying circumstances? What yet remains for us to learn of how far “birds of the year” migrate, and how far succeeding generations of birds of maturer years migrate? Do birds of certain ages migrate *at all*, and, if so, how far? Some we do know of, but surely not all; and does any collection display series of *all* ages from *all* localities of even our own British summer migrants? Even that collection may not yet vaunt completeness “*all along the line*”—in *all* the stages of change

* I do not speak of a few species here and there, but of the far more general treatment.

in plumages, or even growth of pinions!—and other equally strange developments, due to ages and sex, and climate and surroundings.

There are other phases of this question of congested synonymy which require considering, but I do not intend to discuss these here, except to add: that, at least, those who use this method to distinguish races, ought, I humbly think, to designate them by a geographical distinguishing name, and not by *nonsense* names; and ought to be also assured that these geographical names truly depict their distribution at all seasons, and during the whole phenomena of migrations and change of localities at different seasons—their *true* geographical range, in fact—or otherwise their geographical range during their nesting seasons where such differ from Linnean types.

SOME COMMON INDIAN BIRDS.

BY GORDON DALGLIESH.

THE new arrival in India cannot help being struck by the number of different birds that are to be seen in an ordinary garden, and even in the large cities and towns of the East bird-life is extraordinarily abundant. Though not nearly so many song-birds as one meets with in England, yet there are some which we can class as first-rate musicians, and others whose notes are at least striking and quaint. A pleasing feature with regard to a number of Indian birds is their remarkable tameness, and the reasons for this are not far to seek—one being that the “mild Hindoo” is very much averse to taking life, and natives with guns are few; another being that one is so accustomed out there to see birds of brilliant plumage, that this does not cause a sensation like in England, where, if a beautiful bird is seen—as, for instance, an Oriole or Roller—every gun in the place is out after it.

In the following paper I propose to give a short account of some of the common birds one meets with in an up-country garden. The nomenclature is that of Messrs. Blanford and Oates in the ‘Fauna of British India—Birds,’ vols. i.–iv.

HOUSE-CROW (*Corvus splendens*).—The old saying that “familiarity breeds contempt” is certainly true with regard to the Crow, for he is perhaps the most familiar of all Indian birds, from the large towns and railway stations right out into the heart of the country. Contempt for the whole human race he certainly has, and the only thing he stands in awe of at all is a gun, and at the sight of this he is off at once; and, as they say of the Rook in England, he seems to smell powder. Nothing in the way of food comes amiss to him, from dainty tit-bits from the *sahib's* table in the verandah down to the veriest filth and garbage of the bazaar. People accustomed to his nasty thieving and sneaking ways are apt to grudge him his scientific name of *splendens*, but in spite of his bad character it must be admitted that the name is an appropriate one. His whole appearance

reminds one very much of the Jackdaw, but his altogether heavier build and dark eyes distinguish him from that bird. His soft and glossy plumage of purple and green reflections, grey neck, and black cap, all tend to make him a beautiful bird. The House-Crow breeds from April to July, and, as well as having to rear its own brood, it often has in addition to bring up the young of the Koël (*Eudynamis honorata*), a parasitic Cuckoo that deposits its egg in the Crow's nest. The Crow is very fond of sipping the juice out of the pots of toddy, or native liquor, and occasionally becomes a victim to intemperance, and in this state falls into the hands of his most dreaded enemy, man, who is not slow to take advantage of the bird's helpless condition, and pay it out for old scores. One poor bird was once found by my people which had the lower mandible cut off by some rascally native, and it was hand-fed for some time on sopped bread.

COMMON INDIAN MAGPIE (*Dendrocitta rufa*).—Though not such a bold and cunning thief as its relative the Crow, the Magpie is not above petty larceny and murder. Dr. Jerdon tells of one which used to visit daily a cage of small birds he had in his verandah. It at first only fed on the seed given to the birds, but apparently tiring of this fed on the birds themselves, and was for this misdeed promptly executed. I myself have often watched it feeding on callow nestlings, and it is also very partial to garden produce, such as peas, beans, and fruit of all kinds; but its chief diet is the eggs of numerous small birds. Unlike our English Magpie, the Indian bird seldom descends to the ground, but confines its movements to the leafy foliage of trees, and is far oftener heard than seen, its note sounding like "kook ā lee." Unlike the English bird also, it makes no dome to its nest, though fond of building in similar situations, such as thorny trees and shrubs.

COMMON MYNAH (*Acridotheres tristis*).—I can never understand why Linnæus gave the specific name of *tristis* to this bird, as it is quite a libel on the bird's whole nature, for, far from being sad or melancholy, it is one of the most active and cheerful of our Indian birds. It is very likely Linnæus's description might have been taken from a stuffed specimen, and if such was the case then perhaps the bird as he saw it might well have looked sad and melancholy. The generic name *Acridotheres*, i. e. "grass-hopper-catcher," is much more appropriate, as the bird consumes

vast numbers of these insect pests. When the indigo is being brought into the vats the whole plant swarms with insects of all sorts and sizes, which delight the heart of the entomologist and the Mynah, and on these occasions both are in their glory. With stately and sidelong step the Mynah will pick the insects up at one's very feet, and, indeed, at times such as these it is remarkably tame, hardly troubling to get out of one's way. Despite its usefulness in destroying insects, the Mynah will at times commit sad havoc among the crops when the grain is ripe, and is only induced to leave by the shouts of numerous small and scantily clothed boys posted on a platform of grass and bamboos, known as a "machân," whose duty it is from sunrise to sunset to drive the Mynahs and other grain-eating birds from their crops. Even the veriest novice in ornithology can see at a glance that the Mynah is a thorough Starling. In its very actions, voice, and mode of nesting it closely resembles that bird, and, like it, lays pretty blue eggs of the regular Starling type. Nearly the whole of the Indian Empire is invaded by the Mynah, from Kashmir to Mergui, and it is found in the hills at moderate elevations.

Among other Indian forms which are more or less familiar there is the Bank Mynah (*A. ginginianus*), closely allied to the present bird; the Jungle Mynah (*Æthiopsar fuscus*); the Grey-headed (*Sturnia malabarica*) and Black-headed Mynahs (*Temenuchus pagadorum*), the last two being small birds, much prized by natives as cage pets; and the beautiful Pied Mynah (*Sturnopastor contra*), which in its form approaches very closely to the true Starling, and builds in societies on pepl and other trees large and untidy nests.

INDIAN ORIOLE (*Oriolus kundoo*).—One of the most beautiful of all our Indian birds that enlivens the too often dull monotony of the surrounding scenery. Its soft liquid notes, though not exactly amounting to a song, are much more pleasing than many of the songs of singing birds. Both this bird and the Black-headed Oriole (*O. melanocephalus*) are known to Anglo-Indians as "mango birds," the bright yellow plumage resembling the colour of the ripe mango fruit. Their beautifully suspended nests are made on the branches of sisso and pepl trees, from ten to thirty feet above the ground. Their food is fruit and insects, and they are never seen on the ground, but confine their attentions to the

very tops of trees. A resident for many years in India told me she once saw a Golden Oriole and a Roller perched on a clump of "morning glory," a plant of the convolvulus family with deep blue flowers, and she said that the light blue of the Roller and the rich yellow of the Oriole contrasted beautifully with the dark blue flowers, and was a sight—the whole being enlivened with brilliant sunshine—not easily forgotten. The Golden Oriole does not bear confinement well, and ought never to be caged, unless, of course, to send to England, where it would no doubt be thought a great deal of. The Indian Oriole ranges over the whole of India, where in the north-west it meets with the true Golden Oriole (*O. galbula*), a bird that has nested in England, and would doubtless continue to do so if not molested.

BLACK DRONGO OR KING-CROW (*Dicrurus ater*).—As soon as the faintest glimmer of dawn breaks through the eastern sky the sweet note of the Drongo is sure to be heard, as this is the earliest Indian bird to rise. The Drongo may well be called the most characteristic of our Indian birds, and the traveller is sure to see it everywhere, for a specimen is to be seen on every few yards of the telegraph-wire as one looks from the railway carriage window. I must confess to having a great liking for the King-Crow. Though by nature pugnaciously inclined, he is no coward, and, unlike the Crow, is honest in all his dealings, and will not hesitate to attack a bird much larger than himself—a bird even as big as a Kite—and is a most devoted husband and father. The King-Crow is a somewhat solitary bird, and does not fraternise much with other species, and jealously guards the post of vantage he regards as his own, whether it be telegraph-wire, tree-stump, or bovine back—for he has a great partiality for perching on the backs of cattle. His diet is purely insectivorous, and his mode of catching his prey is Flycatcher-like. In aerial evolutions he excels, and his curious twisting flight is very pretty to watch. The Drongo is so closely mimicked by a species of parasitic Cuckoo (*Surniculus lugubris*) that it requires a practised eye to distinguish the two birds at a glance. This impostor, trading on its likeness to the King-Crow, deposits its egg in that bird's nest. The King-Crow has a larger and handsomer relative, the Racket-tailed Drongo (*Dissemurus paradiseus*), which has its outer tail-feathers lengthened considerably into bare shafts feathered only

at the tip. When I was in Darjeeling I heard from the natives wonderful accounts of a king or rajah bird, which all small birds were said to follow to pay it homage. One was eventually shot and brought to me, which turned out to be the above-mentioned bird.

The Barbets are essentially birds of the tropics, occasionally ascending the hills to moderate elevations, and in their brilliant colouring, shape of their feet, and mode of nesting resemble Woodpeckers. Nearly all the Barbets of India are fruit-eaters, many of the African and South American forms being insectivorous. As soon as the really hot weather makes itself felt throughout the Indian plains the monotonous cry of the Crimson-breasted Barbet (*Xantholæma hæmatocephala*), or, as it is better known to Anglo-Indians as "Coppersmith," is heard almost without ceasing from morn to night. The notes sound like "tonk, tonk, tonk," and so closely do they resemble the hammering on a piece of metal as to almost deceive many people. Hence the name "Coppersmith." If one is sufficiently interested in birds as to wonder from which one's throat this curious sound proceeds, he will, if he looks carefully, discover, probably perched on the very top of some tall tree, two quaint little birds about the size of a Sparrow, but adorned with the most brilliant shades of green, crimson, and yellow. One of the birds sits perfectly motionless while the other one gravely bows to it, jerking out these curious metallic sounds in quick succession. When you have seen this you may know that these are a pair of "Coppersmiths" in love, and the male bird—the one who bows so gravely—is wooing his mate. These constant monotonous notes so get on our nerves that we often feel tempted to shoot the author of them, though no doubt they fall as sweet music on the ears they are intended for. *Chacun à son goût!* The "Coppersmith" is almost entirely a bird of hot weather. It is true one *may* hear them occasionally in the cold weather, but then only for a short time, and then the notes are only uttered in a half-hearted manner. The nesting arrangements of this bird, as before stated, are Woodpecker-like, the hole being hollowed out in a tree or bamboo, and the eggs, which are pure white, being laid at the bottom of the hole, with no lining at all.

(To be continued.)

NOTES AND QUERIES.

MAMMALIA.

Yellow-necked Mouse (*Mus flavicollis*) at Witley.—On March 14th last I found a dead specimen of this Mouse. It was the largest I have seen, and had the yellow pectoral band well developed. Unfortunately it was so decomposed as to render either preservation or the taking of measurements impossible. — GORDON DALGLIESH (Brook, Witley, Surrey).

AVES.

Curious Eggs of the Blackbird.—The eggs of Blackbird recently figured (*ante*, p. 98) may or may not now be unique, but at one time I possessed what appears to have been identical with them. The blank parts of the shell were clay-colour, and the zone or markings at the ends—some on the larger end, some on the smaller—were very minute black dots, almost coalescing, as if sprinkled on with a nail-brush. The above may prove interesting to your correspondent.—J. A. HARVIE-BROWN (Dunipace, Larbert, Stirlingshire, N.B.).

Early Nest of the Dipper.—In spite of the very severe spring weather we have had, I can record an early nest of the Dipper (*Cinclus aquaticus*). The bird commenced building on Feb. 15th, and her fourth egg was laid on March 16th, when she commenced sitting.—T. THORNTON MACKETH (The Hall, Caldwell, Uplawmoor, Renfrewshire).

Is the Grey Wagtail (*Motacilla melanope*) decreasing in Number? Now that we have the birds back to their breeding haunts, I would like to draw the attention of observers to the comparative scarceness of the Grey Wagtail in many of its hitherto favourite breeding haunts in the West Riding of Yorkshire, particularly so during the last three or four years. Not that I wish to make out that this species is now rare, but it certainly is not, in my opinion, so plentiful as, say, ten or fifteen years ago. Many of our little rock-strewn moorland streams, where at one time a pair or two nested, seem now to be deserted, for what reason it is difficult to surmise. The Yellow (*Motacilla raii*), on the

other hand, has increased considerably during the same period, and the Pied (*M. lugubris*), too, seems to be holding its own. The Grey—a great favourite of mine—is one that I grieve to find decreasing, for of all the graceful birds it surely must be admitted to be the most graceful, and perhaps, too, one of the most beautiful. Will other North-countrymen communicate their views anent its comparative scarcity or otherwise?—W. H. PARKIN (Studholme, Shipley, Yorks).

Curlews carrying their Young.—Last June a friend, . . . Great Salkeld, Cumberland, writing to a local newspaper, says:—“I had rather a strange experience with a young Curlew during the month. The Curlews had nested on the lower slopes of Wan Fell [close by Salkeld], and when the young were hatched they came into the fields near my house. I was very curious to know how the young birds managed to find the gates so as to get from one field to another, as the fields are mostly surrounded by stone walls, and so quite impassable for the young birds; and on one occasion I saw one young bird in a small potato-field surrounded by stone walls on three sides, whilst the fourth side was protected by wire-netting, equally impassable for the young one. I could not see how it was possible for the young bird to get in itself. I questioned the man who farmed the field, thinking it possible that he had placed it in there to destroy the insect pests, but he denied having done so, and said the old birds must have brought it in, as he was sure that they carried their young about from place to place. I have never seen them carrying their young, but have often wondered how the young, whilst still incapable of flight, have been conveyed over considerable distances in a very short time. This could be easily accounted for if the old birds actually do carry them. On mentioning the matter to my brother, he said he had noticed a Curlew coming from the top of Lazonby Fell one evening with a large lump, either held in its bill or pressed between its bill and breast, and it had gone down to a favourite swampy spot to feed. It is well known that Woodcocks carry their young from place to place, so that it is quite possible that Curlews do the same, and I shall be much obliged if anyone can give me any information on this matter.” Perhaps some of the readers of ‘The Zoologist’ will be able to throw some light on this interesting subject, as I can find no reference in my works on ornithology to the Curlew carrying its young, though in ‘The Zoologist’ for 1888, p. 301, there is an instance of a Golden Plover, and for 1892, p. 360, of a Lapwing, both of which are reported as using this method of defending their young.—T. C. PARKER (Carleton Derick, Penrith).

Glaucous Gull in Co. Antrim.—On the 25th of February last I received an immature specimen (in the flesh) of *Larus glaucus*, posted from Ballycastle, Co. Antrim. On writing to my correspondent, I learnt it had been shot by him on Rathlin Island on February 19th, it having been seen on the previous day with other Gulls, and was considered to be a stranger by its large size; it measured twenty-seven inches from tip of bill to end of tail.—W. C. WRIGHT (Belfast).

Grebe in Cheshire.—A Grebe of this species (*Podiceps nigri-llis*) was shot on the Dee Marsh, near Chester, in November of last year (1906). The specimen was in the possession of a taxidermist when I saw it, and he told me that it was handed to him as the Little Grebe. The stomach contained fish and insect remains, and other material which I was unable to determine. Two specimens are recorded in Dr. H. Dobies's list of the Birds of West Cheshire, Denbighshire, and Flintshire ('Proceedings,' iv., C. S. N. S.), and a third specimen is contained in the local collections of this Museum, which was procured at Tranmere, Cheshire, in December, 1897.—A. NEWSTEAD (Grosvenor Museum, Chester).

Movements of Birds in Time of Snow.—I have received the following notes from Mrs. Croasdaile, of Shanganagh Terrace, Killiney, a lady whose careful observations have been of great assistance to me when writing the 'Birds of Ireland.' The point that strikes me as most interesting is that, when the thaw had set in, Mrs. Croasdaile observed a return movement from the west, in which direction the flocks of birds had gone during the snowstorm.—R. J. USSHER (Cappagh, Co. Waterford).

"Exmouth, South Devon, 30th December, 1874. A snowstorm from the S.E., with great cold. Large flocks of Fieldfares and Redwings kept passing in a S.W. direction for some hours.

"31st.—Fieldfares and Redwings still passing in flocks this morning to the S.W. Snow and storm from the S.E.

"1st January, 1875.—Thaw and rain set in.

"2nd.—Snow gone.

"4th.—At 7 a.m. fine and still morning. A steady stream of Fieldfares and Redwings was flying in a N.E. direction. I could see them arriving across the sea from the South Devon and Cornwall coasts, evidently returning from where they had gone south-westwards in the snowstorm of December 30th and 31st. These flocks continued to pass until 9.30 a.m.

"N.B.—Very mild weather followed."—ANNA CROASDAILE.

Westward Movement of Birds during Snow.—We had no snow here on Christmas Day, but awoke on the morrow to find the ground covered with about six inches. I was shooting all day on the 26th, and so had ample opportunity of watching the many flocks of birds that were continually passing. Sky-Larks were by far the most numerous, but there were many Starlings (in flocks of twenty to fifty individuals), and a good number of Fieldfares and Lapwings. I was rather surprised to note that all the birds were flying *due south*, as I had an idea that such a migration would have been westerly or south-westerly. The birds were not following a river valley or range of hills, as the small valley in which I was runs S.S.W., and thus they were crossing it diagonally, and they had, of course, recently crossed the Thames valley at right angles. I would suggest the following theory with regard to this migration: The cause was, I think, the complete cutting off of the food supply by the snow—Sky-Larks, Starlings, Thrushes, and Lapwings being chiefly affected—and not the advent of cold weather. All those birds which happened to be situated away from the coast in Scotland and England immediately migrated due south, and probably anyone observing at any spot in the whole length of the Thames valley would have seen the migrants crossing it at right angles, as I have no reason to believe I was situated in a special line of flight. Those birds near the coast probably concentrated there, and followed the coast-line, as observed by Mr. Patterson. As soon as the migrants arrived at the south coast they turned west, eventually crossing to Ireland, where, having once been set in a westerly direction, they kept on as far as they could. Why they did not cross the Channel when they arrived at the south coast it is hard to say. Had they an hereditary instinct that the weather was likely to be even worse on the Continent than here? Yet, if this were so, why did not they start off in a westerly direction? As they refused the Channel crossing, why did they not refuse the crossing to Ireland? Was it simply that they had absolutely no other choice? At any rate, they seem to have followed the two sides of a triangle instead of going the shortest way. Mr. H. Peters Bone suggests that the great migration on the south coast emanated from the Continent. I think that, considering most of the birds from Scotland and England evidently arrived at the south coast, it is not necessary to suppose there were foreign migrants as well.—NORMAN H. JOY (Bradfield, near Reading).

Notes on some Welsh Birds in 1905 and 1906.—For ten days in 1905 and 1906 I had the opportunity of studying the birds on a little-known part of the Welsh coast. It was unfortunately rather early for

the majority of birds, but Ravens had nearly fledged young in their nests. We knew of five eyries both years, and probably over a dozen young birds were reared safely from them. Two nests appeared to have been harried—one by shot, the other by stones. In 1906 the former of these contained an egg and a very small young bird on April 21st, which was almost certainly the result of the second attempt that year to breed on the part of one pair of birds. A couple of days after the nest was empty. It was remarkable what difference there was in the attitude of the individual pairs towards intruders. The owners of the nest nearest the village at which we were staying, accustomed more or less perhaps to human beings, were very noisy and bold at the nest. A pair two miles away, whose young were about the same age, kept so quiet that it was often difficult to see them at all. They would keep perhaps half a mile distant, perfectly motionless and silent on the sky-line. The favourite way of spending the morning seemed to this family to be basking on a ledge just outside the nest in the hot sun. After the young Ravens had left the village nest—as I may call it—I witnessed a most interesting skirmish between a Peregrine and one of the old Ravens, the cause of which was that two of the young ones had got near the Falcon's eyrie (or where I suppose it was, for we found one near the same spot in 1905, and this year the birds were rather anxious if anyone approached). However, both combatants appeared to have doubts as to the advisability of closing. I afterwards saw one of these Ravens steal an egg from a Cormorant's nest—not, I think, spearing it, but carrying it in its beak. The other birds of prey were Sparrow-Hawks and Kestrels, the latter of which were common. A friend of mine succeeded in photographing a hen of the first-named species on its nest without much difficulty. This nest, which could be seen from a distance, contained five most beautifully marked eggs. A keeper of a large estate a few miles off told me that Merlins (!) bred annually in a belt of firs on his ground. He also said that he had several times seen a Peregrine kill a full-grown cock Pheasant; that the Falcon found the bird on the ground, and, after putting it up by repeated stoops, promptly knocked it over.

In the case of several species of birds, there was a curious fluctuation in numbers to be noticed. In 1905, on a projecting rocky head, there were several hundreds, I should think, of Puffins to be seen, and no other cliff-birds. In 1906 the opposite was the case. Not a glimpse of a Puffin was to be got, their places being taken by large numbers of Guillemots, which sat in lines on the cliff-face, or disported themselves in the water below. Again, in 1905 we saw no trace of Shags,

but the next year there was a whole flock of them. Cormorants, too, appeared to be commoner. The Shags were for some reason less timid than the Cormorants, and what makes this the more remarkable was that the former were not breeding, and the latter were. Of two Cormorants' nests, which were found side by side on a little point, one contained an egg. The next day the nests were deserted, and the egg lay unbroken six feet below, and directly underneath the nest it did not belong to. I am quite at a loss to account for this. If the Gulls were guilty, why was the egg not eaten? If the wind, why was it not smashed to atoms? A bird whose numbers were diminished in 1906 was the Stonechat. This lively but very cunning little bird could be called common in 1905, but was scarce in 1906. The ease with which nests of this and similar species, which delight in leading the observer astray, can be found depends very much on whether there are eggs or young in the nest. One nest which contained eggs took six hours of patient watching; another with well-grown young took about an hour and a half, and then, when the camera was set up near, the cock, particularly, showed little hesitation in coming to the nest. The Wheat-ears, too, were very cunning. The hen would go continually into the mouths of rabbit-burrows (which she had no real interest in), and then suddenly dart straight into her nesting-hole fifty yards away. Sheldrakes were common on some sand-hills farther along the coast. One of the prettiest sights there, I think, is to see two or three pairs of these fine Ducks flying over the sand-hills, while you hear the soft whistle of the drake. We did not succeed in finding a nest, perhaps because it was too early in the year. The only other species of Ducks seen were Mallard and two Common Scoters, these last being out at sea. Meadow-Pipits were very abundant indeed, and Rock-Pipits in smaller numbers frequented the rocks near the sea. The first year two nests of the latter were discovered with eggs, the owner of one of which I succeeded in photographing.

A large marsh, separated from the sea by a line of sand-hills, formed the breeding-ground of a great many Lapwings. One day a heavy hailstorm caught me there, and I ran for shelter into a hen-house close by. No sooner had I entered than a Plover settled down a few yards away with a hoarse "pee-wee," and three tiny young ones ran to meet her. I am sure that it was owing to the severity of the storm that the mother bird became so very bold and easily deceived. I found two of the youngsters, but the third absolutely baffled me. Snipe, too, bred on this marsh, and from the four eggs in one nest came faint squeaks, showing that the young were ready to come out.

Snipe were common on the whole both here and in another marsh some miles away. In 1905 a flock of about two hundred Dunlins frequented the shore for some days, in full breeding plumage; perhaps they were birds which did not breed that year. Ring-Plovers were fairly numerous. In 1905 I spent about an hour on a small piece of shingle without result, looking for a nest which, judging by the behaviour of two birds, I am sure was there. Last year, however, we found four nests with little difficulty amongst the rough grass on the sand-hills, where the eggs were rather conspicuous. One of my friends, on finding a nest, put up his camera to photograph it, when he was astonished to see the old bird come up and sit on the eggs for a few seconds. Before he could photograph her she was off again, and refused to repeat her conduct, even when the camera was hidden, and a long thread attached for the operator at a distance. None of the birds were the least demonstrative. Other Waders which were seen were a flock of Turnstones, on April 30th, 1906, and a few Purple Sandpipers, which kept about the low rocks on the shore for some days. These last were remarkably tame, the tamest wild birds I have ever seen (with the exception of a Knot in Yorkshire, which allowed itself to be photographed within a yard of the camera, which I held in front of me without any attempt at concealment whatever). Curlews were common, and bred, I feel sure, somewhere in the locality, though we failed to find them doing so. I only saw four Whimbrel the whole time I was there.

Three species of Gulls were noticed—the Lesser and Greater Black-backed and the Herring. Of the three, the last was much the commonest, the Greater Black-back being rare. The Gulls seemed to take little notice of the Peregrines. The only other uncommon (if they may be called uncommon) birds seen were Corn-Buntings, which kept up a terribly monotonous tune all day, Oystercatchers, a Razorbill, and a couple of Gannets in adult plumage. Unfortunately, no trace was seen either year of the Chough, which, according to the 'Birds of the County,' is confined to the locality about which I have been writing.—E. F. A. HAY (C. C. C., Oxford).

Notes on Kerry Bird-Life.—While on a visit to Kerry at the end of January and beginning of February, 1905, I spent some very pleasant days with the birds. Circumstances were favourable for making observations—the weather was mild and for the most part fine, the climatic conditions being much the same as they are in mid-April in the North of England. Bird-life was plentiful and varied—indeed, a much longer time might be spent in the locality with both pleasure

and profit. The particular district I have in view is very mountainous. Large tracts of bog are to be found in the valleys; on the hill-sides small lakes lie hidden, closely resembling the tarns of the North of England. Near by is a large bay—a river flows into it; the estuary is a very favourable place for observing the Waders, Redshanks flying up from the bay with a loud rush of wings in companies of twenty or thirty, and other species following in their wake. Rather farther down various species of Ducks may be noticed. The country is eminently suitable for the larger *Falconidæ*, and it was rather surprising that I did not meet with either the Common Buzzard or the Peregrine Falcon, though I believe the latter nests farther down the coast. The Tits were unaccountably scarce; the Blue Tit was seen in fair numbers, and a single example of the Great Tit was noticed, but that was all, though there were several localities which seemed to be suited to the requirements of the *Paridæ* in every respect. The Blackbirds and Thrushes were singing beautifully; nowhere else have I seen either species in such large numbers. Additional records of sea-fowl would probably have been obtained if I had been able to get farther down the bay, but upon the days I intended to go the sea was invariably too rough for the boat to venture out. The following notes only refer to the more interesting birds, all mention of the commoner species being omitted:—

The Snow-Bunting (*Plectrophenax nivalis*) comes first on my list. On only one occasion was this species noticed. There were about a score of them picking amongst the sand in a very lively manner; they were, however, very wild, and difficult to approach.

The Chough (*Pyrrhocorax graculus*), according to the natives, is much scarcer than of old. I first saw this species on the bank of a stream, about a mile and a half from the sea. There was a pair of them. On the ground they appeared to be smarter in their movements than the Rook, picking about much more quickly, and moving in a sprightlier fashion. On the wing it is, at a distance, impossible to distinguish them from the larger bird. The Chough often feeds in company with the Rook, the two species being on friendly terms. On one occasion two birds, one of either species, were observed feeding together; when disturbed they flew some distance, but again pitched within a yard or two of each other. Their call resembles that of the Jackdaw, but is pitched much higher. In another locality which I visited they are still common, as many as a score being occasionally seen together, though they more usually go in pairs. These birds appear to be very fond of perching on the peat-stacks, where they sit

with their wings drooping. I believe there are one or two inland crags in which they nest, but the site is usually very inaccessible; more often they nest in the sea-cliffs.

Only two Ravens (*Corvus corax*) were seen; they were flying high over the crag-tops near a secluded lake. They are scarcer inland than on the coast. These birds were croaking lustily, their harsh voices according well with the wild scene.

The Hooded Crow (*Corvus cornix*), which is better known to the Irish as the "Scaul Crow," was fairly numerous. Five or six of them could often be seen on the shore, some flying up and dropping shells, in order to break them and obtain the dainty morsel enclosed within. No Carrion-Crows were seen, but the Magpie was plentiful.

The only Owl observed was an individual belonging to the Short-eared species (*Asio accipitrinus*). It was disturbed from the centre of a large tract of waste land.

The Hen-Harrier (*Circus cyaneus*) was seen on three occasions—once inland, and twice near the sea-coast. Its flight at times closely resembled that of a Gull. More often it flew low, with a glide every few seconds, the wings being outstretched above the level of the back, as though about to alight. When crossing a fence the bird was noticed to rise just clear of it, and then fall below its level again. The natives called them "Sea-Hawks."

The White-fronted Goose (*Anser albifrons*) was present in fair quantities. One fine gander which I stalked weighed six pounds the day after it was shot. Wild Geese are proverbially wary birds, but it is wonderful how they have learnt to discriminate between anything which threatens their safety and things which will do them no harm. One would have thought that they would have been terrified by a railway train, but such is not the case, for on one occasion I saw a flock consisting of about twenty White-fronted Geese standing within a hundred yards of the line, and taking not the slightest notice of the passing train; yet if a man had appeared within two or three times that distance they would not have been long in making it greater.

Wigeon (*Mareca penelope*) were present in enormous quantities, spending the days out on the bay, and fighting on to the "slob" at dusk in order to feed.

Only one flock of the Scaup-Duck (*Fuligula marila*) was seen; it consisted of about thirty birds. Locally they were known as "Lake-Duck," though I never saw them anywhere but on the sea.

A fair number of Long-tailed Ducks (*Harelda glacialis*) were

observed. I first saw them when rowing out in the bay. The sea was rough; the Long-tails kept rising a foot or so above the water, and then dropping back again. When flying they usually went in parties of about half a dozen. They flew low, uttering their peculiar call, which sounded to my ear something like the word "cockle." In disturbed in a channel they refused to fly over land, but followed every turn of the water; thus they often came comparatively close to the boat. On rough days they were occasionally to be seen far up the estuary.

The Red-breasted Merganser (*Mergus serrator*) was common. The local gunners called them "Divers." They ascended the river at high tide every day, but were very difficult to approach. Three or four usually flew together.

The Rock-Dove (*Columba livia*) flies inland daily in order to feed, and is frequently shot when so engaged. The flocks commonly consist of about a dozen birds.

The Greenshank (*Totanus canescens*) was not very abundant. At low tide they were accustomed to fly up the river, and pitch in company with the Redshanks. On one occasion I encountered a flock of about thirty of these birds flying down the course of the stream, but this was exceptional, for at other times only a few odd birds were seen.

Both the Herring-Gull (*Larus argentatus*) and the Lesser Black-backed Gull (*L. fuscus*) were to be seen on the coast, the Black-backed species being also seen inland. On one occasion a Gull (I was too far away to identify the species) was observed to carry something up and drop it, no doubt in order to break the covering and get at the contents, after the manner of the Hooded Crow.

Single Great Black-backed Gulls (*L. marinus*) were often to be seen sitting solitarily on the edge of the sand, and were very shy and hard to approach.

The Great Skua (*Megalestris catarrhactes*) was noticed on several occasions; the sound of firing usually attracted them. No doubt they came in the hope of making a meal off a wounded bird.

The Black Guillemot (*Uria grylle*) was only seen on one occasion. The sea was very rough, and it was doubtless stress of weather that had driven these lively little birds inshore. There were about a dozen of them.

The Great Northern Diver (*Colymbus glacialis*) was not at all uncommon, one or two birds of this species being always in the bay. The Irish called them "Loons" or "Looms."—ERIC B. DUNLOP (The Howe, Troutbeck, Windermere).

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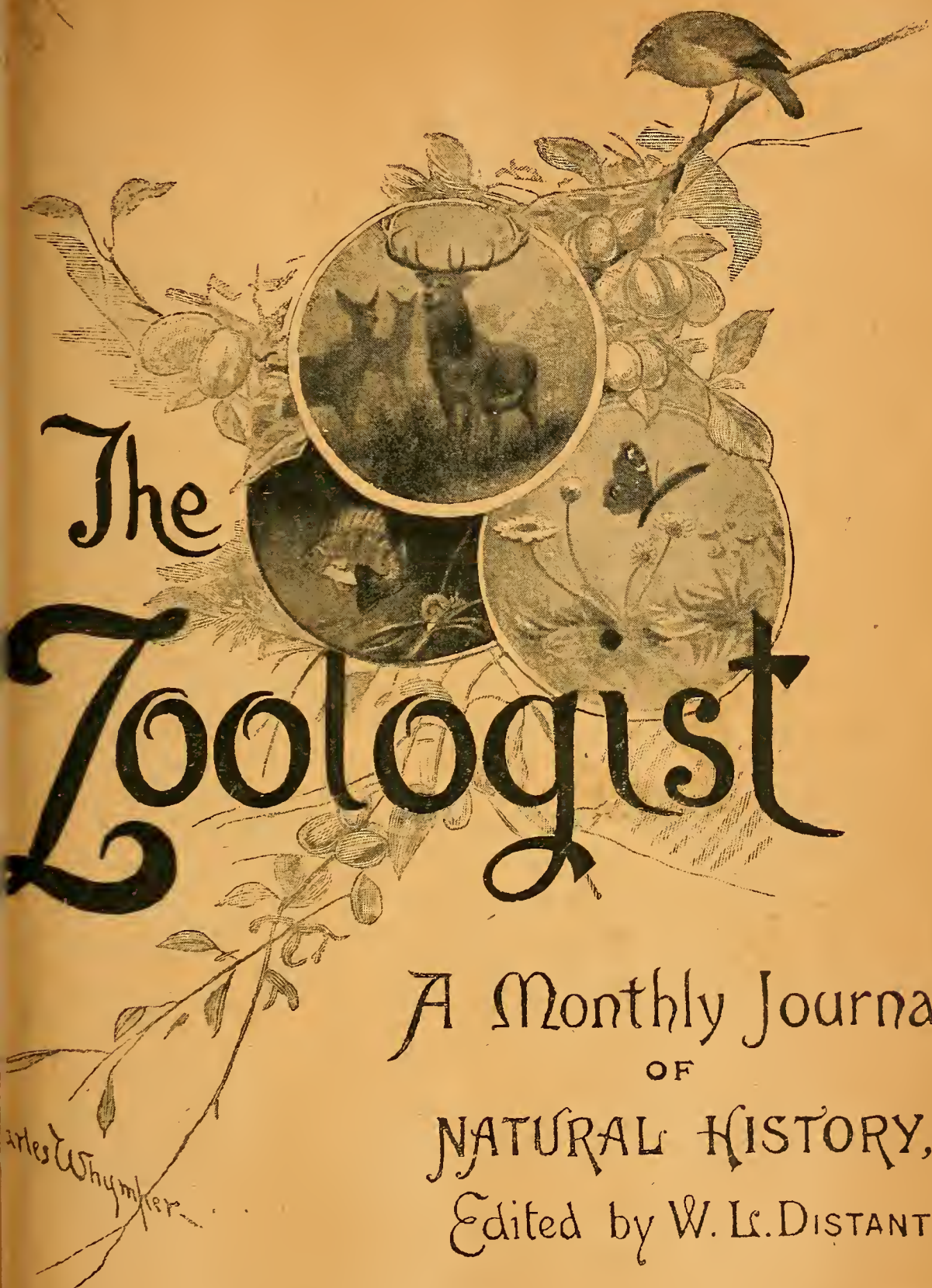
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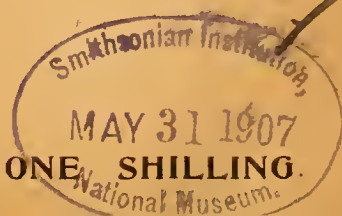
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THE ZOOLOGIST

No. 791.—May, 1907.

OBSERVATIONS TENDING TO THROW LIGHT ON THE QUESTION OF SEXUAL SELECTION IN BIRDS, INCLUDING A DAY-TO-DAY DIARY ON THE BREEDING HABITS OF THE RUFF (*MACHETES PUGNAX*).

BY EDMUND SELOUS.

(Continued from p. 65.)

April 25th.—To bed in my clothes—the right way for a right field naturalist—and, rising about 2.30, am on the spot an hour afterwards. Some birds went up in the darkness, but so near the hut, as it seemed, that I am not quite sure if they were the Ruffs or not. If they were they must have come back almost directly, for, as soon as I had safety-pinned my plaid round the sacking, and got into the *camera obscura*, I could make out some of their darker figures amidst the surrounding darkness, and, as it grew, imperceptibly, lighter, these began to move swiftly about over the surface of the ground, looking like enlarged rats in the first dim twilight of early morning. Then suddenly they would disappear, changing into pieces of cut turf lying here and there about the land, amidst a number of which the assembly-ground is situated. From this I knew that even at this early hour the birds were making excited runs and rushes at one another, between the intervals of which spasmodic energy they lay crouched and motionless on the ground, in a sort of sexual frenzy. On account of the darkness, and these disappearances, as, also, later, through the numbers and commotion, it was difficult to count the birds, but, even before new arrivals appeared

on the scene, there were, I should think, at least a dozen, exclusive of one Reeve, whose presence, as it lightened, became revealed. As the morning advanced, the rushes of the birds became swifter and more and more violent, whilst each spring which they made at each other was accompanied with a loud whirring of the wings. Evidently they were actuated by a much more intense and stirring spirit than I had yet seen, and this, as they were joined by others and yet others, till the party consisted of a score or more—for I never could count them exactly—exclusive of the Reeves, was an ever-increasing quantity. Now, too, it becomes more clearly evident that the whole end and object of the gathering is courtship on the part of the Ruffs, choice and acceptance on that of the Reeves; that the gathering-ground is essentially the temple of Venus, not of Mars, and that such fighting as there is—violent, indeed, whilst it lasts, but never lasting long—is merely incidental to the one all-important purpose, the performance, namely, of the nuptial rite. This, however—again it seems clear to me—is entirely dependent on the will of the Reeve. As yet, in Shakespearean language, though not in the ordinary sense of it, she has not “seemed to signify,” and in despite of rufflings, crouchings, prostrations, and every form of voluptuous solicitation within the power of the male bird—in spite, too, of battles royal, which, though never more than beginning, are yet by their number and frequency never-ending—nothing has been “got done,” in this way. So it is when, shortly after 5, with the sun rising gallantly, all fly off, a merry party, and circle several times, around, in the new-born sunshine, before coming down again, when all goes on as before.

There are now two Reeves that I can see—there may be more in the confusion—and at 5.15, whilst the sun brightens, and the frosted grass shines pure and fresh in the morning air, the first pairing takes place between one of these and the brown bird of yesterday's intrigues. Then some ten minutes afterwards the rite is again performed by the same Ruff, but whether with the same Reeve I am unable to say, for just before—as now—four were standing together almost equally near him, and amidst a little press of pleading and protesting males. Then, amidst the feather-waves of this little, turbulent ocean, I make out five or six Reeves, and shortly afterwards there are two pairings, each

with the same Ruff, not the brown one this time, but with that very other one—he of the blue-black mane and white, flowing head-plumes—which I saw chosen yesterday by a certain Reeve, who came up to him and touched him on the head with her bill. Whether it is this same Reeve, now, I cannot say, since Reeves, unfortunately, are not to be distinguished as are the Ruffs. On the latter point there is no doubt whatever. There is but one other bird that at all resembles this one, and though the resemblance is so close that they must, I think, be brothers, yet they are sufficiently distinguished by the different colours of their bills (one red, the other black), and the shade of chestnut, as against cream, in the head-plumage of one of them. Thus the two birds which I have first seen pair have certainly been singled out, and that more than once, by one or more Reeves, and, as far as I have been able to see—and I think had it been so I must have seen—they certainly have not owed their good fortune either to fighting or superior vigour of any kind. They are, however—as to this there could hardly be two opinions—two of the finest and handsomest birds on the ground.

The scene now is most interesting and quite beyond description. Birds dart like lightning over the ground, turn, crouch, dart again, ruffle about each demure-looking, unperturbed little attraction, spring at each other, and then, as though earth were inadequate as a medium of emotional expression, rise into the air and dart round overhead, on the wing. The air resounds with the frequent dull shock of bodies, and the violent whirring of wings; it is all motion, all energy, at the very fever-point of excitement, and then, all at once, a sudden cessation, almost a sudden death—only the feathers of each bird's back to be seen, or the tops of their head-gear, or ruff, or tail-feathers waving, here and there, in the wind, as they lie in tense, rigid immobility, like so many little bows of Ulysses, bent by themselves and ready, each moment, to spring back. A wonderful drama, truly, of bird-life, thus unfolding itself before me, in the early, bright, but bitterly cold morning, whilst learned ornithologists all over Europe lie sleeping in their pleasant beds! But they will come down all the fresher to breakfast, and perhaps issue bulls against sexual selection from their studies. In the midst of it all, but after a considerable interval—for it is long before things become quieter

—there are four more pairings, in quick succession, between the same brown Ruff and a Reeve, which, as I cannot identify her, I will not assume to be the same who chose him yesterday. Possibly, too, there is another nuptial consummation, in which the blue-maned bird before mentioned plays his part. Of this, however, I cannot be sure—it is a business, indeed, when all moves and changes so quickly, to make out all that goes on. Then, whilst things are at their height, the whole flock fly off together, to return, again, in but a few seconds.

At 6.30 a Reeve makes her way, with evident *intention*, all through the crowd of Ruffs—who “do protest” to her—and from one side of the lists to the other, to the brown bird so often alluded to, and not to be confounded with any other one, with whom she is soon “in the very lists of love,” and then twice again, at short intervals, and once more, after a longer one. That is to say, I think so. Four pairings there most certainly are, but whether all with the same Reeve it is impossible to say with certainty, for another one is now there, and amidst the moving bodies, by which they are sometimes hidden, it is impossible to keep them distinct. Now, a moment later, I count four Reeves in all, whilst, at one time, there have been five, if not six. Another one now flies in—but before this some of the others have gone, so she may be one of them—and walks up to the attractive brown Ruff, beside whom she stands, but there is nothing further between them. The scene is quieting, and the pairing seems to be over for the morning. Possibly, had I stayed, I should have seen more, and something, perhaps, of new interest; but at 7.20, after enduring it as long as I can, I am constrained to come out on account of the intense and now wholly unbearable cold, which strikes through everything I have on, though short of the arctic regions I should have thought myself fairly invulnerable. Other elements, of a less straightforward nature, such as I have before touched on, have not been wanting during these scenes. There have been, for instance, at least three male unisexual coitions, whilst one Ruff is at this moment assiduously courting another. My impression, however, is that these false rites have been performed more often.

Thus, then, in 4 hours—or, say, $3\frac{1}{2}$ from the time things may be said to have begun—there have been twelve pairings, and ten

of these have been with one bird—the favoured brown Ruff. This, however, is a minimum, for it will be easily understood that, with so many birds and so much motion, it is quite possible to miss such a matter, salient though it be. It may be, therefore, that another Ruff or two paired with one or other of the Reeves, but I do not think so, and in my own mind feel sure they did not.

I was at my lair again in the afternoon before 3, but the birds had been disturbed by some visitors who come here, from time to time, to be shown a nest or two. However, they may not have done much harm, but nothing very interesting, after what I have now seen, took place. A Reeve flew in once or twice, but did not go to any of the prostrated males—for they had all instantly gone down. About 4.30, however, there was a great acceleration of numbers, a party of Ruffs, with two Reeves, flying in to the seven or eight Ruffs already there. The two Reeves proceeded to the brown bird, and the scene then became something like those of the morning, but only “as moonlight is to sunlight, or as water is to wine.” The blue bird, as for short I will call him, now often alluded to, was a persevering lover, but in spite of his attractions, which this morning “had been worth the whistle,” the one somewhat “maimed rite,” as it seemed to me, was with the all-powerful brown one. Now this bird, when he is properly considered, must certainly be set down as one of the most handsome, his ruff being a very fine one—the finest, I think, of any—large, soft, and thick, and of a light golden-brown colour. His head-lappets, which rise above it, and are also very thick and soft—though short and rounded, not so flowing as in some others—are of a darker brown which well sets off that of the ruff. His bill is red or reddish, and so are the little warts or pimples of naked skin, which, commencing at its base, spread upwards over his cheeks. In fact, except for one other bird, which I, personally, think more handsome, but which is peculiar, and has no mistress, as far as I know, he and the blue-ruffed one with the white flowing head-gear, tinged with brown, strike me as perhaps the two most handsome. That these two, then, should have been just the ones favoured is certainly curious, and still more so that the one so extremely fortunate should be distinguished by the superior development of that particular adornment which is specially characteristic of, and has given

the name to, the species. Thus we have not only selection, as it appears to me, but selection which, if constantly applied in this direction, would have made the male Ruff what he is.

April 26th.—Rising about 2.30, was ensconced before 4, and witnessed between then and 7.30 scenes which, on the whole, were still more remarkable than those of yesterday. The following points were noted down by me, after coming out of my watch-hole, as soon as cold and stiffness would allow me to write. The pairings, this morning, were more numerous, and also more varied—that is to say, they were effected with a greater number of Ruffs—but as a greater number of Reeves were upon the ground—sometimes seven or eight at a time—it does not follow that the same birds who paired before with the others, paired now, with these. I noticed that one of the new birds selected—though he did not rise very well to the situation—was a Ruff that I had previously seen a Reeve caress by pecking or nibbling with her bill amongst his head-plumes. This was a very conspicuous bird, not to be mistaken for any other.* Indeed, to the great advantage of precise observation, every Ruff of the band is individually distinguishable from every other one. Were this also the case with the Reeves I could feel satisfied on some points that I am doubtful about. I cannot say how many Ruffs paired this morning, but, besides the two that had done so previously, and the new bird just mentioned, I do not think there were more than another couple. If this be so, then out of five birds with whom actual pairing has taken place two were seen by me to be unmistakably selected for this office, in the early days, before, probably, it had properly begun, whilst the third had been caressed by a Reeve in the way previously referred to. If we suppose the Reeves to remain true to a single Ruff that they choose, then, out of eight possible husbands—for I have never seen more than this number of Reeves together, and it seems likely that they would now all be present—five are accounted for. But how are we to be sure, or ought we to assume, that each Reeve pairs only with a single bird? First, if this were not the case, to any marked degree, one would hardly expect the nuptial habits of the Ruff to be what they are, for, as there would then be no difficulty in each bird

* Except one, which, however, seldom visited this meeting-place.

satisfying its sexual instinct, why should there be all this emulation and strife? Again—this perhaps is a clearer indication—I have this morning seen three endeavours, I think by as many Ruffs, to force the compliance of the female, each one of which was unsuccessful; and, moreover, there must be something of conjugal relations amongst these birds, as for many days, last year, as I came down to the lands, and again when I returned, I used to see a Ruff standing in the near neighbourhood of a certain nest, with eggs, and that the bird incubating these was his mate there can, I think, be little doubt. This, however, is perhaps less irreconcilable with polygamy than with polyandry, and the fact that I certainly saw the brown Ruff, this morning, pair with at least two Reeves, whilst two others were close about him, seems against the latter view.* But if each male who pairs at all has more than one *hetaira*, and as many as he has are true to him, how can five husbands be chosen by only eight wives? Perhaps, therefore, the Reeves are really more numerous than I have been thinking.

Supposing there to be promiscuity on the part of both sexes, would this, in the first place, lessen the fertility of the female? and, secondly, whether it did or did not, how would it affect the question of sexual selection? Supposing a small number of Reeves to be shared between a much larger number of Ruffs, yet choice might still be exercised by the former, and, if it were, it would still be the most attractive males that would be first and most often selected, for, as far as I have been able to see, certain Ruffs were selected by certain Reeves before any others, and of these, one—the brown bird—must have paired more than twice as often as all the others together, even on this one morning, when three or four more were also selected, since he did so, perhaps, a score of times. Moreover, besides that, three attempts to force the female bird have been unsuccessful, as mentioned before, one Reeve, at least, just before pairing with the attractive male, so often specified, had refused the ardent solicitations of another. This other was, if I mistake not, the blue bird—also a *joli garçon*—and it was he, too, who on one of the occasions referred to failed in his attempt. These facts, as it appears to me, are good evidence of choice being exercised by the female.

* See, however, further evidence, pp. 181, 182, and in continuation.

Another evidence of it is this. It was quite apparent that the female derived as much pleasure from the act of coition as did the male, or, at any rate, that she derived a high degree of pleasure from it. When she crouched, or stood,* to the male she drooped and quivered her wings, and her satisfaction during and immediately on completion of the act was abundantly evident. Those also who have seen hen birds soliciting their husbands, often to no purpose, must be aware that this is generally—probably always—the case. If, then, the act is pleasurable, what is it that makes the female so often and so stubbornly refuse the male? Satiety, no doubt, may be one reason, but this does not last long, nor can we apply it to such cases as that just mentioned, where the refusal of one male was “followed, hard upon,” by the acceptance of another. The more generally probable interpretation seems to me to be that the hen may dislike or be repelled by some males, to an extent sufficient to discount the pleasure which the act itself procures, whilst she is attracted in a proportionate degree, and with opposite effects, by others. We must remember that, with the hen bird, it is seldom a case of Hobson’s choice. She may choose, as a rule, where she pleases, and therefore it would not be extraordinary if she became difficult to please. To be more responsive to the charms of some males than of others is to have choice, just as much as we, in such matters, possess it—and such choice must be founded on something. To think that the appearance of the male, even though specially decorated for the nuptial season, has nothing to do with it, is so irrational that some special explanation seems needed for the prevalence of such an opinion. It is to be found, I believe, in deep-seated theological prejudice, and in pure human conceit.

More strange matter this morning. Not only is there what I have called unisexual coition, on the part of the Ruffs—instances of which I have again witnessed—but on the part of the Reeves, too. There were several examples of this, and on one occasion when the brown Ruff was about to perform his marital office, the bread, as I may say, was taken out of his mouth by another excited hen, who rushed in front of him, and was, apparently, an

* Both attitudes are adopted, but the latter seems the more characteristic.

entirely satisfactory substitute. Again, the Reeves courted each other, and one, in particular, followed another about in a very persistent manner, and with unmistakable actions. Thus, then, it is perfectly clear that there is no want of sexual appetite on the part of the female Ruff, and her frequent and firm refusal of a number of males is all the more significant.

The shortness of the intervals between the successive pairings of the brown Ruff—which now seemed to be always, or nearly always, successfully accomplished—struck me as remarkable, and the fact that I could only make this observation in his case shows how favoured—*i. e.* selected—he was by the Reeves.

But it may be asked, “Is it not the superior fighting powers of particular Ruffs which procure them the apparent choice of the female? Are not other Ruffs driven off by them, or do they not fear their resentment in a way which lessens their chances?” To all this I answer “No,” nor do I believe that anybody who had witnessed what takes place could give a different answer. The fighting, as a matter of fact, has nothing to do with it. In the matter of the courtship it is not, as far as I can see, a working force at all. Prolonged encounters between rival aspirants, ending in the defeat of one of them, and thus leaving a *champs libre* to the victor, do not obtain. Instead, there are nothing but short spasmodic outbreaks, without direction or guiding principle, and producing no other effect than that of general commotion—“confusion worse confounded.” The Ruff does not fight intelligently, and also he fights very much less than is popularly supposed, or than his name, in the Latin, implies. He simply darts and springs and kicks and whirrs his wings, like a frantic creature, and though this, on the part of a dozen or twenty birds, makes a great spectacular effect, yet, if we were to estimate the amount of time and energy expended by any individual in actual conflict during the whole day, we should find it very much less than we might have expected—little indeed compared, for instance, to the Redshanks—and what there was would have been dispersed amongst a number of individuals, met at haphazard, and on not one of whom it had exercised any effect.* There are Ruffs, indeed, who, owing to their being young or their plumage not being grown, or, as it has sometimes

* In regard, I mean, to the main issue.

appeared to me, to their being a little stupid, if not actually half-witted, are easily disposed of; but how can this come in, seeing that such birds could be no rivals in any case, and that there are other and more efficient ones all about? The long-continued fighting of any Ruff would be rather a disadvantage to it than otherwise, since it would be off the scene whilst other birds were actively courting the Reeves—and this may have something to do with my not having seen any such protracted duels whilst a Reeve was present, and only one moderately so during her absence. Again—and this, too, may be an effect of natural selection—it is a curious fact that, though, up to the time of the commencement of the rite, no Ruff is immune, yet I have seen no instance of interference with it whilst actually in process. Were it otherwise, then, with so many birds together, it is difficult to see how the act could ever be accomplished. However, even before, and whilst the male is making ready in the most noticeable manner, he seems almost always to be let alone, and if not, it is by mere accident. In fact, I cannot make out that, by fighting, the birds seriously hinder one another in their designs, nor can I think of any one amongst them who has made himself particularly conspicuous as a combatant. Whether the Reeves pay any attention to the fighting I cannot say, but I have seen no evidence of it, whereas they are certainly not indifferent to the courting actions of the males, though they may be often either unnecessary or steadfastly resisted. But both in the first and the last case their choice may have been already made. The impossibility, almost, of both seeing and knowing that you see the first choice of any bird is to be regretted, but the evidence in regard to sexual selection is not thereby affected, since choice is choice whenever exercised, and the more so if reasserted.

I was down again at 3 p.m., and about 4 some Reeves came in, and pairing took place, but only with the brown and the blue Ruff, before mentioned—with the latter only once, with the former seven or eight times at the least. The Reeves were, at first, four, and then six in number, and the appearance was as though four, at least, constituted the brown Ruff's seraglio. He certainly paired with two, but beyond this I could not identify them, owing to their similarity and change of position. He occupied the same position on the pairing-ground as this morning, and I here

note—which I forgot to at the time—that before the later and more frequent pairings with him took place, then, the Reeves moved down to where he stood, in a little troop of four or five. They did so also now, so that it begins to look as though different birds had little seraglios of their own in different parts of the ground. An observation just made seems to bear on this. About to pair, and full of the excitement incident to such a prospect, this bird—the brown one—kept delaying to do so, in order to give intermittent peckings to another Ruff, who lay crouched just in front of him. I could not, for some time, understand what the object of this was, but it, at last, appeared that this bird was in his way, and upon his at last taking the hint and running off, the intended Reeve, coming from behind, occupied the exact place where he had been, and the pairing was, at once, accomplished. It thus appears that this golden-ruffed Lothario has a certain place, or *run*, of his own, which is dedicated to the performance of the nuptial rite. The peckings administered to this particular bird—which seems to have chosen that place without an admitted right to it—I had noticed before, but could assign no particular meaning to them, and other of this favoured Ruff's actions become, now, plainer to me; also his inaction this morning, for he did not seek the Reeves, but waited for them to come to him. I had not noticed this tendency, to the same extent, in the blue, and still less in the other chosen birds; now, however, I do notice it in his case, and, since his place is close to that of the brown Ruff, this reduces the likelihood of the four or five Ruffs who came down to that locality all belonging to the latter.

Does anything I have seen this afternoon—the driving off of this bird, for instance—call for modification of what I have said in regard to the part which fighting plays in the Ruff's courtship? As to this I must reflect and observe further—but I hardly think so.

April 27th.—At my place, again, about 3.30 a.m., and shortly afterwards counted eight Ruffs fly in, in the semi-darkness, so that I think this must be their habit. Some, perhaps, may come in earlier or sleep there—if they do sleep at all during the night. I put none up, however, in coming to the place, as I should have done, I think, had they been there. Of this, how-

ever, I cannot be sure, for, though I have done so on other mornings, it was then a little lighter, and this might make the difference between their taking alarm or not.

4.45. — The first Reeve in. Much darting about. Some springing and sparring—more prostrating. Then suddenly all off, and back in a few seconds, after one circle.

Four Reeves in now. One stands by the brown Ruff, two elsewhere, in different places, and by different Ruffs. Pairing has taken place six times with the brown bird and five with the blue—and now these two have paired several times more, and I have seen, besides, two other ones pair. The principal pairing-time was between 4.45 and 5.30.

Impossible to make out satisfactorily whether the Reeves pair with certain Ruffs only, or promiscuously, but I think it is the first.* A Reeve with something distinctive about her, and who pairs with the blue bird, I have not seen pair with the brown, though both sit—and pair—near together. Nor have I been able to make out the brown bird pairing with more than two Reeves.

There are now frequent sudden flights off of all the birds, with quick returns. These flights seem often quite instantaneous, and are certainly not attributable to any extraneous cause. They are a psychological phenomenon, a part of the *tout ensemble* of Ruff habits when thus assembled together at the pairing-place. Such common impulses of various kinds affecting large—sometimes enormous—numbers of birds at one time are frequent in bird-life, and are not, in my opinion, to be accounted for on any theory known to and admitted by what is called orthodox science.

Each Ruff has certainly a place of its own, and the most envenomed fights appear to me to result from one bird pitching down in another's place, when he flies in. The aggrieved bird instantly rushes at the intruder, and there is a fight which may last for a longer or shorter time. The birds have then a perfectly frantic appearance. They kick, strike with their wings, and especially endeavour to bite or peck each other. This biting is very noticeable, the mandibles seeming to snap with rage.

* A good example is the sudden hush which falls upon a whole shrieking ternery. I am speaking of a widely extended one. But see pp. 181, 182, and in the continuation.

Montagu says (speaking, I think, of birds in confinement), "when either could obtain a firm hold with the bill, a leap succeeded," but to me the springing and biting have always seemed to be independent of each other. They leap, commonly, before they close, and then continue to do so, as a matter of course, the object seeming to be, as with other birds, to get above the adversary, and strike down upon him with wings and feet and bill. Of course, when one bird is displaced by another, others are displaced also, leading to general commotion, and moreover the mere anticipation of any fresh arrival is matter of excitement for every Ruff on the ground.

I have noticed vicious conduct—if nature be vice—in a certain Reeve. This bird, after pairing with the blue Ruff, droops and quivers the wings, then, assuming the courting actions of the male, makes overtures to certain Reeves, which, however, do not seem to be understood. She even courted a Ruff in the same manner, but all in very inferior style. Whilst thus acting she had a very unpleasing appearance, but then she is not at all a pretty Reeve, and looks an old bird—some of the Reeves are pleasing and elegant in appearance. She has paired twice with the blue bird, but with no other. The blue bird has paired three or four times with this and one other Reeve—no other at all, as far as I have seen. The brown bird again has paired with, at least, two Reeves, but more I cannot be sure of.

April 28th.—Down by 4 a.m. Some birds fly off as I arrive, but are back almost directly.

4.20.—Fighting caused by bird coming in. Pitching down, not quite in his own place, he disturbs some bird or other, and, each being jealous of its chosen place, fighting ensues. The above, I think, may be considered one of the principal causes of the Ruffs fighting, especially when no Reeve is on the ground. When the Reeves are there, too, it still has its place, for the very movements of the birds, towards and about her, produce this result. It is now apparent that each Ruff has his special place in the lists, and, as the birds are many in proportion to the size of the assembly-ground, we can understand how an attachment to it may have had its share—perhaps a powerful one—in the development of the fighting instinct. This cause alone would have made skirmishes frequent, and, the appetite growing with

what it fed on, a pugnacious disposition would have been evolved. A social one, however, must have existed before, and it is curious and interesting, in watching these Ruff assemblies, to see the combination of the two. They are, indeed, so interwoven that the birds may almost be said to fight, and to love one another's society, at the same time; but if the two things are irreconcilable, assuredly the one obtains till the other begins, and commences again as it leaves off. As, however, according to my own observations hitherto, that part of the twenty-four hours during which, in the breeding time, any individual Ruff is actually at blows with another, is probably, on the average, a good deal under half an hour,* it will be seen how small a force the hostile one in reality is, in comparison with the social. And although, as just remarked, the encroachment upon each other's standing-places is one of the main causes of contention amongst Ruffs, yet, on the other hand, the way in which, if this encroachment does not take place, they will stand or sit for hours in close proximity, without coming into collision, is very observable. For instance, the apartments of the brown Ruff, and of the one which, for convenience, I distinguish by the word blue (his ruff does seem to me more blue than black), are next one another, and so close as to be almost, if not quite, contiguous. Consequently, when the Reeves are there, it is difficult, supposing them to be not shared in common, to tell which belong to the one and which to the other. Yet in spite of this, and though the pairing was frequently proceeding on each property at the same time, I have never seen the two birds have anything like a real fight. Once—and I think it was on one of the latter occasions—there was a demonstration, followed by a spring or two, but it was soon over. Otherwise, except for certain little ebullitions which have taken place at long intervals, and amounted to nothing, they have been like the best of friends and old cronies. The above remarks apply, more or less—and much more than less—to all the other birds—friendliness, in fact, or at any rate the love of, or feeling of comfort in, each other's society is the foundation of the Ruff's character. The little ebullitions to which I refer are

* It is a curious and, to me, significant fact that much later in the season (on my former visit), when the pairing must have been over, fighting seemed to be not less, but more.

of the following nature, and constitute the second of the three principal causes which lead, or may lead, to strife. Every now and again, for no discoverable reason, a little emotional tempest of a warlike character seems to sweep through the assembly, or a portion of it. The birds who come under its influence awake suddenly, as it were, from repose or a reposeful attitude of mind, crouch, ruffle their feathers, give a turn or two about, or from side to side, and assume the fighting attitude (distinct from the crouching or prostrate one which I have mentioned) towards one or other of their neighbours. Then, on the part of a pair or so, there is some springing and fighting, but it quiets down almost before it has well begun, and, in a few seconds, everything is quiet again. What exactly the birds feel on these occasions is difficult to say. It may best be thought of, perhaps, as a sort of sociable and light-hearted hostility, or perhaps it is individual hostility breaking out of collective sociability, and guided merely by proximity—for I have seen but little sign amongst Ruffs of enduring personal enmities, spite, or petty persecution. It is more like a convivial, though rather sleepy, assembly of jack-tars, all very friendly, but any two ready to stand up and spar at any moment. Imagine such an assembly, and a sudden passing idea of sparring sweeping at intervals through it, in a gust here or there, and one gets something I do not say like what these Ruff-meetings are, but like the idea that they give one. The third cause of fighting—of which, perhaps, the little ebullitions referred to are a sort of memory—is, of course, the presence of the Reeve, and the more the merrier in this respect. Till latterly, however, this has not produced nearly so much combativeness, or, at any rate, not nearly so many prolonged duels, as I was prepared to expect—but now I have seen some. Several times yesterday, for instance—I have only time, now, to get it in—two birds fought with the most tremendous fury and energy for perhaps two or three minutes at a time; but whether the watch would have made it as long as this I am doubtful. At any rate, it was, I am sure, upon each occasion well under five minutes. As fighting, however, I have never yet seen the like. The birds literally hurled themselves at each other, biting and kicking with the greatest imaginable fury, and striking showers of blows with their wings, the noise of which was like so many

little thunder-claps. They spring very high, and when at an unusual distance from one another, one endeavours to get above the other, and to kick down upon him. Another characteristic of their fighting seems to be the rushing away after some "desperate close" to get to the proper distance for another rush and leap—like two knights repairing, after their tilt, to opposite ends of the lists again. It is not always, however, that the two are of a like mind, in this respect, and generally, perhaps, it amounts to no more than that one bird after another, getting slightly the worst of it, or at any rate desirous of disengaging and making a fresh onslaught, can best do so in this way. Its opponent, however, may be too quick for it, and may dash upon and seize it from behind, as one frequently sees. Whilst fighting, Ruffs seem actuated by a sort of madness ("*ira furor brevis est*"), and it is more than rancour or malignity which their furious combats suggest.

It is curious that the fighting out of which these few protracted duels have sprung has been all amongst some three or four or half-dozen birds at one end of the ground, and it is amongst these that I have seen just a few, and, as one may say, stray pairings take place, as also several forcible but futile attempts on the part of the male; whereas the two birds who have almost shared the Reeves between them have fought but little, as far as I have been able to see. The Reeves have simply repaired to them, each on his own holding, and though there has been commotion and excitement, with some fighting, on account of the Reeves, round about them, they themselves have had no particular pitched battles—the brown one none that I have seen—only, as is usual, and, as I have before described, just before pairing they would make an excited rush away at another bird at some distance, give a spring or two, and then, rushing back again, the rite would be accomplished. This, however, was only on occasions, or the rush would end only in a threatening. Is it possible that whilst these favoured birds are old ones, who go on with their established harem of the last and preceding years, we see in these other turbulent wooers the younger males, who court the Reeves generally, and make a conquest here and there, either amongst new or old ones? It is true that the veterans, on this assumption, wooed their own Reeves when

it was at all necessary to do so—which was not often the case—not, however, to win them—that, it was evident, had been done—but to induce them to pair. The ones I speak of, however, seem to have no harems, but to “shoot folly as it flies,” so to speak, whilst passing by their part of the assembly-ground. For they, too, have had to stay in their own places, which happen to be all at one end—I do not mean in an absolutely hard and fast manner, but at that end they habitually were, and it was when the Reeves were there, too, that the wooing, fighting, and occasional pairing took place. Naturally, under these circumstances, the birds encroached upon each other’s places, and this may have had as much or more to do with the fighting as anything else. Except that the Reeves were there, it did not appear to me to be specially marked in relation to the pairing, nor did any success of the male, in this respect, that I witnessed, seem due to his martial powers, but directly to his courting actions, or if not that, then to himself, his presence—to separate which from his appearance appears to me to be a piece of prejudiced absurdity. Yet this idea of mine does not appear very probable. Why should just two birds and no more be mature, and established in life? The greatest part of the flock, surely, should be in that condition, and most of my supposed young wooers look as old as any. Nothing like a provisional hypothesis, however, with further observation to check it.

Some birds, at any rate, whether younger or older, have not yet acquired their nuptial plumage, and these neither woo nor are regarded by the females. Of course, however, there are degrees in such acquirement. I have spoken of one bird which seemed, both on the first day I noticed anything of this sort, and also afterwards, to be favoured by a Reeve. This one’s plumage was not fully developed, but very nearly, and quite sufficiently so for it to have—with its coloration—a very striking appearance. Latterly, however, I think I may have mistaken the Reeve’s motive, which on one occasion, at any rate, was to get the bird in question out of the way. This Ruff, indeed, which I think must be a tenderfoot,* does not seem to have a place of its own like the others, and is consequently always in somebody’s way. I have mentioned the brown Ruff’s expelling him, in order to

* In regard to the true relations of this bird see continuation.

pair, and he was expelled in the same way, and for the same purpose, by the blue one also, who pulled him up by the scruff of his neck with his beak, and sent him packing. It was when again in the brown Ruff's territory that one of the latter's Reeves pecked at him, as I now think, to have him out of the way. He was, however, unmistakably invited by another Reeve (not the first whose repeated caress I have recorded), though, instead of answering her expectations, he lost himself in a prostration. So implanted, indeed, is this habit that often a Ruff, instead of pairing, when, as in the above instance, he has every incentive to do so, sinks down in this way at the side of his mistress, and goes no farther. Yet on another occasion this same bird attempted, but unsuccessfully, to pair with a Reeve by force. He appeared to me to be somewhat stupid or half-witted, and I was struck with the fact that, although expelled on several occasions, in the manner I have mentioned, yet, as a rule, the Ruffs received him kindly. The brown one, for instance, would let him sit beside himself or just fronting him, and so would others. Yet, as I have said, encroachments of this sort are one of the main causes of fighting. They must have made, then, a difference in his case, either because he was a young bird, or that they recognized some mental deficiency—some want, that is to say—in him. Let that be the interpretation for the present.*

Nothing special to note this afternoon. The only pairings which I saw take place were with the brown Ruff, and not more than three in number. They may not have been with more than one Reeve. Four, however, if not five, pressed about him, and appeared anxious for his ministrations, so that I feel sure, myself, that his harem includes these. That it includes three, I believe I have made out, for I have seen him pair with two, and, at another time, with a Reeve that had something salient about her appearance, and was, I am sure, neither of these. Neither is she the vicious Reeve (also peculiar-looking, and larger than any of the others, except a nondescript bird more like a male with female plumage, which I cannot make out), who has paired only, as far as I have seen, with the blue Ruff. He, however, pairs with at least one other, making two the bare minimum

* See continuation.

which I have been able to distinguish. Yet, as said before, I have only seen eight undoubted Reeves at one time on the ground. If, then, they are true to one Ruff, and if four belong to the brown one, and two, as a minimum, to the blue, this leaves but two for all the rest. But even if promiscuous in their habits, yet I have only seen two other Ruffs—or, at most, three—besides the brown and blue ones, pair. Yet I have counted twenty-two, and already the pairing seems to be on the wane.* What, then, is to be made of this?

April 29th.—Overpowering weariness in the morning and headache for the rest of the day made me miss this date. I got down, however, by about 7 p.m. to arrange grass in my hole, and put up three or four Ruffs, amongst them those two inevitable old clubbites, the brown bird and the blue—no Reeves. Is it not a noteworthy thing that these two, who are almost always at home, are just *the* two who, with a very few exceptions, as far as I have yet been able to observe, have had it almost all their own way with the Reeves?

April 30th.—Going to bed, boots and all, I was up and dressed before 2.30, and on the spot by 3. I walked over the pairing-ground, but neither saw nor heard any Ruff go up. Yet at 3.20, without my noticing it, whilst I arranged my *camera obscura*, a number—indeed, almost the whole number—were there. Thus it seems evident that Ruffs, in the breeding-time, feed during the night, and fly in to their haunt in the very early morning, so punctually that they get there almost all together. They may, however, feed together. There was a great deal of fighting in the darkness, and once three Ruffs, like three little storm-clouds that had rushed together, fought a triangular duel. Whether this fighting was all about the Reeves I do not know, but I suppose it was chiefly, for there were two or more there—how many I cannot say—and, very early, others flew in, till, as it lightened slowly—the night fading, as it were, into day—it became apparent that they were numerous, and also—though how long it had been taking place I cannot say—that pairing was proceeding in a very spirited manner—more so than has yet been the case. The scene, in fact, was a quite bacchanalian one. Darting about, fighting and scrimmaging, the Ruffs again

* This, however, was a little premature.

made a wonderful spectacle, their time, when not thus occupied, being spent in pressing about the Reeves, and eagerly courting them—which of the two occupied the greater part of it I am unable to say. The Reeves, for their part, seemed just as eager, in their way. If the Ruffs courted, they, as evidently, came there to be courted, as they, from time to time, testified. How many Ruffs paired, exclusive of the blue and the brown one, I cannot say for certain, but I did not distinctly see more than four, and should doubt if more than six did. But things glowed more—"the sweet influences of the Pleiades," it was evident, were more felt, Venus reigned more supreme than on any former occasion. Yet this was in the very early dawn, the grass all frosted and hung with dew, whilst a pure white mist curled up to a few feet above it, and there hung, presenting a most beautiful appearance, as the sun's first rays—sent out before him—began to illuminate the delicate, filmy sea. Holland was Holland no longer, but a very flat fairy-land, in which danced houses and windmills. And it was in this chill mist and frostiness of the first morning—4, perhaps—that nuptial joys were at their height. This, of course,—though the mist was in partial abeyance over the bare, trampled space occupied by the birds—yet made it difficult to follow individual happenings closely, and when I have said that certain Ruffs, besides the two Lotharios, now paired with certain Reeves, I have said all I can say with certainty. Six or perhaps eight others may have done so, but it did not strike me as so many. Three or four is all I can vouch for.

During this early period neither the brown nor the blue Ruff had been very much occupied, and both, for the most part, had kept their places. Then, as the light lightened and observation grew easy, a little troop of Reeves pressed down, as usual, upon them, and began to make court, to the brown one especially. They pressed upon him, and as he lay, quiescent, after the first responses, either pecked him gently about the head or neck, or, crouching in front of him, walked backwards, and claimed his attention by a still more suggestive contact. Upon these various hints he "spake" a good many times, but so eager were the hens that one would sometimes push another out of the way, and in several instances, instead of waiting, they paired unisexually, whilst once there was the strange sight of Ruff and

Reeve hindering one another in the discharge of the marital office. When one sees hen birds coming up uninvited to the male, and acting in this way, one begins to wonder what that oft-used phrase, "the coyness of the female," really means, and one realizes forcibly the enormous proportion which mere asseveration, repeated from mouth to mouth and from book to book, bears, in natural history, to actual ascertainment. If the hen acts like this at 4 in the morning, when all the world is in bed, it is conceivable that later, when it is up, she may be a little "coy," *i. e.* sated. The question is whether the supposed coyness is not always to be explained by some fact which bears no real relation to the idea conveyed by the word. The male is often coy in the same way, and would be called so were he not the male. Disinclination to a certain act, for a variety of reasons, comprehensible in themselves, and shared by both sexes, is not an active principle of dislike confined to one sex only. Instead, therefore, of using the word in the loose way that we do, we should set ourselves to ascertain if there is really such a thing in nature as we understand by it. These Reeves, at any rate, had thrown off all modesty, if they ever possessed it, of which I have, as yet, seen no evidence. Possibly their numbers, by exciting a spirit of emulation, may have had something to do with the matter, but I rather suppose that more have come because more have felt the inclination to. I counted, at different times, ten, twelve, and thirteen, and as the one I have spoken of, who has a distinctive appearance, was not amongst them—at least, I never saw her—this makes fourteen, as the minimum number of Reeves belonging to the flock, exclusive of one or two nondescript-looking birds, whose sex I have not yet felt sure about.

There were also one or two cases of male unisexual coition, but this was not so noticeable a feature as it has, at some other times, been. A Redshank that, on two occasions, entered the charmed circle, was, each time, wooed by a Ruff, but ran only the faster.

Now, too, it struck me, more forcibly than it has before, that the Reeves were pairing promiscuously—that the same bird, I mean, admitted two or more Ruffs. But, again, certainty in regard to this was impossible, and it may very well not have been the case. The general *abandon* of the scene was calculated

to produce the impression, but as far as detailed observation goes I have no evidence. With one exception—not present—it is practically impossible to distinguish the Reeves, and, with so much motion and little light, I could never, for long, keep one distinct from the other. When it was lighter, and then quite light, I had no clear evidence of promiscuity, but the difficulty above mentioned was hardly lessened. Say, however, that eight Ruffs have paired, then if two have four Reeves apiece—and this, I believe, is a minimum—this only leaves one apiece for the other six, if we take fourteen as the full number of the Reeves. But then, again, there may be more Reeves, and all may not have come in at the same time. Still, the general features of the scene rather suggest promiscuity on the part of either sex—though limited, as far as the Reeves are concerned, by a somewhat slender choice of Ruffs—than polygamy. The Reeves press up to this or that Ruff in twos or threes, or little batches, but the signs, on the part of each male, that these are his special seraglio, are not so prominent as one might expect. Such a sign would be his keeping, or attempting to keep, them together, and resenting their straying away amongst other Ruffs, but of this I have seen absolutely nothing—the reverse, indeed, is noticeably the case. Perhaps, therefore, I should rather have said that the evidence is all against the theory that each selected Ruff has a harem, or, at least, that he cares about having one.

(To be continued.)

THE NDHLONDHLO.

BY CHARLES M. D. STEWART.

OF late years zoology has been enriched by the discovery of many new species. Here, on the contrary, I aim at placing on record evidence tending to establish the fact of the partial or complete extinction of a reptile during recent years.

The Ndhlonhlo was a serpent well known to all the Kafirs of Natal and Zululand as exceeding all other venomous snakes in size, deadliness, ferocity, and swiftness of attack, and Ndhlonhlo was one of the titles of honour applied to the Zulu monarch. It was reputed to have upon its head a crest resembling a feather, and to whistle shrilly when excited. I hesitate to relate all I have heard concerning it, lest I should lay myself open to the charge of romancing.

Even in the seventies it was so rare that some Europeans thought it to be only a very old Black Mamba, but whenever I suggested this explanation to Kafirs they emphatically repudiated it, and maintained that it was a distinct species.

Colenso's Zulu-English dictionary says that the Ndhlonhlo is "crested—poisonous—the king of snakes—applied as a word of honour to a chief, and also, by way of reproach, to a woman of violent temper."

Recently, to my surprise, I learnt that it was unknown to science. Being rare, and possibly extinct, I have small hope of establishing the fact of its existence in the past except by circumstantial evidence. Although the evidence of natives upon points of natural history is often reliable enough when no superstition intervenes to vitiate it, the prejudice against it so discounts its value that I am compelled to rely on the scant testimony obtainable from Europeans.

I make my appeal, not to those who are scientists only and nothing more, but to those who, while interested in natural history, also possess the judicial faculty of appraising the value

of evidence. My first step was to write to Mr. C. R. Saunders, C.M.G., who is Civil Commissioner in Zululand, and who has a great reputation as a keen sportsman and observer of nature. It goes without saying that he speaks Kafir fluently, and has that intimate knowledge of the people without which no European can hope to acquire accurate information. Here is an extract from his letter in reply to mine:—

“To come to the main point of your letter—the question of the Ndhlonhlo. I am afraid I cannot throw much light on this, as all the information I have been able to gather is not much more than you possess. Some twenty years ago, and later, every native we met professed to know of the Ndhlonhlo, and they were in those times most emphatic as to its being a distinct species, and the most deadly snake known. They all declared it was not a Black Mamba, but much larger, and with a feather on its head; that it often killed people herding cattle, which it would then drive away by whistling to them. The belief as to the existence of such a reptile was most universal both amongst the Zulus and the Natal Kafirs about the time mentioned, and, as almost every man, woman, and child in those days knew the Black Mamba well, it is difficult to convince oneself that the existence of the Ndhlonhlo as a distinct variety or species at one time is a myth. At the same time, if it did exist in olden times, I fancy it must have become extinct, as one seldom or ever hears the name mentioned now, and the majority of the present generation of natives know nothing about it.

“I know almost every inch of Zululand, and a good deal of Swaziland, Portuguese territory, and the greater part of Natal; but in all my travels, although they have extended to parts where Black Mambas are very numerous and attain to a very large size, particularly on the Libombo Mountains, I have not come across anything which I could describe with any certainty as distinct from the ordinary Black Mamba. The nearest approach to anything of the sort was one I shot myself many years ago—about 1874—near the Tongaat River, in Natal. It was the largest I ever saw, measuring sixteen feet in length, and though I then thought, and still have no valid reason to alter that opinion, that it was only a very old Black Mamba, most of the natives who saw it *declared it was an Ndhlonhlo*, the existence of which was fully believed in at that time. Every detail in connection with my encountering it is still vividly impressed on my mind, although I was only a youngster at the time, and to a certain extent corroborated the stories the natives told of the Ndhlonhlo. I was walking along the edge of a

krantz through some grass which had recently been burnt, shooting Pigeons, and suddenly became aware of the presence of the snake coming towards me with its head raised some three feet or more above the ground. I noticed that it seemed to have a hood on the top of its head. I at once fired, killing it on the spot, and, although it was shot through the head, it was not injured in the slightest, as I was using No. 6 shot, and the distance was sufficient for the shot to have scattered. On examining its head there were some long scales—three, I think—which, when lifted up, formed a sort of hood. These scales were from half an inch to an inch long. Being very proud of my trophy, I dragged it several miles home, when it was examined by several old natives, and carefully measured, with the result stated. It was much lighter in colour than numerous other Black Mambas I have killed and seen, being of a dark slate-colour, particularly about the head, which was almost a pale bluish colour.”

Mr. Saunders gives his testimony with admirable clearness. He declines to commit himself to a belief in the existence of the Ndhlonhlo as a distinct species, but his dictum is merely an expression of personal opinion.

Now, upon the assumption that it was a very old Black Mamba, it would be a most interesting addition to natural history knowledge to learn that it was so completely differentiated from the normal Black Mamba as to induce, in natives, the belief that it was a distinct species. But this supposition seems hardly tenable. Black Mambas are now as numerous as ever. *Why, then, are there no old ones to be seen nowadays?* Until this question is answered it seems difficult to come to any conclusion other than that the Ndhlonhlo was a distinct species, which is now quite or nearly extinct.

The head of an ordinary snake is as bare of scales as the carapace of a Tortoise. Mr. Saunders says that the three scales were *upon* the head. Possibly this may have been an error, due to imperfect observation. Yet my old waggon-driver, Mataffayen, who had seen Ndhlonhlos dead and living, described them as having a feather or plume *upon* the head. On my questioning him closely, he replied that it was not a feather but resembled a feather when the creature was alive.

Even if its existence is not established on the foregoing evidence, it is clear that the belief in its existence could not have been mythical, for, with Kafirs, *myths are persistent*. Notwith-

standing the experiences of the Zulu war, the recent insurrection in Natal showed that the Kafirs still retain the belief that they can be rendered bullet-proof by incantations. That the knowledge of the Ndhlonhlo is dying out amongst the present generation of Kafirs can, therefore, only be ascribed to the decrease or extinction of the species.

I interviewed Mr. Boulenger, whom I believe to be the greatest living authority on reptiles. He said that, as far as he was aware, no Black Mamba had ever been known to approach such a size as the snake recorded by Mr. Saunders, though he was willing to admit that Black Mambas might attain sixteen feet. The differentiation in colour did not trouble him, as snakes are especially variable in that respect. The crest was a difficulty to him, but he suggested that an old Black Mamba might give the appearance of a crest by elevating the scales of the neck just at the back of the head. With all deference to his vast knowledge, it seems difficult to conceive of such functional differentiation, unless there was at the same time some corresponding modification of the controlling muscles. I believe, too, that no snake has ever been known to raise its scales. The keepers of the Snake House at the Zoological Gardens have never observed anything of the kind.

I felt that the disappearance of this species without any assignable cause was a difficulty, but Mr. Boulenger assured me that such cases of extinction are not unknown. He instanced the *Coluber longissimus* (often called *C. æsculapii*), and the *Emys orbicularis* (European Pond Tortoise), which once were spread over Europe, but which now can only be found in certain isolated localities, and even these small areas are steadily contracting.

Recently Dr. R. J. Colenso and Mr. F. E. Colenso (sons of the great Bishop of Natal, whom I had the privilege of knowing), very courteously gave me their experiences of what they think may have been an Ndhlonhlo. Dr. Colenso, when a boy, saw a large snake of a dark colour moving through long grass at least three feet high. Its head was elevated considerably above the grass, and he distinctly observed a crest resembling a feather, which sloped back from the head, somewhat as the crest of a Cockatoo does. I asked whether the crest appeared to spring from the neck or from the head. He replied that it appeared to

spring from the after-part of the occiput. Mr. Colenso gave me information which fully corroborated the experience of his brother.

It is to be noted that the snake was not irritated, but was calmly pursuing its way. The inference, therefore, is clear, *viz.* that the crest was not a mere elevation of neck-scales in a moment of anger, but that it was a true crest.

I fear that, as no specimen of the Ndhlondhlo has ever been seen in a jar of spirits, and probably will never be so seen, it will be difficult to convince the majority of people that it ever existed. Still, the general evidence may convince some that the belief of a nation was founded on observed facts, and that the deadly king of snakes once was, although it may have now ceased to be.

SOME COMMON INDIAN BIRDS.

BY GORDON DALGLIESH.

(Concluded from p. 150.)

A MORE beautiful bird even than the "Coppersmith" is often to be seen in Indian gardens—the Blue-faced Barbet (*Cyanops asiatica*), a most gorgeously coloured bird, with shades of blue, green, and bright crimson all blended together in exquisite harmony. The note of this Barbet differs considerably from that of the "Coppersmith," and may be likened to the syllables "kuturruk," uttered at slow intervals, but is quite as monotonous as that of *Xantholæma hæmatocephala*.

To the exile in India, who is forced to remain indoors during the greater part of the long, hot, Indian summer's day, the different cries and sounds of birds, beasts, and insects, heard day after day with no change, begin at length to become irksome. I have above alluded to the none too melodious cry of the Barbets, but this can in no way compare with the cordially detested voice of the Hawk-Cuckoo, or "Brain-fever Bird" (*Hierococcyx varius*). As sure as its voice is heard throughout the land, so surely is the summer approaching, with its heat and numerous discomforts. When the temperature is well over a hundred in the shade, then the "Brain-fever Bird" begins to tune up, and its hateful cry is heard all day and night, too; indeed, it is a mystery to me how or when it finds time for eating or sleeping. If you can imagine someone whistling in a very shrill high key, and gradually ascending the scale to its fullest pitch, then coming half-way down again, and finally ending up with "brain fever," repeated several times—or, as some have it, "we feel it"—you have a very good idea of the bird's cry. Another rendering of it is: "O lor'! O lor'! how very hot it's getting. I feel it; I feel it." The "Brain-fever Bird" is another of the parasitic Cuckoos, and deposits its eggs in the nests of the "Seven Sister" Birds (*Crateropus canorus*). It has been said that "India

is a country cursed with Cuckoos," and the list truly is a long one, and most of them have peculiar cries. There is one found in many gardens (*Cuculus micropterus*) that says most distinctly, "Make more Pekoe."

In a certain garden in Bengal that I know well stands an ancient banyan tree. This is the haunt of a colony of Spotted Owlets (*Athene brama*), birds closely allied to the European Little Owl (*A. noctua*), the far-famed bird of Minerva. These Little Owlets are very noisy, and keep up a continuous chatter. A pair built their nest near the house, and for some reason or other one of the birds took a violent dislike to my father. It would swoop down and peck at his head if he went anywhere near the nest, and so violent were its onsets that it actually drew blood, and on one occasion lifted the cap from off his head. Other people, strangely enough, the Owl left alone, and my father was the only member of the household on whom it ever vented its spite. Most curious and quaint little birds are these Owls. If you should happen to disturb one from its sleep in some tree during the day it will blink and peer at you, snapping its bill the while, and going through the most absurd antics, bowing and courtesying. Unlike most other Owls, this one is somewhat sedentary in its habits, and prefers to sit and watch for its prey from some post of vantage, as the roof of a house or tree-stump. It comes out early in the evening, and retires late—just about the time the King-Crow begins to tune up.

The list of Owls found in India is a lengthy one, and beyond the scope of the present paper; but among the common forms I might mention the Barn-Owl, a bird often found in the neighbourhood of Indian houses, and of almost world-wide distribution; and, being subject to much climatic variation, has given rise to many bad species, and it may be as well to say that there is in reality only one Barn-Owl, and that is *Strix flammea*. No bird has suffered more at the hands of vulgar superstition than the Owl, both at home and abroad, and natives in India always speak of it as something devilish and uncanny, and if one should happen to enter a house they say a death is certain to take place.

The Honeysuckers, or Sunbirds, to a certain extent, replace in the Old World the Humming-birds of the New. It would

perhaps be hard to find more exquisite little birds than these, of which several species are to be found in Indian gardens. Van Hasselt's Sunbird (*Arachnechthra hasselti*) is, to my mind, the loveliest of the whole family. It is a small bird, about the size of a Goldcrest, and, indeed, the brilliancy of its plumage rivals many of the far-famed Humming-birds. The male has the whole head shining metallic green, shoulders velvety black, upper back purplish green, throat bronze, under parts bright red. This description, I fear, cannot do justice to the bird, but some colours in nature almost defy description. The females of Honeysuckers are quite dull little birds, having for the most part a mixture of olive-green and yellow. The Purple Honeysucker (*A. asiatica*) is a common species in many gardens in Bengal, and has for so small a bird a very loud and clear song, resembling that of the English Wren. The nest is made of cobwebs and moss, oval in shape, with an entrance-hole at the side, and this is usually suspended from a twig, rarely from the eaves of houses. The Amethyst-rumped Honeysucker (*A. zeylonica*) is often sold as a cage-bird in Calcutta, and I believe does well for a time. A friend of mine had one which was fed on a moistened sugary paste.

“Fine feathers do not always make fine birds” is certainly true with regard to the Indian Roller (*Coracias indica*), which has a harsh unpleasant cry, and is moreover one of the most pugnacious of Indian birds, and rarely loses an opportunity of fighting with one of its own kin and sundry other birds. The Indian Roller—or, as it is better known to residents in India, as “Blue Jay”—is, like the Golden Oriole and King-Crow, one of the features of an Indian landscape, and I do not think I am exaggerating when I say that on a journey from Bombay to Tirhoot, in Bengal, I saw from the carriage window, on an average, one Blue Jay for every two or three telegraph-poles. I once read in some book that the American globe-trotter's name for the Roller was “Surprise Bird,” and I think a very good name too. Seen as it sits on the telegraph-wires or posts, it is not much to look at, but see it as it takes to flight, and the startling display of dark and light blue is very striking. When not engaged in quarrelling the Roller is a sedentary and lazy bird, only leaving its perch to chase some passing insect. I have

brought up young birds, which were not at all difficult to rear. On one occasion I saw a Roller hover over and plunge in water, like a Kingfisher, and this suggested to my mind an interesting theory. The Roller is very Kingfisher-like in many of its ways, and might not this taste for water have been inherited by a bird whose ancestors descended from Kingfisher-like birds? The Indian Roller is regarded as sacred by all pious Hindoos, and when I first went out to India, everything being new to me, and also being keen on collecting birds, I was in the act of shooting a specimen of this bird, when an English-speaking Hindoo lad that accompanied me laid his hand on my arm and said earnestly, "Do not shoot pretty bird, sir; like God!" To his mind the beauty of the bird and that of his deity were one, and out of respect to his feelings I lowered my gun. It is a curious fact that, though Rollers appear to feel the heat as much as any bird, and sit with gaping bills during a hot day, they seldom drink.

Among the Pigeon family one of the most noticeable is the Bengal Green Pigeon (*Crocopus phoenicopterus*), a bird of exquisite plumage, which is very fond of the fruit of the banyan tree. Its call, which is a low soft whistling, has been likened to the sound of rippling water. As it keeps to the thickest and highest part of the tree, it does not afford much scope for observation. I have never seen them on the ground, and very much doubt if they ever do settle on it. Two familiar Indian Doves are the Spotted Dove (*Turtur suratensis*), and the Indian Ring-Dove (*T. risorius*); the latter has soft and pleasing notes, and a native rendering of them is "sissoo do," *i. e.* "give mustard seed." The Red Turtle-Dove (*Enopopelia tranquebarica*) is, to my mind, the most beautiful of any of our Indian Doves. The male bird is somewhat larger than a Thrush, and has the general plumage rosy pink, with slate-blue head and black collar. It is found commonly enough in some parts in small flocks among crops.

Most, if not all, Indian gardens have in or near them water in some form or another, whether it be river, lake, or pond, and fishing quietly by the side of it will be seen the Little Heron, known to Anglo-Indians as "Paddy-bird"—or, to give it its correct name, the Pond Heron (*Ardea greyi*). I think one of the most attractive features of Indian bird-life is the Heron family, so generously distributed throughout the country—from the Common

and Purple Herons, beautiful Snowy Egrets, to the little dwarf Bitterns. Every piece of water—I speak chiefly of Bengal—has its Herons in some form or another, and none are so common as the “Paddy-bird.” Its colour, as it patiently waits for its finny prey, so blends with its surroundings as to make it almost invisible; but as it is disturbed it flies up, uttering a harsh croak, and displaying its conspicuous white wings—in fact, another “Surprise Bird.” In the breeding season it is a lovely creature, resembling the Squacco Heron (*A. ralloides*) of Europe, to which it is closely allied. The breeding plumes of this and other Herons are much sought after by a class of natives whose business it is to snare birds, and a good price they fetch—or *used* to fetch—in the Calcutta market. Thanks to the trouble a lot of people have taken in India, a society for the protection of birds has sprung up, and the Herons, with many others, come under its influence. Such a good work as this deserves every support, for what would a country be without its birds? And the Herons are a family of birds we could ill afford to lose, and, as I have said before, add much to the charm of many an Indian landscape.

The above number of birds I have written about are only a small percentage of those found in and around Indian gardens, and a whole volume might be written on the avian inhabitants of these alone. To the naturalist birds are a source of never-failing interest, and thanks to them I have been able to spend many a long Indian day with full enjoyment, when otherwise time would have hung heavily on my hands.

NOTES AND QUERIES.

MAMMALIA.

Whiskered Bat in Somerset.—While searching the Cheddar Caves on April 4th and 13th last, I took two specimens of the Whiskered Bat (*Myotis mystacinus*). This Bat is not recorded in 'Millais' for Somerset, though no doubt it has been taken there before, and not recorded. I was informed that Barbastelles lived there too, and I obtained Greater and Lesser Horseshoes and Long-eared Bats there myself. The Whiskered Bat was reported for Wells Cathedral, as also the Barbastelle, Greater and Lesser Horseshoes, Long-eared, and Pipistrelles.—P. Buxton (32, Great Cumberland Place, London, W.).

AVES.

The Dartford Warbler (*Sylvia undata*) in Hants.—It is with great pleasure I have to record the reappearance in some of its old haunts of this little, dark, short-winged, but long-tailed species. Some thirty years ago it was not rare in several localities I used to visit—where the Stonechat resided, and the Whinchat passed its summer stay—and, being resident the whole year through, it was always an interesting object amongst the furze-bushes. It is one of those species whose acquaintance, once made, is not soon forgotten, for, although a poor Warbler as far as scope or compass of song is considered, I know of few more active and interesting, as it dives in and out of its much-loved furze-bushes, and assumes the most grotesque attitudes—remining one of the Tits, flits and erects its tail like a Wren, or creeps away like a Nuthatch—amongst the prickly stems; often entering the bush low down, and as quickly departs from a more elevated position, only to go through the same performance in the nearest bush; or at other times I have watched it very closely as it collected the minutest insects from the rough bark of the furze, keeping up a happy and continued chatter as it did so. The severe winter of 1881–2 seemed to have killed or driven away the whole community, and for many years my friends have searched for it in vain. In some parts of the forest it has always held its ground, perhaps in decreasing numbers, and of its

present scarcity or abundance I cannot speak. More than a century has passed since the indefatigable Colonel Montagu wrote of the habits of this tiny bird, as observed in Devonshire, and very little can be added to its life-history to-day. Does it migrate? If so, when and whither? as it is often seen more frequently in the winter than in summer; and yet I suppose there is no influx from more northern localities, where it is scarce or unknown. As a "resident," the scarcity of food in the colder weather may induce extra activity, and consequently it is oftener detected; but it seems rather curious it should disappear for a number of years, and then be found in the same locality as of old, yet such is the case I am told.—G. B. CORBIN (Ringwood).

Status of Grey Wagtail.—Your correspondent, Mr. W. H. Parkin (*ante*, p. 151), asks for the experience of others regarding the Grey Wagtail. My own experience is that *Motacilla raii* and *M. melanope* are both local in their distribution, and that you do not find the two species in large numbers (if at all) in the same district at the same time of year. In the valley of the Chess (Bucks), as also in that part of Bedfordshire with which I am most familiar, the Grey Wagtail is present in considerable numbers in winter. In neither locality have I seen it in the summer, when its place is taken by the Yellow Wagtail. Here, in the valley of the Tay, the Grey Wagtail makes its appearance with great regularity between the 1st and 10th of April, and the local boatmen regard it as a summer migrant. It is now fairly plentiful, and if anything more abundant than it was six years ago. In the valley of the Tamar (Devon) there were a great many Grey Wagtails last autumn, but I have never seen a Yellow one there. A pair nested for many years on the ground in a corner of the verandah of our house, but the hen bird unfortunately got shut into the drawing-room one evening, and was badly frightened by my cat. It deserted its nest, and has never returned. — MARY DUCHESS OF BEDFORD (Meikleour R.S.O., Perthshire, N.B.).

IN the April number of 'The Zoologist' (*ante*, p. 151), Mr. W. H. Parkin writes *re* the decrease of the Grey Wagtail (*Motacilla melanope*) in the Shipley district of Yorkshire, and asks for the observations of other North-countrymen on this species. Perhaps Irish information may prove interesting to him as well as some others of your readers. The Grey Wagtail is not a migratory species here, but frequents the same localities all the year round. Of late years these birds appear to be on the increase in this district (Hillsborough, Co. Down). Five years ago I only knew of two pairs in this neighbourhood, but now there are at least six pairs, each pair apparently keeping to its own

portion of the stream or rivulet. The Yellow Wagtail (*M. raii*) is very local in Ireland, but breeds within twelve miles, while the Pied Wagtail (*M. lugubris*), common in winter, is now seldom seen in the district during the breeding season, although some years ago it bred not rarely in the neighbourhood.—NEVIN H. FOSTER (Hillsborough, Co. Down).

Cirl-Bunting in Hertfordshire, Brambling in Bedfordshire.—Walking past Cheldwick Manor on February 14th, I observed a male Cirl-Bunting (*Emberiza cirrus*) on the fence along the roadside; it was particularly tame, allowing me to watch it from a few yards distant. A few Bramblings were also seen in that county. On the high chalk lands between Luton and Barton, in Bedfordshire, flights of this bird were very numerous.—J. STEELE-ELLIOTT (Dowles Manor, Shropshire).

Hen-Harrier (*Circus cyaneus*) in South-western Hants.—Some interesting notes on the occurrence of this fine species in the neighbouring county of Surrey appear on page 92 of the present volume, and it may be remembered I gave a short account of a specimen having been found dead near here some months ago. Since that time I have known of no fewer than five or six being slaughtered, and several others seen within a radius of six or eight miles, and, strange to say, the majority were females, or at least birds in the dark brown plumage. I am aware that the male of this species is said to breed sometimes in the brown plumage of the second year, but four out of the six above mentioned were undoubtedly mature females, and I heard of but three "blue hawks." In flight—so different from that of the Peregrine Falcon—such a large and conspicuous bird as a Harrier is a great temptation to the game-preserving community, who lose no opportunity to destroy indiscriminately any of the Hawks and Owls, all of which are classed as "vermin." Let us hope some of the Harriers may be spared to nest, and rear their fluffy brood in peace. Years ago, in the summer or autumn, the sight of its near relation, Montagu's Harrier (*C. cineraceus*), was not altogether a rare sight, as it quartered the ground to and fro, on lithesome and sailing wing, over the moors and heaths of the forest, the stubble-fields on its borders, or, more rarely, even the meadows in the valley of the Avon, where I have seen it several times.—G. B. CORBIN (Ringwood).

Spring Arrival of Sandwich Terns in Killala Bay.—As I have seen no records of the spring arrival of this species of Tern on the English and Scotch coasts, I shall be very pleased if some of your correspondents will supply dates of arrivals in next number of 'Zoologist.'

to be compared with some notes of the earliest that I have taken here. I give only March dates :—On March 23rd, 1852 ; 21st, 1854 ; 20th, 1856 ; 29th, 1877 ; 24th, 1880 ; 31st, 1881 ; 30th, 1882 ; 30th, 1885 ; 25th, 1886 ; 28th, 1887 ; 28th, 1889 ; 15th, 1890 ; 28th, 1891 ; 27th, 1892 ; 23rd, 1893 ; 27th, 1894 ; 30th, 1895 ; 22nd, 1897 ; 26th, 1899 ; and 24th, 1907. These Terns must be very hardy, for cold weather does not appear to affect them after their arrival here. When they arrived on March 27th, 1892, there was four inches of snow on the ground, and the mercury in thermometer indicated six degrees of frost, and yet they were as lively and noisy as if it was the month of May.—ROBERT WARREN (Moy View, Ballina).

Winter Notes from Ringwood, Hants.—The past winter, notwithstanding its brief severity, was not very productive of rare wildfowl upon the Avon. Wigeon were here rather earlier than usual, and later in the season were in large flocks ; one or more small “ skeins ” of Wild Geese were seen, and, if an inference is to be drawn from the single bird killed, they belonged to the White-fronted species (*Anser albifrons*) ; several Gadwall put in an appearance, but in very immature plumage. The Tufted Duck was commoner than usual—this is scarcely to be wondered at, as comparatively recently it has become a nesting species in Hants, but the Shoveler, which undoubtedly sometimes remains to breed, was scarce, and this in face of the fact that birds were seen at intervals throughout the summer ; Teal, although in some considerable flocks, were not so abundant as last season, neither were Snipe, although a fair number of Jack-Snipe were accounted for. Such species as Pintail, Goldeneye, Goosander, &c., which formerly visited us in severe weather, were “ conspicuous by their absence,” and I am glad to say I knew of but one Bittern having been killed, though several were seen in the neighbourhood ; let us hope some of our sportsmen are becoming wiser in sparing this beautiful and interesting bird. We somehow escaped—to a certain extent—the great snow-storms such as visited other localities both east and west, but several migrants were abundant, such as the Redwing and Brambling, which latter were in countless numbers wherever the “ beech-mast ” were to be found, and I saw a male in lovely plumage as late as April 18th. The poor Redwings seemed to suffer more quickly than most species whilst the frosts and snow continued, and many were picked up in a famished condition. A friend of mind, whilst “ flight ”-shooting in the dusk, shot a female Kestrel, scarcely knowing what it was, and on picking it up found it had an apparently starved Redwing securely clasped in one of its claws. Several Merlin were reported, and the

Hooded Crows were too much in evidence for many a sportsman's wounded quarry, and in some instances were very bold and crafty. The Short-eared Owl has deserted us altogether, and it is several years since I heard of one in this particular neighbourhood, although previously it was not uncommon in the winter time, and I have occasionally seen it in the summer months; the Siskin, too, does not visit us so regularly as it did once; the numbers of the Crossbill are very uncertain, and do not frequent this neighbourhood so much as they did formerly, when the fir woods were very extensive, giving both shelter and food to this handsome species. On a part of the river where the wildfowl are shot from "gazes"—(an interesting article on this particular mode of shooting is published in a recent number of the 'Cornhill Magazine,' from the pen of a well-known sportsman)—the following birds were killed, from Nov. 28th to Feb. 15th, in five shootings, averaging five guns, *viz.* :—Wild Duck, 421; Wigeon, 99; Teal, 81; Tufted Duck, 34; Pochard, 8; Gadwall, 3; Shoveler, 1; White-fronted Goose, 1; Coot, 176; Moorhen, 67. Thus it will be seen, from the amount of slaughter, that a large number of fowl were on the water, especially considering none were hand-reared, as was the case some years ago; and yet they were few compared with the vast flocks frequenting the same locality thirty or forty years ago. At that time such large bags were not made, and it may be the present *systematic* mode of shooting is one small item in the general decrease, and I suppose the improvement in firearms has a tendency in the same direction. Otters: since my previous note (*ante*, p. 30), I have been informed on very reliable authority that lower down the river a man shot three large Otters, weighing respectively 21, 22, and 24 lb.—G. B. CORBIN (Ringwood).

Winter Notes from Wye, Kent, 1906-7.—Nov. 12th.—Saw a Little Auk killed the previous day near Crundale.

21st.—A Swallow flying round the church in the morning.

Dec. 11th.—Three Green Sandpipers by a ditch near the Stour.

Feb. 6th.—Watched a Buzzard sailing slowly over a wood near Crundale; it was very pale in colour.

March 1st.—One Siskin in an alder by the river; the only one seen this winter. Redshanks returned to their breeding-ground.

3rd.—Greenfinches began to become common again.

12th-17th.—Lapwings passing northwards.

18th.—Goldcrest returned, after two and half months' absence.

21st.—Linnets arrived; not seen since early December. Last Hooded Crow seen. flying northwards.

22nd.—Chiffchaff arrived; Grey Wagtail last seen at its winter haunt.

23rd.—Wheatear arrived. Water-Rail by the river. Kingfishers have been absent since December. — C. J. ALEXANDER (South-eastern Agricultural College, Wye).

Notes from Sussex.—About sunset on Monday, April 8th, I saw four Cuckoos within a mile of Barcombe Mills; two were flying separately up the valley of the Ouse, and two, one of which I saw quite close, were in a small plantation at the mills. A flock of Curlew frequented the water-meadows here in January. At 8.15 on the bright night of March 29th a large flock of Wild Geese flew over N.N.E. March 30th, first Chiffchaff. April 1st, first Wryneck. — CLIFFORD TOOGOOD (Barcombe, Lewes, Sussex).

Bibliographical Query.—Can any reader of 'The Zoologist' tell me on what authority the Barred-headed Goose (*Anser indicus*) and the Clucking Teal (*Nettion formosum*) are included by some authorities on the British list; also if these two have ever occurred on the Continent of Europe? Any information on the subject will be gratefully received. GORDON DALGLIESH (Brook, Witley, Surrey).

CŒLENTERATA.

Peachia undata at Guernsey.—It is worthy of mention that on April 1st a fine specimen of the Waved Muzzlet (*Peachia undata*, Gosse) was found on the east coast of Guernsey by Mr. E. Sharp. This rare Anemone has been found at Herm (Gosse's description is from this specimen), and was somewhat doubtfully regarded as occurring here, though none have been recorded for many years. It is rather remarkable that the locality, composed of fine sand, in which its non-adherent base was embedded, was being continually dug over by men seeking for ragworms for bait. This individual lived only a few days in confinement, during which time it remained constantly expanded.—FRANK S. WRIGHT (Guille-Allès Library and Museum, Guernsey).

NOTICES OF NEW BOOKS.

The British Tunicata; an unfinished Monograph by the late JOSHUA ALDER and the late ALBANY HANCOCK. Edited by JOHN HOPKINSON; with lives of the Authors by Canon A. M. NORMAN and the late DENNIS EMBLETON. Ray Society.

IN 'The Zoologist' (1905, p. 319) a notice was given of the first volume of this excellent publication. Vol. ii. has now appeared, in which the work is continued in the same thorough manner, and marked by a similar loving care of which we have already attempted an appreciation. It is therefore possible to confine ourselves on this occasion to the notice of a prominent feature in this volume, consisting of biographical notices of both Alder and Hancock. In the previous volume a portrait of Alder appeared, in the second volume one of Hancock constitutes the frontispiece. "Alder and Hancock were naturalists of a bygone time. With only very moderate advantages as regards early education, they progressed greatly in knowledge by private study as years went by. An intense love of nature absorbed them, and they realized that everything else must be sacrificed to allow them to find out nature's secrets. They were not well off; with the little they had they were content; thought of marriage had to be given up, for nature must be their spouse." So long as zoology escapes the limitation of a profession such men will be honoured and encouraged; their disinterested zeal is the compensation for lack of scientific training.

The Letters to Gilbert White of Selborne from his intimate friend and contemporary the Rev. John Mulso. Edited, with Notes and an Introduction, by RASHLEIGH HOLT-WHITE, M.A. R. H. Porter.

MOST naturalists will find these letters a somewhat barmecide feast. Excepting the fact that anything relating to Gilbert White has a literary interest, it is difficult to understand why

this correspondence should have been printed. It is never brilliant, and only just misses the standard of common-place. Mr. Mulso appears to have been a very ordinary man in holy orders, of good education, as befits a Church of England clergyman, and with a constant ambition for preferment. As a letter-writer he had no imagination, as a clergyman we should consider him a failure, and to natural history quite a stranger. It is a calamity that the letters Gilbert White sent him should have been destroyed, for what could he have written to interest Mr. Mulso? The correspondence probably provided the relaxation that most men feel in the possession of a friend who *cannot* talk "shop." To a novelist requiring a perfect study of an old-time cleric, this book should be invaluable.

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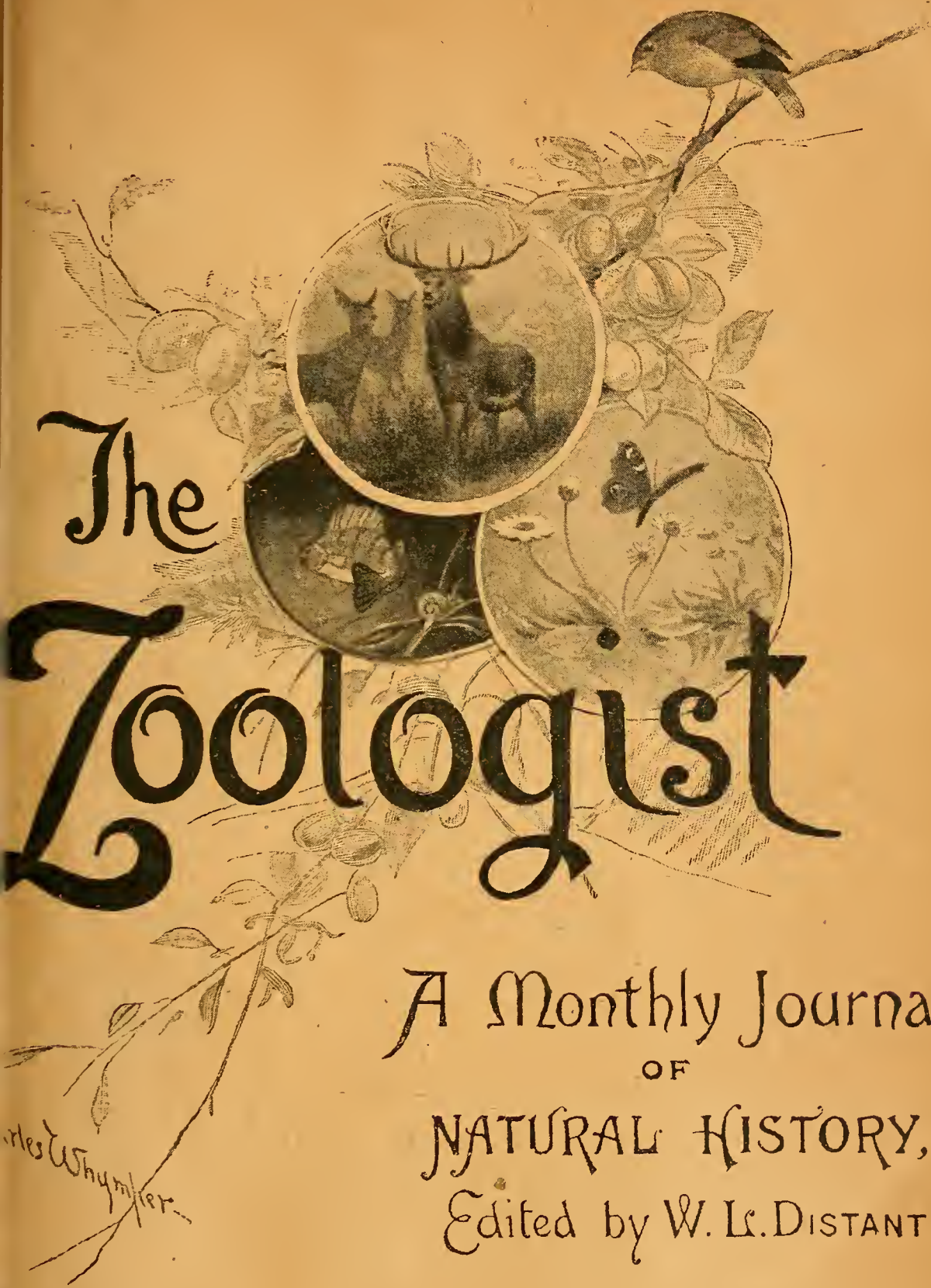
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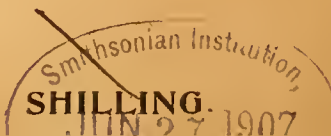
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THE ZOOLOGIST

No. 792.—*June, 1907.*

SCIENTIFIC WORK IN THE SEA-FISHERIES.

BY PROF. McINTOSH, M.D., LL.D., F.R.S.S. L. & E., Gatty
Marine Laboratory, University, St. Andrews.

PART I.

BEFORE proceeding with the main subject of this memoir—*viz.* the light which science has thrown on the sea-fisheries of our country—it may be well to take a brief glance at the condition of this great—it may almost be said national—industry from the earlier times to the period when the aid of science was brought to bear on it.

As might be expected, the most remote past is veiled in obscurity, for Britain had neither an Aristotle nor a Strabo, but authors* from the third century onwards, such as Solinus and Dion Cassius, as Dr. Fulton tells us, give occasional references to sea-fishes as the food of certain of the natives, or as occurring in numbers off the British coasts. Though the sea-fisheries of the country doubtless became more important in the subsequent centuries, they were far behind those of other nations, such as the Scandinavians, who led the way in the Herring fishery, and the Hanseatic leaguers, who supplied Catholic Europe with Herrings. No nation, however, took a more prominent part than

* An interesting series of articles by Dr. Fulton on this head appeared in the 'Fish Trades Gazette' for 1893, and from which some of the facts have been drawn. I have to thank Dr. Williamson for kindly aiding me in this respect.

the Dutch, the enterprising successors of the Hanseatic leaguers, whose fleet of over two thousand "busses" swept the North Sea from Shetland to the Dogger, as well as searched the inshore waters all along the English coasts—to the chagrin of the native fishermen in the sixteenth and first half of the seventeenth century. It was not, indeed, till the middle of the seventeenth century that the supremacy of the Dutch was overthrown, and that British fishermen took the foremost place in sea-fishing.

Throughout all this period the horizon of the sea-fisheries was often as cloudy as now, and occasionally even more so, for once in the thirteenth century armed Flemish fishermen attacked the unarmed English boats, and killed more than a thousand of their crews. Regulations as to close-times, meshes of nets, and small or immature fishes were frequently made, showing the anxiety of the legislature as to the safety of the sea-fisheries. Even in Parliament, more than three hundred years ago, it was said that "in divers places they fed swine and dogs on the fry and spawn of fishes, and otherwise, lamentable and horrible to be reported, destroy the same—to the great hindrance and decay of the Commonwealth."

Since Britain attained supremacy in the sea-fisheries ever-recurring fears as to their decline have been conspicuous. Now it was the destruction of small Turbot on the sandy shores that aroused attention, for London as early as the seventeenth century needed eighty thousand Turbot *per annum*. Again, it was the incursions of French fishermen on the inshore grounds—especially after the peace following Waterloo—that caused the native fishermen to petition Parliament to stop what they considered the ruin of the British industry.

Ever the same distrust of the permanence of the supplies of the sea-fishes, and the intolerance of other methods of fishing than that thought to be legitimate by the local men, have characterized the chequered history of the subject. Yet throughout all these centuries the plenitude of the sea-fishes was beyond dispute. Moreover, successive Governments, whether representing the wishes of the people or not—both in England and Scotland—have always taken an exceptionally favourable view of the daring and hardy toilers of the sea, since, amongst other things, their ranks furnished the finest recruits for the Navy. Inquiries

and Commissions were numerous, and in the seventeenth century many protective Acts were passed, and companies floated to encourage the struggling fisheries; whilst in the eighteenth century the bounty-system was instituted, and was abolished only in 1830.

Of the Commissions, it is only necessary to allude to one or two. Thus, in 1833, the Commissioners appointed by the House of Commons reported that the fishes of the British Channel had been declining since the peace of 1815, that the numbers of boats and men were decreasing, and that the fishermen and their families were dependent on the poor-rates for support. Now at that time it must have been extremely difficult to arrive at a right conclusion, since statistics of value were almost non-existent, and the Commissioners had little else to rely on than the evidence placed before them. It is at any rate certain that at that period comparatively few fishermen had a knowledge of the finny wealth of the Channel.

A great change was apparent in the Report of the Royal Commission of 1866. The Commissioners (Sir James Caird, Prof. Huxley, and Mr. Shaw Lefevre), after a prolonged inquiry, had no difficulty in coming to the conclusion that the supply of fish is increasing, and admits of progressive increase. Yet the Commissioners were not then fully aware of the marvellous powers of reproduction and the complex life-histories of the fishes. It has also to be remembered that the mode of fishing known as trawling (though a very old method) had not been developed as it now is, yet England had no less than nine hundred and fifty-five sailing trawlers working in the North Sea and St. George's Channel, that were estimated to supply three hundred tons of fish daily.

Shortly afterwards (1871) the United States Fish-Commission sprang into existence, mainly from the complaints as to the diminution of the stock on the American fishing-grounds. In a few years (1878) this Commission commenced the hatching of sea-fishes, with what success will subsequently be shown.

The conclusions arrived at by the Commission of 1866 held for twelve years, when complaints by the liners caused Parliament to arrange for a Commission of two (Messrs. Breckland and Walpole) to carry out an inquiry on the same lines as the last.

The Commissioners reported (1878) to the same effect in regard to the abundance of fishes, and the absence of wasteful destruction, and they made various suggestions concerning injuries done by trawlers to lines and nets. Steam-trawling had then begun.

The occurrence of Fisheries Exhibitions in France, Germany, and Holland, as well as that at Norwich, stimulated the interest of the public in the Department, and led to a notable exhibition in Edinburgh in 1882, and next year to the still larger exhibition in London, from which emanated volumes of valuable addresses and papers.

The rapid extension of steam-trawling and its spread into Scottish waters gave the Government little respite, for in 1883 the pressure brought to bear was so great that a Royal Commission (Lord Dalhousie's)—comprehending, besides the Chairman, Mr. Marjoribanks (now Lord Tweedmouth), Prof. Huxley, Mr. Caine, and the late Sir Thomas Brady—was appointed to inquire into the complaints of the injuries done to the line and drift-net fishermen, and to ascertain what legislative remedy can be adopted without interfering with the cheap and plentiful supply of fish. This Commission introduced scientific investigations into the inquiry for the first time, and, mainly through the influence of Lord Dalhousie, a small marine laboratory was established at St. Andrews at the beginning of 1884, and was useful in preparing the scientific Report. Much evidence was laid before the Commissioners strongly condemnatory of trawling—as destructive to the spawn of fishes, the grounds they frequented, to the fishes themselves and their young, and to the lines and nets of the fishermen.

The Commissioners, while noting (from the evidence) a falling off of flat-fishes in territorial waters from the Moray Firth to Grimsby, and a diminution of Haddocks in certain places, found no decrease in the total catch of fishes in the North Sea, except in the case of Soles. Further, that the beam-trawl is not destructive to the spawn of the Cod and the Haddock, or other edible fishes, nor does it cause wasteful or unnecessary destruction to the immature food-fishes. It has not been proved, moreover, that it is the sole cause of the diminution of fish in territorial waters.

Here, then, another Royal Commission was clearly not satisfied as to the supposed widespread diminution of food-fishes in our waters. The Commissioners recommended the creation of a Central Authority for the Fisheries of Great Britain, if not of the United Kingdom; that in the meantime the powers of the Fishery Board for Scotland be increased; and that statutory powers be given to collect statistics—besides various minor recommendations. One of the most important steps, however, followed, *viz.* the closure of certain inshore areas, and the carrying out of experiments therein—as recommended in the scientific Report.

As the scientific Report was the first of its kind, special instructions had been drawn up for the guidance of the reporter. Thus the observations were to be made on board commercial trawlers upon the grounds they frequented at the different seasons. Special note was to be taken of the proportional quantity of immature food-fishes at various seasons; of the destruction of the spawn of food-fishes; and of the proportion of living and dead fishes brought on board. Other points were the breeding of fishes, the temperature of the sea, and the sedentary and pelagic fauna of the fishing-grounds.

The scientific observations—just alluded to—in trawling vessels on the various important fishing-grounds off the East Coast had this not unimportant feature, *viz.* that they were all carried out under the same eye and by the same hand on sea and on land. Moreover, a simple method of dealing with the food-fishes captured was adopted, *viz.* a division into “saleable,” “immature,” and “unsaleable”: yet this division rested on a size-limit. It has to be remembered, however, that it was not the scientific observer who regulated the size of the “saleable” fishes, but the fishermen, who knew the demands of the public; and the same principle was followed in reviewing the subsequent experiments of the Scotch Fishery Board’s ship ‘Garland.’

This scientific Report gave an account of beam-trawl fishing, and the kinds and proportions of the saleable and unsaleable fishes, the proportions of the living and the dead, and of the immature fishes; the development and growth of the food-fishes, and the universal presence of floating eggs in all the ordinary food-fishes, except the Herring and the Wolf-fish. It showed that no noteworthy destruction of the spawn of food-fishes

occurred; that the small or immature fishes (in the deeper water) consisted chiefly of Dabs and long rough Dabs. It gave the distribution of the food-fishes on the various grounds, and the relative position of the districts; lists of unsaleable fishes (chiefly Frog-fishes); the fauna of the trawling-grounds, surface and bottom; food of fishes; temperature of the air, temperature of the surface- and bottom-water, besides other points, such as the satisfactory condition of the fishes themselves; and the effects of frequent hauls of the trawl on the same ground.

It demonstrated that the inshore was dependent on the offshore for the supplies of eggs and young of various fishes, *e. g.* Plaice and Turbot, and that a gradual passage of the eggs and young shorewards, and of the growing fishes at a later stage seawards, took place. Thus legislation confined to one area might not be followed by much benefit. It showed that in a small bay like St. Andrews, constant and long-continued trawling did not exhaust the fishes, and that the local men almost invariably kept to the same line in their operations—a state of matters which the history of the Brixham trawlers substantiated. Finally, that there was no proof of such serious diminution of food-fishes as to lead to extinction, or that the actual facts, when carefully considered, should conduce to anything else than vigilance. The condition, indeed, was such that hesitation was felt in interfering with moderate freedom in well-conducted modes of fishing. The Report also recommended the establishment of experimental hatcheries of sea-fishes, the closure of certain areas for experiments, and the keeping of records by all fishermen, showing the ground, weather, depth of water, and the nature of the fishes caught.

From the earliest stage of the inquiry Lord Dalhousie was struck by the absence of reliable statistics, and he immediately took steps to remedy this condition in Scotland. His personal influence and initiative, indeed, have placed Scotland in advance of England in this respect.

After presenting his Report to Parliament, Lord Dalhousie requested the scientific reporter to draw up a scheme for the experiments in the three areas selected for closure, *viz.* the Forth, St. Andrews Bay, and Aberdeen Bay; and the Chairman of the Scotch Fishery Board and its scientific member also visited

St. Andrews for details, so that the fullest information was at the Board's disposal. Unfortunately, as it proved, the Board deviated from the advice given in regard to ship, staff, and apparatus, as well as in the regularity of the experiments in the closed areas, though, it is right to add, this may have been partly due to lack of funds.

The Scotch Fishery Board thus entrusted by the Government with the important duty of carrying out the scientific experiments—experiments which were to form the basis for future fishery legislation—had recently been constituted (1882), and had begun to interest itself in scientific questions—such as the spawning of the Herring. Many would have thought that it would have thoroughly sifted this intricate subject in the closed areas before proceeding to avail itself of the increased powers the Secretary for Scotland (Lord Dalhousie) had obtained for it. The death of Lord Dalhousie, who always kept himself in touch with the proceedings of the Board, seems, however, to have loosened the hands of the members. Having just commenced the trawling investigations in the areas, and before any reliable result could have been obtained, the Scotch Board closed a considerable area in the Moray Firth, being “of opinion that valuable scientific results might be obtained if beam-trawling was restricted in the district.” Moreover, while releasing Aberdeen Bay, it would appear somewhat hastily, the Board increased the closed areas in the Firth of Forth and St. Andrews Bay.

Subsequently, the work of two summers in the closed areas—with an inefficient ship, and with observers new to the duties—was sufficient to make the Board forgetful of the labours of Lord Dalhousie's Commission and its injunctions, for it appointed a Committee of its own members to form an independent judgment on trawling and the closure. After inquiries held at various fishing centres in Scotland, this Committee presented a Report on the subject to the Secretary for Scotland (Sir G. Trevelyan) in May, 1888. Whilst no one would have wished to cramp the energies of the Board in this or any other inquiry, the methods adopted were open to criticism. It is also probable that this inquiry would not have happened if Lord Dalhousie had been Secretary for Scotland. Their experimental ship had, as mentioned, only searched the seas for two summers, when, misled by

the high averages of captures (for last season's work had been done in the warmer months), this Committee recommended the closure of the Firth of Clyde, and the territorial waters between Red Head and Kinnaird Head, and they were closed in 1899, because "they were satisfied that within the area to which this bye-law applies (*viz.* between Red Head and Kinnaird Head) beam-trawling as a mode of fishing is injurious to the sea-fishings." The Herring Fishery Act of the same year (1899) was the signal for closing the whole of the Scottish waters within the territorial limit. Still further closures occurred in 1890, when the Moray Firth from the Ord of Caithness to Craighead was shut against trawlers, the primary object, it was stated by the Board, being to prevent the capture by trawlers of immature fish, which exist in large numbers in the area closed.* The entire Moray Firth, again, was closed in November, 1902—(1) "to protect the fishes on their spawning-grounds (*e. g.* Smith Bank), and to ascertain the extent to which such measures are likely to be beneficial to the fish supply"; and (2) "in view of the repeated petitions from the line fishermen in the Moray Firth, and from a belief that trawling was really a source of injury to the fisheries there."†

Whatever basis, social or political, this action of the Scotch Board (and the Scotch Secretary) may have had, it cannot be said that it rested on a reliable scientific foundation. The supposed protection of the spawning areas in the Moray Firth was and is unnecessary, either in regard to the adults or their floating eggs and young. The spawning fishes—both round and flat—occur beyond the closed area of the Firth, as well as within it, for fishes respect no imaginary lines, and between them place the safety of the food-fishes beyond question. Lately much prominence has been given to the influence of the offshore on the inshore areas, as if such were a new feature, but this was clearly pointed out in the scientific Trawling Report of 1884, and, when studied, will give little countenance to the closure of Moray Firth on scientific grounds. Besides, no report of the scientific results gained by the closure of this area has yet been placed before the public, unless it be the following‡:—"The quantity of fishes

* Ninth Ann. Rept. S. F. B., p. xl. (for 1890). 1891.

† Eleventh Ann. Rept. (for 1892), p. xlix. 1893.

‡ Eighteenth Ann. Rept. S. F. B., part iii. p. 7 (for 1899). 1900.

procured by the 'Garland' is therefore small, and furnishes a most inadequate basis for any conclusions as to the effect of the closure of so wide an area as the Moray Firth." There is little satisfaction in this, especially as the Board was to show—by the closure of such offshore waters—how the spawning fishes which supplied the inshore with eggs and young could be protected. Moreover, so far as known, the proofs of the injurious effects of trawling on the fisheries have not yet been demonstrated by the Board. The idea that the eggs of the fishes of the Moray Firth supply the eastern shores of Scotland and the offshore is chimerical. Besides, both are independent of such supply.

Science, therefore, declines responsibility for such a closure, for, as will subsequently be shown, it is satisfied that the closure even of small areas is not followed by an increase of fishes, and that the supply of eggs and young may be altogether independent of such closure.

No one will, however, deny the right of the Government to close an area for the protection of the lines and nets of fishermen should they be constantly destroyed by trawlers, and it has to be remembered that about ten thousand fine fishermen frequent the shores of the Moray Firth. Nor would exception be taken if it were proved that such a measure was indispensable for the existence of these fishermen. But such grounds must be frankly stated and openly upheld. No thin veil of so-called science should obscure them.

Before entering into the consideration of the results of the ten years' experiments of the Scotch Fishery Board's ship 'Garland,' it is necessary, in sequence, to notice a Parliamentary Committee of seventeen members (with Mr. Marjoribanks as Chairman) in 1893, and which with great promptitude presented a Report within five months of its appointment. This Committee had the advantage of the statistics collected by the Board of Trade, and by the Scotch Fishery Board, and of the evidence of scientific men of experience in the fisheries. The Committee reported no falling off in the Herring fishery, that the Cod and Haddock fishery required no legislation, but that the flat-fishes—especially Soles and Plaice—had diminished, and that a size-limit (eight inches for Soles and Plaice, and ten inches for Turbot and Brill) should be fixed; further, that the three-mile limit

should be extended, and that an English Sea Fishery Board should be established—besides other and minor recommendations.

It is important to bear in mind, however, that a considerable part of the scientific evidence was founded on the statistics of scientific trawling as furnished by the Scotch Fishery Board. Now, as will by-and-by be shown, these data were not reliable. The faulty method of handling them had led to the view that the flat-fishes were decreasing.

The search of the 'Garland' along certain specified lines in the closed areas, and in the sea immediately beyond, for the long period of ten years can only be briefly dealt with here. It has been exhaustively studied elsewhere, and in a similar manner to the original trawling experiments in 1884, with the result that this costly but interesting scientific work showed that there was no striking increase in the fishes of the closed areas, but, on the contrary, that the fish-fauna stood at the end very much as at the beginning. It is true the Scotch Board considered, as already indicated, that there was a decrease of flat-fishes (especially Plaice), caused, it was thought, by the destruction of the spawning Plaice and other forms by trawlers outside the closed areas, but it has been shown that this arose from a misapprehension. The Board, indeed, contrasted the first five years' work—in which the trawling was done in a larger proportion of warm months—with that of the second five years, in which the trawling was done in a larger proportion of cold months. The conclusions arrived at were equally erroneous with the earlier notion that a great increase of fishes had occurred in the closed areas, but it strengthened the Board's supposition that the decrease in flat-fishes was due to the destruction of the spawning fishes beyond the limit. This view, moreover, formed an explanation and a justification for the closure of such an area as the Moray Firth. Long observation, however, has shown how futile such imaginary protection is in so small a bay as St. Andrews. How much more futile in the case of the vast area of the Moray Firth.

The experiments of the 'Garland' in the closed areas, and continuous observation in St. Andrews Bay and elsewhere—*viz.* on both sides of Britain from Shetland to the Channel Islands—in everything pertaining to marine life, have gradually formed

more rational views of the fisheries. No bay, for instance, is better known to men of science than St. Andrews Bay, which has been fished from time immemorial. It is probably about one hundred years since an elementary kind of trawl was used in its waters, and more than forty years since a fleet of local sailing trawlers swept it more or less every year. Moreover, ten or twelve steam trawlers also worked it for some years—before the closure for the scientific experiments of the 'Garland' in 1886—when it was said to be "trawled out." Yet, on the cessation of trawling, there was no lack of fishes, and especially of flat-fishes. Further, it is a remarkable fact that the fleet of local sailing trawlers worked, weather permitting, invariably in the same line, by well-known land-marks; thus for more than thirty years setting at naught the fears of those who make a nightmare of "trawling out," and of "barren areas" of the sea. Such, indeed, might have been expected from the longer and more continuous experience at Brixham.

Notwithstanding the lamentable accounts of the condition of St. Andrews Bay as shown in the evidence before Lord Dalhousie's Commission in 1883, its fishes, scientifically examined in 1884, were very much as they are at this moment. Careful observations since that date have demonstrated that in their season, and by the use of anemones for bait, and then of gill-nets, Cod (said to be so rare) can be caught in hundreds by a single boat; that for a space of two years at a time (1905–1906) enormous numbers of saleable Haddocks may swarm in the bay, unaffected by the busy steam trawlers outside the limits; that the larger Thornbacks (a kind of Skate) are and have always been plentiful, and of the same size; and that much that has been said about the diminished size of the perennial Plaice needs modification, for in such a shallow sandy bay few mature fishes normally occur, only multitudes of young forms, which as they increase in size pass outwards to the deeper water—as of old. Further, the gill-nets demonstrated not only the abundance of food-fishes, but of numerous large Sharks (Porbeagle, nine feet), and many Porpoises, which would otherwise have been unknown, and every one of which levied daily contributions from the food-fishes.

All this plenitude has been retained, though the number of

men and boats has increased from six or seven yawls, with five men, to twenty-one modern boats, of treble the size, and with all the new appliances, so that six or seven men suffice. Besides, Broughty Ferry and Arbroath send a large contingent.

The work of the 'Garland' in the closed waters of St. Andrews Bay and other areas will probably long remain unique, for it is unlikely that such a series of observations, continued over ten years, will ever again be made. With all the faults arising, amongst other things, from the small size of her trawl (25 ft.), and her unfitness for the rough seas of the eastern coast, the observations made by the aid of this ship have been noteworthy, and useful, by way of contrast, with those made in 1884. The results have corroborated the view that the marine food-fishes are able to withstand man's interference. By its aid, more or less, the rate of growth of fishes, the size and age at which maturity occurs, the fecundity of fishes, period of spawning, distribution of fishes—adult and young—and other features have been considerably advanced. Even Dr. Garstang, the author of a paper on the "Impoverishment of the Sea," observes:—"I am satisfied that the experiments have been largely successful in throwing light on the problem which they were designed to elucidate, in spite of the unfortunate errors of method with which the conclusions have been associated."

It is eleven years since the 'Garland's' experiments in St. Andrews Bay have ceased, and it is therefore quite fair now to ask, with reference to the supposed diminution of Plaice in it, where and when this has occurred? The introduction of Plaice-nets alone gave this notion a short shrift, not to speak of the swarms of tiny young along the tidal margin every spring, and of those of larger size all over the bay. The uncertainty, moreover, of relying on one line of investigation is shown by the fact that, at certain seasons, few or no Plaice can be caught in the gill-nets, whilst Dabs are abundant; but if hooks baited with lobworms are scattered on the same ground—from which some suppose the Plaice have "migrated"—a good supply will be obtained.

Since the publication of the 'Resources of the Sea,' in which the details of the experiments in the closed areas are dealt with, a Select Parliamentary Committee, under the presidency of the

late Mr. Ritchie, was appointed in connection with the Immature Fishes Bill. It reported a diminution of flat-fishes in the North Sea, probably due to the destruction of immature fishes. The Bill, however, was rejected.

Lastly, the Committee on Ichthyological Research appointed by the Board of Trade sat in 1901, and made various recommendations of importance in regard to improved statistics, increase of steamers for scientific work, establishment of a scientific department at the Board of Trade, a national Fishery Museum, and a co-ordination of the various administrative and scientific bodies.

At this stage it would be well to retrace our steps to 1883—*viz.* the commencement of the scientific period—in order to review another phase in the scientific treatment of the fisheries. At this time (1883) the floating or pelagic condition of the eggs of the sea-fishes was almost unknown to scientific men in this country, though Prof. G. O. Sars, of Norway, about twenty years previously, had shown that the eggs of the Cod, Haddock, and Gurnard were pelagic, and others had subsequently added the eggs of the Pollack, Bib, Pilchard, Mackerel, Flounder, Dab, and Plaice to the same category. No attention had been given to the subject in Britain, the most eminent men, indeed, believing that the floating or sinking of such eggs might be due wholly to the temperature of the water; whilst others deemed that the buoyancy was caused by the oil-globule, overlooking the fact that many were without such. As the investigations for the Trawling Commission advanced it was found how universal this pelagic or floating condition was. Moreover, steps were at once taken to put our knowledge of this important subject on a more creditable basis by constant observations with nets (including the large triangular midwater and bottom net of 10 ft. bars*), trawls, scrutiny at low water-mark, and by the co-operation of liners and trawlers. Now this country is, to say the least, not behind any

* We read of a "new era" in fisheries' work being inaugurated the other day by the use of a *square* net of this description. The era will have to be antedated by twenty years at least. Dr. Nansen took one of the St. Andrews nets to Greenland. They can be used at any depth, the finest hauls of young fishes of all kinds being obtained about a fathom above the bottom—say, in twenty to thirty fathoms of water. For inshore flat-fishes another form, like a beam-trawl, is employed.

other in its knowledge of the reproduction, the development, and the life-histories of its marine food-fishes. Whilst St. Andrews took the lead in this work, it is only fair to say how ably the Laboratory at Plymouth exerted itself amongst the southern fishes, and the scientific staff of the Scotch Board amongst the northern fishes.

Very early in these inquiries it was shown how easy it was to hatch the pelagic or demersal eggs of every sea-fish, even though they had to be transported from Shetland or the middle of the North Sea. A lecture on the subject, indeed, was given in the Royal Institution in 1889. This brings us to one of the recommendations of Lord Dalhousie's Commission, *viz.* that experiments should be instituted to test the possibility of augmenting certain valuable sea-fishes by artificial hatching of their eggs. Much had been said to the Commission about the success of the Americans in this department, and the picture thus sketched was supposed to be somewhat discreditable to our country. In view of the importance of the subject the Scotch Fishery Board made inquiries in Norway, where Capt. Dannevig had hatched Cod in large numbers for some years, had a duplicate of his hatching-house and boxes made under his supervision in that country, constructed a concrete tank, various enclosures of the sea, and started a hatchery at Dunbar in 1892 under the management of Dannevig's son. The fishes selected for experiment were Cod, Plaice, Lemon-Dabs, Soles, and Turbot. In 1899 the hatchery was transferred to Aberdeen. For fifteen years the Board has continued the operations, and has endeavoured to test their value by stocking—*e. g.* with young Plaice—such areas as the upper reaches of Loch Fyne and Loch Gair. Unfortunately, no definite general result appears to have been obtained, for none has been published. Probably a considerable amount of time was lost from inexperience in the early efforts, but after the lapse of fifteen years' expenditure the country has a right to know the result. Hatching operations have likewise been carried on at Piel, in Lancashire, by the North-Western Sea-Fisheries Committee, under Prof. Herdman, but here also evidences of their practical influence on the sea-fisheries are wanting. In France considerable success has attended the efforts of M. Fabre-Domergue* to rear to the length of 12–15 mm. Soles, but the

* 'Développement de la Sole.' Paris, 1905

experiment is on a small scale, and, in view of what takes place in the nets of the shrimpers, could not materially affect the situation.

Allusion has been made to the work of the United States Fish-Commission, which for nearly thirty years has carried out extensive experiments in sea-fish hatching. Yet, though Prof. Baird noted that small Cod of the grey or offshore variety (that used in the hatchery at Gloucester, Mass.) appeared in the harbour next year, where they never were found previously, and larger forms of the same variety in the two following years, no absolute proof is forthcoming, even up to date. It is true the American Fisheries Bureau* claims that there has been a general improvement in the shore-fishery for Cod, and that this improvement has been to some extent cumulative since the operations commenced at Woods Holl and Gloucester, and that the increase followed the line of the adult fishes which were marked and set free after spawning. Even though hundreds of millions of fry of Cod and Flounders have been placed in the sea by the Americans, Mr. Fryer, one of H. M. Inspectors of Fisheries, holds that marine fish-hatching is immaterial, since there are so many young forms in the sea. Similar views are held by Petersen, of Denmark, who considers that it is of no consequence whether Plaice spawn in the Lim Fjord or not, as enormous numbers of small Plaice exist in the free waters outside, and migrate into it. Even the long-continued labours of Capt. Dannevig, who for many years has turned the artificially hatched Cod-fry into the fjords of Norway, are held to be useless by Dr. Hjort, Dr. Knut Dahl, and others in that country. Similar remarks apply to the great hatchery for Cod at Dildo, Newfoundland.

The enormous powers of reproduction of the sea-fishes, their pelagic eggs, the wonderful passage of the larval and post-larval fishes shorewards, or otherwise, according to definite laws, which are altogether independent of currents or temperatures, and their migrations outward to deeper water as they grow older, place them in a wholly different category from fresh-water and anadromous fishes—even without considering the marvellous and

* I am much indebted to Dr. Goode Brown for valuable information on this head.

unbroken chain of those organisms—from diatoms to fishes*—which form their food at every stage.

On the whole, the conditions under which the adults of sea-fishes are kept for the artificial supply of eggs are not always favourable for health, and a comparatively small number of such adults in the open sea would produce a much greater number of healthy young. Besides, there is no lack of young fishes in the ocean.

The whole history of the sea-fisheries of our country, from the earliest period up to date, thus affords no solid grounds for the pessimistic views either of scientific or practical men. It has not been proved that our seas have been depleted of food-fishes to a dangerous extent by man. In pre-statistical times the outcry was as loud as now, even though the captures were small. After statistics were established, the complainers fixed on certain fishes, such as the nomad Cod and Haddock, till it was demonstrated that their fears were groundless. Then the flat-fishes (supposed to be sedentary) were singled out, and persistently held up—even now—as forms which were diminishing year by year before the hook and trawl. The public are thus constantly harassed by uncertainty and foreboding, whilst the legislature is ever invoked to satisfy one or other group of the pessimists. As Sir Spencer Walpole says, it is the old cry of “wolf, wolf,” and yet the wolf has not come during all these years—it might truly be said, centuries. We know that, whitebait notwithstanding, the soundness of the position of the Herring, which furnishes so large a share of the total annual catch, is beyond cavil, and has long been so, and that the round-fishes, such as the Cod and the Haddock, have, though grudgingly, been admitted to be safe—both by their abundance in the market, and the vast areas over which they and their young are distributed. The flat-fishes, such as the Turbot, Sole, and Plaice, possess, not only in the early condition, but throughout life, a protection which few round-fishes (amongst these the Sand-eel and Sting-fish) have, *viz.* the habit of living on the surface of, and often covered by, the sand. Moreover, the number of the pelagic eggs of the first named is enormous, *viz.* about ten millions. In their earliest (larval) condition they are, it is true, pelagic like their eggs, but

* Lecture, Roy. Instit. of Great Britain, Friday, Feb. 1st, 1889, p. 10.

they soon gravitate to the bottom as the eye joins its neighbour of the opposite side, meanwhile approaching the margin of the tide, where they may be found in numbers amidst the muddy sand of the beaches, and where they are comparatively safe. During growth they are constantly shifting from the shallower to the deeper water, where the adults are found. Thus, while the adults may suffer from trawl or hook, their places are filled by an ever-constant stream of young—in the case of Plaice—in such numbers that hitherto their extermination has defied man's most elaborate ingenuity and far-reaching cupidity.

Bear in mind how often the approaching extinction of this and that fish has been predicted—how the fishery for Soles, for instance, has had its days numbered about a quarter of a century ago, even by scientific men, it may be, out of touch with the sea. Yet what does Nature teach us in the estuary of the Thames? For five or six hundred years at least the limited area of this estuary has been persistently and almost daily fished for Shrimps by man, and his nets have simultaneously captured and killed, amongst other fishes, numerous young Soles (and I have to thank Dr. Murie for his genial aid in the expedition to secure them)—tiny wafers which are blown on the gunwale of the boats, to which they adhere, in sifting; whilst the larger examples, at various stages, are picked out with the *débris*, and, as a rule, also killed. Since the area referred to has been calculated to send daily to London at least two thousand gallons of Shrimps,* the drain on these young fishes is enormous; yet, it may be asked, has it affected in any marked manner the prevalence of the adult Soles throughout these centuries, and, moreover, has the sea been impoverished in regard to Shrimps? Mr. Shaw Lefevre (now Lord Eversley) has recorded a case where, in Morecambe Bay, a far greater destruction of young flat-fishes was caused by the drying up of the shallow pools between tide-marks by the sun than by all the local shrimpers, of which the flounder-fishermen complained. The fishermen, however, had a ready rejoinder when this was pointed out by the Commissioners, *viz.* that the natural loss was allowed for by Providence, but not that caused by shrimping. It must not, however, be supposed that this wholesale destruction of young fishes is treated with in-

* Mr. Spencer Walpole, Fish. Exhib. Lit. vol. i. p. 47, 1884.

difference, or allowed to go on if it could be avoided. It is only cited as a proof of the wonderful resources of Nature, which for so long a period has maintained supplies in spite of the constant drain—natural and artificial.

A noteworthy instance of the supposed extinction of a food-fish, again, is to be found in the American Tile-Fish (*Lopholatilus chamæleonticeps*).* This fish was discovered in 1879, in deep water off the United States, when fishing for Cod and Hake with "trawls," each about one mile long, and having one thousand hooks, and was caught in considerable numbers. In March and April, 1882, vessels entering the Atlantic harbours of the United States reported that they had passed through countless numbers of dead Tile-Fishes while crossing the northern edge of the Gulf Stream, the mortality being estimated at 1,438,720,000. For ten years no trace of the Tile-Fish was found, but again in 1892, and the following four or five years, some were caught, and in 1898 a large number were captured by an expedition sent to their special grounds, the bait being Mackerel. Prof. Verrill thought that the destruction of the Tile-Fishes was due to the effects of a great storm, which lowered the temperature of the warm slope they inhabited. Their reappearance was connected, by Prof. Libbey, with the movement of the warm band of water towards the shore, which thus restored their former environment.

Nor do the foregoing facts stand alone. A perusal of the English and Irish statistics, and still more of the Scotch official returns, which are at once the oldest and most complete, will show the soundness of the position. One instance will suffice: In 1897, the last return dealt with in the 'Resources of the Sea,' the grand total of the Scotch fisheries was 5,001,672 cwt., of the value of £1,627,752. More or less steadily have these fisheries mounted up, till in 1905 (the last published Report) the grand total (exclusive of shell-fishes) reached 7,856,310 cwt., or 2,854,638 cwt. more than in 1897, whilst the total value was £2,649,148, or considerably above a million more. So far as can be observed, therefore, and taking all the circumstances of increased means of capture into consideration, the result is not disquieting. Moreover, countries which began in fear—like the Americans—to spend large sums on the sea-fisheries, now find

* Dr. H. C. Bumpus, Bull. U. S. Fish. Com. vol. xviii. p. 321, 1898.

that there has really been no general reduction in prosperity, notwithstanding the development of modern methods and the vast increase of population.* The same may be said of the Lofoten Cod-fisheries of Norway, which for one thousand years have shown no diminution; of the perennially abundant Cod-fisheries of Newfoundland; of the vast fisheries of Canada (under the scientific guidance of Prof. Prince, of St. Andrews), which during the last thirty years have steadily maintained, if not exceeded, their pristine value. Even the Lobster (by some regarded as a vanishing form) began in 1875 with 1,638,658 dollars, and ended in 1905 with 3,906,998 dollars, the canneries and traps having increased ten and one hundredfold respectively. Yet in the most rigorously fished area (Western Nova Scotia) there was an increase in 1904 over 1902 of 196,316 dollars. If a comparatively sedentary animal like the Lobster, which carries a limited number of eggs for many (eight to eleven) months, can survive, and even multiply, under such severe conditions, how much more fitted for endurance are the food-fishes, with their far greater number of floating eggs, their wonderful life-histories, and surroundings in an element so vast and so conducive to safety.

VALUE OF CATCH (IN DOLLARS) OF IMPORTANT CANADIAN FISHES.
THIRTY YEARS.

	Cod	Haddock	Hake	Mackerel	Lobsters	Oysters	Herring
1875	3,249,000	282,385	152,756	1,245,570	1,638,658	12,000 barrels	1,377,175
1880	3,900,000	626,300	656,894	1,181,000	2,843,100	64,646 barrels	1,233,000
1885	4,302,454	785,245	217,981	1,826,681	2,351,559	50,540 barrels	2,645,447
1890	3,449,640	532,068	440,064	1,958,492	1,648,348	61,032 barrels	2,294,914
1895	3,638,519	444,703	210,856	736,655	2,210,096	47,673 barrels	2,800,556
1900	3,614,775	608,067	520,504	1,549,448	3,055,350	41,920 barrels	1,853,237
1905	3,421,400	806,743	447,665	985,223	3,906,998	34,449 barrels	2,303,485

* In Japan, likewise, boats are increasing in number as well as in equipment, and though Prof. Kishinouye thinks inshore fishes have decreased, yet the absence of reliable statistics shows that Japan is only passing through the experience of all old countries.

So long as the countless hosts of the young of the round-fishes, like the Cod and the Haddock, people vast areas of the open sea, regularly appear off our rocky shores, or fill the great midwater- and bottom-nets in deep water, or, like the newly-hatched Herrings, form a carpet on the sandy bays ; so long as swarms of the young of the flat-fishes frequent the tidal margin on sand or sandy mud, and are scattered, at a somewhat older stage, broadcast over our sandy bays ; so long as the fishery statistics, not only of Britain, but of all the countries bordering the North Sea, show only the usual fluctuations of an uncertain pursuit, or point to an increase ; so long as the calm survey of the whole subject is as satisfactory as at present, it would be neither scientific nor practical to doubt the permanence of the marine food-fishes, or the marvellous resources of Nature in the sea.

Such, then, is a brief and imperfect outline of the facts which make it clear that the British fisheries, notwithstanding all the restlessness and distrust of the fishermen and the public, and notwithstanding all the fears of the learned as to man upsetting the balance of nature, are, upon scientific grounds, not unsatisfactory. The larger fishes on a given area may, by constant work, be diminished, and the rest rendered more wary, but the ranks are soon filled up by the younger forms. When we come, in the following part, to consider the international statistics and observations—though some of these are from the hands of those who began the work imbued with the popular notion of the ‘Impoverishment of the Sea’—it will be interesting, after their unequalled opportunities and unequalled expenditure (of £70,000), to discover how far such a view has been substantiated.

AQUATIC COCKROACHES.

BY R. SHELFORD, M.A., F.L.S.

IN 1897 the writer was collecting insects on a mountain close to Kuching, the capital town of the State of Sarawak, in Borneo, and, whilst examining a small pool at the base of a waterfall for water-beetles, discovered several Cockroaches lurking in the sodden leaves scattered about the edge of the pool. The insects, when disturbed, took to the water, and dived to the bottom, where they hid under sticks and stones. The habit was sufficiently remarkable and unexpected to deserve further investigation, and several specimens were captured alive, and placed in a glass tank with some water and an abundance of vegetable *débris*. All the specimens were immature, and of varying size, ranging from 10 millim. to 25 millim. in length. It was observed that they could not endure total immersion in water for any length of time; if a specimen was confined in a tube full of water, and denied all access to air, it would struggle violently for a few minutes in its efforts to escape, and then sink to the bottom of the tube, and there expire. This is what one might expect from the results of certain experiments conducted by Prof. Plateau, of Ghent, on the relative staying powers of land- and water-insects when totally submerged in water. The distinguished Belgian entomologist found that, whilst terrestrial insects will support an immersion for a period ranging from $97\frac{1}{2}$ hours to $22\frac{1}{4}$ hours, aquatic beetles succumb in periods ranging from $65\frac{1}{2}$ hours to 3 hours. The aquatic Cockroach drowns even more rapidly than aquatic beetles, and it was found that a terrestrial Cockroach, though enduring total immersion for a few hours, is unable to remain alive without air for even the minimum time recorded for terrestrial beetles.

The aquatic Cockroaches that were kept under observation were very inactive, resting for hours at a time on the dead leaves with which they were provided; generally the front part of the

body was in the water, but the tip of the abdomen was never submerged, even when all the rest of the body was covered. The abdomen moved up and down with a rhythmic action, and bubbles of air issued at more or less regular intervals from the prothoracic spiracles. These air-bubbles were seen to form gradually, to grow larger and larger, and finally to break away from the spiracles; about twenty per minute passed through the spiracles. Air issued from the mesothoracic spiracles only when the insect was violently agitated. From these observations it seemed fairly obvious that the terminal abdominal spiracles were inspiratory in function, the thoracic spiracles expiratory, and that it was necessary, therefore, for the insect to have the tip of the abdomen exposed to the air, but that it was a matter of indifference whether the expiratory spiracles were above water or below it. In order to settle the question beyond all manner of doubt, some specimens were fastened with cotton threads to strips of cork; half the number were fastened head downwards, the other half head upwards. The cork-strips with the attached insects were then immersed in tubes of water. In the case of the reversed specimens the water covered the thorax and basal segments of the abdomen, but the tip of the abdomen projected above the water-level; the other specimens had the abdomen in the water, but the thorax exposed. The results in every case proved the inspiratory and expiratory functions of the abdominal and thoracic spiracles respectively. The reversed specimens endured their constrained position for many hours (twenty-four to forty-eight or more), and when released seemed little the worse for their experience. On the other hand, the specimens with the abdomen immersed in water died in less than twelve hours, sometimes in less than six. The structure of the thoracic spiracles in Cockroaches is quite different from that of the abdominal spiracles,* and a difference in function is only to be expected; nevertheless, when repeating these experiments with terrestrial Cockroaches, such as *Panesthia javanica*, I was unable to demonstrate satisfactorily the functional differences of their spiracles. This failure may be accounted for—in part, at any rate—by the fact that this species struggled long and violently when pinioned to the cork-strips, and, as they are extremely muscular insects,

* Miall and Denny, 'The Cockroach,' 1886, pp. 151–155, ff. 85–88.

their bonds had to be tightly fastened in order to keep them in position; even then the prisoners did not relax their efforts to free themselves, and I believe that they died of exhaustion and of injuries sustained in their struggles rather than from drowning. The aquatic species, on the other hand, remained comparatively quiet; the reversed specimens, being fastened in a position more or less natural to them, and being able to obtain their supply of air in quite a normal and usual manner, were very little dis-

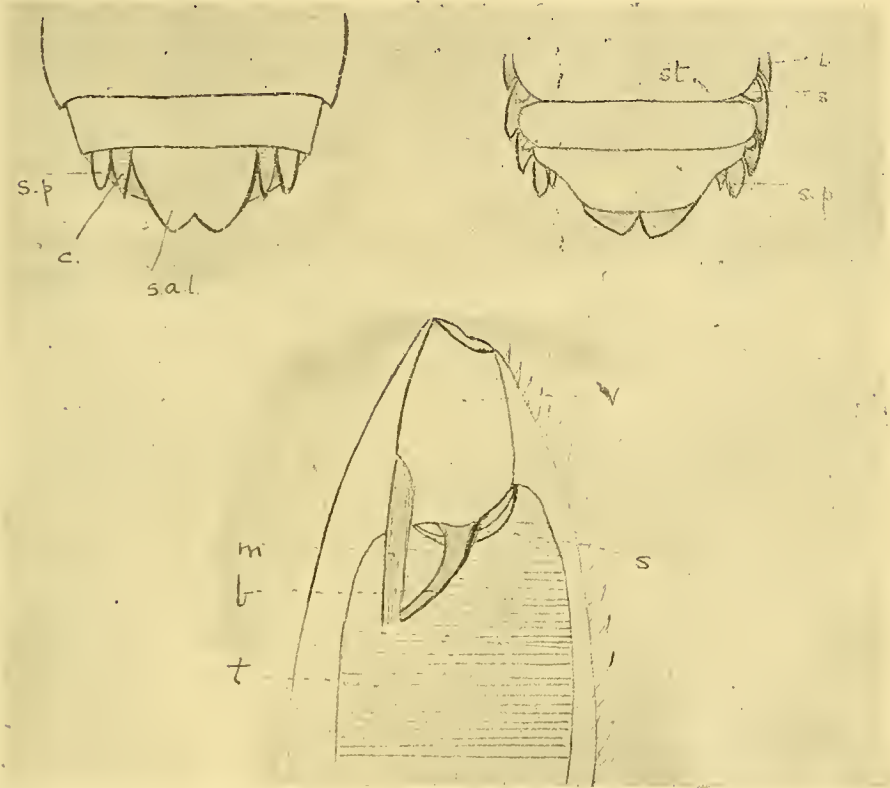


FIG. 1.—End of abdomen of a larva of *Rhicnoda natatrix*, sp. n., dorsal view; *s. p.* spiracular tube; *c.* cercus; *s. a. l.* last dorsal tergite.

FIG. 2.—The same, ventral view; *st.* abdominal sternite; *s.* spiracle; *t.* abdominal tergite.

FIG. 3.—Spiracular tube, highly magnified, seen in optical section; *v.* vestibule; *s.* spiracle; *m.* muscle working *b.*, the chitinous bow; *t.* trachea.

tressed by their bonds, and the other specimens were soon reduced to a comatose condition by the difficulty of obtaining air. The terminal spiracles of these aquatic Cockroaches are situated at the base of two tubes visible on the dorsal side projecting from below the seventh tergite, and external to the anal cerci (fig. 1).

This same feature may be observed in many terrestrial *Blattidæ*, so that it cannot be regarded as associated with the aquatic habit. A microscopic examination of one of these spiracular tubes reveals the following features (fig. 3). The orifice of the tube leads into a short vestibule (*v.*), the vestibule joins a large trachea (*t.*), but intervening between vestibule and trachea is the spiracle (*s.*), a narrow slit in a diaphragm; the slit is opened and closed by the action of a chitinous bow (*b.*), worked by a muscle (*m.*) attached to the wall of the vestibule. This is essentially the structure of all the abdominal spiracles in Cockroaches, and the terminal spiracular tubes of the aquatic species are merely enlarged equivalents, shifted dorsally, of the short spiracular plates of the preceding segments (fig. 2, *s.*), which are situated on the *ventral* side of the abdomen.

Externally, at any rate, the aquatic Cockroaches exhibit no particular modifications for their remarkable habit of life, the legs are not different from those of allied terrestrial genera, and there is nothing in their general appearance to suggest their aquatic habit of life. During the experiments that have been described one distinctive feature, however, in the economy of the insects was notable, *viz.* the ease with which they could remain below the surface of the water. Most adult aquatic insects, e. g. *Dytiscus*, *Corixa*, *Notonecta*, can only keep below the surface by continuing to swim, or by propping themselves under some stone or submerged leaf; directly they relax their efforts they float to the surface. Again, if a large heavy Cockroach, such as *Panesthia javanica*, is thrown into water, it flounders helplessly on the surface, and is quite unable to sink; whereas the much lighter aquatic Cockroach is able to swim, to dive, and to remain submerged with great ease. An explanation of these facts is found if the tracheal systems of the insects are examined. The tracheæ of *Dytiscus* and of *Panesthia* present the usual appearance of opaque silvery tubes filled with air; the tracheæ of the aquatic Cockroaches, on the other hand, are transparent, flattened, strap-like structures, dilated here and there only with air-bubbles. *Dytiscus* and *Panesthia* are buoyed up in water by the plentiful supply of air stored in their bodies, but the tracheæ of the water Cockroach are mere air-passages, not storehouses, the respiratory movements are rapid, causing a constant circulation of air, and

if the supply is entirely cut off there is practically no reserve supply contained in the body to draw upon. Hence the rapid death of the insect when totally submerged; if only partially submerged death supervenes less rapidly, probably because some air can be drawn through the thoracic spiracles. *Panesthia javanica* is able to endure *total* immersion longer than the *partial* immersion to which individuals were submitted, because these individuals, when bound, struggled so violently as to make heavy demands on their reserve air-supply; their position was so constrained, so unusual, and so unnatural that they were not able to "take matters quietly," even when fastened in a position presumably favourable to drawing in a fresh supply. Plateau has shown that aquatic insects drown more quickly than terrestrial insects, and suggests that this is because their supply of oxygen is quickly converted into CO₂ through their violent struggles to escape, whereas terrestrial insects, when submerged in water, soon cease to struggle, and, although they become comatose, they recover power of movement when restored to land. It would be of interest to learn if an aquatic insect such as *Dytiscus* would endure partial immersion, *i. e.* with the tip of the abdomen exposed, as well as the aquatic Blattids.

Dr. Nelson Annandale discovered some aquatic Cockroaches in the Malay Peninsula*; the females were wingless, and rested on floating logs, whence they dived into the water when disturbed; the males were winged, and were seen to rise from the surface of the water, but were never seen to enter it. Dr. Annandale states, moreover, that the egg-cases of this species were found in crevices of the floating logs. If the Malay Peninsula species belongs to the same subfamily of *Blattidæ* as the Bornean species, namely, to the *Epilamprinæ*, this discovery of egg-cases is of some interest, for the *Epilamprinæ* are, so far as is known, viviparous insects, the chitinous ootheca deposited by the females of other subfamilies being represented by a delicate membrane enveloping the eggs inside the brood-sac of the mother. Unfortunately, Dr. Annandale's specimens appear to be lost, so that they cannot be identified with certainty.

Another species has been discovered in Formosa,† and Dr.

* Ent. Rec. 1900, p. 76.

† Shiraki, Ann. Zoolog. Japon. vi. 1906, p. 32, pl. 2, f. 4.

Annandale has found an immature specimen in Chota Nagpur, India.* It remains only to give a name to the Bornean species, which appears to be undescribed. The following description is drawn up from an unique female specimen in the Hope Museum, Oxford, evidently the adult of some of the larval forms obtained. The male is unknown.† The Japanese species has been wrongly referred to the genus *Opisthoplatia*; there is no doubt that it is congeneric with the Bornean species.

Subfam. EPILAMPRINÆ.

Genus RHICNODA, Brunner.

Rhcnoda natatrix, sp. n.

♀. Castaneous. Allied to *R. rugosa*, Br., from Burma and Java, but larger, and with the dorsal segments less rugose. Head concavely depressed between the antennal sockets, this area cribrately punctate, rest of head with scattered punctures. Pronotum just covering vertex of head, arcuate, posterior margin truncate, anterior and lateral margins slightly reflected; a few scattered punctures and a pair of impressions on the disc. Tegmina rufous, exceeding the mesonotum in length. Meso- and metanotum and abdominal tergites slightly and irregularly rugose, the posterior margins of the sixth and seventh tergites plicated. Supra-anal lamina produced, apex emarginate, cerci abbreviated, spiracular tubes short; subgenital lamina ample, posterior margin sinuate, disc transversely wrinkled. Front femora with five spines in middle of anterior margin beneath, four spines on posterior margin; formula of apical spines $\frac{2}{1}, \frac{1}{1}, \frac{1}{1}$, front femora with no genicular spine. Posterior metatarsus equals remaining joints. Total length, 35.5 mm.; length of tegmina, 7 mm.; pronotum, 10 mm. × 17.5 mm.

Borneo (Wilson Saunders collection, Hope Museum, Oxford).

* Jour. As. Soc. Bengal (new series), vol. ii. 1906, pp. 105, 106. Dr. Annandale confirms my account of the respiration of these insects, and noted the ease with which his specimen was drowned when totally submerged.

† In a preliminary account of these Cockroaches (Rep. Brit. Assoc. 1901, p. 689) I stated that they consisted of two species—one an Epilamprine, the other a Panesthiine. This is an error due to inaccurate information supplied to me at a time when my knowledge of the *Blattida* was less than it is now. All the specimens collected by me are immature, and are referable to two Epilamprine genera, *Rhcnoda* and *Epilampra*. The females of the former genus apparently lead a semi-aquatic life always. I expect that it will be found eventually that some terrestrial species of *Epilampra* are amphibious or aquatic in their earlier stages.

OBSERVATIONS OF AN ATTEMPT OF THE SWALLOW
 TRIBE TO WINTER IN SOUTH HANTS DURING
 1906-7.

BY HARRY BEESTON.

FOR several years past I have taken a very deep interest in the migration of birds, both during the spring and autumn, and have noted some extremely interesting, yet withal puzzling, observations on the very late departure of the Swallow family in the South of England.

Havant—the town where I reside—is situated near the sea, the open Channel being only four and a half miles distant, while the waters of Langstone and Emsworth Harbours are within half a mile of the town.

The locality is well sheltered on the north by the South Downs, and by the Isle of Wight to the south; the atmosphere is humid, and the climate rather mild, even in winter, so much so that frequently gnats and flies are seen hovering over the streams and fields, in abundance, in the middle of winter. During a residence of twelve years in the district I have never seen the streams frozen over.

I mention these facts in order that the following remarks may be better understood; they have, in my opinion, a direct bearing on the question of bird migration, and may be able partly to explain why Swallows and Martins arrive so early, and linger so long in the locality.

It is more of the *apparent desire of the birds to remain* so abnormally late in the district, than of their early appearance on which I wish to dwell specially, with a view to obtaining some satisfactory solution to the problem.

The fact is well known that members of the Swallow tribe are reported from various parts of the South of England very late in the season (autumn), but Hampshire seems greatly favoured in this respect, year by year, in the neighbourhood of Havant. In the year 1903 Swallows and Martins (two species) lingered well on into November, and a solitary *House-Martin* was seen flying

about, and hawking for food over a stream in the locality, quite near to the town, on *December 30th*. This at the time was thought to constitute a record, but during the following years much later records have resulted. The next year (1904) Swallows (*Hirundo rustica*) remained well on into November, but during 1905 and 1906 the birds remained abnormally late.

First take 1905. Swallows and Martins, in fair numbers, remained on after the general southern exodus was over. Here follow the observations copied from my diary.

On Nov. 18th *six Swallows* and *one Sand-Martin* were observed vigorously feeding, and very strong on the wing. The day was very cold, and a keen N.E. wind was blowing. I mention the direction of the wind as it had been blowing from a *northerly* point (N.E., N.W., or N.) from the 13th inst.; so that the birds had not apparently lingered *because the wind was not in the direction most generally thought to be suitable to migration*. There had been ample time and opportunity for departure.

On Nov. 19th *five Swallows* were observed—two adult birds and three young ones. The wind was still N.E. The Sand-Martin seen on the 18th had disappeared.

The 20th was a bright day, with a cold, raw, frosty air, with wind due north. During the night there had been a keen frost, and the ground was white with hoar-frost. *One Swallow* only was seen—an adult bird. The others may have been in the locality, but were not seen, as the observation was made at dusk, and the birds may have gone to roost for the night.

21st.—*Two Swallows* sporting about to-day, and very strong on the wing, although there had been *ten degrees of frost* during the night; the roads were frozen hard, and the puddles and ditches thick with ice, though the streams were not frozen over. The birds occasionally rested on a wire-fence by the side of the stream, and preened their feathers as though the weather was mid-May instead of winter. The wind was N.W. *One* of the birds noted to-day was *adult*, and the other appeared a young one, and in immature plumage.

22nd.—Sudden change in weather—wind S.W., and a mild showery day. During the night eight degrees of frost had been registered, yet *two Swallows* remained—to all appearance the same as seen yesterday.

23rd.—Wind W., mild and showery. *Two* Swallows hawking vigorously for food over the stream.

24th.—Wind S.W. *One* Swallow seen, and this appears to be the *young* bird, as it has several whitish (or greyish) feathers on the rump, and in the tail.

25th.—Strong S.E. wind. *One* bird still strong on the wing.

26th.—Fierce gale from S.W., with heavy rain. *One* Swallow braving the blast, though finding great difficulty in beating against the wind up-stream.

27th.—Brighter day. Wind W.N.W. Same bird present (by markings), strong in flight, and seemingly quite at home, and in no hurry to depart.

28th.—Strong squally S.W. wind, with rain. Bird to-day seemed weary, and frequently settled to rest on wire-fence; appeared to find a difficulty in facing the wind.

29th.—Bright day. Wind N.E. Bird feeding as usual.

30th.—Cold, raw day. Wind due S. Bird still present.

Dec. 1st.—Weather bright. Wind N.W. Bird strong on wing.

2nd to 4th.—Fine mild weather. Wind N.E. Bird vigorously feeding and strong.

5th.—Very mild. Wind S. Missed bird to-day for first time. Has it departed or died?

6th.—A changeable, mild day. Wind N.E. Much surprised to-day to find the Swallow back again over the stream, and quite lively. No doubt yesterday the weather had tempted the bird to leave the stream, and go on a foraging expedition farther afield. I was quite delighted to find the bird was still alive, and in its usual haunts.

7th.—Fine day. S.W. wind. Bird very fit and vigorous.

8th.—As yesterday. N.W. wind. Bird flying strongly, and making excursions across the fields away from the water. To-day winter and summer seemed strangely blended, for, while the Swallow was gaily skimming over the surface of the water, the Grey Wagtails from the northern districts were taking short flights, and hovering over the stream for instants to snap up the gnats from the surface, displaying their long white tail-feathers in the action, and then fluttering with a cheery “chiss-up! chiss-up!” to the weedy margin again.

9th.—Wind N.W. No Swallow!

10th.—Sharp rimy frost. Wind N.W. No Swallow!

For several days from this date I have visited the stream, but the bird has not been seen since. Has it at last departed to a summer clime? I doubt it. In my opinion it has either fallen a prey to some predacious bird while on the wing, or a prowling cat has secured it from its roosting-place.

On the 8th, when last seen, it was too vigorous on the wing, and swept over the meadows so full of life and animation that I cannot believe for a moment it died of starvation. I regret its disappearance very much, as I feel almost confident, considering the bird had safely weathered *ten degrees of frost* nearly three weeks before, that it would have stayed on until spring, food being plentiful. But this matter of food and other interesting points I shall discuss later.

I now pass on to last year (1906). Even more interesting than the previous notes are the observations made during the late autumn and winter of 1906-7.

Up to the first week in November (1906) Swallows and House-Martins were common, as is the usual thing here, although not in great numbers, small parties of five or six—no doubt parents and their late broods—being occasionally noted sitting on the telegraph-wires, or skimming over the streams.

I again follow my diary notes:—

Nov. 11th.—Wind N.E. Three *House-Martins* seen.

18th.—Wind N.W. Gale of wind and heavy rain. *Five Swallows* seen circling over the tops of elm trees, evidently on the feed.

25th.—Wind N.W. *Three Swallows, two House-Martins,* and *one Sand-Martin* sweeping up and down stream in full vigour.

27th.—Wind W. *Two Swallows* skimming over the water and fields.

28th.—Wind N.W. *Five Swallows* sitting on telegraph-wires, evidently a family party, occasionally flying off together in search of food.

29th.—Wind S.W. Weather very mild. *One Swallow* and *two Sand-Martins* in full flight, hawking over the stream. The two latter are evidently stragglers from some other locality

(northward), and the Swallow probably one of the five seen yesterday; but this interesting fact is worth special note—that *four of the latter* have disappeared with a N.W. wind, and the two Martins have arrived; but why *should one Swallow remain and the others depart?* The two Martins may have travelled southward with yesterday's N.W. wind, and have chosen to rest and recuperate here, and then pass on, but later observations, it will be seen, prove that they *did not proceed farther, nor show any desire to do so.*

Dec. 1st.—Strong N.W. wind. One Swallow only seen, strong and fit.

2nd.—*Two* Sand-Martins and one Swallow.

4th.—Wind N.W.; mild day. One Swallow only seen.

5th.—Wind N.W.; much colder. Two Sand-Martins, but *no* Swallow.

Note.—It will be observed that on some days the Swallow only was seen, and on other days the Martins were seen by themselves; while frequently the two species would be together disporting themselves over the water. No doubt when they were not all together the absent ones had gone farther afield in search of food, or taken longer flights around the district, thus accounting for their *apparent* departure, as was proved on succeeding days by their reappearance.

6th.—Wind N.E. One Swallow, two Sand-Martins.

7th.—Wind N.E. Four degrees of frost, white rimy frost this morning, and roads coated with ice. The three birds (both species) in evidence. The Sand-Martins are vigorous, but the Swallow seems very feeble, flying with evident labour just over the surface of the water, occasionally dipping its beak into the stream, and picking off an insect.

N.B.—From this date forward the observations, it will be seen, are almost a counterpart of those of 1905, and it is these facts which are so very interesting, and constitute so suggestive a study—I may almost venture to say, an unique and puzzling enigma—in ornithology.

8th.—Wind N.E. Keen rimy frost, with hard icy roads; change to rain in evening. *Two* Sand-Martins present; no Swallow.

9th.—Keen strong N.W. wind. Another hard frost last night,

and freezing hard all day. *One* Swallow and *two* Sand-Martins beating up and down stream in the cold N.W. wind, but hawking on the lee-side of willow trees and haystacks, which shelter the stream somewhat from the blast; birds quite close to the water, scarcely ever leaving the stream. Query: *Why do these birds linger on?* They are sure to perish!

In order to show how very keen the weather was at this time, and to what straits the birds were put to obtain food, I may mention that along the margins of the stream over which the Swallow and Martins were flying I observed the following species of birds which were seen fossicking for food at the same time (3.30 p.m.), *viz.*:—Stonechat, Meadow-Pipit, Wren, Grey Wag-tail (see note *re* this bird for 1903), Robin, Starling, Song-Thrush, Blackbird, Sparrows.

10th.—Fine bright day. Wind N.W.; six degrees of frost last night. All *three* birds on the wing—the Sand-Martins wonderfully strong on the wing, and apparently unaffected by the cold weather; the Swallow seemingly very feeble, but still keeping on the feed, resting occasionally on a wire-fence. As I stood on the margin of the stream, I could easily have caught the Swallow in a butterfly-net, or have touched it with my stick, so tame or heedless of my presence did it appear. As it rested its wings drooped languidly downwards, showing a distinct patch of whitish feathers in the middle of the back. It was this patch which served to identify the bird as the same which had remained on from Nov. 25th. It hardly seems possible for this bird to survive through another night of keen frost.

11th.—Wind N.W. Thawing to-day; thick fog; heavy rain in evening; seven degrees of frost last night. To my great surprise, both Swallow and Martins on the wing, the latter fairly strong in flight, but the Swallow very feeble, taking short flights, resting a minute or so on the wire-fence, then backwards and forwards along the stream, occasionally sweeping the surface, and picking off an insect with evident effort—a magnificent struggle of animated nature against great odds. Which will win, bird or weather? Alas for the bird!

12th.—Wind W.; cold, piercing, strong wind. As I anticipated, Martins *only* in evidence to-day. The poor Swallow has evidently perished. I searched the ground below the wire-fence

where it rested yesterday in the expectation of finding its corpse, but failed to do so. It has probably died on its perch, or fallen into the stream, and, unable to recover itself, been carried away and drowned. It would be interesting to know its fate.

13th.—Cold west wind; frost last night. The *two* Sand-Martins still on the wing.

14th.—Wind N.W.; cold, raw, wintry day. *Very* hard frost last night; roads frozen and covered with ice. *One* Sand-Martin only to-day, flying *vigorously* up and down stream, snapping up the gnats from the surface as it skimmed along, with no evidence of feebleness or discomfort. The weather is so wintry that the Song-Thrushes, which have been in full song up to this week (9th), are now silenced, being too busy seeking food to think of singing; yet this belated summer bird seems to quite disregard the weather, and appears as strong and healthy as though it were midsummer.

15th.—Wind N.W.; dull cold day. *Both* Martins present to-day. I spent a couple of hours searching the beams, ledges, and floors of several barns and stables, where I thought it likely the Swallow, last seen on 11th inst., might have roosted at night, in the hope of finding its dead body, and thus satisfy myself that it had died a natural death (*i. e.* of cold and starvation), but my search was in vain. Evidently one of the Martins had yesterday made an excursion by itself away from its usual feeding haunts. A Grey Wagtail and a Snipe seen feeding by the stream to-day.

17th.—Wind N.W.; mild dull day. Birds still alive and well, but to-day high in the air above the trees, outhouses, and fields, yet never going far from the vicinity of the stream.

18th.—Weather and wind as yesterday. Birds very strong on the wing, and still circling high above the ground, and seemingly quite vigorous, and in no hurry to depart to warmer climes. The mild weather has once more incited the Song-Thrushes to commence singing again.

20th.—Wind changed to N.E.; weather much colder. The *two* birds still in evidence.

21st.—Wind N.E. Cold, with hard frost again. *To-day a strange and curious thing has happened—the two Sand-Martins have been joined by a Swallow, a poor, bedraggled, miserable-look-*

ing, half-dead object. There is absolutely no mistaking him (a male), with his reddish throat and long-forked tail, and without doubt none other than the bird seen on Dec. 11th. But—and here is the mystery, if we grant it to be *the same bird*—where in the interval has the bird been—a matter of ten days? When seen last (*vide* 11th inst.) the poor creature could scarcely fly, therefore it was quite incapable of taking a lengthy flight, and would scarcely be likely to go on a speculative journey in search of food when insects were fairly plentiful in the vicinity of the stream where it had fed so long. On the other hand, *is it possible for it to have existed for ten days without food?* Had it been in a semi-torpid condition during that time in some warm corner of an outbuilding, protected somewhat from the cold weather, and then, having been partly revived by the milder conditions which prevailed from 15th to 18th, managed for once to struggle out in search of a scanty meal? If so—and *we grant it possible* for a bird to exist thus in a semi-torpid state for several days—there might be some foundation for the accounts given of Swallows being seen in attics, church-towers, roofs of buildings, and other similar places, apparently dead; or of Sand-Martins being dug out of sand-pits and other sheltered places in a torpid condition, and actually returning to life when subjected to the effects of warmth. This *theory of semi-torpidity* does not seem to have been yet entirely refuted, though it is usually regarded as *impossible*, but I am inclined to think there may be “something in it.” I would like to have the opinion of ornithologists regarding the disappearance of the Swallow on Dec. 11th, and its reappearance on Dec. 21st. It is quite certain that the Sand-Martins have not yet been in a torpid condition, as they have been observed almost every day from Nov. 29th.

(To be continued.)

NOTES AND QUERIES.

MAMMALIA.

Dolphin in Moy Estuary, Killala Bay.—The carcase of a Dolphin was left by the tide on the shore of one of my fields here on the 5th inst.; it was in an advanced stage of decomposition, having probably been killed some weeks previously by the Salmon fishermen. It was a male, $7\frac{1}{2}$ ft. in length. I could not measure the dorsal fin or flukes, both being partly cut away; the flippers were 14 in. long from the shoulders, while from blow-hole to end of lower jaw measured 14 in.; the same distance from eye to end of lower jaw. The teeth were small and sharply pointed, those of the upper jaw fitting closely between those of the lower, and some of the teeth at end of upper jaw were wanting, but those of the lower were all perfect—*forty-eight on each side*. I have no books of reference by me, but suppose from the large number of teeth that the animal is the Common Dolphin (*Delphinus delphis*).—ROBERT WARREN (Moy View, Ballina).

AVES.

Dipper (*Cinclus aquaticus*).—On April 14th I took a clutch of five Dipper's eggs. Being near the spot again on April 30th, I dropped down to have a look at the nest. The Dipper flew out as I approached, and, on examining, I found five fresh-laid eggs in the identical nest. Needless to say, I did not disturb this second laying. — T. THORNTON MACKETH (The Hall, Caldwell, Uplawmoor).

Tree-Sparrow (*Passer montanus*) in Denbighshire.—In the Dulas Valley, about three miles above Llandulas, there is a colony of Tree-Sparrows. The birds mostly nest in some ivy-covered oaks in the hedgerows which border the high road, but one pair, which Mr. W. Brownsword and I watched on May 22nd, was feeding young in a hole in an ash. This species has been observed near Wrexham, and in the Ceiriog Valley (W. H. Dobie, Proc. Chester Soc. Nat. Sci. and Lit. i. No. iv. p. 298), and is, perhaps, not so rare in Denbighshire as is generally supposed. There are, however, few definite records of its occurrence in North Wales.—CHARLES OLDHAM.

Late Appearance of Bramblings in Sussex.—During the winter, from Jan. 22nd onwards, there was one flock of Bramblings (*Fringilla montifringilla*) near Tunbridge Wells, but these left about the middle of March, and but for two on March 28th we saw no more until April 16th. From that date to the 22nd they were quite abundant; altogether we saw them in four widely separated places during that time, on two of these occasions in considerable numbers, with other Finches. Other winter visitors stayed unusually late in the district—Redwings until April 16th, and Fieldfares until the 23rd (at least). On the 29th I saw a flock of Fieldfares in Surrey. — H. G. ALEXANDER (3, Mayfield Road, Tunbridge Wells).

Notes on the Cuckoo.—On May 23rd I found, in a rough grass-field near Diss, a Meadow-Pipit's nest containing three eggs of the owner and two Cuckoos' eggs. These eggs, laid by different Cuckoos, are certainly the produce of the same two birds which each deposited an egg in a Meadow-Pipit's nest near the same place last June (*cf.* Zool. 1906, p. 276), and that two hen Cuckoos should have survived the perils of a double migration, returned to the same place, and once again made choice of the same nest in which to place their eggs seems worthy of record. — JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds, Suffolk).

Rough-legged Buzzard (*Archibuteo lagopus*) in Cheshire.—On Nov. 5th, 1906, at Knutsford, a gamekeeper shot a Rough-legged Buzzard, which was devouring a snared Rabbit. The bird is in immature plumage, having the basal half of the tail brown.—CHARLES OLDHAM.

Osprey near Plymouth, and other Notes.—I have just seen an Osprey (*Pandion haliaëtus*), shot by a gamekeeper at Bickleigh Bridge, which spans the Plym about seven miles from Plymouth. It was shot in September, 1905. The gamekeeper told me the wings measured from tip to tip 66 in. He first fired at it below the bridge as it rose. The bird alighted further up the valley, where it was secured by a second shot. He did not know what kind of bird it was until I identified it. Among the birds of note which have been seen around Plymouth during the present year I may mention a Peregrine Falcon, which remained for several days between Penlee Point and Rhame Head. It was seen on Good Friday, and again on Easter Monday. A few years ago a female Peregrine was trapped near the same spot by the gamekeeper at Mount Edgcumbe. Towards the end of last month (April) I saw an Egyptian Goose on Plymouth Racecourse, but it was

gone when I looked for it again the following week. On May 5th I visited Wembury Cliffs, the breeding-place of the Herring-Gulls. I was sorry to see that the Raven's nest has been interfered with again. A pair have bred there from time immemorial, but for the last several years, to my knowledge, the young have either been taken or destroyed. Last year they were shot in the nest, and left there. The year before two of the young were sold to doctors in Plymouth, and now I see the nest is deserted, although I saw the female sitting in it last March, whilst the old male was flying about chasing the Jackdaws and Gulls in his usual quarrelsome way. There is, however, I am glad to say, no fear of the extinction of the Raven in Devon and Cornwall for a very long time to come, as they have many secure nesting-sites in both counties. I walked back to Plymouth by the coast, and saw the first flock of Whimbrel on the rocks near Bovisand. There were about fifteen of them.—H. P. O. CLEAVE (18, Leigham Street, The Hoe, Plymouth).

Sanderling (*Calidris arenaria*) in Cheshire.—On May 26th there was a Sanderling in nearly complete breeding dress on the mud at Cotebrook mill-pond, near Tarporley. With it was a Ringed Plover, a bird of the small non-resident race.—CHARLES OLDHAM.

Birds killed by Telegraph-wires near Yarmouth.—On April 23rd an example of the Land-Rail or Corn-Crake (*Crex pratensis*) was picked up on the New Road, between Yarmouth and Acle. It had evidently been killed by striking the telegraph-wires the night previous. It was in fine condition, and its plumage was uninjured. A Spotted Crake (*Porzana maruetta*) also met with a similar accident by striking the same wires on Aug. 27th, 1904. Both specimens are in my possession.—B. DYE (60 Row, Great Yarmouth).

Sexual Selection.—My attention has been lately drawn to a description of the nuptial "dance" and song of the King Bird of Paradise (*Paradisea regia*, also *Cicinnurus regius*), as given in a recent number of the 'Ibis' by Sir William Ingram, whose observations were made upon a captive specimen in his possession. In this account the following occurs:—"He bends down on the perch in the attitude of a fighting-cock, his widely-opened bill showing distinctly the light apple-green colour of the gullet, and sings the same gurgling notes, without once closing his bill"—having, as I gather, previously sung them in the usual way. This, as it appears to me, is strong confirmation of a view which I believe I have been the first to bring forward, *viz.* that the bright colouring of the buccal cavity in various birds—as *e.g.* the Shag, Razorbill, Guillemot, Kittiwake, &c.—taken in conjunction with the display made of it during the season of nuptial activity, is only to be

explained on the principles of sexual selection as enunciated by Darwin. Inasmuch as the protective theory, with its offshoots of recognition-marks, warning coloration, &c., seems here excluded, this question has an important bearing on that of sexual selection generally. Those, indeed, who believe bright colours to be but the effect of high vitality may claim the blazing gullet of the Shag as due to this cause alone; but why, then, is the frequent and striking revealment of it a very marked feature in the bird's nuptial philanderings? At pp. 169, 170, and 176 of my 'Bird Watching,' and more particularly at pp. 55, 56, 123—131, and 210, 211 of my 'The Bird Watcher in the Shetlands,' I have endeavoured to direct attention to this interesting and crucial point, but what I have had to say has hardly received a comment.—EDMUND SELOUS.

[Darwin ('The Descent of Man,' ed. ii. p. 426) called attention to the fact of the inside of the mouth of *Buceros bicornis* being black in the male and flesh-coloured in the female, but did not consider it explainable by his theory of sexual selection.—ED.]

Artificial Additions to the British Fauna.—Last summer we turned out some Red-crested and Dominican Cardinals. Some of them remained with us all the winter, coming to feed with the wild birds on the food-trays in my garden. There is now a nest of young Red-crested Cardinals in the garden. The nest is very high up in an old cedar tree. I feel sure that one if not two other pairs have nests, but have not yet been able to find them.—M. BEDFORD (Woburn Abbey, Woburn).

REPTILIA.

Water-Tortoises (*Emys orbicularis*) in England.—In the summer of 1890 or 1891 we turned six full-grown Water-Tortoises into a small artificial pond in the garden. Soon afterwards one was brought back by a man who said he had ploughed it up in a field a quarter of a mile away. A second was also brought back from some distance off. They hibernate during the winter, and reappear in April. The bottom of the pond is concrete, so that they cannot bury themselves in the mud. They occasionally get bits of meat, but are able to live on worms, dead gold-fish, and such other food as they find. Two of the original six were alive last summer, having survived about sixteen English winters. They may be still alive, but as last year we put in two others they cannot be identified. They spend the sunny hours on the edge, and slip into the water as one approaches. Their sight is exceedingly keen. I should be curious to know whether any have survived so long in this country in the open air.—HAROLD RUSSELL (Shere, Guildford).

OBITUARY.

FREDERIC MOORE.

THIS well-known Indian lepidopterist passed away on May 10th at his residence, Maple Road, Penge, S.E. He was born on May 13th, 1830, at 33, Bruton Street, Berkeley Square, and was introduced as a youth to Dr. J. E. Gray, who then required someone to draw Tortoises for him. While so engaged he attracted the attention of Dr. Horsfield, who was also in need of one capable of making natural history drawings, and shortly afterwards joined the staff of the East India Museum, then located in Leadenhall Street, City of London. He remained in this institution till its absorption with the National Museum, and then passed the remaining days of his busy leisure in following his favourite pursuit. He was an indefatigable worker, and, beyond numerous papers published by different scientific societies, his principal works are—'A Catalogue of the Lepidopterous Insects in the Museum of the Hon. East India Company,' two vols. (1857-59), which was written conjointly with Dr. Horsfield, whilst he alone wrote 'The Lepidoptera of Ceylon,' in three vols. (1880-87), and was engaged in his great work, 'Lepidoptera Indica,' to the actual time of his death, and of which six volumes have appeared.

Dr. Moore was an ardent and old-time naturalist. His path was remote from the stream of evolutionary conception; to him it was sufficient to describe the vast host of species which still awaited recognition, and to this work he brought an eye so trained for observing the most minute differences, that his species were not always accepted by his colleagues. The lumpers considered him a splitter. He thus incurred during his later years a considerable amount of severe criticism, but possessing that dogged determination found only in quiet men—and he was one of the quietest of men—it left him practically unaffected, and he conscientiously continued his work according to his light to the end. He was pioneer in the study of Indian Lepidoptera, and he knew these insects intimately better than any man living. In private life he was an upright man, with a serene disposition which trouble did not impair. His career was self-made and without reproach.

NOTICES OF NEW BOOKS.

European Animals ; their Geological History and Geographical Distribution. By R. F. SCHARFF, Ph.D., B.Sc., &c. Archibald Constable & Co., Ltd.

THIS book is a storehouse of facts which take precedence of theory, a welcome innovation to the frequent publication of a theory to which the facts are only subsidiary. The opening sentence of the book is the text throughout: "The geological history of our animals is largely the history of their past wanderings." The method of treatment is a sectional one. Ireland, Scotland, England and Wales, occupy separate chapters, and others are devoted to different European regions; while many outline maps show the distribution of a particular animal or plant. This procedure focuses the local information, and simplifies the argument, while at the same time it makes the work available as a work of easy reference. And this is the merit of any standard work. To read a book in haste and then put it on the shelf for ever is death and destruction to its writer, however much we may bepraise the derelict. The well-thumbed volume that promotes discussion lives longer than the volume possessing the imprimatur of general acceptance.

Dr. Scharff is very familiar with the Irish fauna, and he writes:—"Taking into consideration the testimony yielded by the remains contained in the recent English Tertiary and post-Tertiary deposits, I am of opinion that the whole of the existing Irish fauna and flora is of pre-Glacial Age."

There are no footnotes, an appendix giving a list of works and papers which have been most frequently consulted. There appear to be a few slips in this or the converse. At p. 124 we read of Messrs. Wright and Upham as authors of a little work on Greenland, and on referring to the appendix can only find a reference to Wright and Warren.

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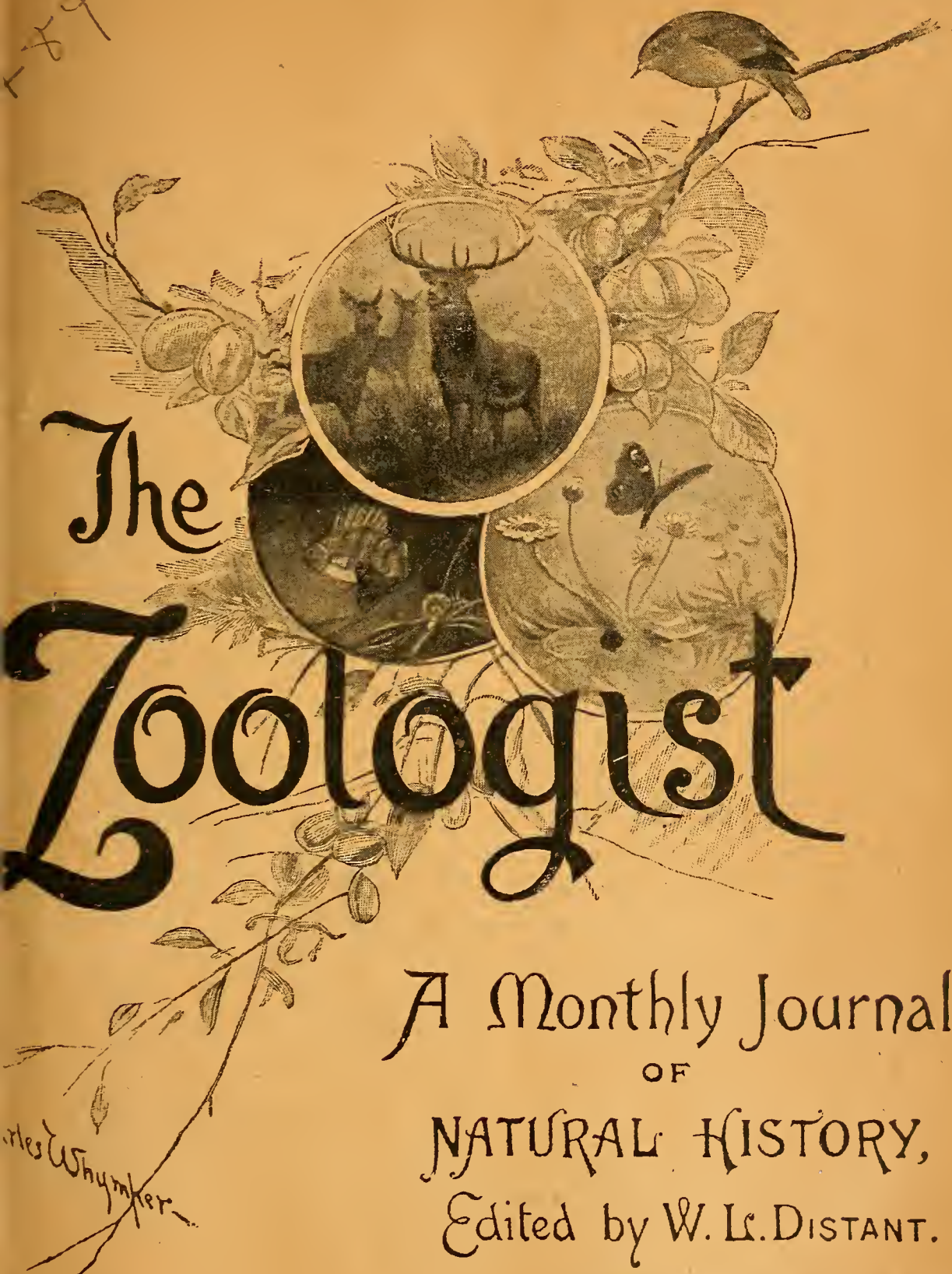
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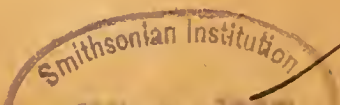
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THE ZOOLOGIST

No. 793.—*July, 1907.*

THE MAMMALS OF SOUTH CAMBRIDGESHIRE.

BY ALBERT H. WATERS, B.A.

I DESIGN in the following pages to describe what I have personally observed in the district south of the Fenland of Cambridgeshire—say, from Waterbeach in the north to Chesterford in the south—a large part of which is upland and more or less wooded, but includes such marshy spots as Fowlmere and Dernford Fen.

I confine myself at present entirely to the Vertebrata, and chiefly the Mammalia. Of the fishes, I shall say very little. In the district comprehended within a radius of fifteen miles round Cambridge I have spent most of my life, and when at home have been rambling about it almost daily, whenever I have not been confined to the house by accidents which have laid me low—not a frequent incident, I am thankful to say.

My observations go back to the sixties, and I cannot help but contrast the thickly inhabited Cambridge of the present day with what it was at the time when it was a garden city. Even in our place of business in the centre of the town we had a large garden on the east side of our house. But very little way from us, on the west side, was the old Physic Garden, the precursor of the present Botanic Gardens. On the south were the groves of Downing College, about the bird-life of which I have notes enough to make a volume. Even from the north there was an outlook over gardens and the 'Lion Hotel' bowling-green.

I have been in Downing Grounds from the time I could first toddle thither up to the closing of them to the public, and the

building over the parts where as a schoolboy I sought every nest, and studied the birds, aided in this by another boy whose adventurous spirit was unquenchable, and who "knew" every nest in Downing, or in the meadows bordering Tennis Court Road.

Even when not in the grounds, I was able to observe from the window of the uppermost room over our Dispensary, by the aid of a seaman's telescope, not only the Rooks building or repairing their nests, and feeding their young ones, but in winter the advent of any large, singular birds resting on trees. But I must check myself, or I shall get on to writing about the birds of Downing College, and this would make this article far too lengthy, for, as I have just said, I could write a volume about them.

While building Willoughby House, on the Mill Road, of which I was not only the architect but actually assisted in the practical work of erection, I had splendid opportunities for observing nature. Much of the work was done when the spring migrants were passing along the very tract, leading right across this part, which the birds pursued. When we had got the shell of the house up, and I was on the joists of the roof helping the carpenter nail on the slate-laths, I had a fir-tree close by my left hand, and this was one of a row of fir-trees to which the Siskins came.

Looking south-west I had an uninterrupted view across corn-fields right away to the Gog Magog Hills. More to the right the horizon was bounded by the trees in Brookland's Avenue, the best part of a mile away. Looking to the north-west the town, half a mile or so away, could hardly be seen for the bird-haunted trees in orchards and groves. Turning round, and looking eastward, I could see, when on the ridge of the roof, right to the tall poplar-trees near the old paper-mills across meadows and low-lying semi-marshy ground surrounding a long pool of water, which has been filled up and built on for years.

It was in the just mentioned corn-field that I was able to describe and sketch the method of the little Harvest Mice in building their wonderful nests, so cleverly tied to the corn-stalks by the little rodents. In our garden whereon we built my old house, Rabbits burrowed, and Weasels came after the Rabbits, although I have not seen one now about that part for over a quarter of a century. But I have seen them farther afield in the direction of Teversham and the Newmarket Road. A farm half

a mile or so beyond our house used to be known as Polecat Farm. When the growing town had begun to creep up Mill Road, I purchased a plot of ground much farther out in the country than Polecat Farm, and immediately on entering into possession had a lodge put up, which would, I thought, be convenient for observing wild life, and yet not be too far from Cambridge and my tutorial work. Although in a very few years the increasing human population drove away the Polecats and the Weasels, I was, by being in this lodge late at night and very early in the morning, able to make notes enough on the wild life of this part to fill a volume. The lodge was fitted up with a fireplace, so that I could have meals when I desired to make a late stay or came off without any breakfast, as would naturally be the case when I went very early in the morning.

Bats were abundant and so bold it was easy to catch them with a net made of cheese-cloth, and used like a butterfly-net. My object in capturing them was to make out a list of the species. They were mostly Pipistrelles, but there was an occasional Noctule. The last was plentiful about my residence and in the more immediate vicinity of the town. There have been Long-eared Bats also on one or two occasions, but *Plecotus auritus* has retired before the advancing town, and it is long since I have seen one about Cambridge.

I am one of those persons who can hear very high-pitched sounds such as those of Bats quite perfectly, while I am deaf to grave ones. I can discriminate the squeak of the Pipistrelle from that of the Noctule, and the tone of the Long-eared Bat is different from either. I have often amused myself by trying to make out the species by the sound of the "tweets" alone ere I verified my guess by capturing the Bat. I have heard Bats squealing in a tone different from those of any of the four most familiar to me, for often when strolling by the river-side I have been gladdened by the extremely high-pitched note of Daubenton's Bat.

While I am on the subject of Bat whistling I may mention that these little mammals have different tones to express the emotions excited by eager pursuit of an evasive moth, love, fear, and anger. They have their cries of alarm as different to their other tones as are the notes of birds under like circumstances,

and they have their love-tones when they are calling to and pursuing one another.

But I must defer to a future occasion all I have noted of the ways of the Cheiroptera, else I shall take up too much valuable space. When going round the hedgerows with a lantern it makes such a picture to come across a Hedgehog feeding on a fat worm he has tugged out of its burrow that I wish it were possible for me to get a snapshot of it with my camera. The comical surprise and bewilderment at the sudden flashing on to him of the bright light made a picture well worth preserving. Sometimes it may be a pair of Hedgehogs engaged in amorous play—possibly, by great good luck, they may have little ones with them. I must not include in this account of South Cambridgeshire wild life what I have seen in the lonely fenland, in the woods of the Breckland, and in the recesses of Epping Forest—all splendid places in which to observe wild life ; else I might say more about Hedgehogs and their family ways.

Another nocturnal animal my portable search-light reveals to me when out at night is the Shrew. Shrews were very common about the district I have just been describing. The Water-Shrew was then to be seen by daylight, even, early on a summer morning on the banks of the Stur rivulet. It still occurs, I believe, on the rivers Rhee and Granta.

In the days when our professional duties took us over to Orwell, Badgers were not at all infrequent over that way. There is much of the ancient wild life still persisting in that district, and I should be glad to see the County Council or Government establish a sort of miniature Yellowstone Park, and preserve this remnant from destruction. It is the only part of Cambridgeshire where I can assuredly say the Badger still breeds. When opportunity has offered I have regarded it as a pretty sight to see at early dawn a group of young Badgers and their parents returning to their burrow. The little ones are far less shy and suspicious than the old ones. I like, when observing wild life, to have a few tit-bits in my pocket or haversack. By patience and quiet movements I succeed in getting a near sight of creatures it would be impossible to observe effectively otherwise. Young Badgers, for instance, are very fond of dates, and a couple of pounds of these is a good investment if one wishes to make friends with them.

By the way, it is curious what a lot of animals love these sweet fruits. My Cat will beg for them, and eat as many as I like to give her. She is the kitten of one of those half-wild Cats whose progenitors were, I think, the extinct (so far as Cambridgeshire is concerned) *Felis catus*. Her mother was picked up on a country road, and had undoubtedly been born in a wood. These half-wild Cats with the stripes and short blunt tail, like *Felis catus*, are the sole representatives of the real Wild Cat now existing in this county. I have had them breed in the plot of ground I have mentioned, which is partly wooded, and one summer, while camping out on it, a kitten or two got on friendly terms with me, and came regularly to share my meals.

Although I have not for some few years seen the Marten in South Cambridgeshire, it was still to be numbered among the mammals in the days I am writing about. But it has always in my time been a scarce animal in this county, and my knowledge of its ways has had to be gained in other districts.

There was no necessity to be out very early in the morning in those days, or investigate at night with a portable search-light, in order to see the Stoats. These wild animals might be met with at any hour of the day. I have had one come and inspect me while eating my lunch by the side of a field, and move so leisurely it was easy to see it was neither a Weasel nor a Polecat.

My desire has been to see, by close observation, to what extent wild things vary individually in their ways and in different localities. I have long doubted whether the habits of any particular species are stereotyped to the descriptions of the standard text-books. Therefore, I have thought that first-hand notes on the natural history of a district such as that of South Cambridgeshire may have its value, even if it is not to be compared with wilder spots.

At the same time it is remarkable what a variety there was of wild life within walking distance of Cambridge a quarter of a century ago. The list of mammals observed by me, which I gave in the 'Garner' for 1886, included, besides the above-mentioned, a white variety of Mole, the Fox, Squirrel, a melanic variety of *Mus decumanus* (specifically different from *M. rattus*), the Common Long-tailed (*M. sylvaticus*) and Harvest-Mouse (*M.*

minutus), the Water-Vole (*Arvicola amphibius*), a piebald variety of the Field-Vole (*A. arvalis*), and the Bank-Vole (*A. glareolus*).

To the Shrews I add the Oared Shrew (*Neomys fodiens*), and the Little Shrew (*S. minutus*), which used to be called the "Irish Shrew (*S. hibernicus*)," but I cannot positively say I have seen the latter south of Waterbeach. The Oared Shrew I have not seen in South Cambridgeshire for some years. I am now specially engaged in looking out for it. My plan is to endeavour to trap these small mammals in traps similar to mouse-traps. For Water-Shrews a bait of fish is frequently irresistible; they are wonderfully fond of fish, and a piece perfectly fresh or a recently dead Stickleback will frequently entice them into the trap. The best time to set the trap is early in the evening; they are hungry when they first come out of their burrows, and sniff about eagerly after something eatable. If one has sharp eyes, and there is light enough to see, it is interesting to observe how carefully a Shrew quarters the ground in its search for food, going over every square foot of it. Now and again it will stop and nibble a bit of grass, for the Shrew seems to like a bit of greenstuff occasionally.

It may not be generally known that Otters attack and kill Water-Rats for food. Such is the case with those (few) I have observed on the Granta and the Rhee. If I were guided by my own personal observation of the South Cambridgeshire individuals, I should say that Otters do quite as much good by destroying Rats as they do harm by eating fish.

Foxes are more common in the south-east corner of the county. There they have increased so much that they are reported to be a serious menace to the Partridges, and some people cry out for their extermination.

I have hesitated to say more about the Fox than just mention it, for fear I may be led by my enthusiasm to launch out into a lengthy dissertation on this good old English sport, so exhilarating and healthy. I wish it was always conducted after the example of Sir Roger de Coverley, and the Fox be allowed to keep the life it has fairly fought for when it has made a good, game run.

We used to be over at Wimpole a good deal when the Fallow-Deer were there, and no one regrets more than I do that, except for one or two I seem to recollect being in the grounds of Peterhouse College some years ago, these graceful animals disappeared from the South Cambridgeshire fauna when the herd was sold.

SCIENTIFIC WORK IN THE SEA-FISHERIES.

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PART II.

SINCE the initiation of scientific work in connection with the fisheries at the beginning of 1884 very considerable advances, as already indicated, have been made in this country in various directions—especially in our knowledge of the development and life-histories of the sea-fishes themselves. Statistics, moreover, have shown how prosperous, on the whole, the fishing industry is,* and how, as the Royal Commission of 1866 had affirmed, there is still room for expansion.

In now reviewing the work accomplished by the scientific staff—especially that of the British section—into whose hands the International Fisheries Investigations were placed, it is scarcely necessary to explain that I fully appreciate all the difficulties of the task, as well as know the strenuous efforts to achieve noteworthy results. The subject, however, is of such importance to the country that perfect candour in dealing with the materials at hand (for the work is still unfinished) is indispensable.

GROSS TOTALS OF FISH LANDED IN SCOTLAND.

1897†.....	Cwt.	5,001,672	.....	£1,627,752
1898	,,	6,657,768	.....	1,879,866
1899	,,	5,145,076	.....	2,189,933
1900	,,	5,369,265	.....	2,325,994
1901	,,	6,385,170	.....	2,238,310
1902	,,	6,866,028	.....	2,502,668
1903	,,	6,518,808	.....	2,410,287
1904	,,	7,947,829	.....	2,231,102
1905	,,	7,856,310	.....	2,649,148

* I had omitted to thank Professor Prince, Dominion Commissioner of Fisheries, Canada, for valuable information and statistics given in Part I.

† The last year embraced in the 'Resources of the Sea,' where all the previous years are reviewed.

In taking a brief survey, therefore, of the reasons which prompted our country to join the other nations in the investigation of the sea in 1902, it would appear that the main object was the prospective benefit to the British Fisheries, the scientific investigation of which had for eighteen years been actively carried out. It is also probable that the testing of the antagonistic views, *viz.*—on the one hand, of the ‘Resources of the Sea,’ and, on the other, of the ‘Impoverishment of the Sea,’ which is really a revival of the old doubts and fears—may have influenced the decision. It had, however, immediately been shown how untenable the notion, for instance, of Dr. Garstang was—that, because one hundred fishing-ships now catch what fifty did before, the sea is impoverished. Nature was thus expected to fill each square mile of the sea with fishes by measure, and send its quota mechanically into each ship. The diminished catch in each of the one hundred ships (supposing such did occur) would be more in accordance with reason. Even the sea, by the laws of nature, contains only a certain number of fishes at a given time, and it should not be a matter for surprise that there are fewer fishes, *e. g.* large flat-fishes, in an area after one hundred ships have swept it, than after the operations of ten using a similar method of capture. Yet it would be unsafe to speak strongly of such diminution. A change from trawls to fixed nets, or to bait, might upset the conclusions by the discovery of numerous fishes. As Mr. Archer and Dr. Kyle assert, the average catch per boat is insufficient to prove over-fishing.

The task, then, undertaken by the British naturalists was neither simple nor light, and there was no lack of courage in affirming that within the two years (for which the Government at first arranged) results would be forthcoming. A survey of the problem presented several lines of action, most of which had been laid before the Ichthyological Committee at the end of 1901. To the scientific investigator a careful and extended survey of the main grounds frequented by fishermen in the North Sea stands in the forefront, together with the distribution of the food-fishes in the more distant waters. If, for instance, the round-fishes stretched far outwards from our shores, anxiety for the near grounds would be removed. This survey would include the distribution of the eggs, larvæ, and young of the

fishes, their growth, and the changes at the different seasons, together with the appearance of anadromous fishes like the Salmon, at various stages, and would decide as to the present position of the British sea-fisheries in the North Sea.

Such a survey cannot be efficiently carried out by subordinates whilst the chief remains on land, since the experience gained under varying conditions gradually takes a definite shape after years of careful observation and inquiry at sea. Such experience is not gained by examining boxes of fishes on shore, by the tabulation of recorded observations, or the manipulation of sheets of figures filled up by others on board the experimental ships.

Another point, again, in these investigations is the effect of the operations of fishing-vessels in connection with variations in the abundance and in the size of the food-fishes. Such is a promising field for observation, but by no means international in character. It would include, for example, the effect of the work:—

a. In temporarily diminishing the larger fishes, and rendering the smaller more conspicuous.

b. In making the survivors more wary.

c. In driving the shoals of pelagic forms from particular grounds, or otherwise.

d. In demonstrating the effective nature of sudden changes in the method of capture—*e. g.* the substitution of Anemones for Mussels, of Cuttle-fishes for Herrings, of Lobworms for Scallops, and of the alternation of gill-nets with tempting bait of various kinds. Few appreciate the revelations made by such a change of method.

Other important points that suggest themselves to the investigator are the special study of hard grounds unsuitable for trawling, if any such exist in the North Sea.

The food of fishes and the pelagic fauna and flora are less in need of attention, since they already have been investigated sufficiently for all practical purposes.

Such are some of the problems that would have suggested themselves for solution on facing this inquiry.

It is difficult to ascertain precisely what the British investigators expected to discover, but the task of ascertaining “whether

the quantity and consumption of fish taken from the North Sea and neighbourhood are in proper proportion to the production occurring under the prevailing natural conditions, and whether any disproportion between production and consumption arises from a local over-fishing, or from an injudicious employment of the fishing apparatus at present in use," is one which, if it were possible, would have taken many workers to accomplish. However that may be, the observers also chose to include the systematic exploration of the small flat-fish grounds, an inquiry which would naturally fall under the first head already mentioned. It is evident that considerable ambiguity existed as to the nature of the task, since mention is made of the "publication of annual results," of "discoveries of practical importance to the fisheries," and of "recommendations for international action"—all excellent in their way, provided the field had been a *tabula rasa*—that is, that others had not previously searched the sea.

From the beginning of the arrangements for the international exploration of the sea one department placed itself in the front—*viz.* the hydrographical—and this probably was due to the influence of those associated with the origin of the scheme. No one will deny that, if hydrography could solve the complex problems which exist, or are supposed to exist, in connection with the ever-varying captures of sea-fishes, with their distribution, and their daily or seasonal movements, a great gain to our knowledge would result; but a perusal of the publications of the International Council up to date shows that this is yet far distant, no reference, indeed, to fisheries' problems occurring in some of these long reports.

Those of us who have watched the hydrographical efforts since 1872—when the German ship 'Pommerania' included these in her work in the North Sea; who have endeavoured, on the spot, to connect temperatures of the sea at surface and bottom with the captures of fishes; who have studied those of the Scotch Board in the eastern and western waters of North Britain; and who have personally been interested in the Scotch Board's international survey of the North Sea, in conjunction with the Swedish, German, Norwegian, and Danish Governments in 1893-94, have, however, reason to maintain reserve on this head in connection with the sea-fisheries. The consideration

of the results of these surveys, indeed, does not lead us to expect a solution of fisheries' problems from the hydrographers, however much we may appreciate their skilful and patient, though expensive, labours in other respects. Therefore, grave doubt was expressed, in 1901 and 1902, as to the propriety—at least, so far as Britain was concerned—of making such observations so prominent in the international scheme.

The International Council has published four bulky quarto Bulletins annually, besides other papers, giving hydrographic details, temperatures, and tables of floating organisms. Few important additions have been made to the latter—except the long list of species of diatoms—since the subject was dealt with for a whole year in St. Andrews Bay in 1888. The hydrographical remarks merit careful attention, since the British naturalists—from the experience acquired in these investigations—state that they are within measurable distance of explaining all the migrations of the fishes, as well as the fluctuations in the fisheries, by such means. Further, that ordinary trawling experiments are of little value, unless hydrographical, physical, and chemical researches go with them; that the changes in the water cause the changes in the fishes which (species not mentioned) may be in one place in autumn and another in spring; in short, here to-day and away to-morrow to their special waters. They narrate that, though the periodic Gulf Stream does not reach the North Sea, yet Atlantic flooding into this area occurs at the same time. There are, however, perturbations, the study of which belongs to the future. Dr. Otto Pettersson, indeed, thinks these disturbances show a two-yearly period—even and odd years—the even with more temperate waters than the odd, and accompanied by a warm-water area in the cold season—with a failure in fishing. He adds that the winter Herring-fishery in the Skagerak has returned with intervals, on the whole, of 111 years—since 859. Other hydrographic researches—such as that of the Farøe-Shetland Channel and the Influence of the East Islandic Polar Stream on the climatic changes of the Farøe Isles, the Shetlands, and the North of Scotland—do not seem to bear on the main point at issue, and the same may be said of another on the compressibility of sea-water.

So far as experience goes, it is scarcely possible to explain

the changes in the fish-fauna on these grounds. The movements of the Herring are independent of such phenomena, and we now know that the Herring abounds all the year round, and can be captured—irrespective of currents and temperatures—in considerable numbers at any time. Moreover, hydrographical influences are powerless to cause it to deviate in its progress to the coast to spawn. The sudden disappearance of the Herring from its wonted spawning grounds is not due to hydrographic influences, any more than to the guns of the artillery volunteers, as the fishermen supposed. Dr. H. M. Kyle, a trained marine zoologist, plainly says that neither the temperature-charts nor those for salinity exhibit a true parallelism with the biological phenomena, and suggests weekly instead of monthly data. Some, however, may be of opinion that even hourly records would be equally futile. It would almost seem to be as reasonable to explain the passage of the larvæ of animals dwelling on the bottom to the surface of the sea by similar data.

It is well known that in a shallow bay a cold frosty morning is bad for fishing, that extreme cold kills fishes and their eggs, and that the high temperature of summer favours swarms of fish-food, which, however, equally abounds in the arctic seas. Fishes, moreover, are not so sensitive to changes of temperature, to changes in salinity, or to other phenomena, as supposed; neither do they dread currents. The Salmon, the Sturgeon, and the Eel are at home both in the sea and fresh water, and the Flounder, the Mullet, the Sea-Perch, the Sprat, and the Sparling take little notice of varying salinities. The Baltic Herring can readily be acclimatized to fresh water, even to the extent of being killed, if by accident it suddenly falls into seawater. The Shanny from the rock-pools is indifferent to immersion in fresh water. Even the transparent floating eggs of the Flounder may be heated in a test-tube till they rush up and down with the currents, and yet may be safely hatched subsequently. Further, irrespective of temperature and currents, the very young fishes invariably follow the laws which regulate their appearance at particular seasons. Thus the young Cod, Green-Cod, Haddock, and Whiting, after their earliest (larval) stage, are oblivious of currents in their movements—on the one hand to shallow, and on the other to deep water, and the same may

be said of the young of the flat-fishes. There is no reason to believe that the hardy adults are affected by temperatures, currents; or salinity in a greater degree, except in so far as storms may sweep into bays greater quantities of food; or a fish, to which cold water is congenial, may approach the coast more closely in winter, or follow the pelagic organisms characteristic of the season.

It would thus be only reasonable and just to say—with Dr. Otto Pettersson—after all the complication and expenditure on this head in relation to the influences of such phenomena on the fisheries: “The full answer, which practically is of vital importance, will not be at hand for years yet to come.” The great expenditure for hydrography in these investigations was not entered on without warning, and it is noteworthy that the Hydrographic Report by Dr. Pettersson was not adopted by its section, but was printed only as the private view of the author.

We now turn to the publications of the senior naturalists whose efforts were to be directed to the special elucidation of fisheries' problems, such as the present condition of the food-fishes of the North Sea, and who were, moreover, to make the “announcement of those discoveries which are of direct practical importance to the fishing industry,” as well as furnish “recommendations for international action.”

Commencing with the southern section, the first subject to be dealt with is the fisheries' work of the Marine Biological Association, a body which more or less identified itself with the “Impoverishment of the Sea.” From its workers, therefore, with their new and unequalled opportunities, we looked for substantial proof of the soundness of their position, more especially when it is stated that “facts have been obtained upon which a proper understanding of the yield of the sea must in future be based”—a pregnant sentence, which apparently dispenses with all previous observations at home and abroad.

This statement appears to derive its origin, not from laborious surveys of the fish-fauna of the southern half of the North Sea—both practically and scientifically studied in the adult and young conditions—but from certain experiments with marked Plaice. The marking of Plaice has long been carried out by the Fishery Board in Scotland without important results, whilst the Americans

have dealt with Cod. The Germans and the Dutch, again, joined in marking Plaice in the international work. The Plymouth naturalists, then, labelled a number of Plaice, returned them to the sea, and founded on the numbers of those subsequently captured several important conclusions, *viz.* (1) the migrations of the species, (2) the rate of growth, and (3) the intensity of fishing.

In regard to the first head, *viz.*—the migrations—one Plaice travelled 175 miles and another 210 miles in three months, and Dr. Garstang considered that there was a general tendency to move from the small fish-grounds of Holland to deeper water in summer, and of those in the southern bight of the North Sea to move northwards. Of those below $9\frac{1}{2}$ in. most remained on the spot in winter, migrating offshore in a north-westerly direction the following summer; whereas fishes exceeding that size migrated southwards and westwards shortly after liberation. Dr. Bolau, the German experimenter, differs from Dr. Garstang, the former stating that Plaice leave the coasts in summer and autumn, and return in spring, whereas the latter gives spring and summer as the period for migration to the offshore. Here, then, is considerable variation in the results, and neither agrees with the condition at St. Andrews. Moreover, it may be that the irritation of the label may have had something to do both with the capture and the migration of some of the marked Plaice, for the wound made by the transfixing wire is often irritable, is in contact with bone, and may be felt by the fish when skimming over or into the surface of the sand. Besides, some of the captured fishes were not well-nourished. If the white surface of the flat-fishes could be tattooed, such would be a great improvement on the present rough method, which even in the hands of a skilful operator leaves a source of constant irritation, and a permanent lesion. I have no doubt that Sir James Dewar could readily suggest an indelible and comparatively innocuous colour for this purpose.* The migrations of these marked Plaice and other forms, however, are interesting in connection with the distribution of the species and their general safety. The data are as yet too few, as Dr.

* Sir James recommends the carbonaceous or Indian ink process. Experiments will shortly be carried out at St. Andrews. An instrument with numerous points would probably carry out the work quickly.

Heincke states, and the time too short for reliable observations ; and the same may be said of Dr. Fulton's notion that the Plaice go against the current to compensate for the drift of their eggs. On the whole, it is doubtful if more can be proved than that the very young Plaice seek the tidal margin, and, as growth advances, gradually pass to deeper water, and that in this, as in other flat-fishes, considerable distances may be traversed. Their vigour and vitality, in any case, would enable them to sustain a long journey (*e. g.* to Australia).

The second head—*viz.* the rate of growth—has long been studied, and the additional information gained in these investigations bears, as in Johansen's observations, more on the proportional rate of growth in connection with locality. It was found, for instance, that small Plaice taken from the Horn-reef and liberated on the Dogger-shoal grew about five inches in seven months, the transplanted Plaice thus showing an increase of four times in length and six times in weight over those left on the reef. A. C. Johansen's figures are—young Plaice on beach grew 2-3 cm., those on Horn-reef 4-5 cm. ; those on the Skagerak, 10 cm. The latter is thus even more favourable than the Dogger-shoal.

It is accordingly suggested by Dr. Garstang that small Plaice should be transplanted from the crowded inshore to the offshore grounds, such as the Dogger. The Danes, indeed, have done so for some years in the Lim Fjord, a sandy, land-locked lagoon formed by the breaking in of the sea about one hundred years ago, the young Plaice thus finding an entrance, growing in the lagoon, and forming a fishery. Their numbers can readily be augmented by artificial transplantation (for the fishermen do so at the rate of about two for a farthing), whilst they are tolerably safe from escape to the sea, which is forty miles distant. This, however, as an acute critic* has already pointed out, is a different condition from an open seaboard like our own, where the Plaice are free to pass outwards as they grow older, and best know where to find suitable feeding-grounds. In this connection no difficulty was experienced twelve or thirteen years ago in transplanting hundreds of Soles from Scarborough to St. Andrews Bay ; but this would be a somewhat expensive method of increasing the yield of the sea, even were it necessary. The life-

* 'Fish Trades Gazette.'

history of the Plaice does not seem to suggest it. It is possible, from the observations of Dr. Wallace on the ear-bones and other points in this fish, that its average rate of growth is higher in offshore than in inshore grounds. Experience would seem to show that there is little fear of suitable ground being left unoccupied by such fishes as Plaice.

The third head—*viz.* the intensity of trawling in the North Sea—as indicated by the capture of the marked Plaice, is apparently considered an important discovery by the staff of the Marine Biological Association. In all about 900 marked Plaice were liberated in the offshore and about 563 in the inshore grounds, the percentage captured in the former being twenty and in the latter ten in twelve months, it being explained that fewer captures take place in the inshore grounds when trawling is prohibited. The Association, therefore, considers that “from this result it seems clear that the total annual catch of the fishermen no longer forms an insignificant proportion of the total stock of Plaice.” In short, fishing would thus appear no longer to be an uncertain pursuit in the hands of the Association.

But, as pointed out in the first lecture, this conclusion is not supported by fifty years' scientific experience of the Bay of St. Andrews, a bay which contains no spawning Plaice, which are in the open waters beyond, free to every trawler, nor does it appear to coincide with the history of the Plaice-fishery of the Cattegat. Again, in the old trawling days of nearly a quarter of a century ago, it was not uncommon to bring on board the dead Frog-fishes (usually with a slit on the under surface), and old utensils of other trawling-ships on well-known grounds, and, though this showed considerable intensity of fishing, yet the same grounds are regularly fished to-day in their season. There are various degrees of intensity of fishing; thus, though Salmon, Green-Cod, Greenbones, and other forms occasionally abound off our shores, yet they seldom appear in the trawl. As already shown, fixed gill-nets for Cod and Plaice make us acquainted with various forms (Sharks, Porpoises, Sturgeons) rarely met with in the trawl or on the lines.

Besides, the numbers dealt with are too few for a conclusion so important, and there is considerable difference of opinion amongst the international observers themselves. It would seem

that the Dutch caught the largest proportion of marked fishes (but it was said that they liberated them on their own coast where a most active fishery goes on), the English following, whilst the Germans caught least.

Bearing in mind, therefore, that many of the Plaice so marked may have been restless, indisposed to seek shelter in the surface of the sand, and less active in avoiding the trawl, though continuing to grow, it would appear that, whilst full credit is awarded to the observers, caution is necessary in accepting these data as proofs of the serious intensity of fishing in the North Sea and the Channel.

The work in the northern section of the North Sea may now be referred to. It was hoped that the extended experience of the Fishery Board for Scotland would have produced during these five years a store of substantial information drawn directly from the fishing-grounds in their new ship. Personal contact with the varied phases of the capture of sea-fishes, with their surroundings, and with their distribution, are indispensable for an accurate grasp of the subject. Further, the consideration of their movements, whether for food or otherwise, and still more of their development and life-histories, as bearing on the practical problems to be solved, afford an ample field even for the most unflagging investigator. It may have been the prospect of these opportunities that caused the scientific representative of the Scottish Board (Prof. D'Arcy Thompson) to guarantee results in so brief a period as two years.

On turning to the large 'Blue Book,' published at the end of 1905, with an interest intensified by the experience of the excellent original work, which for so long a period has characterized the Board's scientific staff, surprise was felt on finding that about three-fourths of it consisted of hydrographical work (part of which has already been published elsewhere), of a record of pelagic fauna and flora, and of a review of eighteen years' commercial statistics collected by the Granton Steam Fishing Company, by Messrs. Johnston, of Montrose, and by the Board's officials at Aberdeen, the latter arranged according to the scheme*

* Squares of one degree of latitude and two of longitude. Prof. D'Arcy Thompson says two degrees in latitude and one in longitude. Dr. Fulton arranged for these squares by taking every degree of latitude and every second degree of longitude (see his paper).

of the Board's scientific superintendent, Dr. Fulton, who contributes the final paper in the 'Blue Book,' viz. "The Distribution and Seasonal Abundance of Flat-fishes in the North Sea." A second Report of a purely hydrographical nature has just appeared, as if to emphasize the surprise in connection with the first.

Science, as well as the country at large, had anxiously looked forward to a new and original series of fisheries' investigations in the North Sea, based on a well-considered plan, and carried out by the most skilful and experienced zoologists trained to fisheries' work, and aided by all the scientific accessories of modern times. Pioneer's work in this department is a thing of the past, and random efforts are wasteful as well as inopportune. The importance, indeed, of having zoologists trained to fisheries' work on board the experimental ships was duly emphasized in the case of the 'Garland,'* in which those on board simply filled in blank forms, which were transmitted to the central office—far from the field of operations—and where the compiler was out of touch with nature. Unfortunately there is little evidence of the scientific methods just mentioned in this ponderous 'Blue Book.' If such experiments have been efficiently done in connection with the international work, they are still, at the end of five years, in obscurity.

So far as can be gathered from these statistics, fishing rises to a maximum in August, and falls to a minimum in December, a feature shown a considerable time ago both in the pelagic fauna of the Bay of St. Andrews and in the work of the 'Garland.' Many random observations on the maxima and minima of the food-fishes occur, such as that the Haddocks increase as temperature rises, and begin to abate as temperature falls, and that they show in recent years an inferior yield to the earlier ones. The Whiting reached its highest curve in 1901 (winter), and its abundance was generally converse of the Haddock. It is unnecessary to deal more minutely with these remarks, which, though interesting, have no real bearing on the present inquiry. Even less can be deduced from the Montrose statistics, except that they indicate a persistent rise to the present time.

The opportunities afforded by the great captures of food-

* The Scotch Fishery Board's first ship for scientific investigations.

fishes landed at Aberdeen do not appear, mathematically treated,* or otherwise, to have produced results of moment, though elaborate curves are given of the increase or decrease of particular fishes in each of Fulton's squares in the northern part of the North Sea.† We are told, however, "that by these methods, if we only had statistics enough, we should mark down accurately for each fish the time of the coming at every position in the North Sea, and then, weaving all the facts together, show the route followed in the migration of any species"—amongst which the Wolf-fish or Cat-fish seems to be included. While a tribute may be paid to this enthusiasm, it must be confessed that not even the use of a Brunsviga calculating machine for the averages impresses the reader of the importance, in view of the practical question demanding solution, of all these pages of curves and tables. One feature nevertheless is apparent, *viz.* that the fisheries of the North Sea, including the grounds long fished and near the Scottish shores, are in a sound condition, a conclusion, however, arrived at long before these international investigations commenced. Perhaps one of the most interesting contributions in this 'Blue Book' is the series of monthly maps showing the position of liners and trawlers throughout the year. From these charts alone evidence of the wide distribution of the food-fishes on the old grounds as well as on the new is unmistakable. They constitute, indeed, an answer in facts to certain aspects of the impoverishment theory.

The Scotch Board's further contribution on "The Distribution and Seasonal Abundance of Flat-fishes in the North Sea," by Dr. Fulton, is also largely a statistical paper—from the author's position at the great fishing centre of Aberdeen. Though it omits many previous observations, it would be improved by condensation, especially as Dr. Henking's work on the fishes of the North Sea and the Cattegat, and Dr. Heincke's, overlap it so far as the flat-fishes are concerned.

One of the main points in this paper is what is called complementary and compensatory fluctuations in these statistics, *viz.*—one form taking the place of another, *e.g.* the "Whitch" in square xiv, near the Fair Isle, during winter taking the place of

* Mathematical theory of probabilities.

† The reporter thinks Witches or Pole-dabs recent fishes in the market. This is scarcely correct.

Dabs, Plaice, and Lemon Dabs. There is, however, an element of uncertainty in these fluctuations, which are well known to fishermen considerably nearer home. The author, indeed, mentions that Henking, who had found similar fluctuations, is of opinion that Plaice are caught in greatest abundance in winter. At St. Andrews such has generally been the case, *viz.* in late autumn and winter, whilst Dabs are mostly caught in summer and Flukes in early spring. At any rate, the working season of the fishermen at a particular fishing has to be considered, and it would have been more satisfactory, as in 1884, to have had the captures made under the observer's eye, and with all the circumstances before him. Consequently, it is doubtful how much weight can be put on the assertion: "I believe that the discovery of this principle or law of compensatory fluctuations, as described in this paper, will materially assist in the explanation of many points in the natural history of the food-fishes that are at present obscure."

It is further stated that the maxima of the captures in each fish correspond to the spawning season, but that some have two maxima and minima, the cones and curves of his illustrative diagrams thus being complex, and the cones of the immature may be in unison with those of the mature. No explanation, however, is given of a remark that the "Witch" has a high cone in winter and a small secondary cone in the warmer season marking the spawning period. The same criticism applies to some of the cones of the Plaice, neither corresponding to the spawning season; indeed, it is doubtful if much importance can at present be attached to some of these cones. The author is of opinion that congregation on the grounds and subsequent dispersal, or migration from one area to another, will explain his curves, but as no steps were taken to ascertain their presence or absence by other methods, this is conjectural. Moreover, he observes that the scarcity of flat-fishes in the deeper water in winter is due to their withdrawal to the coast, and hints that the Moray Firth may be one of these areas of refuge. But St. Andrews Bay and the region beyond are coastal areas, and no support can be found there for such a view. A doubtful statement, again, is that Dabs do not penetrate to the deeper water at any period of the year. If by deeper water twenty to forty

fathoms is meant, that is just what Dabs do, and the young may be reared there—in marked contrast to the Plaice, as was pointed out in 1884. Turbot and Brill extend over the greater part of the North Sea, yet the Turbot is at its minimum in his squares at the spawning season. Its wide distribution is probably a guarantee for its safety.

Taken all in all this contribution is of a different type from the preceding papers of the Scotch Board in this 'Blue Book.' It is true most of the points of importance in regard to the flat-fishes were previously known, and it would sometimes appear that the check of actual work in the sea itself, and close contact with the fishermen, lead to misinterpretations. While interesting, moreover, it does not deal directly with the great question handed over to the Scotch Board to solve, but it furnishes support to the views in the 'Resources of the Sea,' since it shows that the total average of pounds per hour of fishing was:—

In 1901	....	....	....	....	....	21·2 lb.
1903	....	....	....	....	....	21·7 lb.

Of the other fisheries papers which the International Investigations have produced few are of greater interest than an elaborate contribution by Dr. H. M. Kyle, "On the Statistics of the Sea-Fisheries in the Countries of Northern Europe." Briefly, these show that there is no decrease in the total quantities over this very wide field, though it is possible the average size of certain adults may be reduced, yet the intermediate stages of the Plaice and the Haddock have increased. He finds the total quantities of fish of all kinds landed in the North Sea ports in 1000 kilos. (1 cwt.=50·8 kilos., 1 ton = 1000 kilos. about) are:—

For 1902	....	....	....	....	....	575,255.
1903	....	....	....	....	....	940,739.

Of these totals about fifty per cent. arises from the Herring fisheries.

Again, the much vexed Plaice-fishery of the North Sea produced, in 1902, 43,339,000 kilograms (1 kilo.=2·2 lb.), whereas in 1903 it was 83,958,000 kilos., but from the latter a deduction for Plaice brought from other grounds brings the total to 45,000,000 kilos.—still considerably above that of the previous year. Dr. Kyle points out that the intensity of fishing in the offshore grounds is but a fraction of what it is in the inshore

grounds. Moreover, he demonstrates that Dr. Petersen, an able Danish fisheries' investigator, made an error in asserting that the Plaice-fishery of the Cattegat, which was begun in 1876, had reached its maximum, and was in 1894 declining. Dr. Petersen, however, believes—it may be with reason—that overfishing may occur when the numbers of fishes are stationary, or even increasing, a condition which perhaps, in the face of facts, might not be inappropriate for the scientific men in our country who uphold the impoverishment of the sea. Dr. Kyle, then, found in 1904—ten years after Dr. Petersen's report—that not only was the Danish Plaice-fishery as productive, but even more so, a larger number of boats being employed; and, as if to show the resources of nature, a new Plaice-fishery by the Swedes along the northern border of the same area had sprung up (since Dr. Petersen's report), and was flourishing. In this interesting contribution by Dr. Kyle many facts of importance are brought out. Thus, for instance, the quantities of Cod taken by Norway alone are three times those of all the other countries round the North Sea combined. He points out, moreover, the well-known fact that trawls only fish on the bottom, and thus are unable to give a complete account of the distribution of fishes, even on open grounds. The conclusions of Dr. Kyle are substantiated by an account, by A. C. Johansen, of the biology of the Plaice for Denmark, for he shows that as soon as the Plaice-seine was adopted by the fishermen (1872–80) the fishery grew apace. Thus the total yield of the Danish Plaice-fishery was:—

1887	....	....	....	....	....	1,048,000	kroner.
1903	....	....	....	....	....	3,017,000	„

The author is of opinion that the whole conditions in the North Sea are favourable, for with the increase of material there is a steady increase in yield.

Another paper of unusual interest is that containing an account of Dr. Hjort's work in the Norwegian sea. Many of the results were known, however, before the International Investigations began. He found three fish-faunas in these northern waters, *viz.* an arctic fish-fauna on the northern side of the ridge, from the Shetland-Faroë channel to Spitzbergen; an Atlantic fish-fauna on the southern slope of the great submarine ridge (in the deep basin of the Atlantic); whilst a third, allied to

the coastal fauna, occurred on the ridge itself. But what most concerns us is his discovery of vast multitudes of young fishes of the Cod tribe from Jan Meyen southwards—enough, and more than enough, to supply all the needs of the North Sea. With such enormous resources at command Nature is able to cope with ever-increasing captures.

Space would fail if allusion were made to all the scientific (zoological) fisheries' papers, but some are so important on general grounds that they should be briefly mentioned. Thus Dr. Fulton found Cod, brought from grounds one hundred and eighty to one hundred and ninety miles north-east of Aberdeen, were spawning in autumn—another fact which increases the safety of the Cod. Joh. Schmidt gives important information on the young stages of the Cod tribe, of the Lings, Halibut, long rough Dab, and Torsk. Dr. Kyle produces two papers for the use of International workers, *viz.* "On the Literature of the Ten Principal Food-fishes of the North Sea," and a "Catalogue of the Fishes of Northern Europe." Dr. Wallace contributes an able paper on the ear-bones of the Plaice in connection with age and rate of growth. A. S. Jensen (Norway) writes on the ear-bones of fishes from the bottom of the deep polar sea, and shows that Cod may frequent the upper layers of the water and be overlooked. A. C. Johansen describes the life-history of the post-larval Eel. Dr. C. G. J. Petersen (Denmark) contributes papers on the larval stage of the Ling, the larval and post-larval stages of flat-fishes, on the larval Eels of the Atlantic coast, and on the fisheries of the Cattegat and Sweden. Schmidt and Petersen give an important account of the spawning-ground of the Eel.

On the whole, those papers on the larval and post-larval stages of the food-fishes do not, with a few exceptions (*e.g.* Schmidt and Petersen on the spawning-place of the Eel), show much that is strikingly novel, for they had long before been worked out from the egg to a recognizable stage at St. Andrews.

Of zoological papers more suited for the work at marine laboratories, and the expense of which was unnecessary, are those on "Crustacea Collected during the Hydrographic Cruises," "New Crustacea," "On Copepods," and on "A Siphonophore (*Muggiæa atlantica*)."

Besides, it is not necessary, so far as Britain is concerned, to absorb time and money in the present special investigation on the food of fishes. That has long been sufficiently known for all practical purposes. Neither would the great labour and cost bestowed on the temporary and permanent pelagic or floating organisms seem to be warranted. Enough has long been known to demonstrate the ever-abundant supplies from diatoms to fishes. Concentration in an inquiry of this kind is essential.

In conclusion, therefore, a survey of the published work of the International Fisheries' Investigations, excepting that of the Bureau, from the British standpoint, has failed to elicit a satisfactory answer to the fundamental question submitted to the British investigators, *viz.* "Whether the fishes in the North Sea are," to state briefly, "in proportion to their consumption, and whether any disproportion between production and consumption arises from an injudicious employment of present apparatus."

Though some zoologists, apparently less confident of solving the various problems in their own department, pin their faith to hydrography, this science is, to make a slight alteration on the words of its workers, still at an immeasurable distance from being helpful; whilst it has—formerly and now—entailed heavy expense.

The results in the southern section of the North Sea—as to migrations, rate of growth, and the intensity of fishing—though interesting, are premature and inconclusive, and the distribution of the Sole has not been forthcoming; whilst those in the northern section, on the whole, and though some are laborious, make little real advance on previous knowledge, yet they inadvertently support the view of the 'Resources of the Sea.' Neither substantiates the theory of the "Impoverishment of the Sea," and both leave much of the British area unexplored.

On the other hand, in the light of long experience, a general consideration of all the facts of the British and Continental workers is fairly compatible with the safety of the fishes in the North Sea.

The experience of this costly international work, however, shows that, with the exception of the Bureau, it is not well adapted for any practical gain to the British Fisheries, which are best managed by central boards and a carefully trained

scientific staff. Scotland and Ireland, to some extent, already have these; England has not, and Lord Dalhousie's recommendation has additional force to-day.

An endeavour has been made in these memoirs to show that, on scientific grounds, the British Fisheries are not unsatisfactory, and that Nature is capable, by her marvellous resources in the sea, of keeping pace, even with all the modern agencies of destruction. Yet no supine attitude is advocated. Constant care and vigilance are becoming, under this great national trust of the sea-fisheries, and of the hardy race so largely dependent on them. The liner should be encouraged to adopt gill-nets in suitable inshore water, and also to vary his methods of fishing with bait. He has still, in the Herrings alone, about half the totals landed from the North Sea, besides Pilchards, Mackerel, Sprats, Lobsters, Crabs, Shrimps, and shell-fishes, not to allude to a share in the white-fishing, and the undisputed freedom of all the closed waters. In his case industry and sobriety never fail to afford a competence.

It is, indeed, fortunate for this and other nations that the unbroken chain of circumstances combines to render the sea-fishes so capable of holding their own, not only in former geological periods when, for instance, the gigantic fish-eating *Ichthyosauri* traversed the seas from pole to pole, but to-day. For what alternatives are before us?

Artificial hatching, while admirable in fresh-water and anadromous fishes, has not yet been proved (and this is said with all deference to the splendid efforts of the Americans) to be of actual service in marine fishes, the young of which are everywhere so numerous. Besides, the heavy expenditure would ill be borne by the taxpayers when the foreign fishermen share equally with their own.

Transplantation could readily be carried out, especially with flat-fishes, though under the same international disadvantages; yet Nature in our open waters needs but little aid in this respect.

More might be said in favour of a size-limit, but that more has much of sentiment in it; for, whilst the ordinary fisherman dare not sell his small fishes, and could not possibly eat them, many—indeed, almost all those hooked—would perish. But what would the Legislature make of the destructive shrimper who

cares neither to sell nor eat the small fishes? Moreover, it is hollow legislation which imposes a penalty in the case of small flat-fishes, and is purblind to the slaughter of young round-fishes.

The closure of large areas of the sea rests on no scientific basis, and there cannot be a doubt that the public are thus deprived of a large and perennial supply of fishes of easy capture.

To him who revives the barren fears and doubts of many centuries, and to the disciple of the "Impoverishment of the Sea," there is thus little to choose in the round of alternatives.

On the other hand, the plenitude and the endurance of the sea-fishes are marvellous, yet true. Nature is even prodigal in their vast abundance and variety. Indeed, it is by no means certain whether the combined destruction caused by invertebrate marine animals, from the democratic Jelly-fish (*Cydippe*) to the predatory Cuttle-fish, by the food-fishes themselves, many eating their smaller brethren or the young of their neighbours—even the Herring swallowing dozens of the floating eggs of the white fishes with its food—by predatory fishes like Sharks, Dog-fishes, and Skate, by the vast army of piscivorous birds, by the multitude of Whales, single and social, and by the Seals—I repeat, it is by no means certain whether this combined destruction does not equal, if not exceed, in numbers at least, that of man himself. Let us, then, be chary of futile international or other expenditure in search of a phantom, but at once organize the scientific staff of the three centres of the kingdom on a modern (which means a separate, *i. e.* apart from agriculture), effective, yet not costly footing. Finally, whilst vigilant in guarding the great national trust, and in checking any avoidable waste of fish-life, let every well-conducted method of capturing the sea-fishes be free from unnecessary restrictions.

OBSERVATIONS OF AN ATTEMPT OF THE SWALLOW
TRIBE TO WINTER IN SOUTH HANTS DURING
1906-7.

BY HARRY BEESTON.

(Continued from p. 234.)

Dec. 22nd to 24th.—Neither Swallow nor Martins seen.

25th.—Cold N.W. wind. It is not often that birds of the Swallow tribe are seen sporting about on Christmas Day in this country, and the occurrence of such an event as two Sand-Martins on the wing on this date is *almost* unique; but on the same date in 1903 a House-Martin was observed hawking for flies over a stream in this district, while on Dec. 30th of the same year a House-Martin, *possibly the same bird*, was seen near the same place.

26th to 29th.—Weather very wintry. Wind N.W. On the morning of the 27th snow lay several inches thick on the ground, and cold frosty weather continued, with the thermometer down to twenty-four degrees below freezing-point (eight degrees of frost) on the morning of 29th. Evidently the Martins had suffered severely, and were feeling the effects of the continued cold, for on the 29th only *one* bird was to be seen on the wing, and that appeared very weak, yet making a brave struggle to keep on the wing and obtain food. It would be interesting to know the fate of its companion.

30th.—Change of wind and weather; mild S.W. wind. *Both* birds again observed, but beating up and down stream with weary flight and apparent exhaustion. How long will the unequal contest last?

31st.—*One* bird only on the wing, but to-day it appears stronger.

1907.

Jan. 1st to 7th.—Weather variable. Sharp frosts on nights of 2nd and 3rd. Wind veered from S.W. (1st) to N.W. (7th). The solitary bird has struggled on day after day, and now (7th)

seems quite recovered from its weakness, and is once more vigorous, sweeping up and down stream with easy flight, and occasionally taking short journeys over the adjacent meadows.

9th to 13th.—Open and rather mild weather, with continuous N.W. wind. One bird only now appears to have survived, and is strong in flight. On the 11th, at noon, I thought *this* bird, too, had disappeared. After watching by the stream for some time, and not being able to see the bird either near the water or over the fields, I was about to depart somewhat disconsolate, when, as though to once more reassure me, the Martin came skimming along within a few feet of where I stood, dipped down close to the surface, snapped up an insect or two, and then disappeared again behind the farm-buildings. There is no doubt whatever in my mind that the bird has settled down to try to weather the winter, and, if insect-food holds out long enough, I have hopes it may be able to survive. But then the question arises—why has not the other Martin also managed to live, if it is only a matter of food-supply? Here is a curious and interesting instance of the “survival of the fittest,” and an enigma in evolutionary migration.

14th to 17th.—Anticyclonic weather, with mild N.W. wind each day. The bird still in evidence each day, very vigorous, and only occasionally visiting the stream. Food is evidently plentiful just now away from the water.

18th to 21st.—Anticyclone still continues; calm, mild, misty weather. Wind S.E. The Martin still on the wing, seemingly as strong and fit as ever it was in summer, and only occasionally does it hawk for insects over the stream; evidently food is obtainable in sufficient quantity elsewhere.

22nd.—Cold, wintry day; ground frozen hard. Wind N.E. Visited the stream to-day at noon, and was agreeably surprised to see the Martin still on the feed, up and down stream, and appeared quite strong and well, taking occasional flights away from the water over the fields.

23rd.—Weather as yesterday, but cutting wind from N.E. *Eleven degrees of frost last night!* Martin still courageously and persistently hawking for food close to the surface of the water. It appears to-day very feeble, and is only just able to flutter along, and does not attempt to leave the stream as yesterday.

Last night's severe cold seems to have lowered the bird's vitality almost to the lowest ebb, and it is more than likely that to-day will be its last effort to survive; the odds are very much against its being able to stand a temperature as low as that of last night.

24th to 27th.—Visited the stream each day, but no signs whatever of the Martin since 23rd; it has without doubt succumbed, but it certainly deserved a better fate.

Before finally dismissing these diary notes, there is one very puzzling point which I am unable to settle, viz. *where during the time the Sand-Martins continued to remain in the district—i. e. from November to January—before finally perishing, did they roost or conceal themselves at night?*

As is well known, these birds live in holes or burrows during their stay in this country, and sleep in the burrows at night, never, as far as I have been able to discover, in any other situation. Immediately on arrival in spring the birds repair to their nesting haunts, and use the old burrows for roosting purposes. In the district around Havant I know of no place where Sand-Martins breed within a distance of thirteen miles of the town, as the geological formation is mainly chalk, which is quite unsuited to the requirements of these birds for breeding purposes. Hence it has puzzled me very much to know in what situations and under what conditions the birds found shelter at night. Would they be likely to roost in reed-beds, or take shelter in out-buildings or stacks of hay or straw? The observations and criticisms of ornithologists on this point would be welcomed by the writer.

The following weather table serves to illustrate my remarks and criticisms bearing on the subject of migration as dependent on *wind direction*, which Mr. E. K. Robinson maintains so strenuously is a vitally important factor in bird migration (see table on next page).

In the 'Country-Side' for week ending Jan. 5th, 1907, p. 109, the Editor, Mr. E. K. Robinson, to whom I submitted some notes on the abnormally late departure of Swallows and Martins, endeavours to explain the reason for the "prolonged and untimely stay" of these birds in South Hants by saying

that "no wind from the right quarter, presumably N.E., blew with sufficient strength or persistence to reawaken the instinct of migration."

WEATHER ANALYSIS TABLE, NOVEMBER AND DECEMBER, 1906.

Date.	Direction.	Character of Weather, &c.
Nov. 19th, 20th.....	N.W.	Wind steady.
„ 21st to 24th ...	S.W. or S.E.	Gentle, but steady wind.
„ 25th to 28th ...	N.W. or W.	Breezy. Wind west on 27th.
„ 29th	S.W.	Calm.
„ 30th	N.W.	Wind steady.
Dec. 1st	N.W.	Strong wind; bright clear weather.
„ 2nd to 5th.....	N.W.	Steady wind; S.W. on 3rd.
„ 6th to 7th	N.E.	Strong on 6th; frost on 7th.
„ 8th to 11th ...	N.W.	Strong cold wind on 9th and 10th, <i>with hard frost.</i>
„ 12th	W.	Strong cutting wind.
„ 13th to 15th ...	N.W.	Steady cold breeze.
„ 16th	S.E.	Mild, with "Scotch mist."
„ 17th and 18th	N.W.	Mild and calm.
„ 19th to 23rd...	N.E.	Steady breeze; <i>hard frost</i> 21st to 23rd.
„ 24th	S.W.	Steady breeze; <i>hard frost</i> followed by thaw.
„ 25th to 28th...	N.W.	Strong wind; <i>blizzard and snow</i> on 26th, with keen frosts.
„ 29th	N.E.	Steady wind, <i>but many degrees of frost.</i>
„ 30th	S.W.	Strong wind, thaw, and rain.
„ 31st	N.W.	Steady breeze and milder.

Now, it will be seen from the above weather table that, with the exception of one day (27th), from Nov. 25th to 28th the wind blew steadily from the N.W.

This answers the point with regard to "persistence," and I should imagine a N.W. wind would be quite as favourable as one from the N.E. for migrating birds, or those, at any rate, which *desired to migrate*. A steady breeze from this direction would carry the birds across the English Channel, and land them safely on the shores of the Mediterranean in a few hours; whereas a N.E. wind would be more likely to carry them further out to sea, and thus render the journey much longer and more dangerous, because they would have to cross the Bay of Biscay, where adverse winds might carry them quite out of their course.

A short sea passage would be safer than a long one, and, besides, the advantages the birds would obtain by crossing a larger land area, by being able to stop if necessary to feed, cannot be overlooked when considering the matter whether a N.W. or N.E. wind is the more suitable for migration.

Without going through the table in detail, it will be seen that there were four days, from Nov. 25th to the end of the month, when the instinct of migration—whatever that may mean—could have been taken advantage of, but the birds did not for some inscrutable reason follow their instincts, but delayed their departure, or, as it seems to me, *were quite content to remain*, the reason for which I shall discuss later.

(To be continued.)

OBITUARY.

PROFESSOR A. NEWTON, M.A., F.R.S., &c.

ZOOLOGISTS in general, but especially ornithologists and oologists, will deplore the loss of Professor Alfred Newton, one of our most distinguished and soundest zoologists, who passed away on the 7th of June. Professor Newton, who held the Chair of Zoology and Comparative Anatomy at Cambridge since 1866, was well known and most highly esteemed, not only in Great Britain, but in every country where zoology, and more especially ornithology, is studied, and his writings, though many, were not so voluminous as they might well have been, for he never put pen to paper until he had fully studied his subject, and in consequence nothing that he wrote will pass away, but will stand as a lasting memorial of the care and hard work he bestowed on all that he undertook. Extreme accuracy was with him the corner-stone of all his work, and he would spend weeks of labour and earnest research in verifying any reference. It is scarcely necessary here to enumerate all the works he has written, but amongst these I may especially name his 'Dictionary of Birds,' written with the co-operation of Messrs. Hans Gadow, Richard Lydekker, Charles S. Ray, and Robert W. Shufeldt, a work which is indispensable to every working ornithologist; vols. i. and ii. of Yarrell's 'British Birds'; his 'Ootheca Wolleyana,' a catalogue of the celebrated collection of eggs originally formed by the late John Wolley, and completed by Professor Newton himself, which, though commenced as long ago as 1866, was only completed shortly before his death; and his various papers on the Great Auk or Garefowl.

As one of the founders—probably the chief of the small band of ornithologists who founded, nearly fifty years ago, the British Ornithologists' Union—Professor Newton and his coadjutors gave an impetus to the study of ornithology which has had most gratifying and lasting results.

A severe though a very fair critic, and a hard hitter when he deemed it necessary to administer salutary correction, Professor Newton was a firm friend, most courteous, genial, and pleasant in manner in personal intercourse, and especially kind and helpful towards young ornithologists; therefore he was greatly loved and revered by all who came in personal contact with him. It was a constant custom with him to be

at home on Sunday evenings to young students of zoology, and all who have taken part in these pleasant reunions will know how helpful he invariably was to any young man who was working at any branch of zoology. In this, as in his influence on the study of ornithology, he will be sorely missed, and there is no one who can take his place.

Although permanently lame, owing to an accident in early childhood, he did good work as an outdoor naturalist, and travelled considerably, visiting Norway, Lapland, Spitzbergen, Iceland, the West Indies, and North America, making excellent use, as his writings show, of his opportunities to study the habits of birds in their native haunts.

A keen oologist, Professor Newton amassed a very good collection of eggs, almost entirely of Palæarctic species, and of some, chiefly northern, a very large series—and this valuable collection he has bequeathed to the Cambridge University Museum. His chief hobby was, however, his library of ornithological and zoological books, and whenever a rare ornithological work was in the market he would use every endeavour to secure it, usually with success. Hence this library, which he has also bequeathed to the Cambridge University, is extremely rich, and contains several of the rarest and most valuable ornithological and oological works.

Though very broad-minded, Professor Newton was somewhat conservative, and to the last he was strongly averse to the extreme subdivision of species, often on the very slightest grounds, now so prevalent amongst some ornithologists of the present day, as also to the use (or, we may almost say, abuse) of trinomial appellations, he being essentially a binomialist.

Professor Newton was the fifth son of William Newton, of Elvedon Hall, Suffolk, formerly M.P. for Ipswich, and was born at Geneva on the 11th of June, 1829. Educated at first by a private tutor, he graduated at Cambridge in 1853, and was appointed Travelling Fellow of Magdalene College in 1854, and then visited the countries above enumerated. He was subsequently a vice-president of the Royal, Linnean, and Zoological Societies, and was awarded the gold medal of the Linnean Society, and in 1900 one of the Royal Society's medals.

I first made Professor Newton's acquaintance in 1858, on my return to England from Finland, when he came to my father's town house to examine the collection I had made during my sojourn in Sweden and Finland, and since then he has been the most constant and truest friend it has been my good fortune to possess.

H. E. DRESSER.

NOTES AND QUERIES.

MAMMALIA.

Badger near Cheltenham.—A fairly large specimen of a Badger was recently killed at Brimpsfield, near here, in a wooded “combe” at an elevation of about nine hundred feet above the sea-level. These animals are stated to be not uncommon in the neighbourhood.—CHAMPION LE CHAMBERLAIN (Fairhaven, Cheltenham).

AVES.

Occurrence of the Sardinian Warbler in Sussex.—On June 4th a Sardinian Warbler (*Sylvia melanocephala*) was brought to me in the flesh for identification by Mr. G. Bristow, Jun., naturalist, of Silchester Road, St. Leonards-on-Sea. It had been killed the day before in the neighbourhood of Hastings, and proved on dissection to be a male. Being unable to be present at the British Ornithologists' Club Dinner in London on June 19th, the bird was kindly exhibited on my behalf by Dr. C. B. Ticehurst, M.B.O.U., who informs me that this is the first really authenticated occurrence of this species in the British Islands, though Mr. W. D'Urban saw what was apparently a bird of the same species in his garden at Exmouth on April 16th, 1890. This is referred to in Mr. Howard Saunders's 'Manual,' where he writes:—"There is not the least improbability of this bird occurring in the British Islands, since it is common in the South of France and in the Peninsula." It probably got swept north in the tide of spring migration. I hope to record this occurrence of the Sardinian Warbler also in part iii. of vol. i. of the Journal ('Hastings and East Sussex Naturalist') of the Hastings and St. Leonards Natural History Society.—THOMAS PARKIN (Fairseat, High Wickham, Hastings).

The Scaup-Duck (*Fuligula marila*) in Cheshire.—On the 12th May last I saw an adult male of this Sea-Duck on Redesmere, Cheshire. It proved to be very tame, and I was able to approach to within some twenty yards of it. The head, neck, and breast were black, glossed with green; mantle finely vermiculated with pale grey and white, which in the distance looked white, and was met with the white of the

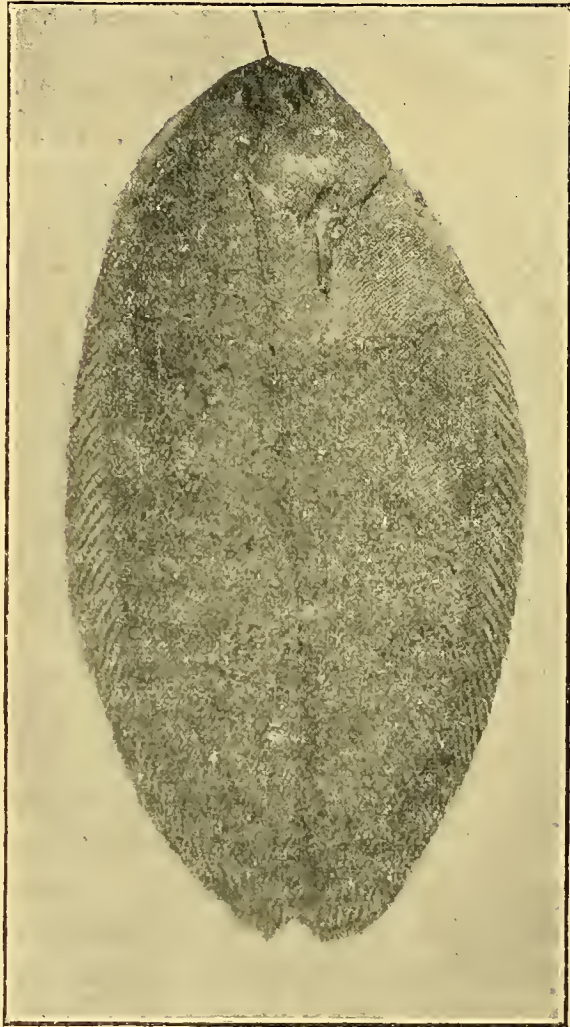
belly overlapping the wing; tail, rump, and flight-feathers black or dark brown; the bill, which was slightly upturned, was bluish slate-colour; eye bright yellow. In the morning, when I first saw the bird, it was searching for food, and dived frequently in the shallow water of the narrow end of the mere; in the evening, when last seen, it had retired to the centre of the mere, where it was resting near a few Tufted Ducks, from which it was easily distinguished by its light back.—FRANK S. GRAVES (Ballamoar, Alderley Edge).

The Shoveler (*Spatula clypeata*) in Cheshire.—I noticed two birds of this species on Redesmere, Cheshire, on the 19th April last. They were adult male and female, and, judging by their behaviour, had paired, but when I visited the mere next day they had gone. These are the first Shovelers I have seen on this mere, or, indeed, in Cheshire. The poise of these Ducks on the water is remarkable; the fore part of the bird is much sunk, as though weighed down by the large bill, and the tail stands clear of the water.—FRANK S. GRAVES (Ballamoar, Alderley Edge).

Non-breeding Birds.—Quite from the beginning of May a pair of Little Terns (*Sterna minuta*) have remained on Breydon, instead of joining the assemblies of their species at Blakeney and at Wells. I have seen them every time I have gone on Breydon, and on reference to the note-book of the watcher Jary found dates, recording their constant presence, between my own. The female appears to be not nearly so strong on the wing as its mate, which is most attentive to it, continually fishing for it, and dropping tiny Herrings on the mud near it, or into its mouth, and what appeared to me to be Gobies and Shrimps as well; these latter were fished out of the tinier "drains," the former being snatched out of the deeper "channels." At the present time the usual summer muster of Gulls is to be seen on the mud-flats; there are numerous examples of Black-backed Gulls, from the fine adult males to the last year's "greys," including oddly blotched birds of the third and fourth years. They are living fairly well now on the flotsam that drifts upstream on the flood from the shrimpers' nets, and on Shore-Crabs scuttling about among the rank *Zostera*. The immature Common and Black-headed Gulls are very persistent in waiting upon the Herons, who, when satiated with Flounders and Eels, will continue to strike and capture prey, to be thrown away at length upon the flats. As late as May 26th some Knots in the perfect "red" of spring were loitering on Breydon. If these were on their way to their nesting quarters the time they were enabled to devote to household matters must be exceedingly short.—ARTHUR H. PATTERSON (Ibis House, Great Yarmouth).

PISCES.

Tailless Sole.—On June 19th I had brought to me by a fish-hawker a small Sole (*Solea vulgaris*), which at no period of its existence had owned a caudal appendage, the posterior extremity of the fish being perfectly rounded, and the dorsal and anal fins quite continuous, without a break. The fish measured 7 in. in extreme length, with a width of $3\frac{1}{2}$ in., inclusive of the fins. As will be seen by the photograph, the



TAILLESS SOLE (*Solea vulgaris*).

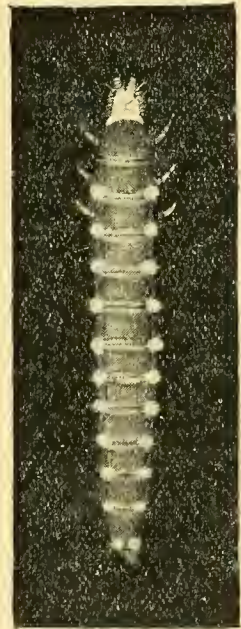
fish is quite oval in shape. There was a slight damage to the fin-membrane at the extreme end, done probably in the trawl-net. I met with a specimen of this fish (*vide* 'Notes of an East Coast Naturalist,' p. 225) in 1890, somewhat similarly malformed, but in that instance the two fins turned in, making a V-shaped inlet.—ARTHUR H. PATTERSON (Ibis House, Great Yarmouth).

MOLLUSCA.

Carnivorous Propensities of a Slug.—On my visiting (June 11th) some traps I had set for Mice, I found a Bank-Vole caught, and feeding on it was a large Slug (*Limax flavus*). It had already devoured a considerable portion of the Vole, having made a round hole about the size of a shilling. This was a surprise to me, as I had no idea Slugs were carnivorous, and had always regarded them as purely vegetarians.—GORDON DALGLIESH (Brook, Witley, Surrey).

INSECTA.

A Remarkable Luminous Insect from Brazil.—The female beetles of the group *Phengodini*—a group nearly related to our ordinary Glow-worms—are exceptionally interesting, not only on account of their remarkable luminosity, but also from the fact that they retain in adult life all the external features of the larva. Whether the specimen figured here is really a mature female or only a well-grown larva cannot at present be determined. This specimen, by the kindness of Mr. J. Kempthorne, who brought it alive from Manaos, in Brazil, has been recently added to the National Collection, where hitherto the group was represented only by male specimens. It is very nearly $1\frac{1}{2}$ in. long, sparsely covered with hairs, especially at the sides, the general colour pale yellow, slightly brownish on the dorsal segments, with the head and last segment reddish brown; the eyes, antennæ, and mandibles black. The head and the front part of the first thoracic ring glow on all sides with a red light, like that of a live coal, the light appearing to be concentrated in two centres, one in the head, the other in the thorax. Each succeeding segment, except the last, has a pair of lights, which, in marked contrast with those of the head and prothorax, are of a distinctly green colour, resembling in miniature the green signal-lights used on railways. The possession of lights of two different colours appears to be confined to South American species of the group; at least, I have not been able to find any reference to the red light in the head in any of the accounts given of North American species. One of the South American forms has been described as having a red light at each end of the body, and a row of green lights along each side. The males are slightly luminous, the luminosity being confined to one or more of the ventral plates of the abdomen.—C. J. GAHAN (Brit. Mus.).



NOTICES OF NEW BOOKS.

The Sense of Touch in Mammals and Birds, with special reference to the Papillary Ridges. By WALTER KIDD, M.D., F.Z.S.
Adam & Charles Black.

THIS is a very useful book ; if it does not propose or support a theory, or is somewhat inconclusive in result, it still becomes, by its illustrations and descriptions, a text-book on the subject. The impressions of the palmar and plantar surfaces of many mammals, especially Primates, will afford quite a new study to some zoologists ; while the literature on the subject, given in an appendix, is a most welcome addition. It is in the literature relating to the study of evolution that these books find their place ; this one, having no novel theory, nor leading to any startling conclusion, may possibly and probably be little known beyond the ranks of a few students. The general reader requires a sensational summary. How many, to whom the name of Darwin is a household word, and ' Natural Selection ' and the ' Descent of Man ' accepted axioms, have really studied the facts on which those conceptions are founded ?

According to Mr. Kidd, the Orang has a hand which approaches nearly to the shape of the human hand. The Gorilla has a hand and foot of more powerful appearance than any other Anthropoid Ape, the hand resembling a clumsy human hand, while the foot is more powerful than that of the Orang. The hand of the Chimpanzee is most human of all in general form, but less complex as to patterns than the Gorilla or Orang, but more so than the Gibbon. The result of Mr. Kidd's method of enquiry points out that the Anthropoid Apes are distinguished from all the Primates below them by marked simplicity of palmar and plantar pattern, and by higher development of apical pads in the Orang and Gorilla, the former change being common to the whole group, the latter to only two out of the four.

Mr. Kidd seems to place a very high value—perhaps too high

—on the use of the hand to man in the basal element of his progress in civilization. Referring to the periods known as Stone, Iron, and Bronze Ages, he writes :—“ It is easy to understand that in such a development of mechanical appliances as these titles indicate the sense of touch has played an extremely important part.” We should consider it was more the evolution of human intelligence which produced the evolution in handicraft.

There are one hundred and seventy-four illustrations and diagrams.

A Hunter's Wanderings in Africa ; being a Narrative of Nine Years spent amongst the Game of the Far Interior of South Africa. By F. C. SELOUS. Macmillan & Co., Ltd.

THIS is a new and fifth edition of a book with a deserved reputation and an evergreen interest. To the real sportsman of big-game the volume requires no recommendation, but it is a question whether mammalogists and other zoologists are always aware of the valuable observations it contains—observations made in the field, and recorded at the time. This is particularly the case as regards the Lion. “ All the Dutch hunters in the interior, as well as many Europeans who pretend to higher scientific attainments, say there are at least three distinct species of Lions in South Africa, while some assert that there are four or even five.” These distinctions are based on the length and colour of the mane, the general colour of the coat, the spots on the feet, and the comparative size of the animals. But Mr. Selous, with a healthy appreciation of variable characters, recognizes but one species, and most zoologists will entirely agree with him. Chapter xiii. is an excellent summary of the author's experience of the South African representative. Another idea that may be laid to rest refers to the South African Buffalo. All representations of these animals “ charging with their heads lowered are purely imaginary, as they never do so, but, on the contrary, invariably hold their noses straight out, and lay their horns back over their shoulders. They lower their heads just as they strike.”

The work is well illustrated, and collectors who may have acquired head or horn trophies from South Africa will have little trouble in identifying the species to which they belong.

The volume also possesses a sad interest to those who have wandered across the veld or through the bush of South Africa. It is a tale of recent time, but as regards the game, of a long ago and a vanishing fauna. When Mr. Selous first visited the country there was no Johannesburg, but there was a hunter's paradise; Bulawayo had not supplanted the kraal of Lobengula, and Elephants could be found in places which will see them no more. Perhaps the time has come when the colonizing march in the southern part of the African continent will at least pause, and, apart from local gold and diamonds, one of the poorest countries in the world may be able again to exhibit its wealth in wild mammals.

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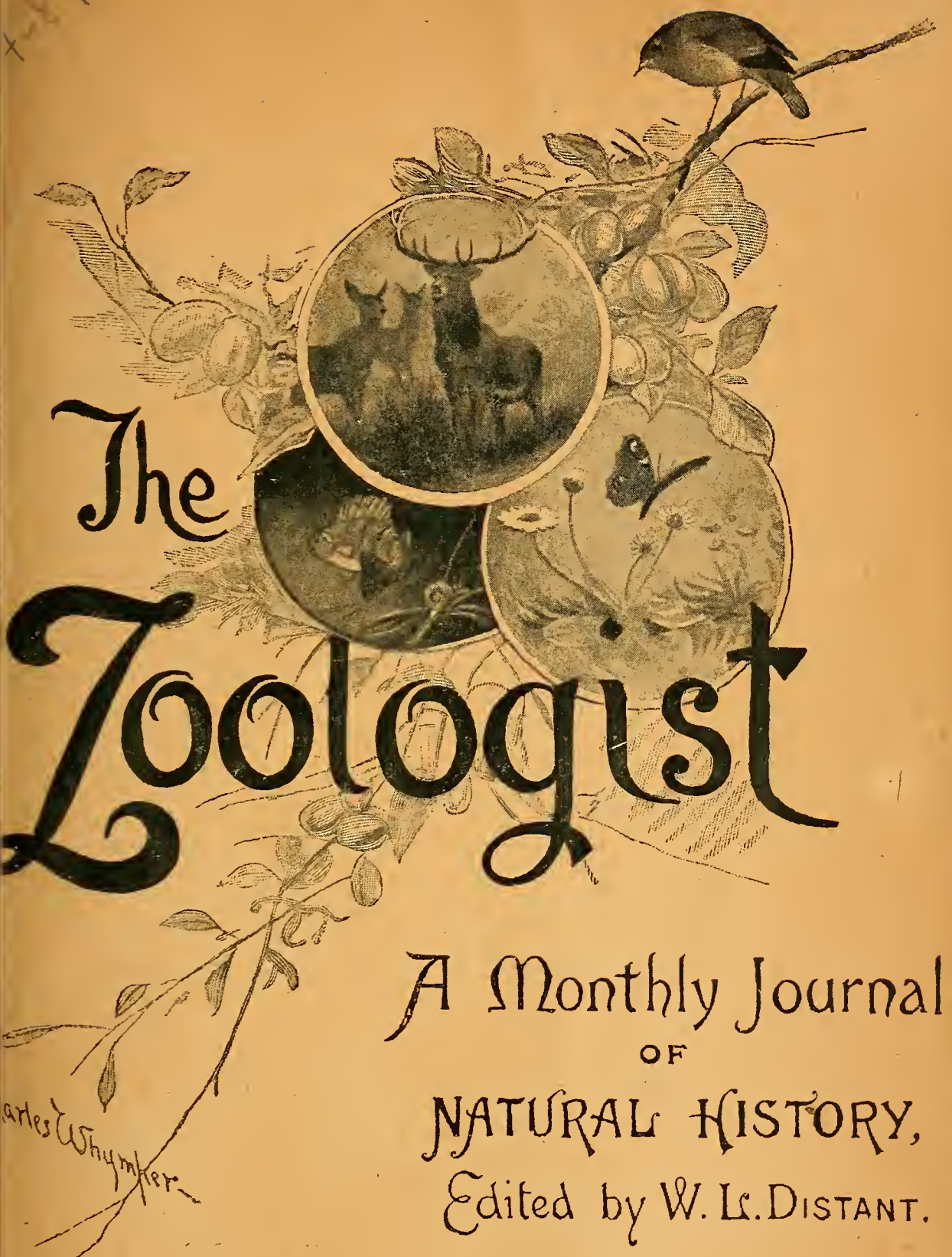
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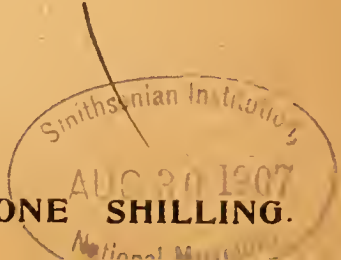
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THE ZOOLOGIST

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RECENT OCCURRENCES OF RARE BIRDS IN CORNWALL.

BY JAMES CLARK, M.A., D.Sc.

IN the present article an attempt is made to notify all specially interesting occurrences of uncommon birds in Cornwall during the last eight years, so far as they have not been already recorded by others in the pages of 'The Zoologist.' Practically all reference is omitted to the Birds of the Isles of Scilly, as these were fully treated in last year's 'Zoologist' by Mr. F. R. Rodd, of Trebartha, and the present writer. Where no authority is given for the capture of any particular specimen, the bird in the flesh or else the fresh skin was brought into the Schools by one of his students or observers, and identified by the writer. "Reported" specimens are such as have not been seen by him, though there is no doubt as to their genuineness.

The Lesser Whitethroat was not observed on the Cornish mainland till the 11th of September, 1902, when an immature male was killed near Poundstock. The following year it was specially looked for in that district, and several were seen during the third week in September on the dense hedge-banks between Launceston and Bude. The two shot as voucher specimens were both immature females. In 1904 it was observed near Poughill on the 2nd of October, and an adult male was killed at Bodmin on the 26th of the previous month. Probably, through lack of observers, it was not recorded in 1905, but in 1906 a female was shot in a dense oak thicket near the top of Coomb Valley, Kilk-

hampton, and an immature male about the same date just across the border at Holsworthy, in Devon. It is therefore at least a casual autumn bird of passage in the north-east of the county.

The Dartford Warbler was a fairly well-known resident throughout the county in the late seventies, but after the severe winter of 1880-81 does not seem to have been recorded till 1884, when Baily observed it near Penzance. After the hard winter of 1886-87 it was not again observed till May, 1899, when Miss E. A. Reynolds saw it in a garden at Hayle. In April, 1904, a nest with four eggs was found near Penryn. Shortly after hatching one of the young birds disappeared, but the other three were watched till fully fledged. In 1905 a nest with four young ones was discovered at Linkinhorne, and another with five eggs near St. Buryan. Last year birds were again seen about St. Buryan in the spring, and one was flushed from a turnip-field in the autumn. This year it has not yet been recorded for the county.

The Firecrest has in late years been a fairly regular winter visitor. In October, 1900, several came in at the Lizard with a large flock of Chiffchaffs and several Redstarts, and one, a male, was shot to establish identification. From the 7th to the 9th of November that year two were observed at Kea, near Truro. In January, 1901, about a dozen frequented some pine-trees near Tregothnan, with a number of immature Goldcrests, for about a fortnight, and in November that year one was shot at Kea. In the first week of December, 1904, two lingered for several days near Gulval, at the head of Mount's Bay, and one was killed later in the month at Helston. For a week or so in the middle of November, 1905, it was not at all uncommon among Goldcrests from Malpas down the left side of the river to King Harry Passage, and in November, 1906, it was heard and seen by F. H. Davey in Tresamble Lane between Ponsanooth and Bissoe.

When staying at St. Goar, on the Rhine, in May, 1905, the writer received from a farmer near Liskeard the remains of a Melodious Warbler that had been shot near Sandplace, Looe, on the 12th of the month, under the impression it was a Nightingale. "We killed it," wrote the sender, "so that people should not laugh at us when we said we had heard the Nightingale in Corn-

wall." The specimen, an adult male, is the first recorded for the county.

For some years now a careful watch has been kept for the appearance of the Alpine Accentor at likely places along the south coast, and on the 11th November, 1906, an adult male was shot at Looe, where it had been noticed two days before sitting motionless for several minutes on a low stone wall, and, when disturbed, going off with an irregular Lark-like flight. On the 16th September, 1899, a male Tawny Pipit was captured at Bodmin, but it refused to eat dead insects and ant-eggs, and died in two days. This is so far the only specimen recorded for the Cornish mainland, though Pechell shot one at Scilly on the 19th September, 1868. An adult male of the Great Grey Shrike was caught on limed twigs near Bodmin on the 26th November, 1898, and reported by R. V. Tellam. An unsuccessful attempt was made to keep it alive. It took lean meat readily, but was never properly freed from the bird-lime, and this interfered seriously with its health. On its death the skin was unfortunately not preserved. In September, 1900, a male Pied Flycatcher was killed at Liskeard. The last previous example recorded for the mainland was obtained near Wadebridge by D. Darell on the 23rd April, 1891. The Tree-Sparrow appears to be a casual winter visitor of infrequent occurrence, but may have been overlooked. The last three county specimens seen by the writer are—one shot by John Williams at Scorrier in 1897, and now in Lord Falmouth's collection at Tregothnan; one, a male, at Pencalenick, in November, 1904; and a male at the Lizard on the 9th December, 1906. On the 19th December, 1903, a Mealy Redpoll in immature plumage was shot at Feock, the second example recorded for the county. The Lesser Redpoll is a not infrequent winter casual, occasionally caught with Siskins at Lostwithiel, with Linnets and other Finches at Penzance, and shot or captured at intervals at Looe, Stratton, and elsewhere. The Twite is of rare occurrence. Seven were seen and two shot at Cardynham after the cold stormy weather of March, 1901; one was killed at Lostwithiel towards the end of November, 1904; and one, a female, near Bude on the 11th December, 1906. An immature Bee-eater, a rare accidental straggler to the county, was obtained at Marazion on the 3rd October,

1906, a few days after one had been shot at Scilly. The Hoopoe is apparently a regular spring bird of passage in the county, but is seldom recorded in the autumn. In October, 1905, however, it was seen by several observers along the south of the county from Liskeard to Penzance, and one was unfortunately shot at Gerrans, and another at Fowey. In the spring of 1901 a pair nested near St. Columb, and successfully reared four young birds out of a clutch of five eggs. The unsavoury nest was built in a chink between two stones in an old hedge-bank, about two and a half feet from the ground, and could just be reached by putting the arm in up to the elbow. When the young birds emerged from the egg the beaks were not at all conspicuous, though their gape was enormous. The crest-quills were decidedly in evidence when the writer saw them on the fourth day, and on the sixth the quills that covered their pink ungainly bodies clearly showed the russet-brown of the coming plumage, and the well-marked black and white bars of the wing.

On May 2nd of the present year a male example of Scop's Owl was shot close to Ludgvan, apparently the second that has been obtained on the mainland. Montagu's Harrier has been a scarce summer migrant to the county for over forty years, and there was still one nest at least in the west last spring. The Hen-Harrier nested on the Goonhilly Downs till about 1841 (F. V. Hill). After that date it became a casual of fairly frequent occurrence. In 1903 it again nested in the county, and has done so every year since. The Marsh-Harrier is now a rare casual, but bred on Redmoor Marsh till 1855 (F. R. Rodd). The Rough-legged Buzzard bred in the county down to about 1850 (Trathen and Harris), but is now a rare casual. An immature male in fine condition was killed near Carelew on the 16th November, 1905. Eleven examples of the Honey-Buzzard have been recorded for the county, including one at Land's End in the autumn of 1901, one at Carelew in the autumn of 1902, and one at Ladock, near Truro, on the 21st October, 1904, reported by the Rev. Canon S. R. Flint—all three in immature plumage. An Osprey was seen by the writer, and independently by T. Cornish, at Carbis Bay in September, 1902. A specimen was shot by the gamekeeper at St. Winnow, near Lostwithiel, in March, 1903, and is now in the collection of Sir C. B. Rashleigh.

The Squacco Heron is represented by over twenty specimens, the last of which, a male in superb condition, was shot at Penwethers, near Truro, by T. H. Rowse on the 1st June, 1907, and is now in the Museum of the Royal Institution of Cornwall, Truro. A male American Bittern was killed by two of the clerks in the employment of the Eastern Telegraph Company at Porthcurnow on the 12th November, 1906. The bird was first noticed on the footpath on the east side of the valley, and was chased down into a large clump of whins by the side of the stream and close to the beach, where it was secured with some difficulty. It proved to be a male with plumage in good condition, though the body was very emaciated. The Glossy Ibis is an accidental autumn wanderer, and is always in immature plumage. In October, 1900, it was reported from Hayle, and a month later from Saltash. On the 25th October, 1906, a male in second year plumage was shot close to Sennen Cove, near Land's End.

Of the five Geese recorded for the county the Grey Lag is by far the scarcest. A specimen was reported from Glendurgan, Falmouth, by G. H. Fox in December, 1901. Last winter two or else three gaggles of the White-fronted Goose visited the west of the county, and one specimen was shot by a farmer near Marazion. Bewick's Swan was not uncommon last January on the north coast. Three were in evidence for several days at Newquay, and eleven appeared at Hayle. Swans were also reported from Bude and from Mousehole.

The Gadwall has been procured at least six times on the mainland. A male was sent in to a poulterer's shop at Bodmin in January, 1905, from one of the neighbouring moors, and a female was shot in the Land's End district on the 10th January, 1907. An immature male of the Ferruginous Duck, the only specimen recorded from the county, was killed by some boys on the beach near Mylor on the 11th March, 1905, during very stormy weather. An immature female Long-tailed Duck was shot near Feock on the 31st December, 1906. Two specimens of the scarce winter casual, the Velvet Scoter, were killed on the Helford River on 16th December, 1906, along with an adult male of that rare American vagrant, the Surf-Scoter.

D. Darell reported a Red Grouse that had been shot by

Arthur Menhennick, of Pennart, Port Isaac, at Penpetty, Tintagel, on the 1st December, 1906, the third specimen recorded for the county.

An Avocet was reported by F. V. Hill from the Cober Valley, Helston, where it was killed on the 21st April, 1900, the only specimen recorded from Cornwall during the past twenty-seven years. The Grey Phalarope puts in an appearance in the autumn or winter of most years, but the Red-necked Phalarope is seldom seen. A solitary specimen of the latter was killed at Swanpool, Oct. 21st, 1902. No fewer than eleven examples of the Pectoral Sandpiper have been obtained in the county, nine at Scilly and two on the mainland. One of the latter was obtained at Gyllingvase, Falmouth, in the early forties (Cocks), and the other, a male in most emaciated condition, at Porthgwarra on the 30th April, 1906. The Little Stint, an occasional visitor on spring and autumn migration, was obtained between Hayle and St. Erth on the 12th October, 1903, and at Swanpool, Falmouth, in the autumn of 1905. An American Stint was shot by W. H. Vingoe at Marazion on the 9th October, 1853 (Rodd, Zool. 1853, p. 4297). Another was killed by a fisherman near Mousehole in September, 1890, and bought in the flesh by W. E. Baily, of Paull, in whose collection the writer saw it in February, 1902, incorrectly labelled "*Tringa minuta*." Temminck's Stint is scarcer in the county than the Little Stint. One was obtained near Devoran in October, 1899, and one on the marsh at Gyllingvase on the 1st November, 1904. Three examples of Bartram's Sandpiper have been killed in the county, and all in the Lizard district. The last specimen was found by Dr. Owen hanging up in a poulterer's shop in Falmouth in October, 1903, and is now in his collection.

The Bar-tailed Godwit is an autumn visitor, occasionally in large flocks, but the Black-tailed Godwit is rarely seen. One was observed by the Rev. H. H. Mills near Camborne in October, 1904, and a male was shot on the Helford River near Gweek on the 8th April, 1907.

Sixteen specimens of Sabine's Gull have been recorded from Cornwall, all in immature plumage. The last was shot between Lostwithiel and Doublebois in November, 1902. The Little Gull is also an occasional casual, last obtained at Hayle in

November, 1896, by E. Vingoe, and at Swanpool in November, 1904. Two examples of the Ivory Gull were obtained in February, 1847 (Rodd, Zool. 1847, p. 1699), and two were seen and one shot in Hayle estuary on the 24th January, 1907, by L. Williams. The specimen obtained is an adult male in good condition.

A Black Guillemot, one of the rarest casuals in Cornwall, was picked up dead near the St. Anthony Lighthouse, Falmouth, on the 12th March, 1905, during very stormy weather. A Sooty Shearwater was shot near Looe on the 21st August, 1899, and stuffed by John Ough, of Liskeard. The bird was seen and identified by the writer, but the captor's name was not ascertained.

NOTES ON THE HABITS OF THE GREATER HORSE-SHOE BAT (*RHINOLOPHUS FERRUM-EQUINUM*).

BY BRUCE F. CUMMINGS.

DURING the past winter I explored, with two friends, some disused manganese mines (in what is known as the Pickwell Down Sandstone) which are situated in a deep valley running from east to west, about nine miles north-east of Barnstaple. I had the good fortune of being quite successful in the object of the exploration, *viz.* the finding of Bats. However, I met with only *Rhinolophus ferrum-equinum*, but an acquaintance had some years before found Lesser Horseshoes and one other species in these same mines.

The mines were not extensive, but long enough to add a tinge of adventure to our expeditions. They consisted of three borings running into the side of a hill, the entrances being on a level with the ground outside, and of four or five shafts, into which we were lowered by means of a rope. One passage (the largest of all) is impregnable on account of water; in places it must be, I should think, over seven feet deep, so wading was out of the question.

I met with only about six specimens, two of which I secured. The first was in what I will call boring A, hanging from the top of one side of the passage. All the others hung from the same part, never from the roof, and usually with their faces to the wall. As soon as I saw it, it drew up by bending the joints of the hind limbs. Thinking it was awake, I quickly boxed him. But later Mr. T. A. Coward, to whom I am indebted for help and advice and a valuable correspondence on the subject of Horseshoe Bats, informed me that it draws up in this way even when asleep, and this I soon found to be the case. This is apparently a pure reflex action.

I kept this Bat in captivity between December 24th and 29th, 1906, on which date it died. I kept it in a very cold

atmosphere—in fact, too cold—for it never woke up, and died in its sleep.

On Dec. 29th I visited the caves again. Boring A contained no Bats. Boring B, close at hand, contained two, one on each side of the passage. On entering this cave again in the evening we found that one Bat had disappeared; the other was just unfolding its wings, and almost immediately flew between my legs and out into the open air, or it appeared to do so, as we did not notice it anywhere on the walls in returning to daylight. These Bats evidently were *not* hibernating.

On Jan. 5th I went to the caves again. In boring B one Bat, which was considerably smaller than the other, was hanging in exactly the same position at the same spot on the wall. The large specimen took flight before we could approach it, and went to the entrance of the hole, but, disliking the daylight, returned and pitched, when I caught it. Then we took both to a room in the deserted mine buildings, where we had a good look at the strange little animals. The large one was of a pale buff colour, and about $12\frac{1}{2}$ in. across the wings. The colour of the fur of the small one, which was not much more than 8 in. across the wings, was dirty grey. Unlike the other, it made an attempt to walk on the table, but it was a clumsy gait. Both rose from the ground easily, and flew around the room. We took them back to the mouth of the boring, and they went in. It was now getting dark, and on our following them into the hole, after a few moments' grace, they came out and disappeared. But when, before leaving, we went into boring A, previously empty, there were two Bats flying, and we concluded that they were the same pair we had just driven from boring B. On later visits, as I shall show, I repeatedly noticed Bats leaving the caves at dusk on warm nights, but these seemed most reluctant to go abroad, and I rather believe that this was possibly on account of the rain, which was falling very thickly, though the temperature was very mild.

On Jan. 11th entered borings A and B, which were empty. In B, I picked up, at the end of the passage, several elytra of a wingless geodephagous beetle belonging to the genus *Pterostichus*, possibly *P. niger*; also remains of certain moths (*Scotosia dubitata* and *Gonoptera libatrix*), several dipterons (including, I believe, *Eristalis tenax*, or some closely allied species), and a few remains of

the Cave-Spider (*Meta menardi*). This goes to show that the Bats feed *in* the caves, as it is very unlikely that they would find *M. menardi* outside. I also saw a good many specimens of both the before-mentioned species of moths on the walls and rotted timber in the caves, where they were hibernating. I saw none outside the caves. The same remark applies to the dipterons. The beetles were probably taken in summer, but it is, of course, an open question as to how the Bats caught these purely terrestrial insects.

At 4.30 p.m., following the advice of Mr. Coward, I took up my stand outside the large water-logged boring C, and waited. At 5.20 a small Bat flew in, and a few minutes later a Greater Horseshoe flew out. At 5.25 another flew out, and disappeared. It was a very mild day.

I watched outside this cave again on Jan. 16th, at dusk, when the temperature stood at 46° F., and at 5.20 I saw two Bats, evidently Horseshoes, fly down across a field on my left. Clearly they had left the mines by way of the shafts higher up the hill. Insect-life, I observed, was on that night in plenty, and the Bats must have found no difficulty in getting food.

On the 19th we arrived at the mines with ropes. We got down one shaft, thus gaining access to the longest passage in the mines. My friend, who went down first, found a Bat almost immediately, and I thought that this augured well, but it proved to be the only one in the passage. Underneath the spot where it was hanging was a little heap of excrement. I noticed similar heaps in the other caves. It would thus appear that the Bats prefer hanging from the same spot. Later observations rather confirmed this view.

We watched outside boring C between 5.10 and 5.36, but in that time no Bats flew out. It was a cold day, with a south-east wind. Borings A and B empty as before. Through being disturbed they finally deserted these two holes.

Watched outside again for some time on Jan. 23rd, when it was freezing all day in the shade, but saw no Bats come out. This leads one to conclude that the Greater Horseshoe Bat goes abroad regularly in mild weather in winter, yet in the cold weather it stays inside the caves.

The Bat which was caught on the 19th I brought away with

me, and kept alive for ten days. It lived in a lumber-room, where it was allowed to fly pretty freely. I observed its partiality for certain spots, to one or another of which it regularly returned after being disturbed. Mr. Coward said that with his Bats he noticed the same to some extent, but after a while they became less fastidious, and would hang up anywhere. As is well known, it always reverses, *i. e.* turns a sort of somersault before hanging up by its hind limbs. This aerial manœuvre is a very clever feat. It never pitches head upwards. It used to crawl about the walls a good deal, but always head downwards. When thus climbing it made use of its wing-claws.

One most noticeable point was the incessant nervous twitching of the ears. It was more than a twitching—it was a series of distinct though rapid movements of the ears, which gave the little animal a very peculiar appearance.

When hanging the interfemoral membrane is bent back over the back, and when flying it is stretched, of course, between the hind limbs, but with the tip turned up somewhat. This is difficult to see, but I chalked the tip of the membrane and the ankles of the legs, and, by judging the relative positions of the chalk-marks when it was on the wing, I was able to observe that the tip was slightly turned up, as was indeed to be expected.

When placed on the ground it rises with the greatest ease, and several times when flying it pitched on the ground with the wings sprawled out at full length, and the belly resting on the ground. Mr. Coward informed me that this was a pronounced habit with this species. When taking flight again from this position, I believe it uses its hind limbs as a “push off.” I only noticed an attempt to walk on two occasions. It once gave me a sharp nip with the teeth, and, although I found it rather spiritless, it never got really tame.

It looks a curious animal when hanging up asleep, with its body enveloped in its wings, and its remarkable face ensconced between the two wing-joints, and its long thin legs stretched out straight, and kept close to each other. As has been pointed out before, it bears a resemblance, when in this position, to a *pupa* of the Lepidoptera. When sleeping the ears are generally tucked in under the cavity formed by the antibrachial.

The enveloping wing-membranes must be very useful in preserving warmth.

I found it took no notice of fumes of camphor and ammonia, &c., solutions of which I presented to its nasal appendages by means of saturated cotton-wool. Bright gas-light never troubled it in the least, and Mr. Coward informed me that even a strong acetylene lamp or an explosion of flash-light powder has little effect on these Bats. It could hear my finger passing gently over my forehead, when I held my head a little more than nine inches away, for it would immediately look up, or move its ears; anything like the rattle of cup and saucer made it shake throughout the body. Its sensitiveness to sound was remarkable. If the slightest noise was made when it was hanging awake from the wall, suddenly up would go its head, and the ears would vibrate for a short time, when it would subside and gradually fall asleep.

It is an interesting sight to watch it "turn in" after flight, *i. e.* fold its wings around the body in preparation for sleep. It hangs a little while with the wings down beside the body like an ordinary Vespertilionid, then in a quick movement it spreads them out around the body, at the same time forcing the fore arm over the back. The ears are taken in under the antebrachial. Occasionally one is left outside, but after an interval it is withdrawn under cover; sometimes it is left out altogether. My Bat had a predisposition to folding the left wing under the right, as this was the position of the wing nine times out of the eleven I especially watched.

One curious point was noticed with regard to the times of waking of these Bats in captivity. Under natural conditions I found them on the wing between 5 and 6 o'clock; but the Bat I kept in captivity woke up a little before 10 o'clock every evening, though the time varied somewhat. Mr. Coward found the Bats waking between 4.45 and 6 under natural conditions, but in captivity frequently as late as 11 o'clock, or even later. This is an interesting fact, but I cannot explain it.

During the cold of the latter end of January my Bat slept for a longer period each night, and on the night of Jan. 23rd I could not wake it. I tried every means I could think of, but it slept on, though it moved; for instance, it "drew up," folded back one

wing when I pulled it out, climbed about the wall when I attempted to dislodge it, and turned over when I placed it on its back on the floor, but nevertheless it seemed asleep and unconscious, and its eyes were closed. However, as soon as I took it to a warm room it very quickly came round, and opened its eyes, vibrated its ears, and lifted its head, and then flew round the room.

On several occasions during its captivity it made a sharp clicking sound, probably a snap of the jaws. I found it a very thirsty little creature, and Mr. Coward remarks that his Bat "drank like an old toper." I was unable to persuade it to eat readily. It fed once or twice when I was not at hand. Mr. Coward observed that his captives, when they fed, did not feed on the wing. He suggests that this species, as a rule, does not devour its prey when on the wing, but conveys it to some spot where it can hang when feeding. This was "the invariable method" of his captives. He has sent me an analysis of the dung of these Bats. The dung was probably deposited in the warmer months, and the analysis was prepared by Mr. Newstead. Among other things, it states that about—

68	per cent.	of pellets examined	contained	remains of	Lepidoptera.
66	"	"	"	"	Coleoptera.
24	"	"	"	"	Diptera.
7 $\frac{1}{4}$	"	"	"	"	Arachnida.
2 $\frac{1}{2}$	"	"	"	"	Hymenoptera.
2 $\frac{1}{2}$	"	"	"	"	Trichoptera.

Of the Coleoptera, at least 44 per cent. were of the genus *Geotrupes*.

On my fourth visit to the mines (Jan. 11th) my light suddenly went out, owing to a draught as I stood in the largest boring C on the edge of a deep pit of water. I was left in complete darkness. I heard the echo from far away in the long dark passage stretching in front as each drop of water fell from the roof into the pool below. It was uncanny. Each drop sounded distinctly, and had a mellow musical ring that was fascinating—more fascinating in the darkness. I felt well-nigh isolated. It is said that absolute isolation very quickly induces madness, but that horrible sensation of absolute isolation is rare, if it exists. Except for the water, everything was as still as summer on the downs. But presently I began to detect a slight indescribable noise, so slight

that at first I thought it issued only from my own head ; yet it grew gradually into a loud, sharp clicking, mingled now and then with squeaks and curious purring sounds— evidently the cries of Bats of some species. But I must not stay longer describing effects and sensations. I promptly relit my candle, and reached *le grand air*. My jacket (an engineering overall) was covered with red slime and drippings of both water and grease !

From these somewhat limited experiences, I arrived at the following conclusions, which may have to be modified after further observation. In a measure most of them agree with those suggested by Mr. Coward in his paper communicated to the Zoological Society in April. Mr. Coward's observations were made in Somerset, some time previous to mine in Devon :—

(1). The Greater Horseshoe Bat (*Rhinolophus ferrum-equinum*) does not hibernate, strictly speaking—at least, in the warm winter climate of North Devon.

(2). In mild weather they leave the caves, and go abroad to feed.

(3). In very cold weather, or during heavy rains, they probably remain inside the caves, and do not go abroad.

(4). In this cold weather they probably feed on the insect-life contained in the caves, and on the spider *Meta menardi*, which lives in the caves, and which the Bats would not probably find outside.

(5). They show a tendency to return to the same spot to hang up and roost.

(6). Neither strong light nor strong smells have much effect on them, but they are very sensitive to sound.

I hope to visit the mines or others in the neighbourhood when the Bats are breeding.

THE CALIFORNIAN CONDOR.

“Unguibus et rostro tarda trahet ilia vultur.”—*Ovid.*

BY GRAHAM RENSRAW, M.B., F.Z.S.

THE indirect extermination of animals, due to what may almost be termed accidental causes, has in recent years become only too rapid, and still continues. The classical instance of this is perhaps the extinction of the Rhytina, or Sea-Cow, of the Northern Pacific, killed off for provision by men who were primarily mere fur-hunters. Here one has a wheel within a wheel, for the loss of the Rhytina also meant the extinction of the *Cyamus rhytinæ*, a sea-louse, parasitic on its hide, and of an unknown ascarid worm, which infested its stomach. In modern days the flightless Kakapo, or Ground Parrot, has all but vanished under the attacks of Stoats imported to destroy the New Zealand Rabbits; the West Indian Doves have been decimated by the Rat-hunting Mongoose; the Haytian Solenodon—that curious insectivore—has become so rare that in five months a recent writer obtained but one specimen—thanks again to the Mongoose. Another instance of indirect extermination is the gradual disappearance of the Californian Condor.

The Californian Condor (*Gymnogyps californianus*) is a fine bird, measuring in good specimens nearly eleven feet in expanse of wing, and weighing from twenty to twenty-five pounds. The beak is whitish or pale yellowish, and is three and a half inches long; the nostrils are small, and pointed anteriorly; the head is small, bare, and smooth, being, together with the bare neck, of a yellow or orange colour. General hue of the plumage sooty blackish; upper wing-coverts tipped with white; under wing-coverts *entirely white*, a character by which the species is at once recognized. The legs are blackish brown; the closed wings reach a little beyond the tip of the tail.

The eggs of this rare Condor are greenish white; two is the number in a clutch, but sometimes there is only one. The nest

is an untidy structure, built in the wildest part of the pine woods, on lofty trees overhanging a precipice, or on the very rocks themselves. It is composed of thorny twigs and grass. The same pair use the nest in successive years, but do not trouble much about mending it as it becomes worse for wear. Incubation takes from twenty-nine to thirty-one days. The nestlings cannot leave the nest for five or six weeks, and have the bill and bare neck blackish instead of orange. I have seen a photo-engraving of a young bird which, with its curved beak, humped shoulders, and body swathed in down, marvellously recalls the Dodo as figured by the old voyagers! The sprouting quills in the wings, the big feet, and the absence of the tail heightened the resemblance, and one could well understand how the old ornithologists were at a loss whether to class the Dodo as vulturine, struthious, or rasorial.

To-day the Californian Condor—the largest bird of prey inhabiting the United States—is represented by a miserable remnant lingering in South-west California; its distributional area, once extending as far north as the Fraser River in British Columbia, is now a mere dot on the map. In the old days it abounded every spring on the Columbia River, feeding on the Salmon cast up on the shore. It hung round the Indian villages for the sake of the offal thrown away, and, together with Ravens and Turkey Buzzards, visited the waterfalls and cascades of the Salmon rivers. The fish, being obliged to take leaps at these places in their progress along the stream, often landed themselves high and dry amongst the bushes, and thus provided a meal for the expectant Condors. The present species also fed on carrion, and was very voracious. When gorged the birds perched on decayed trees, and, with necks retracted and wings drooping about their feet, presented a finished picture of satisfied gluttony. When on the ground this Condor walked with a strut, like a Turkey, but was obliged first to run or hop several yards before launching itself into the air. Once on the wing its flight was slow, steady, and graceful, its noble proportions dwarfing the Turkey Buzzards in the same valley to mere Swallows.

“Their quills are used by the hunters for tobacco-pipes,” observed Mr. David Douglas many years ago. Recently the Mexican and Indian gold-seekers have well-nigh exterminated

the Californian Condor for the paltriest of reasons—because, forsooth, their magnificent hollow quills afforded rough-and-ready purses for carrying gold-dust! Again, the hot summer compels the ranchmen to drive their herds into the cool valleys, where many cattle and sheep are destroyed by Puma and Grizzly Bear. To get rid of these giant vermin the half-eaten carcasses are poisoned, and the innocent Condors, feeding on them, are destroyed in hundreds. In his day (1830), Mr. Douglas described the giant birds as swarming on a carcass, so that a single doctored Sheep might well deal out as deadly destruction as a Maxim-gun. The range of the Californian Condor was never very extensive, including only California, Oregon, Washington, and part of British Columbia; essentially a forest dweller, its home is now limited to the wild gorges of the Sierra Nevada.

The present species was first described under the name of *Vultur californianus* in the ninth volume of the 'Naturalist's Miscellany' by Dr. Shaw. The type-specimen was deposited in the British Museum by Mr. Menzies, who had accompanied Captain Vancouver's expedition. Many years afterwards a pair were shot by Mr. Douglas; these passed into the possession of the Horticultural Society, and the Council subsequently presented them to the Zoological Society's Museum. At some time previous to 1827 a living bird, said to be a Condor, was brought to Europe, and may have belonged to this species; its plumage, however, was said to be *brown*, so that it may either have been immature, or else belonging to some other species, such as the rare and little known Brown Condor of Ecuador, not to be confounded, of course, with the Condor of the Andes. On June 22nd, 1866, Dr. Colbert A. Canfield, of Monterey, California, presented a Californian Condor to the London Zoological Gardens, through the agency of Prof. Baird. Capt. J. M. Dow had brought it across the Isthmus of Panama, and it appears to have been the first example imported alive into this country. The specimen was figured in the 'Proceedings of the Zoological Society' for 1866; it was already a "scarce bird." As regards recent examples, it may be mentioned that after four years' efforts the New York Zoological Society succeeded in obtaining a young bird, which had been taken from the nest by a boy. It arrived at the Zoological Park on March 14th, 1905. In January, 1906,

it had assumed adult plumage. Tame, and even affectionate, the bird was one of the choicest rarities in the collection. A photograph of it was published in the Annual Report for 1905, showing the Condor standing on a perch with lowered head and expanded wing, apparently inspecting some object in front of it. The characteristic white under wing-coverts are shown in the photograph. This valuable bird was killed by swallowing an indiarubber band given by some crazy visitor. Happily a second specimen had been purchased a few days before, and is now in the collection, protected from the public by two screens of wire-mesh.

A flock of no less than twenty-six individuals was seen as late as 1894 by Mr. Stephens, and the species is thought to be holding its own in the remoter mountains. It is also protected by law, but its ultimate survival seems to depend very much on chance, and to enforce the law in the inaccessible districts which constitute its last stronghold would be a difficult matter. Now limited to the coast ranges of California, it would be a thousand pities if this fine Condor, as large as the winged giant of the Andes, should share the fate of Steller's Cormorant and the *pigeon hollandais*, of the Réunion Starling and the Labrador Duck. These have all utterly vanished, and the monarch of the western sierras—Shaw's "vultur niger, rostro albido"—may be the next to disappear. *Res in cardine est.*

FIELD-NOTES ON SOME OF THE SMALLER BRITISH MAMMALIA.

BY GORDON DALGLIESH.

THESE notes are a continuation of those published in the preceding volume of 'The Zoologist' (1906, p. 168). Nearly all my observations are confined to the south-west of Surrey.

NOCTULE BAT (*Pterygistes noctula*).—This species I did not observe this year (1907) until May 11th, which is an exceptionally late date, owing perhaps to the backwardness of the season.

BARBASTELLE (*Synotus barbastellus*).—On May 6th a Bat came into my garden at Witley at 5.30 p.m., and stayed for a few minutes, but quite long enough for me to see that it was undoubtedly a Barbastelle.

MOLE (*Talpa europæa*).—I have a very pretty variety of the Mole, taken in Glamorganshire, the general colour of which is a clear cream, with the throat and under parts deeply suffused with orange-red. I caught one at Witley, in May, that is of the normal colour above, but has the whole under side a rich golden brown.

COMMON SHREW (*Sorex araneus*).—On April 4th, 1906, I found in one of my traps the hind foot of a Shrew, and a few mornings afterwards a Shrew with a hind foot missing was caught. This in all probability was the owner of the foot. I took a specimen this year (1907) in June, with two patches of white on each side of the head. An exceptionally large female caught in June measured (in millimetres), H. B. 80; tail, 40.5; H. F. 12.5; ear, 8.

PIGMY SHREW (*Sorex minutus*).—This little Shrew I have found not at all uncommon, and Mr. Oldfield Thomas informs me that it is far from rare throughout the country. It is not often trapped, owing, I think, to its extremely light weight enabling it to take the bait without springing the trap.

DORMOUSE (*Muscardinus avellanarius*).—On May 9th a Dor-

mouse was caught in my garden at Witley, in an old nest of a Song-Thrush. It was in a complete state of torpor. It died shortly afterwards from shock, and on skinning it I found it extremely fat.

YELLOW-NECKED MOUSE (*Mus flavicollis*).—The name given for this Mouse by Barrett-Hamilton in his excellent monograph on “*Mus sylvaticus* and its Subspecies” (P. Z. S., April 3rd, 1900) is De Winton’s Mouse (*M. sylvaticus wintoni*), and at one time I was also inclined to agree as to its being merely a subspecies or variety; but I now think if *Microtus orcadensis* and *Evotomys skomerensis* are entitled to full specific rank, then *Mus flavicollis* must be granted it also. Therefore I prefer to use the name adopted by Mr. de Winton (Zool. 1894, p. 441). I have lately obtained several specimens of this Mouse near Witley. On looking at a Yellow-necked Mouse one cannot fail to be struck with the difference to that of the Common Wood-Mouse (*M. sylvaticus*). It has, on the whole, a decidedly more thoroughbred look, besides its superior size and brighter colour, to that of its near ally. In the typical *sylvaticus* the length of the tail *never* exceeds that of head and body, but, on the contrary, is always shorter. In *flavicollis* the tail nearly always *exceeds* head and body, rarely equalling it, but is *never* shorter. The yellow pectoral band is present more or less in quite young specimens. De Winton’s measurements for this Mouse are—head and body, 108 mm. to 115; tail, 108 to 115; hind foot, 24; ear, 18. The skull is larger and stronger than *sylvaticus*; length, 27 mm. and upwards (Barrett-Hamilton).

The following is a table of measurements (in millimetres) of seven selected specimens of my own collecting :—

No.	Sex.	H. B.	Tail.	Hind foot.	Ear.	Skull length.	Skull breadth.
1	Male	100	115	25	15	broken	broken
2	Male	110	110	25·5	13	29	13
3	Female ...	111	111	23	18	30	15
4	Female ...	107·5	108	23	18	broken	broken
5	Male	100	105	22	16·5	„	„
6	Female ...	98	102	23·5	17·5	„	„
7	Female ... (juv.)	71·5	79	14	14	„	„

For comparison, I give the same of seven selected specimens of *Mus sylvaticus* :—

No.	Sex.	H. B.	Tail.	Hind foot.	Ear.	Skull length.	Skull breadth.
1	Female ...	88·5	88	23	18	broken	broken
2	Male	112·5	83·5	24	16	"	"
3	Male	100	96·5	23·5	13	27	13
4	Female ...	95	85	23	20	broken	12
5	Female ...	90	damaged	23	13	24	12
6	Female ...	103	83	23	13	20·3	13
7	Male	97	88·5	25	17	broken	broken

From the above tables it will be seen that the Yellow-necked Mouse has a longer tail than *Mus sylvaticus*, and this difference alone would entitle it to specific rank, according to many zoologists, for we see that in the case of other small mammals measurements only can be relied on for discriminating the species; for instance, the immature Common Shrew and adult Pigmy Shrew so closely resemble each other that they can only be distinguished with satisfaction—so I am informed by Mr. O. Thomas—by the measurement of the hind foot, that of the Pigmy Shrew being much smaller. Again, the Skomer Vole differs only from the Bank-Vole in its superior size, though it is true the colour on the lower back is more grey; but apparently colour would go for nothing, as Capt. Barrett-Hamilton says, writing of *Mus sylvaticus wintoni*, that the yellow pectoral band may or may not be present, which we ourselves would have thought to be a distinguishing character, and I agree with and follow Mr. de Winton in giving *M. flavicollis* full specific rank. The most beautiful specimen of *M. flavicollis* I have ever seen is one in my possession, taken during the winter of 1906 in Gloucestershire. I append a description :—Upper parts fawn, mingled with long black hairs; a broad black dorsal line; line of demarcation clearly defined; under parts snow-white; a small yellowish pectoral band; under surface of tail pure white. I have found both *M. flavicollis* and *sylvaticus* in moult in May.

BANK-VOLE (*Evotomys glareolus*).—This little animal is far more aquatic in its habits than is generally supposed. I have alluded to its partiality for swampy ground in a previous note

(Zool. 1906, p. 172). Swampy woods, with the ground composed of black slimy mud, covered with marsh-marigolds and clumps of coarse grass, with here and there pools of water formed by the rain, is one of the favourite haunts of the Bank-Vole. I once trapped one in a ditch of running water in a trap intended for a Water-Shrew, placed on a stone in the middle of the water, showing that the Vole to reach the bait must have swum to it. On planting two bulbs in pots, and putting these on the top shelf of a greenhouse, I discovered shortly afterwards these had disappeared, having been scraped out by some animal. A trap was set, and a Bank-Vole caught. Now, the Vole to reach the pots must have climbed quite four feet up, and the distance between each shelf was a foot, and so, as there was no other means of getting at the pots, the animal must have sprung from shelf to shelf. Showing some skins of the Bank-Vole to a friend of mine, he said he had seen some like them, only very much larger, in a wood in Pembrokeshire. These might have been the Skomer Vole, as Capt. Barrett-Hamilton, who described this species or form, entertained hopes that it might be found on the mainland.* Skomer Island is, it might be as well to state, just off Pembrokeshire. Mr. Oxley Graham records a very large Bank-Vole found in Kent (Zool. 1898, p. 477), and gives the dimensions as "6½ in. from tip of nose to tip of tail; length of tail, 2 in." He goes on to say that the specimen was too decomposed to preserve. This might possibly have been identical with the Skomer Vole, and, as I have said before, in all probability this large Vole may occur on the mainland; field naturalists visiting remote districts of Wales and other parts of the country should be on the lookout for it.

* 'Proc. Royal Irish Academy,' vol. xxiv. sec. B, pp. 315-19 (1903).

OBSERVATIONS OF AN ATTEMPT OF THE SWALLOW
TRIBE TO WINTER IN SOUTH HANTS DURING
1906-7.

BY HARRY BEESTON.

(Concluded from p. 271.)

IF we again refer to the table (*ante*, p. 270), we see that during the first fortnight of December, with the exception of *one* day (3rd), favourable winds prevailed, and especially so on the 6th and 7th, when a strong wind from N.E. was in force. Why, I ask, did not the birds depart then? There was not only this advantageous wind to assist the birds on their journey, but there was an *additional* reason for departure—*viz.* a very sharp frost on the night of the 6th—yet the birds remained.

From the 8th to 11th strong cold winds blew, with six degrees of frost on 10th, and seven degrees on 11th; still the brave birds delayed their departure. From 12th to 18th the weather was fairly open and mild, but day by day, vigorous and strong, the Martins continued to skim up and down stream on the feed.

A steady breeze from the N.E. prevailed from 19th to 23rd, and again gave the birds a favourable opportunity, but they evidently declined to depart, or their instinct for migration had died out—and so on from day to day they remained; and it is quite evident that it was neither a wind from the N.E., N.W., nor from any other quarter, for which the birds waited. Strong and persistent breezes were not wanting, both at the latter end of November and the beginning of December.

We must look for some other reason than mere wind to account for the abnormal departure from the generally accepted ideas regarding the migration of our summer birds. I do not say that wind is not to some extent an important factor, but in my opinion there are other and *more potent* causes, which largely control the movements of migratory birds.

It has been suggested “before the end of November the migratory spirit of a Swallow would under ordinary conditions be at rest.” What explanation can be offered regarding the following instance, which seems completely to confute this proposition:—While staying at Kettering, at Christmas (1906), I was shown three young Swallows (not Martins), nearly fledged, preserved in spirits, which were taken from a nest on Dec. 4th. The previous day they were being fed by one of the parent birds, but either from *the bird's instinct to migrate*, or some other cause, the young were left to perish.

Now, presuming that the mother (?) bird left her young to die of starvation in order to gratify the impulse of migration, why should she do so more than Swallows in Hampshire? There was more reason for her to remain than for the southern birds to delay their departure.

To return to the discussion of the Hampshire birds—respecting the Swallow last seen on Dec. 21st—there seems no reason whatever for believing “that the wind had brought him in a wrong direction.”

From certain well noted marks on the plumage this was one of the Swallows which had been under observation since Nov. 25th. It was a male adult bird in full plumage, and one of the parents of a family of five reared in a cowshed near the stream where these observations have been made. On Nov. 27th the *young* birds had all disappeared, only the *two* adult birds remaining; and on 29th the male bird only was left, and remained on until Dec. 21st, when it undoubtedly perished. But of the Sand-Martins—the first of which was observed on Nov. 25th, flying about with the Swallows, and on 29th was joined by another—these are the birds which were under observation so long, although one disappeared before the other.

On another point I do not agree with the suggestion that the “birds were gradually starved while the winds were blowing from quarters which their instinct rightly bids them . . . to disobey.” As I have shown, so-called *favourable* winds blew, which would have carried them safely away, *but they chose to stay*, and at least *one* had not starved (when these notes were penned); and this is one of the most remarkable and extraordinary things about this puzzling feat of summer birds trying to winter in

England. The incident is unique, I presume, in the annals of ornithology.

Neither is the following inference correct: "*It is not improbable that at the very last the right wind blew, and carried them in a few hours to summer climes.*" No! One of the two Martins doggedly remained on, and undoubtedly perished on Jan. 23rd. I have no doubt whatever that the birds remained in spite of favourable winds for a good and sufficient reason, which I will endeavour to explain; and I am of the firm opinion that *the birds deliberately chose to remain, and that wind-direction had nothing whatever to do with their stay.* The predominating factor, in my opinion, was *a plentiful supply of proper food*, and this abundance is accounted for in several ways. The locality favoured by the birds is well sheltered, as already stated, and the climate of the district is mild even in winter, and insects abound in the immediate vicinity of the stream, which the birds haunt so closely.

Without doubt this stream is the secret of the abundance of insect-life. A part of the water of the stream comes from a number of springs about a quarter of a mile away, but the volume of water is greatly augmented by the surplus water from the pumping-station of the waterworks, and a large quantity of *heated water* enters the stream from two parchment works. Now, as this heated water passes along the stream it produces a luxuriant mass of vegetation for a considerable distance before entering the sea, and in cold weather a perceptible mist is observable several feet above the surface, showing that the water is several degrees higher than the surrounding air. This humid condition favours the rapid and constant production of insect-life, so that it is no uncommon thing to see clouds of gnats hovering over the stream and its vicinity in the depth of winter. One only needs to see the numbers of birds, constantly on the feed along the banks, to know that suitable food is there in plenty.

To watch half a dozen Pied Wagtails in different places along the course of the stream busily feeding is a common sight every day. They fly (or flutter) down stream, and occasionally hover in the air just clear of the surface, and snap up the insects from the water; curious and amusing is it to watch them as they

endeavour to balance themselves while hovering by means of their outspread tails. During the late winter it has been quite a common sight to see numbers of both Pied and Grey Wagtails hawking for flies over the water in the manner described.

Speaking of the Grey Wagtail reminds me of a fact I omitted to mention with regard to migration here on the south coast. Scarcely, I should say, in any other part of the British Islands can it be said that two great migratory movements—*viz.* the return southward of our summer visitors, and the arrival of our winter migrants—overlap, as is the case in this locality. It has been noted by local ornithologists that Geese and Ducks from far Lapland and Siberia often arrive on their feeding-grounds in Langstone, Emsworth, Chichester, and Pagham Harbours *before* the Swallows and other summer birds have departed in the autumn. On the other hand, the same overlapping occurs again in spring. In 1904 and 1906, before the winter migrants had returned northwards, they were overtaken, so to speak, by the returning spring birds. In both years *Sand-Martins* were observed as early as March 24th, the *Chiffchaff* was seen and heard on March 17th, 1906, and the *Wheatear* was reported on March 12th, 1906.

It is very noticeable that these extremely early birds are seen either on the banks or in the near vicinity of the same stream where the Martins lingered so long this year. It seems almost certain that the birds know this particular locality as a good feeding-ground, and return to it year after year. In my opinion it is neither accident nor mere coincidence which can in any way account for the phenomena.

If the Sand-Martin last seen on Jan. 23rd had managed to survive until February it would have been possible to establish the extraordinary record of the Swallow tribe *for every month of the year* for this part of Hampshire. As it is, the record is good for eleven months out of the twelve.

In conclusion, I firmly believe that if our winters (in the south) were only a few degrees milder, and the birds—not merely the Swallow tribe, but others—could always be sure of obtaining suitable and abundant food, they would remain to winter with us, as these records tend to prove.

NOTES AND QUERIES.

MAMMALIA.

Mus flavicollis in Suffolk.—Having given out that “ mice and rats and such small deer ” would be acceptable for a young Tawny Owl, which I thought would be safer in our keeping here than in the hands of the boy who possessed it, a bag containing three Mice was brought to me on June 19th. Two were common House-mice, but the third was the finest *Mus flavicollis* I have ever seen—nine inches in total length, and very richly coloured. Unfortunately it had been kept too long even to be made into a skin. — JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds, Suffolk).

AVES.

The Cuckoo (*Cuculus canorus*) near Aberdeen.—The Cuckoo, in 1907, was heard here on May 7th, but there were not so many as usual, though there was a considerable amount of calling, which continued generally until near the middle of July, one being heard as late as the 19th. The great feature of the year, however, is that there has been but one young Cuckoo seen in this neighbourhood, and it seemed to be an average bird, and of the average colour. This is one of the most remarkable events which has come under my notice. Regarding the wide area which these birds occupy during the year, it is impossible to say how and why the tide has thus turned in 1907. Did the cold May of 1906 have much effect, or is it because the season became so unpropitious here at the end of May and in June? According to my observations there has been a fair nesting season among other birds, though, of course, I cannot vouch for all; so that this incident of the Cuckoo becomes very phenomenal. So far as the foster-parent, the Meadow-Pipit (*Anthus pratensis*), is concerned, they were nesting early and successfully, so that they must have been relieved of a considerable strain upon their resources.—WM. WILSON (Alford, Aberdeen, N.B.).

White Variety of Nightjar.—I have just received a perfectly white variety of the Nightjar, shot here on Aug. 9th. It is in good condition, and has neither spot nor stain of colour or markings anywhere. Numbers of birds are, of course, well known to furnish colourless variation,

but this is the first instance of it that has come to my knowledge (nor can I find any previous record of it) in respect to the Nightjar.—O. PICKARD-CAMBRIDGE (Bloxworth Rectory, Dorset).

Common Buzzard (*Buteo vulgaris*) on the Calf of Man.—About 20th June last a Port Erin boatman observed a large Hawk asleep on the rocks at Amulty, on the west side of the Calf. He crept up to it and secured it. It was taken to W. Collister, boat owner, of Port Erin, who kept it alive for more than a week, during which it ate very little. On its death it was sent to be stuffed by Mr. G. Adams, of Douglas, who showed it to me. It is a mature bird, handsomely marked. This is the second Manx specimen recorded, the first having been obtained in October, 1902, in the southern part of the main island.—P. G. RALFE (Castletown, Isle of Man).

Clocking Hen and Young Partridge.—About a month ago a farmer in this district had some "Clockers" fastened up in a pen, when one morning one of the hens escaped, and was missing for the day. She returned in the evening to the stackyard, accompanied by five young Partridges, which she has brooded ever since. The little things will allow no one to approach them, though they will feed from the same dish as their foster-mother. It would be interesting to know how the old hen came by the young Partridges. In a field opposite the farmstead a pair of Partridges have bred this year, and the old birds are often seen with only six young. The weather at the time when the old "Clocker" escaped had been very cold and damp. The only explanation I can offer is that the five young Partridges had been found by the old "Clocker" in a benumbed condition while scratching about the hedge of the field where the Partridges had their nest, the rest of the brood having gone off with their parents; and that she had brooded them, brought them round, and then taken them back with her to the farm.—J. S. T. WALTON (Sunniside, Stocksfield-on-Tyne).

Notes on Nest-Boxes.—Our list of tenants during the past season includes the Great Tit, Blue Tit, Nuthatch, Tree-Sparrow, House-Sparrow, Starling, Tawny Owl, and Stock-Dove. On March 13th the Owl had two eggs in a box put up in a yew tree quite close to the house, but deserted them, as the entrance-hole was hardly large enough to allow her to get out easily. However, a brood was brought off later on in an old alder-stump not far away, and we still (August 1st) hear the well-known "kee-wick" of the young birds in the garden every night. There was also a nest in the church-tower in the same place, as recorded in 'The Zoologist' for 1905 (p. 263), which came to nothing,

as two eggs were bad, and an owlet disappeared when only about two days old. A Stock-Dove had two eggs in a box on March 4th, which is our earliest record for this species. There were a pair of young ones on the 17th, but a few days later they had been taken by some marauder, probably a Rat. The first nest of the Nuthatch was a failure, as an egg was broken by a piece of clay falling into the box, and the bird deserted the remaining six. These were taken, and she returned later on, bringing off a brood of five—a welcome addition to our Nuthatch population. Last year we had about a dozen nests of Tree-Sparrow in the boxes, but this year only one, and the only explanation seems to be that the birds were killed off during the hard weather. We had one House-Sparrow's nest in a box in the kitchen-garden, which, it is hardly necessary to add, was destroyed. — JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds, Suffolk).

Notes on Manx Sea-Birds.—At the time of the publication of my 'Birds of the Isle of Man,' I was aware of one Manx colony only of the Kittiwake, but during this summer Mr. F. S. Graves and myself were told by a Port St. Mary boatman that "Pirraghs" nested at another spot near the south end of the island, and later I was able to locate the colony—perhaps fifty pairs—in a cavernous recess among high precipices. The nests are, as usual, comparatively low down on the cliffs, many Guillemots on the ledges near, and numbers of Puffins on the green brows above. There has been a great extension of the breeding range of the Puffin on this southern coast within the last few years; whereas it was formerly nearly confined, on the main island, to the top of the cliffs adjoining the Calf Sound, it now swarms in continuous colonies for more than a mile northward past the "Sugarloaf," and the place called "The Chasms."—P. G. RALFE (Isle of Man).

MOLLUSCA.

Carnivorous Propensities of a Slug.—Referring to the note on this subject (*ante*, p. 277), the following may be of interest to your correspondent, Mr. Gordon Dalglish:—Mr. W. A. Gain, writing in the 'British Naturalist,' November, 1891, p. 225, speaking of *Arion ater*, says: "These Slugs attack their weaker brethren, gnawing the skin, and not unfrequently devouring the greater part of the victim"; and again, September, 1891, p. 194, *ibid.*, he says: "Our two species of *Amalia* are exceedingly hardy, very voracious, and nearly omnivorous." —FRANK A. ARNOLD (48, Martell Road, West Dulwich, S.E.).

NOTICES OF NEW BOOKS.

Rambles of an Australian Naturalist. Written by PAUL FOUNTAIN from the Notes and Journals of THOMAS WARD. John Murray.

THE real author of this work is Mr. Ward, a Queensland stock-farmer, and the numerous and excellent natural history observations should, when referred to, be ascribed to his name. Mr. Fountain has apparently been more than editor, and has collated Mr. Ward's notes. It is necessary to make this clear, as the book is a storehouse of field observations, and is certain to be largely quoted. As regards the general physiography of Australia, we know of no other book that in an incidental manner gives us such an impression of Australian scenery—drear, and otherwise. And man is changing the scene; the giant eucalyptus trees are gradually being destroyed for his use; the aborigines—"the native black fellow"—is doomed "by the immutable laws of progress, which knowledge and science may help on to the coming and ameliorate to the going, but cannot stop or alter"; the agriculturist is modifying the fauna and flora; "in all the settled parts of Australia are many spots, sometimes entire estates, that might, if superficial appearances only are considered, have been cut out of an English county and bodily transplanted hither. Everything, from the house in its patch of hawthorn-planted park to the gooseberry bushes and gilliflowers in the garden, is English. The horses, the dogs, the ducks, geese, and fowls, are all of British origin, if not of British breed," &c.

Mr. Ward has well observed the Termites and the growth of the giant "ant-hills" in Australia. By constant watching he has "perceived that small hills are thrown up comparatively more quickly than they are afterwards increased in size. In the first year they may be brought up to a foot in height; at the end of seven years it is a good hill that is three feet high. After that

the increase is very slow—a hill of twenty feet high is probably several hundred years old.” It is impossible to adequately notice the many facts, especially relating to the vertebrates, with which the volume teems, while Mr. Ward’s observations are never sensational, and have the *imprimatur* of a life acquaintance. Sometimes he trips, and has not been prevented from so doing by Mr. Fountain; the remarks at p. 83 on the Australian butterflies and other insects, which are identical with European species, requires modification.

This book would have gained immensely by illustration. Mr. Ward must regret, as others of us have done, that we did not use the camera when the opportunities of a short lifetime allowed us to visit scenes we shall not see again.

Notes on the Birds of Nottinghamshire. By J. WHITAKER.
Walter Black & Co., Ltd.

OF all county books on birds this is the most readable and interesting of any we have seen. It is not confined to the mere county records of the Nottinghamshire birds, but is full of the original observations which gives the character to our “Notes and Queries,” consequently one can read the book from start to finish with the liveliest interest and enjoyment. Mr. Whitaker is apparently a real lover of birds, both for field observation and for the enrichment of a private collection, which must be extremely rich in varieties.

A book might be written on the casual and accidental manner in which rare zoological species have been acquired. Mr. Whitaker tells us the story of the way in which the Spanish Sparrow (*Passer hispaniolensis*) may claim inclusion in the Nottinghamshire list. An angler “was fishing in the Trent near Wilford in the autumn of 1900; close to where he stood was a thorn-tree covered with ivy. At dusk a lot of Sparrows kept coming from a farm near by, and flying into the tree. The noise they made and the quantity of birds attracted his notice, so he walked to the tree with rod in hand, thinking he would hit it and see how many birds there were. On getting close to the bush a crowd of Sparrows flew out, and he made a cut at them with his Pike-rod and knocked one down; on picking it up he saw it was a strange bird, so he

took it home and set it up." It was afterwards examined and properly identified. Such occurrences are numerous in the annals of entomology, and serve to maintain the justifiable expectation of every field naturalist.

We can only find room for one more extract from Mr. Whitaker's reminiscential store, and it relates to our old friend *Strix flammea*:—"Many years ago we kept a lot of Pigeons, but one spring could never raise a pie. On asking the keeper the reason, he replied, 'It's all along of those old Owls; they fetch them every night.' I said, 'I don't believe it.' 'Well, sir, if you will come at dusk, I will show you.' We placed ourselves, and soon an Owl came and went into the dovecote. 'He's gone for one,' said the keeper. In a few minutes out he came with something in his claws, and was immediately shot. On picking it up we found not a Pigeon but a big Rat." This narrative deserves a place in the brief held for the Tawny Owl.

Two hundred and fifty-nine species are enumerated, irrespective of a few others not sufficiently authenticated to add to that total—an excellent avifauna for a somewhat small inland county, and embracing some birds which would scarcely be expected to be found in such an area.

EDITORIAL GLEANINGS.

BRITISH ASSOCIATION AT LEICESTER, 1907.—The recent meeting held at Leicester was not a pre-eminently zoological one, astronomy and chemistry being its strongest features. The President's address was naturally confined to astronomical subjects, but one remark may with advantage be pondered by zoologists. Astronomers "have learned the lesson that human knowledge in the slowly developing phenomena of sidereal astronomy must be content to progress by the accumulating labours of successive generations of men; that progress will be measured for generations yet to come more by the amount of honest, well-directed, and systematically discussed observation than by the most brilliant speculation; and that, in observation, concentrated, systematic effort on a special, thoughtfully selected problem will be of more avail than the most brilliant but disconnected work."

The address to the zoological section by Dr. Wm. E. Hoyle was confined to a survey of the Cephalopoda, and one of its most interesting sections related to the discovery and investigation of luminous organs in the Cephalopoda:—"These have now been observed in no fewer than twenty-nine out of about seventy well-characterized genera of Decapoda, and have been found to present a most interesting variety in position and in structure. Before passing on, however, to consider the structure of these organs, it may be well to lay before you the evidence on the strength of which a photogenic function has been ascribed to them. The actual observations are remarkable chiefly for their paucity; indeed, it may seem to some that the foundation of solid fact is too slender for the superstructure raised upon it, but still due consideration will show that this is not the case. The first recorded occurrence of phosphorescence in the Cephalopoda is due to Vérany, and dates back rather more than seventy years, though it was not published till 1851. The description is so definite and concise as to be well worth quoting:—"As often as other engagements permitted, I watched the fishing carried on by the dredge on the shingly beaches which extend from the town of Nice to the mouth of the Var. On the afternoon of Sept. 7th, 1834, I arrived at the beach when the dredge had just been drawn in, and saw in the hands of a child

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a Cuttle-fish, unfortunately greatly damaged. I was so struck by the singularity of its form and the brilliance of its colour that I at once secured it, and, showing it to the fishermen, asked whether they were acquainted with it. Upon their replying in the negative, I called their special attention to it, and offered a handsome reward for the next specimen secured, either alive or in good condition, and then passed on to other fishermen and repeated my promise. Shortly afterwards I was summoned, and shown a specimen clinging to the net, which I seized and placed in a vessel of water. At that moment I enjoyed the astonishing spectacle of the brilliant spots which appeared upon the skin of this animal, whose remarkable form had already impressed me; sometimes it was a ray of sapphire-blue which blinded me; sometimes of opalescent topaz-yellow which rendered it still more striking; at other times these two rich colours mingled their magnificent rays. During the night these opalescent spots emitted a phosphorescent brilliance which rendered this mollusc one of the most splendid of Nature's products. Its existence was, however, of short duration, though I had placed it in a large vessel of water. Probably it lives at great depths.' '*

After describing the various luminous organs, Dr. Hoyle remarks:—
 “The question of the utility of these variously coloured lights to the creature possessing them admits of an answer which is, at all events, extremely plausible. It was suggested in the case of deep-sea fishes by Brauer, and has been adopted by Chun in reference to the Cephalopoda. They serve as recognition marks by which the various species can identify their fellows; just as certain colour patches in the plumage of birds enable them to find their mates, so in the darkness of the ocean abysses do these fairy lamps serve their possessors. Another and perhaps even more obvious utility is suggested by the general distribution of these organs. It has been pointed out that they are, almost without exception, on the ventral aspect of the body—that is, the inferior surface in the position in which the animal habitually swims. It must happen, therefore, that when the creature is moving over the floor of the ocean in the quest for food, this must be illuminated by its lamps, and the advantages of a series of searchlights playing over the ground will be at once apparent.

“Finally, we have the question, How is the light produced? To this we can only say that this is an instance of the transformation of one kind of energy into another. We are quite familiar with the production of heat in the animal body by the processes of oxidation which

* The species thus referred to was *Histioteuthis bonelliana*.

go on in it ; we are also familiar with the production of kinetic energy when a muscle contracts under a nervous stimulus ; and we are also aware that electric discharges are produced under similar conditions in certain organs of the *Torpedo* and other fish. The production of light is a phenomenon of the same kind. When we can explain how stimulation applied to a nerve causes contraction in a muscle, then, and not till then (so far as I can see), shall we be within reasonable distance of explaining the action of these living lamps.

“ One point is worthy of notice, which has been ascertained, not by experiments on the *Cephalopoda* but on other animals, namely, the remarkable economy of this illuminant. A perfectly infinitesimal proportion of the energy expended is wasted on the production of heat. From this point of view animal phosphorescence puts to shame our most modern devices. Whether we shall ever be able to rival Nature in this respect remains to be seen.”

“ *The Thickness of the Skull in Mammalia* ” was the title of a paper read by Prof. Rich. J. Anderson :—“ Light shines through the orbital roofs in the young Chimpanzee. The coronal and sagittal regions are opaque. The occipital fossæ and roof and sides of the skull are translucent in the Ox. The Kangaroo and Camel have each translucent roof and sides of skull (except in region of horns), so has the Seal. The parietal in part is translucent in both Manatee and Dugong. The upper surface of the skull in Dogs is not so translucent as the sides. The Dolphin's skull is opaque above and translucent behind, and at the central part of sides. The proliferation of the bone cells along muscle attached appears to co-exist with the diminution of the bone under brain and muscle pressure. The bone cells, like leucocytes, desire to avoid the centres of turbulent activity. The skull of the Porcupine is translucent over the frontal and parietal ; the Capybara has a skull that is translucent on each side of the middle line in front of the roof, and also at the posterior part of the roof, where the translucency is strictly limited to the upper surface. It is sometimes stated that the portions of the skull covered by muscle (or ‘ protected ’) are thin. The suggestion is that the skull is strengthened where most exposed. It seems better to refer the thinning to the pressure of muscle mass, brain, or organ. The ridges are due to the accumulation of bone-forming tissue at the points of origin and insertion of the muscles in question. The skull does not appear to lose, but to gain, in strength by the groining (J. Hunter and Holden). The osteoblasts, like leucocytes, seem to avoid the places where thrills or shocks are most common. The former have greatest freedom outside

the active centres, as the latter in the least disturbed nooks contribute to the formation of fibrin."

"Sex in Crustacea, with Special Reference to the Origin and Nature of Hermaphroditism," was discussed by Mr. Geoffrey Smith. We can only refer to his statement of the phenomena:—"The great majority of Crustacea have the sexes separate, and this is also true of the phylum Arthropoda as a whole. There are, however, two large groups of Crustacea, the Cirripedia and the parasitic Isopoda, which are for the most part hermaphrodite; and since these two isolated groups stand alone in this respect among allied groups, we may be certain that the hermaphroditism has been secondarily acquired from some diœcious ancestor. It is therefore interesting to inquire under what conditions hermaphroditism may arise in a diœcious species.

"The most searching analysis of hermaphroditism is afforded by the phenomena of parasitic castration, which was first discovered by Giard, and has been subsequently studied by the author and Potts. The result of these studies has been to show that a number of animals belonging to widely diversified phyla, but especially the Crustacea, when attacked by various parasites, undergo an alteration in their sexual nature of such a kind that at first the gonad in both sexes degenerates to a greater or less extent; secondly, the males assume in varying degrees the secondary sexual characters proper to the female, while the female, without assuming any male character, suffers a certain amount of degeneration in the secondary characters proper to the female. Finally, either on recovery from the parasite or else during the degenerative process, the male may develop ova in its testes, and these ova may grow to a very large size, lying side by side with mature spermatozoa. The females, on the other hand, just as they never develop male secondary characters, also never produce spermatozoa in their ovaries. These results apply especially to the effects of the Rhizocephala upon the Crabs which they infect.

"We see then, first, that hermaphroditism in the Crustacea can be called forth in its completion by an external cause acting upon a sexually differentiated animal, and, secondly, that it can only be called forth in this way in the male sex, not in the female."

Mr. Oswald H. Latter, in his paper on "The Teaching of Biology in Schools," dealt with a subject which shows how far school authorities, as a rule, are still from a sound appreciation of biology and its methods:—"Lastly, a word of defence against certain opponents is necessary. It is by some maintained that anatomy and physiology are 'nasty,' and even indecent, and not fit subjects of education *virginibus puerisque*.

To come straight to the main point, it is the processes of reproduction to which objection is made. It is even urged that zoology may be taught if this part of the subject be left out. There is no more mischievous suggestion. Are we to do all we can to encourage the study of animal life, and then deny all information and guidance on phenomena which are bound to come under observation, as though these were something unholy and unclean? Curiosity on these matters is natural and inevitable, and it is far better—it is best—that this legitimate curiosity should be satisfied and instructed in a clean, wholesome, and scientific way than by any other means. It is only so that a reverent respect for the whole body, whether of brute or man, can be gained. *Puris pura omnia.*"

IN the 'Annals of the Queensland Museum' (No. 7, 1907), Mr. C. W. de Vis describes a Rat under the name of *Uromys banfieldi*, and writes:—"For an introduction to this Rat we are indebted to the observer by whose name it may fitly be honoured—Mr. E. J. Banfield, Honorary Keeper of Dunk Island, an island lying a little to the north of Cardwell, in lat. 15, long. 145. Some while ago that gentleman aroused our curiosity by informing us that a Rat upon the island made little or no nest for its young, but carried them about clinging to its back or to the outer side of its thighs—a habit, to say the least, very unusual among Rats and Mice of the genus *Mus*. The female first sent to us by Mr. Banfield as an example of the species had no young with her, nor were her mammæ much in evidence; consequently, the advent of a specimen caught in the act of carrying young was awaited with interest. Fortune at length favoured our correspondent with an opportunity of placing the correctness of his observation beyond question. Of the second example procured by him, he writes:—"The other day my Dogs turned out a Rat, which made its escape from them by climbing a shrub, and I was able to secure it. You will see that it has a pair of infants attached to the teats. . . . I chloroformed the mother, and noticed that the young lived some time after her.' On arrival the young were found detached. The conical corrugated nipples are, compared with the size of the animal, very long—one especially, 20 mm. in length, calls to mind a marsupial teat. Mr. Banfield finds this Rat to be gentle in disposition, never attempting to bite; it is, therefore, fortunate for it that it is under the protection of one who conserves the native life of the island so strictly that he will not allow a gun to be fired on it."

FROM 'The Longstaffs of Weardall and Teesdale,' by Dr. G. B. Longstaff, we extract the following interesting particulars relative to William Spence, the well-known entomologist:—"William Spence, born 1783 at Bishop Burton, near Beverley (where his father farmed his own estate), served an apprenticeship with Messrs. Carlill, Greenwood & Co., Russian merchants and shipowners. He married Elizabeth, sister of Henry Blundell, with whom he shortly after entered into partnership, a partnership that lasted nearly fifty years. He lived 1806-1811, and probably later, at Drypool, Hull, but in 1820 he was living at 40, Dock Street, Hull. For several years he was very subject to severe headache, which was, indeed, almost continuous, and as a consequence received the special permission of the commandant to walk on the ramparts of the Citadel, which afforded a quiet and secluded promenade close to his house at Drypool. He appears to have visited Matlock, Clifton, and Leamington in search of health. In 1826 he went to the Continent, where he lived for about eight years. In 1838 he appears to have been living at College Green, Bristol, but in the latter part of his life (after 1843) at 18, Lower Seymour Street, London, where he died 6th January, 1860, aged seventy-seven. His wife died 5th April, 1855. He wrote on Political Economy, and was the first editor of the 'Rockingham' newspaper, and 1815-1826 published, in conjunction with his friend the Rev. William Kirby, F.R.S., Rector of Barham, Suffolk, 'An Introduction to Entomology,' a voluminous standard work that passed through seven editions (the latest 1857). Mr. Spence was a Fellow and a Vice-President of the Royal Society, a Fellow of the Linnean and several other British and foreign learned societies. He and Mr. Kirby were two of the founders and first honorary members of the Entomological Society of London, of which he was President in 1847-8."

In the 'Transactions of the Hull Scientific and Field Naturalists' Club for 1906' (published 1907), under "Bygone Hull Naturalists," there is also another notice of this memorable man whose name among entomologists is almost a household word. This notice is accompanied by a portrait (plate xxxi.), which many will be glad to possess. We have affixed it to the fly-leaf of our copy of the classic 'Introduction by Kirby and Spence.

WE have received from Cambridge the 'Forty-first Annual Report of the Museums and Lecture Rooms Syndicate for 1906.' Dr. S. F. Harmer reports that the year has been an eventful one in respect of the collection of mammals. Dr. E. C. Stirling, F.R.S., of Trinity College,

has with great liberality presented a series of casts which form a complete skeleton of the gigantic extinct marsupial, *Diprotodon australis*. The original specimens, from which the casts were prepared under Dr. Stirling's supervision in the South Australian Museum at Adelaide, have been for some time the subject of his special study, which has resulted in the discovery of much additional information with regard to the structure of this remarkable type. Dr. Stirling's gift has already been announced in a letter to the Vice-Chancellor ('C. U. Reporter,' 1906-7, p. 594). Through the kindness of Mr. R. C. Haldane, the Museum has acquired a skull, with the complete set of baleen, of Rudolphi's Whale (*Balænoptera borealis*).

Shortly before this Report was prepared, His Grace the Duke of Bedford, K.G., sent from his collection in the park at Woburn Abbey two specimens of Przewalsky's Horse (*Equus przewalskii*), which has been regarded as the ancestral form from which the domestic Horse has been derived. The older of these specimens was one of the small herd originally imported from Mongolia by Hagenbeck, and purchased by the Duke of Bedford, while the younger individual was born at Woburn. The opportunity of obtaining this rare and interesting species was thus unique, and the gift must be regarded as one of the most important additions which has been made for some time.

Mrs. Wyndham Somerset has given the frontlet and horns of the rare Takin (*Budorcas taxicolor*) from the Mishmi Country, between Assam and Tibet.

The collection of Antelopes has been largely increased, principally through the donations of specimens from Tropical Africa made by C. B. C. Storey, M.A., Clare College, A. L. Butler, Esq., Capt. E. Mackenzie Murray, and Major W. B. Emery. The receipt of Mr. Storey's large and admirably collected series has been announced in a letter to the Vice-Chancellor ('C. U. Reporter,' 1906-7, pp. 594, 595). The collection included nine skeletons and about forty skulls, with the corresponding skins. Although a certain proportion of the species were previously represented in the Museum, the gift is important not only in increasing our series of specimens of species hitherto inadequately represented, but in particular in containing a considerable proportion of young specimens which illustrate stages in the growth of the horns, and of female individuals of species in which the horns are restricted to the male sex. The Museum, like most other Museums, is deficient with regard to immature and female specimens of many common species, owing to the natural propensity of sportsmen to select as trophies specimens which show a large development of the

horns. The four collections of Antelopes above named are all important in view of the fact that the experience of the last century justifies the belief that many of the large mammals of Africa are destined to become increasingly difficult, if not impossible, to procure in the future.

THE writer of "Nature Notes" in the 'Evening Standard' of Aug. 13th makes the following interesting remarks on the intelligent movements of a caterpillar:—"The signal difference between the intelligence of a plant and the mind of an animal in some cases strikes me as just one of slowness of movement and fixity of station. There are plants which have such a look of animality about them, seem so sensitive, and—as I have said of the black bryony in spring and early summer—even so watchful, that one may hesitate to pluck or handle them roughly (writes Mr. George A. B. Dewar). One would rather crush a caterpillar in the rosebud or tender young leaf unfolding than one would stamp on the black bryony trailer, feeling queerly its way across the tangled lane in May. To take this black bryony trailer among plants, among insects, the yellow and black barred caterpillar—I think the Cinnabar Moth's caterpillar—which is now feeding up for its chrysalid stage on the leaves of the yellow ragwort, does the caterpillar really convey to us much more the notion of mind than the trailer of the plant? I cannot say that to me it always does. About both of them there seems to be what I have called a physical intelligence. The feeding—almost incessant feeding—of this yellow and black caterpillar of the ragwort, what is it but an act of physical intelligence? Shake it off the ragwort. Presently it will climb up a neighbouring plant. It apparently tests the leaves of this new station, and, finding that they are not the right sort, refuses to nibble. But this is merely intelligence of the sense of taste, a physical matter. The black bryony would in the same way refuse to feed on certain substances that Nature has not included on its menu if these were set at its rootlet tips. It would be just as intelligent about its food, and just as fastidious as the caterpillar—indeed, many plants are much more fastidious and discriminating in this than many caterpillars; which, their ordinary food-plant failing, or being denied them, in captivity will eat each other. The one mysterious matter in which the caterpillar seems slightly to excel the plant in intelligence is that of 'shamming death.' The bryony, at any rate, never does that! Or, to put it in a way that is a little less unacceptable, Nature never shams death for a plant when an enemy threatens it."

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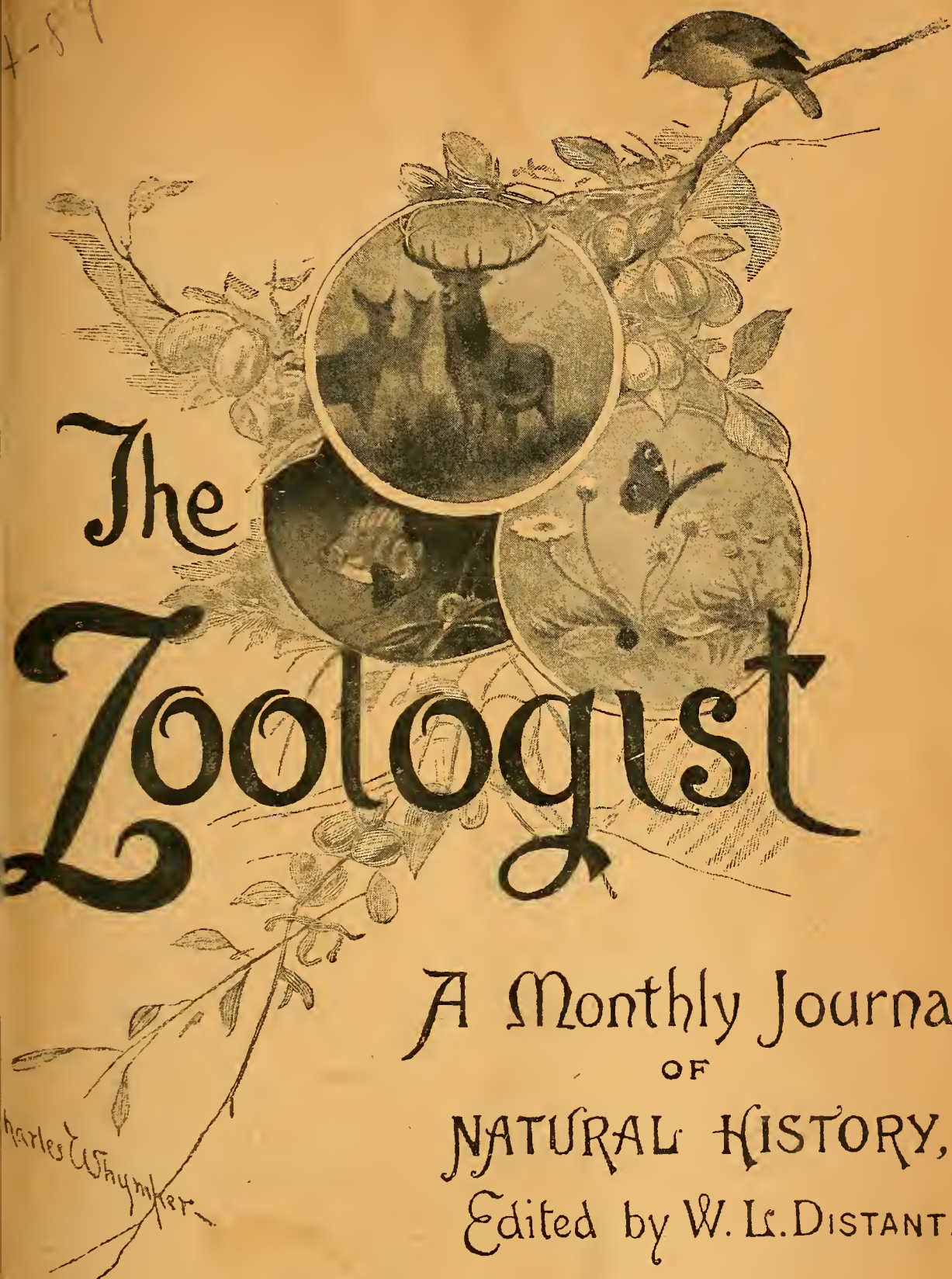
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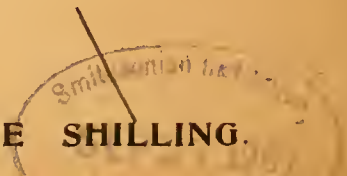


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THE ZOOLOGIST

No. 795.—September, 1907.

NOTES ON THE ORNITHOLOGY OF OXFORDSHIRE,
1905-1906.

By O. V. APLIN, F.L.S., M.B.O.U.

1905.

January 3rd.—Many Redpolls (quite one hundred) in little parties in the alders between South Newington and Barford, and with them some Goldfinches.

6th.—Mr. R. W. Calvert saw thirty-three "Grey" Geese fly over Langley House, going due west, at 2.45 p.m.; they were low down and within shot.

7th.—Mistle-Thrush singing. Few Song-Thrushes remained after the November frost. A Pied Woodpecker shot at Great Tew this week.

12th.—Examined a Bittern, shot at Chadlington a few years ago.

16th.—Bitterly cold, strong S.E. and E.S.E. wind; max. 21°. The most bitterly cold day since January, 1881. About 6 p.m. powdery snow began, and came through between the doors and windows and the frames. Fortunately the temperature changed all at once, and the snow ceased. Froze.

17th.—A flock of about one hundred Fieldfares, the largest seen this season. A lot of Bramblings and Chaffinches under the Grove beech avenue.

19th.—Wrens collecting to roost in hole in thatch.

21st.—Redwings come close to the house, where I never see a Fieldfare.

23rd.—Hedge-Sparrow sang, the only bird singing now. A flock consisting of about a thousand small birds were about three parts Tree-Sparrows and one part Linnets. Three or four Peewits (unusual birds in a frost) on high ground. A Black-throated Diver, adult in winter dress, which was picked up alive here on the 20th and died this morning, was brought to me. Length 25 in., wing 12, tail 3; outside of tarsus and outer toe and outside of part of middle toe blackish; rest of tarsus and toes more or less blue-grey; bill bluish horn, culmen and tip dark horn. This is the only really satisfactory record of the occurrence of this Diver in Oxfordshire.

27th.—Wood-Pigeons cooing 24th and to-day, although still frosty.

February 1st.—Three Mistle-Thrushes flew past, two of them at least singing in a hurried manner.

3rd.—Stock-Dove cooing [this bird has been known to have eggs by March 6th], and several Larks singing.

4th.—Garden full of Song-Thrushes again, but there is little food for them.

9th.—Crows pairing.

28th.—Peewits on the breeding ground.

March 3rd.—Rooks building.

11th.—News that one hundred and fourteen Wood-Pigeons were killed by one gun at Eynsham on 1st.

13th.—Pied Wagtails on ploughings.

17th.—About a score of Redpolls and one Goldfinch feeding under alder trees by the Swere. Wren building.

19th.—Little flock of fresh-looking Meadow-Pipits on Milcomb hills. Several Kestrels seen this month.

22nd.—Chiffchaff.

24th.—Several Chiffchaffs. Another party of Meadow-Pipits. Coal-Tit's spring note so fine and full as to be worthy to be called a song.

26th.—Flock of twenty or thirty Meadow-Pipits.

April 1st.—Near Crouch Hill about a score of Golden Plover, quite low and evidently just put up, flew past me.

2nd.—Wheatear.

8th.—Snow lay thick this morning.

9th.—Mistle-Thrush sings now in early dawn and all day,

but not late in evening; unlike the Song-Thrush, which sings less in the day, but a great deal late in the evening.

10th.—Redstart. Mr. R. W. Calvert reports in the 'Field' of the 8th that a Tawny Owl was found sitting, near Langley House, on six eggs on March 21st.

12th.—Willow-Wren. Two Hedge-Sparrows' nests (of four and three eggs) not six feet apart, in a row of box-bushes. Boy threw three young Carrion-Crows about two days old out of a nest yesterday. These are early.

13th.—Report of Swallow seen on 3rd on the Grove Estate.

15th.—Ray's Wagtail and Tree-Pipit. Blackthorn full out.

16th.—Blackcap.

21st.—A Swallow over a pond here, looking feeble; the fifth day of cold N.E. wind.

24th.—Whitethroat.

26th.—Cuckoo seen.

27th.—Some Otter "spraint" full of remains of Crayfish. Nightingale.

28th.—House-Martin. Swallows singing about these premises this evening.

29th.—A clutch of four Crow's eggs brought by boy, who said he had thrown out of the nests four broods of "bolched" (*i. e.* unfledged) young ones.

May 1st.—Whinchat.

8th.—A Hobby reported as shot on this date near Shipton-under-Wychwood.

Away from home May 4th—June 9th.

Mr. C. B. Chambers wrote me word from Fifield, Milton-under-Wychwood, that on each day from the 20th to the 23rd he saw and watched near there a Woodchat-Shrike, which he described accurately. On two days he watched it for a considerable time, but did not hear it utter a sound. It seldom settled on the hedge, but preferred to perch in the small ash trees that stood in the fence, flying down to the ground, hopping about for a second or two, and then up into the trees again. Sometimes it would sit motionless in a tree for five or ten minutes together. The Chaffinches "spinked" as though its presence was not required, but it seemed to be feeding on insects only. Mr. Chambers thought it was a male. It has only occurred in Oxon once

previously. Although it seemed attached to this particular spot, where it was a conspicuous object, it could not be found on the 25th, or ever afterwards.

June 13th.—I went with Mr. Fowler to a spot on the Isis above Oxford, where two pairs of Redshanks have been breeding this year. One bird was flying round, uttering the usual “clip-clip-clip” of a bird with young ones, and I heard another. We put up a full-grown young one, which flew low and pitched in a bed of rushes on the river-bank, from which I could not again rouse it. Probably the rest were in the mowing-grass. The Redshank is new to the list of birds *known* to breed in Oxon, although doubtless it bred commonly years ago. I examined a Hoopoe which flew against the telegraph-wires near Tackley on April 22nd, a Great Crested Grebe killed near Kirtlington at the season of Rook-shooting, and a Pied Woodpecker shot in Stowe Wood on May 12th. Many oaks and beech trees—in the valleys especially—are for about half-way up them quite brown, as if burnt by fire. This was caused by the great frost in May.

15th.—Examined a Grey Plover (a very rare bird inland) in adult summer dress, which had been shot in an arable field near Farnborough, and only just over our borders, on May 27th. Also a female Hobby, shot on the 13th inst. at Tusmore (where they occur every year). Warblers, especially Lesser Whitethroats, scarce this year.

17th.—Flycatchers have used the old Goldfinch's nest again (*vide* Zool. 1906, p. 448), and laid five eggs; there are some small feathers in the nest-lining. Goldfinches are probably breeding in the same tree—a very tall old pear—for they were about the tree, jerking their bodies from side to side in their peculiar stiff way.

23rd.—A pair of Bullfinches have a nest with five eggs in a pyracanthus-bush which hangs down over our wall, and the nest could be reached by the village boys were not the bush of great width and very thorny! But here the Bullfinch has bred before, for there are two old nests in the bush. They also breed in my garden at the back of the house, but it is only of late years that they have become garden birds in the summer. A few days ago, as I was getting up, I watched the first-named pair, the male feeding the female. Paired Bullfinches are always close together,

and as demonstratively affectionate as Love-birds. Linnets are unusually abundant this season, and are breeding down in the valley.

27th.—As we were sitting in the garden just after 9 p.m. a Brown Owl pursued a Thrush (which was screaming) across the lawn; just as they passed out of sight over a yew tree, and out of the garden, the screaming ceased suddenly! This is the only time I ever saw an Owl in chase of a bird.

28th.—Probably the same Owl flew within six yards of us just after 9 p.m., and passed over the top of an ivy-arch in which a Blackbird was sitting on three eggs. She must have quaked! Three Garden Warblers' nests I have found this month have each contained only four young.

29th.—Several Golden Plover passed, and hovered, over the village, 10.45 p.m. Dark and damp. An early date for migration.

July 1st.—Some ash trees have not yet recovered from the May frost, and will not be in full leaf this year. A Swallow's nest in my stable is built against a cross-beam, its only support being a big iron staple driven into the beam.

4th.—The Shrikes near the Lessor Farm have young, fledging, in an exposed nest in a blackthorn.

5th.—Visited Minster Lovell village and meadows with Mr. Calvert. It is a limestone village with white dazzling roads and grey houses, and a fine place for the House-Martin which abounds. There were many nests—whole rows of them; some building, one of which, under eaves of thatch-roof, was only about eight feet from the ground. But the Sand-Martins, which love to feed about the Windrush, are badly off for nesting-sites, and breed here in a garden wall about eight or nine feet high bordering the village street. It has a flat coping of rough flag-stones, and under this the birds were going in and out, and also in one or two other places about six inches lower down where mortar or stone was displaced. The holes were very small. Although the Windrush is a Trout-river, with a full strong stream of remarkably clear water, the banks are low and marshy—not steep and clearly defined like those of Cherwell and Evenlode. A thick growth of rushes and true feathery-topped reeds, and patches of yellow iris in places, often hide the river, and the banks are so

ill-defined that in places there is a strip of ground which may or may not be under water. The river itself is often choked with *Potamogeton*, and arrow-head, yellow water-lilies, and large forget-me-nots brighten it up; while the scent of crushed horse-mint is overpowering in the July air. The meadows are very swampy and liable to flood, especially above the village. Altogether it is a nice bit of marshy country, and visited in the winter by a fair lot of Duck and Snipe. We found two Moorhens' nests with eggs, and a Little Grebe's in mid-stream with five eggs. An anxious Wild Duck appeared to have young in the cover, and a couple of pairs of Peewits wheeled and screamed over the meadows.

7th.—A Turtle-Dove's nest with two eggs was only three and a half feet from the ground in a hedge. It was lined with butter-cup flower-stalks gathered green; another nest on the 12th was lined with "squitch." July seems to be the chief breeding month of this bird here.

8th.—Bullfinches are unusually numerous this summer. To-day I found, in two of the hedges of a small field, three nests, two of them with eggs, and the other just finished. All three nests were thickly lined with hair—dark horse-hair, grey horse-hair, and a mixture of cow- and horse-hair.

13th.—News of a brood of twenty Partridges hatched. All resident small birds are "swarming" now.

August 7th.—Young birds continue to emerge. There are young Song-Thrushes hardly able to fly, and Wrens just on the wing.

10th.—Many Swifts.

12th.—Greenfinch's nest with four fresh eggs in apple tree. A good many Swifts.

14th.—Still a few.

16th.—None to be seen.

20th.—One Swift. Not for some years have I seen so many Swallows and Martins in the sky in the evenings.

22nd.—A Wheatear.

24th.—Over seventy Martins and one Swallow on the roof up to 8.30 am., and many more earlier in the morning.

Rain on fifteen days amounted to about 4.50 in.

September 2nd.—Two Land-Rails. Nearly all corn cut.

6th.—Lesser Whitethroat, as I was getting up, singing a low, sweet, warbling song; and again the next morning, close to the window.

8th.—Saw a Falcon.

12th.—A fair Partridge season. Red-legs have done very well, but are late, and have recovered from the wet summer and winter of 1903. A few Meadow-Pipits, and a Cuckoo in dark grey dress. Three Land-Rails, I hear, were shot on this glebe in a bit of standing oats yesterday.

16th.—There have been great congregations of Martins on the roof all this month, but the first lot must have gone to-day, and Swallows with them.

19th.—Saw four or five Kestrels during the day; one passing high was mobbed by a small flock of Starlings. A dark grey young Cuckoo seen; and I may here mention that I saw one just over the Northamptonshire borders as late as Oct. 17th. It was mobbed by Rooks.

21st.—Examined a female Peregrine Falcon—a bird of the year—shot at Wardington yesterday while hanging round some tame Pigeons at a farm.

24th.—After to-day a further great diminution in the numbers of Swallows and Martins. Wren singing.

25th.—Many Goldfinches about the thistle-grown fields.

27th.—*Many* Meadow-Pipits in the roots for the first time.

28th.—Pipits going east, as usual.

October 2nd.—Flock of two or three hundred Peewits passing west, high up.

5th.—Hedge-Sparrow singing.

9th.—A few Swallows and Martins about the fields.

14th.—Song-Thrush singing.

25th.—Lots of Fieldfares and Redwings (arrived about the middle of the month). Very few passing Pipits this season. All the Thrush family in numbers about the hedges, but the *flocks* of Mistle-Thrushes so remarkable at the end of summer and in September are not seen now. Two Grey Crows (the first I heard of this season, when they were far more abundant than in any other year in my experience) were reported as seen on the Grove estate about the middle of the month.

A cold October.

November 2nd.—Mr. Bartlett said he had already had several Grey Crows this autumn—three in one week.

4th.—An early autumn. All trees turned, and many of them bare of leaves; hedges much thinned.

7th.—Flushed a Short-eared Owl in the ash poles at South Newington, which settled in a still leafy oak. Some Bramblings. Peewits on ploughings.

13th.—Song-Thrushes singing well.

14th.—We see and hear more Crows than usual, and some of them are probably Grey. All five members of the Thrush family now feeding on the fine crop of haws.

17th.—Fieldfares, which early in the week were more numerous than for years past, have moved on to some extent. Bramblings all about. Blue, Great, and Marsh Tits to-day all feeding on beech-mast, gathering it, and flying with it to the ground or a stump or bough to eat it.

18th.—Greenfinches numerous in the garden, eating the fine ripe sweet-briar hips. Weather very cold.

19th.—27°, 29° 10.45 a.m. Previous days have been colder. Yesterday the thermometer here did not rise above 30° all day. Wind, E. to N.E. In Banbury it would doubtless be a little warmer, but still it was astonishing that House-Martins should be able, even if willing, to feed young. Yet as late as to-day Mr. E. Tyrrell (who has a good knowledge of birds) observed that the young in a nest near his house were being fed, but by one old bird only.

21st.—Fieldfares again in large numbers; also Redwings, Goldfinches, and all hard-billed birds abundant. Flock of Redpolls in big alders near the Pest House. Bramblings numerous this autumn. A cold November.

December 2nd.—Bullfinches abundant. To be seen about the village, and almost at any time in my garden. They have the last two years become permanent residents in the garden instead of unwelcome visitors in late winter and early spring, occasionally staying to breed. They have now bred for two, and I think three, years both in front and at the back of the house, and have been present constantly since summer up to the present time. They are also numerous about the hedges in the fields.

6th.—I watched a pair of Peregrines—fine adult birds—in the

Cherwell valley under North Aston. The female appeared first on a small flock of Peewits rising and flying up the valley, but she only made a pretence at pursuit, and was then joined by the male. Nor were seven Herons feeding in the vicinity molested, but a pair of Carrion-Crows perched in an oak round which the Peregrines circled had a bad fright, and cried out. But these grand birds may have been fed up, for they betook themselves to toying in the air like two dignified butterflies, first one and then the other mounting in the air above its mate. During this toying flight and their slow flights over the meadow their wings were raised rather higher above their backs than usual, so that (the day being very clear and sunny) the under side of the wings and the flanks could be seen very plainly. Once or twice a few "quayks" were uttered, but much lower in tone and softer than those we hear from angry and anxious birds at the nest. Twice the female settled in very shallow flood, taking great care to keep her tail dry, raising it indeed, at one time, almost like a Magpie. She stooped twice as if drinking, but stayed quite a few minutes doing nothing at all. They were fine blue birds, and the female had a remarkably pure white throat. These birds doubtless roosted in the woods about North Aston, in the direction of which they presently departed.

7th.—Mistle-Thrush sang; one hears an occasional Song-Thrush now, but there have been few birds about since mid-November. A lot of local Wood-Pigeons in Banbury Market.

8th.—Saw a Kestrel.

10th.—News from Mr. Fowler of Siskins, with Redpolls, at Oxford, and Redpolls at Kingham; also Bramblings by the thousand. Redpolls are unusually common here this season.

14th.—Examined an adult female Merlin shot at Tusmore in October.

16th.—Bullfinches have been destroying the plum-buds this last week; as many as three in a tree at one time. But I once, in another year, saw six!

21st.—Saw a Grey Crow with Rooks in a meadow near Banbury.

23rd.—Winter aconite fully out, but flower not turned up. There is not much Thrush song this mild weather, consequent on an exodus in the cold weather in November.

27th.—Great flocks of Finches on the stubbles ; among the Bramblings a fair lot of fine old males with conspicuous white backs.

29th.—Two Nuthatches at Broughton. We have none here now.

30th.—Stubbles full of Larks. Great flocks of Wood-Pigeons reported; I saw a small flock of about one hundred in a root-field to-day. Redpolls again feeding on willow-herb seeds by stream.

31st.—Sharp frost and bitterly cold S.E. wind.

A rather mild and dry December. In Christmas week an example of Ray's Wagtail was shot, with a Grey Wagtail, near the mill on the Cherwell at Banbury. I saw them both after they had been stuffed, and this is the only time I ever knew the former bird occur here in winter.

1906.

January 1st.—A Grey Crow, with the Crows, Rooks, and Jackdaws, leaving the arable land at roosting-time, and there may have been others.

5th.—Mistle- and Song-Thrushes continue to sing well, as they did last month.

6th.—A destructive gale from S.W., working out in N.W.

16th.—A Siskin killed by a cat from a dozen frequenting a garden in Banbury. Redpolls still about here.

23rd.—A fine male Stonechat in Grove lane, on the hedge between two ploughed fields.

24th.—News from Mr. Darbey of a Black Redstart caught alive at Cowley, and two Little Auks and a Storm-Petrel picked up near Oxford early this month.

26th.—Coal-Tit sings.

27th.—Very mild. Song- and Mistle-Thrushes, which have sung all the month, are now in very fine and full voice.

28th.—News from Mr. Fowler of Siskins in Christ Church meadows again.

29th.—Blackbird sang [but not again until Feb. 16th]. The amount of Thrush-song is wonderful, and the birds have been numerous the last half of the month.

A wet stormy month, with floods ; very mild at the close.

February 1st.—Larks singing.

3rd.—News of five Grey Crows seen for some days early last month above South Newington.

5th.—A flock of about one thousand Wood-Pigeons on turnips near Tadmarton Heath. A Fox sauntered right in among the flock with apparent unconcern. He had a dejected air, and his brush drooped. He seemed more interested in the sky and the view than concerned about Pigeons, and they on their part at length hardly got out of his way, so poor a creature did he seem. But just then he sprang into active life so suddenly that he made me, watching at a distance, jump; and in a few seconds he was away with his Pigeon.

12th.—Rooks noisy at nest-trees.

15th.—Chaffinch sang a very little.

21st.—Rooks have quite ruined a field of winter-beans which should now be about two inches high; most of them are pulled up. Damage to sprouted beans seems a new thing here. Several Grey Crows reported lately.

22nd.—A Kestrel.

24th.—Clattercote reservoir still only half full, and four Coots the only waterfowl there. A mixed flock of Finches on the banks comprised Chaffinches (chiefly females), a few Bramblings (two or three old males), Linnets, Tree-Sparrows, and one rosy-breasted Redpoll.

A very rough cold month, constant changes and cold throughout.

Mr. E. Tyrrell, of Banbury, recently showed me an adult male Goosander, shot in the Broughton Fulling Mill brook in 1895, and a Slavonian Grebe, shot on the moat at Broughton in the early winter of that year. He also told me of an adult male Smew, shot at Broughton by E. Freeman for the late occupier of the castle, and an adult Gannet, shot near the mill above Banbury two years before.

March 2nd.—The cover-keeper at Wigginton Heath told me that last summer, after watching from a tree, he shot a yellowish-white Badger, which unfortunately rolled down into the earth.

4th.—Two or three apricot-blossoms expanded.

6th.—Greenfinches singing.

7th.—59° in shade. Flock of Meadows-Pipits on grassy hills.

20th.—Mr. Fowler saw a Chiffchaff at Kingham.

23rd.—A Song-Thrush's nest in yew-hedge, which was nearly finished on the 7th, *and was lined with ice* about a week later, had to-day three eggs, although I had thought it was quite deserted.

27th.—Rooks sitting; hedges getting green in very sheltered spots.

28th.—Wheatear at Milcomb on grassy hill with many ant-hills. From one of them it flew and settled on the top of a fair-sized tree, on which I have previously seen spring Wheatears settle. Two Wheatears seen on Bloxham Grove to-day.

Cold and many slight falls of snow after the early part of the month.

April 2nd.—Flock of about one hundred Wood-Pigeons; some Redwings.

3rd.—Chiffchaff at Broughton sang. Two Sand-Martins passed over Hanwell plantation, where I saw a Pied Woodpecker; I also saw the hounds put up a Short-eared Owl from a gorsy coombe near Wroxton.

7th.—Put up a Snipe from brook-bank.

9th.—When walking along the Icknield Way, near Watlington, I watched a cock Partridge being mobbed by four Peewits, a good many of which seemed to be breeding along the foot of the hills. I saw a pair of Stonechats, and two pairs the next day towards Lewknor. Again, this year, I noticed Marsh-Tits common about the beech-woods.

11th.—A really hot day. Walking to Ewelme, I saw a score or more of Bramblings just before I got to Cow Common (*vide Zool.* 1906, p. 313). I went on to the Thames at Benson, but could not even see a Sand-Martin, and two Chiffchaffs were the only summer birds I noticed all day, although Tortoiseshell and Brimstone butterflies were on the wing in numbers, and I saw a Peacock butterfly at Ewelme. A pair of Goldfinches frequented the firs at Swyncombe cross-roads.

13th.—Two Swallows here; seen at Adderbury yesterday.

14th.—Blackcap and Redstart. A female Stone Curlew shot between Wheatley and Cuddesdon.

15th.—Willow-Wren.

16th.—Ray's Wagtail. Some migrant Meadow-Pipits perched in trees, as I have often seen them do at this season; these are late.

21st.—Tree-Pipit (in song on 26th).

22nd.—News of a Grey Crow seen between here and Barford as late as the 11th inst. A Green Woodpecker came out of an old nest-hole which it was enlarging.

23rd.—Clutch of five Carrion-Crow's eggs, almost fresh, and a clutch of three half-incubated brought in.

24th.—Two Common Sandpipers by canal near Cropredy. In a day's Otter-hunting did not see a single Swallow.

25th.—Saw the following Crows' nests climbed to: clutch of three hard sat; three hatching; five, five, and four, I think fresh. We gave up the attempt on two occupied nests, one of which was high up in one of the tallest solitary oak trees I ever saw. All these nests but one were in Bloxham parish.

28th.—Put Wild Duck off nest in head of old low pollard willow in Evenlode valley. Hedges late and not more advanced than in first week of April in some years. Hardly any summer birds about.

29th.—Cuckoo reported at Bloxham Grove, and at Great Tew the next day. I did not hear it this month.

May 1st.—Cuckoo.

3rd.—Examined a Hoopoe from Alkerton on April 13th, and a Whimbrel obtained at Wroxton on the 27th. Also a remarkably fine Stoat just getting a fine gloss on its fur of almost a purple shade. It was killed at Shenington on April 19th, and weighed $1\frac{1}{4}$ lb.

4th.—Lesser Whitethroat.

6th.—Swifts here—about a dozen. Seen in Banbury yesterday.

7th.—Whitethroat, Sedge-Warbler, and House-Martin (plenty of the last in Tadmarton village).

8th.—Away in Wales until June 19th.

About May 17th a canal-boat loaded with Hartshill stone came into Banbury, and a pair of Pied Wagtails were seen flitting about it as the men were unloading it. A nest with six eggs was found. In the same month a truck of coal arrived at the G.W.R. station in Banbury, in which was a Pied Wagtail's

nest with five eggs. I have seen both these nests. On the 19th Mr. E. Tyrrell found, near Crouch Hill, a Blackbird's nest with five ordinary eggs and one small one, which appears to be that of a Cuckoo. They are now in my possession.

June 2nd.—A Red-backed Shrike's nest containing four very bright examples of the red type of egg was found at Franklin's Knob, on the Cherwell, opposite Bodicote, the spot where my abnormal female (with her mate) was shot in 1890. Certain spots seem to have peculiar attractions for this very local species, and it resorts to them every year.

23rd.—Saw near Barford what appeared to be a young Sparrow, white with a shade of brown.

27th.—A very few Willow-Wrens sing now.

29th.—Rain ceased this morning after falling for thirty-six hours.

July 15th.—Goldfinch, which laid six eggs and was sitting by this date, built its nest in an apple tree in my orchard entirely of dead seeding plants of the Procumbent Pearlwort (*Sagina procumbens*), lined with some vegetable down and a little long light-coloured hair.

17th.—Heard a Corn-Crake at Cropredy Station.

25th.—In the level open corn-lands on the north side of Wroxton listened to two Quails calling. The Corn-Bunting is fairly common there. Also saw two young Red-backed Shrikes.

28th.—The Hedge-Sparrow—a most persistent singer—still sings. One was sitting on eggs on the 20th. Spotted Flycatchers are very scarce this year.

30th.—Early this morning several young Thrushes, a Blackbird, and two Garden Warblers all eating the fruit of the bird-cherry. A fine hot July.

August 4th.—The upland-breeding Peewits now frequent root-fields until the tops cover the ground. Shrikes are more common this year than usual.

7th.—A great congregation of Martins seen on this roof early this morning; misty morning.

11th.—A family party of Shrikes on the railway between here and Milton. It seems possible that Shrikes follow the railway lines to some extent, and that their increase here of late years may be partly accounted for by the completion of this branch

line in 1887. News of a pair of Hobbies breeding in a Crow's nest of this season in a big oak in one of the woods in West Oxon. On July 10th the nest contained one young one covered with white down and two "pipped" eggs. On the 5th inst. the young were fledged, but still in the nest. The contents of the nest which were sent to me consisted of the elytra of large beetles, a foot and part of a wing of a Blackbird, one tail-feather of a Song-Thrush, some wing- and tail-feathers of a Blue Tit, and several "castings."

12th.—The Barn-Owl has been noisy for the last week or two.

14th.—Golden Plovers heard passing over at 9.30 p.m.; starlight.

17th.—The morning congregation of Martins (with a few Swallows) has increased daily.

20th.—Numbers of Swifts still here, and I doubt if there is any diminution in their numbers yet; breeding was doubtless delayed by the cold weather in May.

21st.—Willow-Wren singing. Country much dried up. That "gipsy-migrant," the Bullfinch, is much less common this summer than last. Not so many Starlings bred with us this year as in the last season or two, when they occupied every hole they could find. Can it be that the invading host of Purple Starlings has passed on?

27th.—Not for years until last year and this have I seen so many Swallows and Martins in the air in the evenings.

28th.—Blackbirds, finding little fruit this year, have left the garden to a large extent. Thrushes have gone as usual.

A fine hot month on the whole, up to 84°.

September 1st.—87° in the shade. The country in a deplorable condition; grass-fields as brown as stubbles; shrubs dying.

2nd.—88° in the shade.

3rd.—In the forenoon a vast swarm of Swallows and Martins (most of the latter) in the air.

7th.—A Land-Rail shot out of seedy saintfoin, &c., the only one seen so far. But we have walked no standing corn, the harvest being early. Many Mistle-Thrushes in flocks of twenty or thirty together on the clover and grass fields.

12th.—The fine and very dry weather continued up till to-day. A good Partridge year. Forty birds killed at Milcomb to-day were made up of twelve old and twenty-eight young ones. Some very small squeakers are still hardly able to fly. Still flocks of Mistle-Thrushes.

15th.—A great congregation of Martins on the roof.

18th.—Young Swallows still in nest in stable.

19th.—Small flock of Meadow-Pipits in roots for first time. Goldfinches quite numerous about the thistles, now ripe. Some young Red-legged Partridges cannot fly yet, or do not.

20th.—Rooks noisy and about and in their nests.

23rd.—Another great gathering of Martins on the roof; no gathering since the 15th.

24th.—Grey Wagtail arrived in stony shallow in the village brook.

28th.—Another Grey Wagtail at pond. Lark sang. The bulk of the Swallows and Martins left either yesterday or to-day.

Early part of the month very hot; a fine warm month.

October 5th.—Saw a Redwing, and heard the call of a Brambling—both very early. A flock of Martins apparently on the move. Some still in the nest. A few Swallows about.

6th.—Several Redwings. Lots of Meadow-Pipits in the roots.

10th.—Many Song-Thrushes.

13th.—Corn-Buntings about their usual haunts; three or four together with their winter-flying note, "tick" or "jik." Crows very noisy now. No Swallows since 10th.

17th.—Hedges full of Blackbirds and Song-Thrushes; a lot of Redwings. A Peregrine Falcon rose from a high-lying stubble.

24th.—Fieldfares. Yesterday a young and an old (probably 1905) Partridge shot with white horseshoe mark.

Some Quail this year. One put up out of swedes on Potter's Hill Farm about the middle of September, and three or four shot at Asthal-leigh, about a mile off, in the same week. Two shot at Enstone on the 12th inst. October a mild month. Rainfall about $4\frac{1}{2}$ in.

November 2nd.—Some Thrushes have been singing the last few days.

15th.—But little song in comparison with the number of

Thrushes here, so they are probably passing migrants. Wren has sung all the month occasionally.

26th.—Many Bramblings with the Chaffinches, and a few other birds about the fields where manure is being spread. Some elms have not shed all their leaves, and oaks are rather full of leaves, but brown.

27th.—A Woodcock in Milcomb gorse.

I received news this month of a Little Owl, shot on the 5th inst. near Shirburn. Probably all the Little Owls which occur now belong to introduced stock, but it is curious that the only three Oxfordshire examples of which I have dates were killed in the first half of November. This may point to an inclination to migrate or wander in autumn.

Mr. Harvey has been good enough to give me particulars of the occurrence of three or more Rough-legged Buzzards in the vicinity of Dame Lys Game Farm, which is situated at the foot of the hills near Watlington, where there are a good many Rabbits, and the country is very open, but wooded on the hill-tops. Two were seen about the middle of November, and one of them was taken alive on the 18th. Two were again seen on Dec. 4th, quartering the ground, and on the 14th one was seen. They attacked the Pheasants, but did not appear to kill any.

A mild month, with a good deal of rain.

December 1st.—Saw four Herring-Gulls fly over Milcomb gorse, low down, going S.W., their usual course in autumn.

6th.—Very stormy, W.N.W. About forty Peewits in field of thin swedes.

7th.—A Kestrel; worth noting in this month and up to the end of February.

11th.—A Little Grebe, choked by a Bullhead, and picked up in the brook near Broughton, was brought to me. They were quite fresh. I had great difficulty in getting the fish out; it was 3 in. long and $\frac{5}{8}$ in. wide across the head. It is curious that a Dabchick should attempt to swallow such a fish, but there had been a frosty or snowy day or two previously, and the bird may have been hard up for food.

17th.—Song-Thrushes have stopped singing this cold but not severe weather.

24th.—Bullfinches very numerous.

26th.—Deep snow.

27th.—Severe frost, 19°; 22° at 3.30 p.m. Only a few Fieldfares remain. Larks on the move.

28th.—The few Fieldfares very tame. There is only a small crop of haws this year. Mistle-Thrushes and Blackbirds began the holly-berries (of which there is a very fine show) in November. All birds silent.

31st.—Thaw set in. A Bittern shot in an osier-bed between Somerton and Heyford. It was a female. Another was shot near Faringdon (Berks) the day before.

Mr. Darbey informed me that he received a Great Northern Diver about the 13th inst., which still retained its summer plumage. It was shot at Kempford, near Fairford, not very far over our borders.

A cold snap about the middle of the month, and severe weather at the close.

THE BIRDS OF SOUTH CAMBRIDGESHIRE.

BY ALBERT H. WATERS, B.A.

I WILL commence my account of the Birds of South Cambridgeshire with a list of those I observed in my boyhood days about Downing College Groves and the old Botanic Gardens, close by which we then resided. My notes on these are too voluminous to copy in full, abounding in observations on the ways of the Rooks and other birds enough to fill a book.

The Birds of Downing College Groves.—The nests I found in Downing Grounds in the sixties include Greenfinches; one or two I took for Hawfinches, but remark that I had never been able to get a fair view of the bird. The nests are described in my juvenile note-book as being made of small twigs interweaved with roots and decorated with lichens off the dead branches. Outside they were guarded by a small *cheval de frise* of stiff twigs from thorn-bushes. The eggs were of a grey stone colour, with irregular brown markings and a few black dots.

Chaffinches made their lichen-covered nests in the low trees every season. Linnets and Bullfinches were always to be found. I record that I had seen the Lesser Redpoll about Downing Grounds, but was unable to say with certainty I had ever found the nest.

Among the other birds I find recorded as nesting in Downing Groves are Pied Wagtails and Tree-Pipits. On the ground among the long grass, or in a tuft of nettles, were sometimes the neatly twisted nests of the Tit-Lark, and I have noted the occurrence of the Wood-Lark in the sixties.

I find in my juvenile note-book a very interesting account of a Nuthatch's nest, and remarks on the ways of the old birds, but it is too lengthy for quotation. It is illustrated by a drawing I made of the clever way in which the nest was made in a rather unusual position. It is the only Nuthatch's nest I have ever seen in this spot, although I have seen the birds about the trees on several occasions.

I was never able to find a Tree-Creeper's nest in Downing, but the birds themselves I often saw running in mouse-like fashion about the trunks of the lime trees, and sometimes I noticed young ones with them. This looks as if they did really nest somewhere about the grounds, or else in what was then the old Botanic Gardens just across Pembroke Street, where the New Museums now are.

With a telescope I have seen a pair of Tomtits fussing about an old Rook's nest, and did not doubt they made their own nests there. The eccentricities of the Tomtit are more than I can find space for, interesting as my notes are.

On Sundays it was quite a sight to see the granivorous birds flocking over from Downing, attracted by the sweepings of the then Corn Exchange opposite. Among them was what we schoolboys called the "Writing Lark"—that is, the Yellow Bunting. Indeed, I think there was hardly a more favourable spot than this neighbourhood of St. Andrew's Hill for the study of ornithology. At the back of our house was a large garden which stretched right away to St. Andrew's Street, so altogether, what with the Whitethroats and Flycatchers, there were few small birds I did not make acquaintance with.

Jackdaws, Magpies, and Starlings were not so numerous in Downing as in some of the other colleges with ancient buildings and towers. They came more as visitors than for purposes of nest-making. But they would have to be included in a complete list of the birds' nests I have seen in Downing, which would run as follows:—Rook, Jackdaw, Magpie, Starling, Greenfinch, Hawfinch (?), Chaffinch, Linnet, Bullfinch, Wood-Lark, Pied Wagtail, Tree-Pipit, Meadow-Pipit, Nuthatch, Great Tit, Blue Tit, Coal-Tit, Song-Thrush, Blackbird, Wood-Pigeon. I need not say Cuckoos made the Titlarks and some other birds do unpaid nursing work for their young ones.

Birds recorded by me as having been seen, but not, as far as I knew, nesting in Downing, were the Raven, Mistle-Thrush, Whitethroat, Sky-Lark, Flycatcher, Wren, Robin, Goldcrest, Blackcap, and I also record having heard the Nightingale.

I used to see in those days some birds in the winter-time of a kind not likely to be seen in Downing were it not that in the then old Botanic Gardens there was a pond to which came

“Pink-footed Geese, more than one species of Wild Duck, Snipe, and a Plover or two” in severe winters. I quote from a manuscript “Notes on the Birds of Downing College Grounds, made in the early Sixties.” In a profession such as ours we often had to be out very early in the morning. Then was the time to see or hear the birds. Just as it was getting light on a March morning the migrants which had been resting during the hours of darkness were to be distinguished perching on the trees or wall, and preparing to take flight.

The most interesting notes on the Waders and Waterfowl of South Cambridgeshire are to be found in an unpublished manuscript which I wrote in my schoolboy days, and called “Random Notes on the Fauna of a Broadland of the Past.” This ancient land of broad and marsh stretched right away from the base of the Gog Magog chalk hills to the sea. Beginning at the south, there was an ancient broad remembered in the name Fowlmere, a village near Triplow. Dernford Fen, up the stream which joins the Granta at Grantchester, is another. Then comes Lingay Fen, a favourite egg-collecting or nest-observing locality of mine, where Lapwings and Plovers bred along with the Meadow-Pipits, which made their nests in the numerous tufts of soft rush. Then came the fenny tract which, under the various names of Sheep’s Green, Coo Fen, and Empty Common, stretched from Newnham to the end of the footpath by the side of Hobson’s stream, which runs past the Botanic Gardens on Trumpington Road. It was a splendid place for observing marsh-loving birds.

Sheep’s Green consisted then of a series of little meres and ponds connected by rushy ditches, in which *Sagittaria* grew profusely. In summer-time the bird-life was best studied by climbing the trees. In these I found nesting Tree-Creepers, Great Tits, Marsh-Tit, and Blue Tit. Once I found the nest and eggs of the White Wagtail (*Motacilla alba*), and I record having one day seen a pair in which the male bird was a Pied and the hen a White Wagtail. The commonest Wagtail on Sheep’s Green is *M. lugubris*. I record “a rarer Yellow Wagtail which I have seen once or twice on Sheep’s Green. This has a blue head, and is named *Motacilla flava* in the ‘Systema Naturæ’ of Linnæus. They seem merely casual visitors, and I have not seen them attempt nesting. On the contrary, they vanished almost as

soon as they appeared." I also saw Wagtails on Sheep's Green with "a distinct white eye-stripe and brown legs and feet, but with heads only faintly blue-grey. They are a trifle smaller than the Yellow Wagtail, and in all respects except the blue heads answer to the description of *M. flava*. And what is of importance, these Wagtails certainly nested, although I cannot see much difference between their eggs and those of *M. campestris* or *M. raii*."

I have only one record of the nesting of the Willow-Warbler (*Phylloscopus trochilus*) on Sheep's Green. This nest was near the bottom of a decayed tree, among the rubbish in the partly hollow trunk:—"As the tree overhung one of the deep ponds the nest was neither easy to see nor to get at with safety. The eggs were much more decidedly spotted with red than those in the nests found on the ground" in other places. I have also notes of the occurrence of the nest of the Grasshopper-Warbler.

"Brown Owls nest in the holes in the tops of the pollard willows. . . . The handsomest birds are the Kingfishers, but they are so persecuted by those who study natural history with a shot-gun in hand that they get no chance to lay their eggs, &c.

"The winter, or even late autumn or early spring, is the best time for naturalizing in this spot. Many times then I have had the Green all to myself, and could note down or sketch numbers of birds not to be seen at other times. On several occasions I have seen it flooded, and in its pristine state of a mere or broad. Then the Wild Ducks and Geese came to it, Teal swam about, the Wigeon was to be seen, and when the water had nearly gone off there were Godwits, Curlews, and Longshank birds."

Besides the above, I mention the Green Sandpiper, and in the spring the dun-barréd Sandpiper or Dunlin, probably on migration. Waterhens were then more likely to be seen than at the season when the bathers and boaters scared them. Pied Wagtails were to be seen all the winter running about on the bank of the river when the Green was a small broad, or the wet grass when the floods had gone down a bit; and among them would be the dark-footed Grey Wagtail (*Motacilla melanope*), less tolerant of being watched than is *M. lugubris*.

There is a tract of what was formerly marsh-land lying

between Coldham Road and the Stur rivulet, which up to the late sixties was full of interest to the ornithologist. It was dug over for the phosphatic nodules known as coprolites, and when the great pools of water were left ere it was levelled again, which was not till later, it looked in winter, or from autumn to late spring, like a series of mud-flats when the tide was low. I used to delight to walk along the high bank which confines the waters of the Stur, and, field-glass in hand, watch the birds on the mere like silt-beds; I never knew what rare bird I might not see. The kinds I have noted between autumn and early spring are Snipe, Golden Plover, Dotterel, Grey Phalarope, Green Sandpiper, Spotted Redshank, Cambridge Godwit (*Limosa belgica*), Bartailed Godwit, Black-headed Gull, and Common Gull; Quails also came in their season, and Lapwings. Wild Geese and Ducks, too, came in winter-time. The Geese were the Grey Lag-Goose, White-fronted, and Bean. The Ducks were Sheld-Ducks, Mallard, and Pochard.

BREEDING OF TREE-SPARROWS AND DUNLINS IN
CO. MAYO.

BY ROBERT WARREN.

IT is a very remarkable and interesting fact how steadily many of our native birds are extending their breeding haunts throughout the country, and into districts where a few years ago none of the species had been ever met with as breeding birds. For instance, Starlings, Common Gulls, Sandwich Terns, Shoveler Ducks, Tufted Ducks, Dunlins, and Tree-Sparrows; but I was nearly forgetting the Common Scoters breeding on Lough Erne, while during summer Scaup-Ducks have been observed on some of the Mayo lakes; though as yet no nests have been discovered, they probably will be in the future when searched for with greater care.

The Tree-Sparrows were first discovered in Co. Mayo by Mr. Wallace near Belmullet, and later at Kilcummin, near Killala, by Mr. C. Scroope, who, with his brother, again visited the locality this summer, when they found them breeding in holes in the old ruined walls of St. Cummin's Church (supposed to be the oldest Christian church in the province of Connaught). They counted fourteen or fifteen birds, old and young, some of the latter having only just left their nests. Some time last month Messrs. C. and G. Scroope, visiting the old ruined castle of Castleconnor, observed a solitary individual about the ruins, the first Tree-Sparrow ever seen in this part of Co. Sligo. This species was also discovered last summer by Mr. N. H. Foster breeding in Co. Londonderry, and this present summer by Mr. J. M. McWilliam in Co. Donegal. A wide extension of its breeding haunts since Mr. Blake Knox first discovered it as an Irish breeding bird at Dalkey and Baldoyle, Co. Dublin, noted by him in 'Zoologist,' 1870, p. 2018.

This summer Dunlins have bred on a little marsh on the

island of Bartragh, of some ten or twelve acres in extent, and situated between the sand-hills and the estuary sands. The marsh is covered chiefly by a short sedge, having a few clumps of rushes on the wettest parts. Up to the present discovery no Dunlins had ever been known to breed or were seen on this marsh in summer, its only denizens being Lapwings, and when searching for the nests of the latter the marsh has been walked over in all directions for many years past up to August, 1901. Since that date—also that of the death of my much regretted and valued young friend the late Mr. A. C. Kirkwood—it has not been searched for nests. But it is evident that it is some time subsequent to that year that the Dunlins have come to the marsh, for previous to the present discovery their nearest breeding haunt was a wide extent of flat wet bog on the Glenmore Estate, near Crossmolina, Co. Mayo, twelve to fifteen miles from the sea, on which a few pairs were observed, but only one nest with eggs, found by Mr. J. F. Darling on May 17th, 1882. It was by the merest chance their haunt was discovered, for on July 1st I accompanied Mr. Scroope and his brother in my boat to Bartragh, to visit the great Arctic Tern haunt at the end of the island, and when proceeding there Mr. Scroope, walking through the marsh, flushed a Dunlin from the sedge, but after half an hour's search failed in finding a nest. We then went on down to the Terns, which we found as numerous as ever, at least a thousand pairs having eggs or young.

On our return, Mr. Scroope, again walking through the marsh, flushed the Dunlin, but after a long search again failed to find the nest.

Thus, so far, our search was a failure, but, not wishing to be beaten, I suggested trying Wolley's plan of dragging a rope held by two persons along the ground, others walking behind to mark when any birds rose from the rope as it passed over them. Captain Kirkwood, kindly lending a rope, we set to work, making a sweep along one side of the marsh, but without result. Turning, we made another sweep alongside the first, and had not gone thirty yards when a bird rose from a nest and four eggs, almost from under Captain Kirkwood's feet, after the rope passed over it. Taking the eggs, we continued the sweep, and not

twenty yards from the first nest another bird rose before the rope from a nest, also with four eggs. Thus, having obtained all we wanted, and proved that the birds bred there, we abandoned the search, highly pleased with our discovery.

There may have been other nests about the marsh, but these birds rose silently, and, flying away about a hundred yards, stood quietly watching us. We saw only these two birds, so probably their mates and those of any other sitting birds were away feeding on the sands, which were bare at the time.

THE GEOGRAPHICAL DISTRIBUTION OF THE LAND- BIRDS OF THE BANDA ISLANDS.

By J. R. McClymont.

THE Banda Islands are situated between eight and nine hundred miles to the west of the line of division between the Indian and Australian Regions which passes between Celebes and Borneo. The facies of the avifauna of Banda is therefore Australian. *Halcyon chloris* may be less characteristically Australian than the other birds of the islands, but as the Kingfishers are quasi-cosmopolitan, and as the range of *Halcyon chloris* extends from Africa to Polynesia, its presence in the Banda Islands is not significant. At least four of the genera which are represented in Banda are typical Australian genera, namely, *Rhipidura*, *Monarcha*, *Pachycephala*, and *Myzomela*.

The islands of the Banda Sea (with the exception of Letti Kisser and Wetter, which are in the Timor Group) constitute the Ceram Subgroup of the Moluccan Group; the principal units of the Subgroup are Buru, Amboyna, the Banda Islands, Ceram, Ceram Laut, Goram, the Matabela Islands, Kur, the Tiandu Islands, the Ké Islands, the Tenimber Islands, Babar, and Dama. The Banda Islands are eight in number, and consist of four central islands in close proximity one to another—Lonta or Great Banda, Banda Neira, Gounong Api, and Pisang; together with several small islets—Rozengain, about ten miles distant to the south-east of the central group; Wai, at an equal distance to the west; Rhun, about eight miles almost west by south from Wai; and the islet of Suangi or Manukan, about seventeen miles nearly north by east from Rhun.

When the Banda Islands are named in this paper as the habitat of certain species, the central group only is contemplated. On Great Banda and Banda Neira the trees of greatest importance are the kanary tree, and the nutmeg tree which was introduced into the islands by the Dutch in the seventeenth century.

This list of the birds of the islands and summary of their geographical distribution are based upon the collections made by Dr. Wallace, and by the scientific staff of H.M.S. 'Challenger.' Dr. Wallace visited Banda in December, 1857, May, 1859, and April, 1861, and collected eight species, namely, *Rhipidura squamata*, *Pachycephala phæonotus*, *Myzomela boiei*, *Zosterops chloris*, *Pitta vigorsi*, *Halcyon chloris*, *Ptilopus xanthogaster*, and *Carpophaga concinna*. H.M.S. 'Challenger' visited the islands for a few days in September and October, 1874, and during her sojourn examples were obtained of *Rhipidura squamata*, *Monarcha cinerascens*, *Pachycephala phæonotus*, *Myzomela boiei*, *Zosterops chloris*, *Halcyon chloris*, and *Carpophaga concinna*.*

Three other species, namely, *Edoliisoma dispar*, *Eos rubra*, and *Chalcophaps chrysochlora*, are recorded as Banda species in the 'Catalogue of Birds in the British Museum.'† The total number recorded is therefore twelve, which may be thus arranged:—

PASSERES.—Campophagidæ: *Edoliisoma dispar*, Salv. Muscipidæ: *Rhipidura squamata*, Müll. and Schl.; *Monarcha cinerascens*, Temm. Laniidæ: *Pachycephala phæonotus*, Müll. Meliphagidæ: *Myzomela boiei*, Müll. Zosteropidæ: *Zosterops chloris*, Müll. Pittidæ: *Pitta vigorsi*, Gld.

PICARIÆ.—Alcedinidæ: *Halcyon chloris*, Bodd.

PSITTACI.—Loriidæ: *Eos rubra*, Gm.

COLUMBÆ.—Treronidæ: *Ptilopus xanthogaster*, Wagl.; *Carpophaga concinna*, Wall.; Peristeridæ: *Chalcophaps chrysochlora*, Wagl.

Mr. H. O. Forbes, who visited Banda in 1882, relates that he saw traces of Cassowaries which had been introduced into Banda from New Guinea.‡ The sea-birds which are recorded from the Ceram Subgroup are *Sula fiber* (*S. sula*, Linn.) *Sterna bergii*, *S. anæstha*, and *S. melanauchen*.

The geographical distribution of the land-birds is as follows:—

* P. Z. S., 1878, p. 83.

† Vol. iv. p. 46; vol. xx. p. 25; vol. xxi. p. 512.

‡ 'Wanderings of a Naturalist in the Eastern Archipelago,' p. 287.

EDOLIISOMA DISPAR (Ké Caterpillar-eater).

Edoliisoma dispar, Salvad., Ann. Mus. Civic. Genov. xii. p. 329.

Ceram Group: Banda, Goram, Manavoka, Matabela Islands (Tiur), Ké Islands.

RHIPIDURA SQUAMATA (Scale-breasted Flycatcher).

Rhipidura squamata, Müll., Verh. Land-en-Volkenk. p. 189 (1839-44).

Papuan Islands: New Guinea, Waygiou, Salwatti. Ceram Group: Banda Islands.

Food.—Insects.

MONARCHA CINERASCENS (Ashen Flycatcher).

Drymophila cinerascens, Temm., Pl. Col. iii. 430, fig. 2, 1827.

Celebes Group: Celebes, Sula Islands. Timor Group: Kisser, Timor. Ceram Group: Amboyna, Banda Islands, Goram, Tiur, Ké Islands. Gilolo Group: Gilolo, Ternate, Batchian, Tifori. Papuan Islands: Aru Islands, Mysol, Mefur, New Guinea, Echiquier Islands, Admiralty Islands, Duke of York Islands, Fead Islands.

Food.—Insects.

An example from Kisser in the Dresden Royal Zoological Museum may be a local variety.*

PACHYCEPHALA PHÆONOTA, S. Müll. (Brown-backed Thickhead).

Myiolestes phaionotus, Müll., Mus. Lugd. Bonap. Consp. i. p. 358 (1850).

Mefur, Waygiou, Salwatti, Mysol, Ternate, Mareh, Motir, Tifori, Banda, Ceram Laut, Dama.

Food.—Insects.

MYZOMELA BOIEI, S. Müll. (Boié's Honey-eater).

Nectarinia (Myzomela) boiei, S. Müll., Verh. Land-en-Volkenk. p. 172 (1839-44).

Banda Island.

Food.—Insects have been found in the stomach of a dissected specimen; † the bird probably consumes nectar also.

* A. B. Meyer, 'Ueber neue und ungenügend bekannte Vögel, Nester und Eier aus dem ostindischen Archipel.' p. 22.

† 'Report on the Scientific Results of the Voyage of H.M.S. Challenger.' Zoology, vol. ii. 'Report on the Birds Collected.' By P. L. Selater, p. 66.

ZOSTEROPS CHLORIS, Müll. (Banda White-eye).

Zosterops chloris, Bonaparte, Consp. Gen. Avium, i. p. 398 (1850), ex S. Müll. MSS. in Mus. Lugd.

Banda Island, Buru.*

Food.—Insects.

PITTA VIGORSI, Gld. (Vigors' Pitta).

Pitta vigorsii, Gould, 'The Birds of Australia,' vol. iv. pl. 2 (1848).

Dammer (Damar), Banda Islands, Timor Laut.

The geographical distribution of this bird is involved in some obscurity. Gould separated the species from *P. brachyura* as the result of his examination of a specimen in the collection of the Linnean Society, which, he believed, might have been obtained on an island off the north coast of Australia, and adds that the species was said to inhabit Lombok.† Von Rosenberg indicates Sumbawa and Australia as habitats.‡ Schlegel states that the only specimen in Holland was presented to the Royal Museum of Natural History by Prof. de Vries, and that it was not known from what island it was obtained.§

HALCYON CHLORIS, Bodd. (White-collared Kingfisher).

Alcedo chloris, Bodd., Tabl. Pl. Enl. d'Aubent, p. 49 (1783).

Abyssinia, India, Burma, Andaman Islands, Nicobar Islands, Cochin China, Sumatra, Banca, Billiton, Java, Borneo, Labuan, Luzon, Panay, Marinduque, Guimares, Negros, Sebu, Bohol, Leite, Dinagat, Mindanao, Kamiguin, Basilan Palawan. Timor: Babar, Letti, Flores, Solor, Sumba, Sumbawa, Lombok. Celebes: Sula Islands, Siao, Sangir. Ceram: Buru, Amboyna, Banda, Goram, Timor Laut, Dawalur, Luang. Gilolo: Ternate, Bat-chian, Obi, Mysol, Aru Islands, Gagie (Gag.), Pelew Islands, Vaté (New Hebrides).

The dietary of this Kingfisher includes crabs, fish, and earth-

* H. O. Forbes, *op. cit.* p. 410.

† 'Handbook to the Birds of Australia,' ii. p. 527.

‡ 'Overzigtstabellen voor de Ornithologie van den Indischen Archipel.' p. 3.

§ 'De Vogels van Nederlandsch Indië, Het Geslacht Pitta,' p. 14.

worms.* Eggs have been collected in Labuan and at Akyab in Burma.†

Eos RUBRA, Gm. (Long-tailed Scarlet Lory).

Psittacus borneus, Gmelin, 'Systema Naturæ,' i. p. 318 (1788).

Eos rubra, Wagler, Mon. Psitt. p. 558 (1832).

Ceram, Buru, Amboyna, Haruka, Banda, Ceram Laut, Goram, Matabela Islands, Kur, Ké Islands (Ké Dulan).

Food.—Seeds, insects, and nectar.

PTILOPUS XANTHOGASTER, Wagl. (Orange-breasted Fruit Pigeon).

Columba xanthogaster, Wagler, Systema Avium, Columbæ, sp. 29 (1827).

Banda, Kur, Ké Islands, Timor Laut, Dama, Letti, Lesser Sunda Islands, Ladron Islands (G. R. Gray).

Food.—Probably wild fruits.

CARPOPHAGA CONCINNA, Wall. (Mace-eating Pigeon).

Carpophaga concinna, Wallace, Ann. & Mag. Nat. Hist. (2), xx. p. 473 (1857); 'Ibis,' 1865, p. 383, No. 52.

Aru Islands, South Celebes, Sangir, Ceram, Buru, Amboyna, Banda, Ceram Laut, Goram, Panjang, Matabela Islands, Kur, Ké Islands (Ké Dulan), Tenimber Islands, Dama (Riedel), Lesser Sunda Islands.

Food.—Fruit.

CHALCOPHAPS CHRYSOCHLORA, Wagl. (Little Green Pigeon).

Columba javanica, Temm., 'Pigeons,' 1811, pl. 26.

Columba chrysochlora, Wagl., Syst. Av., Columbæ, 1827, sp. 79.

Timor, Letti, Wetter, Banda, Kur, Ké Islands, Timor Laut, South-eastern New Guinea, Solomon Islands, Northern to Eastern Australia, Lord Howe Island, New Caledonia (Nu, Port de France), Lifu, Maré, Aneiteum, Aniwa, Erromango, Tanna, Vaté, Ambrym, Mallicolo, St. Bartholomew, Santo, Api.

Food.—Seeds and berries. The eggs of the Little Green Pigeon have been described.‡

* A. B. Meyer in 'Zeitschr. für die gesammte Ornith. 1884,' p. 276. Schlegel, 'Vogels Ned. Ind. de Ijvogels,' p. 27.

† 'Catalogue of Birds' Eggs in British Museum,' iii. p. 41.

‡ Campbell, 'Nests and Eggs of Australian Birds,' p. 679. 'Catalogue of Birds' Eggs in British Museum,' i. p. 103.

NOTES AND QUERIES.

MAMMALIA.

White-sided Dolphin (*Lagenorhynchus acutus*, Gray).—On July 22nd I picked up a skull on the Bottom Shore, Fanet, Co. Donegal, which Dr. Scharff has identified as that of this rare Dolphin. It was fortunate that I was on a picnic excursion on the day in question, and had a car close by, otherwise I fear I should never have carried the treasure seven long miles home. The spot was a little east of Ballywhoriskey, at the mouth of Mulroy, on sands that are only tide-swept in heavy storms. One or two natives of whom I made inquiries had paid no attention to the object, and had no idea to what “fish” it belonged. Dr. Scharff referred me to ‘Irish Naturalist,’ vol. ix. p. 89, of which passage Mr. Lyster has kindly made a copy for me:—“This Dolphin is probably the rarest of all the Irish species of Cetacea, and has never been taken on the English coast. . . . It was noticed near Portrush some twenty-five years ago by Mr. Ogilby, and duly recorded in ‘The Zoologist.’ More recently Mr. Barrett-Hamilton procured a lower jaw of this Dolphin on the Wexford coast, and presented it to the Dublin Museum”; to which National Collection I have had the pleasure of presenting my find also. It is a northern species, captured also in Orkney, in the British Isles, on two occasions at least, as mentioned in ‘Bell.’—H. C. HART.

AVES.

Nesting of the Lesser Redpoll (*Linota rufescens*) in Sussex.—I have no doubt that the Lesser Redpoll has nested here this year. On Aug. 22nd young birds were being fed at The Budletts, Maresfield, and while engaged in watching them I discovered a small nest among the topmost branches of a slender birch tree. The following day (the 23rd) I solicited the aid of my young nephew, Richard Gilbert, who very quickly secured the nest for me, and which I cannot think to be other than that of a Redpoll. I do not know to what extent the Lesser Redpoll is now known to nest in Sussex, but Mr. Borrer

(‘Birds of Sussex,’ p. 134) does not admit it as a breeding species in the county.—ROBERT MORRIS (Uckfield, Sussex).

Plumage of the Young Cuckoo.—Till recently I was at a loss to understand what might be meant by a young Cuckoo “of a dark blue colour” (*cf.* Zool. 1898, p. 431), but on Aug. 2nd one of this type was brought to me. It was hatched in a Pied Wagtail’s nest in some creepers on a house in this village, and was found dead soon after leaving the nest, having evidently flown against a window or a tree. The upper parts are dark greyish blue, with the feathers narrowly edged with white, and there is a good deal of white on the head. Compared with a young bird of the ordinary rufous colouring, it looks like a Hobby by the side of a Kestrel. — JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds).

Little Owl (*Athene noctua*) in Hertfordshire.—During 1906 several specimens of the Little Owl were both seen and obtained in the northern part of Herts. The first case to come to my notice was of one being killed at Offley in January, and later one was observed at Pirton. On Sept. 20th a keeper shot one at Stevenage, at about five o’clock in the afternoon. This bird was brought to me, and is now in my collection. It proved on dissection to be a female, but is in very bad plumage. I have since heard from the same keeper that there are some more Little Owls in the neighbourhood, and that they have taken to an old tree covered with ivy; if this is the case it would be reasonable to suppose they have nested here. — STUART MAPLES (“Kingsbury,” Stevenage).

Little Owl in Bedfordshire.—I believe that it may interest some of your readers to know that a specimen of the Little Owl was seen near Sandy, Bedfordshire, last month. I was returning from a walk along the high road when I noticed the bird perched on a telegraph-wire close to the pole. It allowed me to approach within about five yards, and then slowly took flight to the centre of a large elm tree standing in the adjacent field, where I saw it alight about forty yards away. This occurred on Saturday, Aug. 3rd, and I should have informed you before this time of the event had I believed it to be of sufficient importance. I was going over the collection of birds at Newcastle-on-Tyne recently, and chanced to mention the fact to the curator, who assured me that the bird was sufficiently uncommon to make it worth while writing to you on the subject. I am sure the bird in question was the Little Owl, as I have excellent eyesight, and have collected

all the birds that inhabit every corner of East Aberdeenshire. I possess stuffed specimens both of the Little Owl and the Scops Eared Owl, but the bird I saw was certainly the former. — DOUGLAS AINSLIE (26, Mount Street, Grosvenor Square, W.).

Scops Eared Owl in Ireland.—A male was caught at the lantern of the Fastnet Lighthouse on the night of the 6th May. The bird was a male in beautiful plumage and condition, and is a rare visitor to Ireland, only seven examples having been recorded.—W. J. WILLIAMS (2, Dame Street, Dublin).

Montagu's Harrier (*Circus cineraceus*) in Ireland.—A male in transition plumage from the immature to the adult was trapped on a Grouse-moor in June near Sallygap, Co. Wicklow. It was nailed up, with other vermin, on the keeper's cottage, and was in an advanced state of decomposition before reaching me for identification. It is very curious that all the nine recorded captures of this rare species in Ireland have occurred in two counties—Wicklow and Wexford; five were taken within an area of ten miles, at different periods, in Co. Wicklow, and three in Co. Wexford. Two young birds were shot near Gorey, September, 1899, and an adult male in May, 1890.—W. J. WILLIAMS (2, Dame Street, Dublin).

Supposed Breeding of the Rough-legged Buzzard in Cornwall (*ante*, p. 284).—The statement in the last issue of 'The Zoologist,' on the authority of Trathen and Harris, that the Rough-legged Buzzard bred in Cornwall to about 1850, should not be allowed to pass without a protest, especially as it has already been made in the recently issued volume of the 'Victoria History of the County of Cornwall.' Sixty years ago little was known as to the distribution of this bird in the breeding season, and Hewitson, in the 'Supplement to British Oology' (1842), describes it as "an abundant species in some of the extensive forests of Germany," and adds that he noticed several in the wilder parts of Baden and Wirtemberg (*sic*). Now, there is nothing remarkable in the fact of a northern species, whose southern limit extends to the south of Germany, breeding in the British Isles; so that the naturalists of those days may perhaps be excused for their somewhat easy credulity in accepting the rather unsatisfactory records of the nesting of the species in Great Britain, especially as undoubted specimens were not infrequently secured during the winter months, and the Common Buzzard was then much more numerous than it is now, and might easily be mistaken for it. Thomas Edward's assertion that it bred near Banff in 1864; J. Smith's statement that it nested repeatedly

near Ash Hay Gill, about three miles from Hackness, Yorkshire; and the old records of Trathen and Harris from Cornwall are in all probability due to confusion between resident Common Buzzards and stray Rough-legged birds shot in autumn or early spring. *B. lagopus* is a subarctic species, nesting in the north of Scandinavia, and in Norway on the high fjeld beyond the tree limit, down to about $59\frac{1}{2}^{\circ}$ N. lat., and also in the extreme north of Russia. It does not breed in the south of Scandinavia or Finland, nor in the Baltic Provinces or East Prussia; so that the cases in which it is supposed to have bred in Pomerania and West Prussia must be regarded with suspicion. The whole case as regards the British records is parallel with the supposed breeding of the Bean-Goose in Scotland, which proved on investigation to be equally unreliable, owing to confusion with an allied species.—F. C. R. JOURDAIN (Clifton Vicarage, Ashburne, Derbyshire).

Osprey (*Pandion haliaëtus*) in Ireland.—An adult male was shot near Drogheda on May 1st by a gamekeeper, who forwarded it to us as a Buzzard. The testes were large, but no other bird was seen, although a sharp look-out was kept. It is a pity this harmless species is molested, but as this particular keeper looks after the fishing as well as the game, he promptly destroyed it as a poacher, having seen it take a two-pound Trout, which it was in the act of eating when shot.—W. J. WILLIAMS (2, Dame Street, Dublin).

Bird-Notes from the Wilsden District.—In spite of the past season having been of an exceptionally severe character, there has not been, with the exception of one or two species, any very marked decrease of our summer visitants to this district. The Swallow is said to have arrived on April 3rd, but not seen again until the 19th. The Wheat-ear and Ring-Ouzel also arrived early, but the bulk of migrants was decidedly later in their arrival than in average years. The most striking ornithological feature of this district in recent years has been the enormous increase of Thrushes during the breeding season; especially is this the case as regards the Mistle-Thrush and Song-Thrush. Not many comparatively of the latter remain through the winter. One, however, came to our garden for two years in succession, and was very tame, feeding close to the feet of one of my daughters who was most assiduous in her attentions to its gastronomic requirements, which were of no ordinary character. Nothing seemed to come amiss in its bill of fare—rice-pudding, cake, and bread appeared to be equally relished, and was carried to its young, as it remained to breed

in the neighbourhood, which is quite exceptional in the economy of the species. For a number of years we have been accustomed to provide food for birds in our garden, but this species is usually very limited in its bill of fare—much more so than the Blackbird—and will not eat bread except when pressed with hunger. The Nightjar has bred here this season more commonly than in any former year. One of our gamekeepers showed me a nest with four eggs, evidently the produce of two females, as the eggs were in pairs, two being much smaller and quite different in shape from the others, but whether introduced by human agency will ever remain a mystery. It is with some satisfaction that we have to record again the nesting of the Hawfinch, and, what is still more gratifying, that more than one brood has been brought off. We were asked to go some distance to identify a strange bird which had been picked up wounded beneath the telegraph-wires, and found it to be this species, which the owner gave me. In a few days it became quite tame, as it was allowed free use of a room for an hour or two each day, and would come out of the cage and eat hazel nuts, of which it was very fond, at my feet. It was fonder of these nuts than even green peas, and had a curious method of opening the pods of the latter. After about a fortnight of “durance vile” it was given its freedom in the garden, and allowed itself to be caught once or twice, but in a very short time it rose almost perpendicularly into an ash tree at the bottom of the garden, after which it made an escape on vigorous wings to a sycamore tree at some distance. In a garden on the edge of Bingley Wood, Cuckoos were very abundant this last spring, feeding upon the larvæ of the gooseberry moth. I had a very near view from the kitchen, and for some time they must have fed almost exclusively on this food, as they were in the garden from early morning “to dew eve,” if any dew can be said to have been deposited here this year. A Hedge-Sparrow was laying its eggs in a nest built in a whin a few yards away from this garden, and we were curious to note whether one or more of the Cuckoos would deposit their egg in the nest in question, but they did not avail themselves of this opportunity. We have never known of an authentic instance of this sort in the immediate district for fifty years. My son Rosse and I were walking on a heathy waste near Bingley Wood when our attention was arrested by a Ray’s Wag-tail having food in its mouth. As we were certain of its having a nest in the vicinity, we watched the female for some time without success. We both thought, owing to its being the rendezvous of Cuckoos for miles around, that possibly this species might have been selected as its dupe; so we determined to find the nest, and for this purpose we

changed our venue for observation to a considerable distance. No sooner had we done so than we saw one of the parent birds fly near to a large boulder amongst the heather, and immediately fly away, and, on going to the place, we found the nest in the heather, with nearly fledged young. This is the second instance in this district of the species having selected such a nesting-site; a patch of bent-grass lay near this site, which appeared to be a much more suitable place for its nest.

Just when commencing to write these notes a relative called out to me to come into the garden and see a beautiful bird, which we found to be a Chaffinch, and, although there was an abundance of small seeds, it was hunting for insects nearly all the time we watched it. It came very near to us, and did not mind us in the least; it was a male bird of the year. A female bird of this species visited this garden almost all last winter—a rather unusual thing. To see how confiding the species can become if undisturbed during the breeding season, one should visit Bolton Woods, a seat of the Duke of Devonshire in Wharfedale, where they feed upon scraps of food at your feet, and will actually alight and hop about on the table provided for visitors at Strid Cottage without manifesting the slightest fear, which has of late become quite an attractive feature to visitors of this place.—E. P. BUTTERFIELD (Wilsden).

PISCES.

Large Eel in the Hampshire Avon.—Some years ago a gentleman interested in fishing doubted if an Eel a yard in length was procurable from the river, and offered a sovereign for one of the length named. Some little time elapsed before such a fish was caught, but eventually two of the desired dimensions were obtained. On the morning of August 29th a man who has the superintendence of the Eel-stage at the flour mills showed me an Eel which had been caught during the previous night, “running,” I suppose, before the moon rose. Its weight was seven pounds, and I measured it as follows: three feet five and a half inches in length, and ten and a half inches in girth in the thickest part of the body, about eight inches from the head; a large specimen undoubtedly, but I understand not a record for the river, as two or three about the same weight have been taken in the immediate neighbourhood of Ringwood, and one or more larger and heavier near Christchurch. It is a well-known fact that Eels—like many other kinds of fishes—have decreased very much in numbers

of late years. I suppose in ancient times they were more abundant, and considered quite as valuable as at present, for in documents as old as 'Domesday' we read of mills having been rented by payment of Eels caught in the river; and, if we may draw an inference from the amount chargeable, the higher reaches of the stream were more productive than parts nearer the sea, as, from an extract quoted in Wise's 'New Forest,' we find that Charford (Cerdeford) mill, between Salisbury and Fordingbridge, was rented at 15s. and 1250 Eels, but the mill at Ibsley (Tibeslei), a few miles farther down the river, had a rental of only 10s. and 700 Eels.—G. B. CORBIN (Ringwood).

NOTICES OF NEW BOOKS.

The Birds of Kent. By WILLIAM J. DAVIS. J. and W. Davis, Dartford.

THIS book does not lend itself to detailed comment or review. It is the first attempt at dealing with the birds of the whole county, and must be of a somewhat pioneer character, for the area of Kent is moderately large and varied, and the observers—at least, those made use of by Mr. Davis—are not numerous. It is probable therefore that, however useful this book is, and will be to all bird-students of the county, very much more still requires to be done in the way of observation and locality, though its census is likely to be nearly adequate.

We are glad to read that *Alcedo ispida* is not scarcer “to any appreciable extent” than it used to be in Kent. In Surrey, near the western borders of Kent, the Kingfisher is probably increasing in numbers, especially along the course of the Mole. With many of the birds, however, the author has not brought the narrative up to date. The pages of ‘The Zoologist’ seem to have been little consulted, and so many records have been missed which would have added tone to the volume, and it therefore only provides a sketch rather than a detailed account; in fact, there is available material for a work of twice the size.

We have not much fault to find otherwise, but there is one striking lack of proportion in biological comparison. Writing on *Locustella nævia*, Mr. Davis states “the note of this bird resembles that of a grasshopper.” The Orthoptera stridulate by special organs, and the sound they produce cannot be described as notes in the sense of the song or notes of birds.

Birds I Have Known. By ARTHUR H. BEAVAN. T. Fisher Unwin.

THIS is a chatty book about birds which the author has seen in various parts of the world, chiefly of common species which the average globe-trotter may expect to meet with. The ornithologist will scarcely find original observations in such a volume,

but the general reader can peruse its pages perhaps with greater advantage than he would those of a more scientific character. One of the most interesting incidents detailed is that of a vast flock of "a kind of grey petrel" seen in about 40° south, and about a thousand miles east of the Cape. They could be seen for about eighteen miles in every direction, and the sailing-ship took six hours to get clear of them with a steady 5½-knot breeze. The doctor, "who was a bit of a calculator," estimated that they were in the centre of a circle of birds thirty-six nautical miles in diameter, or a square of thirty-six miles—*i. e.* 1306 square miles—or 4,079,108,160 square yards; and, as each Petrel, clear of its neighbour, occupied about three square yards of water space, that would give 1,359,702,720 individuals.

The illustrations are of an exceedingly middle-class description.

Fishes of Australia; a Popular and Systematic Guide to the Study of the Wealth within our Waters. By DAVID G. STEAD. Sydney: W. Brooks & Co., Limited.

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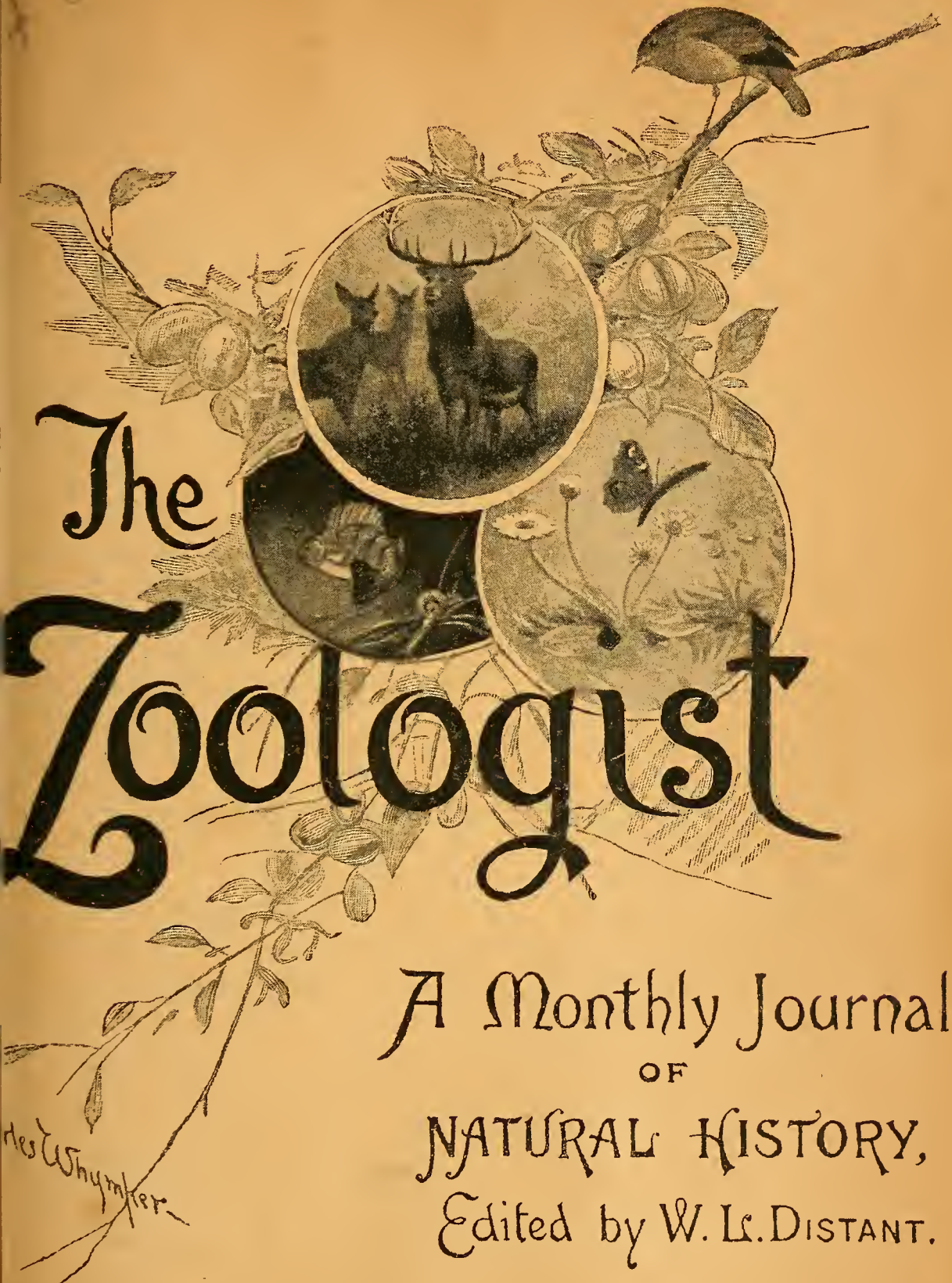
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THE ZOOLOGIST

No. 796.—October, 1907.

SOME HOLIDAY NOTES FROM BREYDON.

BY ARTHUR H. PATTERSON, A.M.B.A.

My summer holidays, correctly speaking, start when the schools break up—when the slums and alleys and wandering children are for a time forgotten in my perambulations among the mud-flats and the vagrant birds that haunt them. All other days, too, that I can spare to visit Breydon are *holidays*.

Turning over the pages of my 'Note-book,' a few entries strike me as being of sufficient interest to include in this series. The persecution of the Coots* driven out from the frozen broadlands went on well into February; my entry for Feb. 4th is as follows:—"Coots still about Breydon, many miserable creatures hopping about on one leg from shot-broken limbs. Poor wretches!"

The smallest Pink-footed Goose I ever saw was killed at Buckenham during the second week in February. I regret I was unable to take its dimensions. About two hundred Wigeon visited Breydon, March 9th.

On March 31st I was sailing across the submerged flats when I observed a large Gull busily engaged on some long white object, which I soon made out to be a large Eel as thick as my wrist. I got almost within punt's length of it before it reluctantly took to wing, when I pulled the defunct fish into the boat; its head had been picked to pieces, a process undoubtedly

* Cf. 'Zoologist,' *ante*, p. 85.

begun the day before by a Heron, who found it "too large an order" to swallow. I showed it to the watcher, who envied me my possession, and it afterwards, accompanied by onions, made, he tells me, "a rattling good dinner" for him.

A young Spoonbill most obligingly alighted on the edge of a flat in front of my houseboat, and started a thorough overhauling of his already spotless plumage. With my glasses in one hand and a pen in the other, I knelt in my stern-sheets, using my hatch for a desk, and roughly dashed on a slip of waste-paper six very unorthodox attitudes, which no sane taxidermist would ever dare display in setting up a specimen. The accompanying illustrations, taken in less minutes than in number, are probably the only ones ever secured under similar circumstances. This was on May 11th.

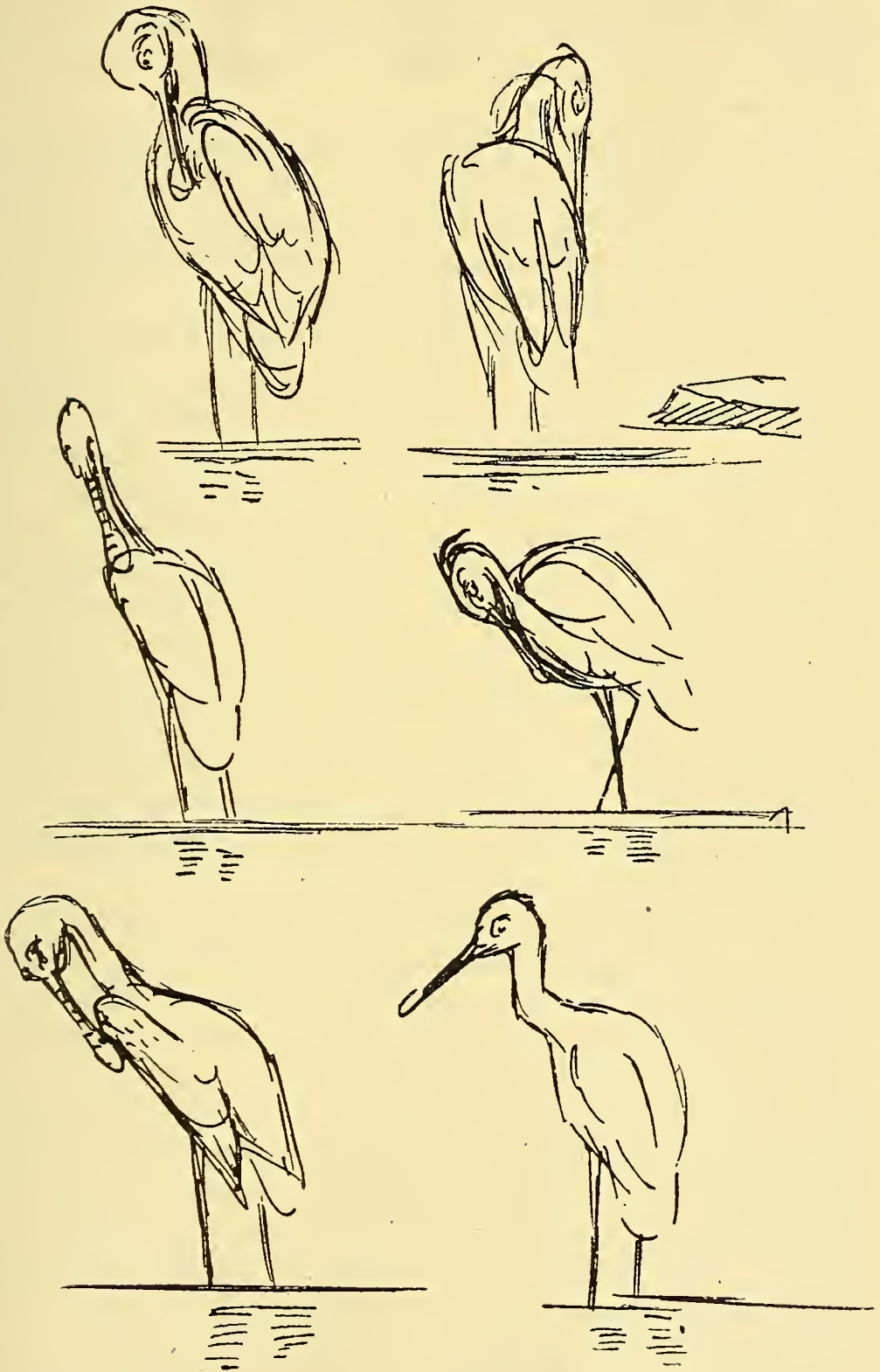
On May 12th, fifty-two Grey Plovers—beauties! dropped in.

The manners of a Cuckoo, restlessly flitting about near the railway, not far from my houseboat, attracted my attention on May 18th. From its mouth depended a large black object which I have little hesitation in deciding was a slug—one of those big ditch-side prowlers, *Arion ater*; it seemed much too large to swallow, and I hoped, by harassing its captor, it would drop it for my especial edification, but I was disappointed. It would be interesting if it could be proved beyond a doubt that *Cuculus* occasionally preys on *Limacidæ*.

Several Knots "in the red" of spring-time visited Breydon on the 25th. The watcher assured me that on the 13th a flock of between fifty and sixty came to the flats; a rare thing nowadays, for this bird which visited us in the spring in large flocks in the sixties very rarely puts in an appearance on the spring migration.

I saw two very immature Spoonbills on June 7th. The visits of this species were very few during the season. The congregating of Starlings on the prostrate *Zostera* at low water, on their hunting trips for mudworms and stranded crustaceans, was a marked feature this year.

During the early part of August the Black-headed Gulls spent much of their time picking mudworms (*Nereis*) out of the ooze. They are very quick in snatching out the luscious worm, often running to the edge of the "drain" in order to wash it. I tried



SPOONBILL'S TOILET.

the birds with some fish-bones, not half-picked by myself, but, although many came quite close in order to satisfy their curiosity, they utterly ignored them and hastily resumed their worm-catching.

On the 13th they (the Gulls) and the many Common Terns then frequenting Breydon had a rare afternoon's profitable sport in picking up small Herrings (syle) stranded in numbers on the flats left by the receding tide before they could "draw down" into the channel, and into comparative safety.

A most unusual number of Common Terns used Breydon all through August, many of them birds of the year, and with them now and again small lots of Arctic Terns were seen. On easterly winds, when the water is "sheer" (*i. e.* very clear), the fish swim lower, and are more alert. On such occasions the Terns fished with greater impetuosity, often throwing themselves into the water from a height of fifteen feet, submerging themselves all but their primaries and half of the tail. Their frequent hovering, after the manner of Kestrels, and their Gannet-like plunges, were exceedingly interesting to watch. Terns are wonderfully pugnacious. Sometimes they quarrelled among themselves, and every stray Rook that crossed Breydon was set upon most energetically by some spirited bird, who chased and harried the corvine until both would be almost lost to sight overhead, each one endeavouring to get above the other.

On the 21st (August) two or three Terns flew past the watcher's boat, wherein I stood watching them, accompanied by several Black-headed Gulls; these imitated the smaller birds both in hovering and endeavouring to go below the surface, and clumsily as they performed this attempt, I noticed on several occasions they secured a small Herring. The fish, owing to the water being muddled and thick, swam nearer the surface. Mimicry of action is not a strong point with different species, but in this instance it was not only entertaining but profitable to the Gulls. Never did I see one, among the many Terns present, alight on the water; they do not appear to like wet feet. They will rest and preen themselves upon the drier muds, but prefer to settle on some inverted basket or other stranded object, and will crowd together on a bit of stump or timber. Scores remained with us until the shooting began on Sept. 1st, when many a one

who reckoned himself a sportsman made common cause against them. Scores were slain ere the remnant took the hint to go south; those killed were eventually thrown in the refuse-box as useless.

I was sufficiently interested in some plump young Herrings we captured one day in the watcher's Smelt-net to dissect them, and found their stomachs packed with Opossum Shrimps.

The Greenshank very much interested me this summer, and hardly a day passed but its clear ringing notes were heard on Breydon. Mostly in twos and threes this species haunts the rond-corners, where little pools and small runs afford easy captures of small crustaceans and worms. The Greenshank is a restless, impulsive creature, and runs its sturdy mandibles in quick zigzag fashion in the shallow water, forming a continuous series of figure 8's without a break, differing in these respects from the Redshanks, which prefer usually to keep to the ooze and probe for mudworms, forming also figure 8's, but separate and complete. The Redshanks also like to pick up with dainty action crustaceans stranded among the semi-marine vegetation.

One afternoon I observed a Greenshank feeding, *hopping on one leg* as it proceeded. Watching it for some time, I naturally came to the conclusion that it had lost one leg by accident—by a gun-shot perhaps; but suddenly the hitherto hidden leg shot out, and the bird industriously scratched its head! It flew towards another of the same species, which itself was actually hopping on one leg; and they hopped in concert! From subsequent observations made, I feel safe in saying, I think, that it is a feature with the Greenshank, and practised more from caprice than necessity. Herring-syle, which this species might easily have captured this season, was not sought for by it. On one occasion I observed a Greenshank playing with a small Herring, finally dropping it as if half-reluctantly, and resuming its worming.

Curlews visited us in some numbers late in August, and one evening, at closing-in time, fully two hundred came to an adjoining flat. I wish this noble bird could be absolutely and entirely protected. We have lost the Avocet, and some other erstwhile British-breeding birds. Why not make sure to preserve this

quaint and favourite species? Why wait until it shall verge on extinction?

Late in August, I one day crept up a bank and peered over into a marsh, up one low-lying corner of which was a puddle not twenty feet in circumference. I was delighted to see in and around it nine Redshanks, one Greenshank, three Lapwings, three or four Gulls, three Ringed Plovers, and three huge farm-horses, around whose legs some of the birds stood airing their freshly-washed clothes. Such a little "happy family" was, to me, intensely interesting.

I watched two young and stupidly tame Knots on Aug. 30th, which fed within a few feet of my punt as I lay observing their tactics. This sluggish bird feeds in a very leisurely way, probing the mud less than half a bill's length, and swallowing a captured mudworm with a shaky little movement of the head without bringing it to a level with its shoulders. And while the pert Ringed Plover scours over a superficial acre of ooze, the Knot is content in probing an area that might be covered with a blanket.

On Sept. 18th, hundreds—some five hundred at least—of Starlings were busily feeding and squabbling on a low part of a Breydon marsh, smothered with the purple Michaelmas daisy. A gunner, who let two barrels into them, secured two dozen, mostly young birds with dingy brown heads. Being interested to know for what purpose they had congregated, I purchased a number and dissected them, finding their gizzards crammed with a mass of matted stuff which resembled cocoa-nut fibre, which on separating resolved itself into scores of legs of the "daddy long-legs" (*Tipula*); the softer bodies and the wings (if they actually swallowed them) were reduced to an indefinable pulp. A number of *Hydrobiidæ* and Shorehoppers (*Orchestia littorea*), with some beetles, and in one instance a winkle, were the only other objects I discovered. The huge number of these destructive pests the Starling must make off with ought to be favourably noticed by the farmer and the gardener, the latter of whom might forgive it the few mulberries it manages to pilfer from his trees.

OBSERVATIONS TENDING TO THROW LIGHT ON THE
 QUESTION OF SEXUAL SELECTION IN BIRDS, IN-
 CLUDING A DAY-TO-DAY DIARY ON THE BREEDING
 HABITS OF THE RUFF (*MACHETES PUGNAX*).

BY EDMUND SELOUS.

(Concluded from p. 182.)

April 30th, 1906.—In the course of this record I have more than once had occasion to mention a certain bird of very distinctive appearance who seemed to have no settled abiding-place of his own, and was constantly getting into the way of other male birds by lying crouched in their particular quarters, from which, when occupied with the Reeves, they endeavoured, by frantic peckings and draggings—but by no means always successfully—to expel him. An incident witnessed by me on the morning of the above date, and several times repeated, throws a new and unexpected light on the significance of this bird's behaviour, but, in regard to it, I shall only here say that in its essential nature it somewhat resembled one which will be well known to students of ant-life, the theft, namely, habitual and premeditated by a certain parasitical or "guest" insect, living in the nest, of a drop of honey which is in the act of being given by one ant to another. Passing to the afternoon, there was considerable fighting between several Ruffs on one side of the ground for the favours of some Reeves who had repaired there. Two of these birds were successful in their pretensions, but it did not appear to me that their success was due to superior prowess on their part, for, in this respect, all seemed much alike. Simply the Ruffs fought and the Reeves chose, but the general result of the commotion and storm was to bring nuptial matters to an end in this quarter, the Reeves going over to the brown bird, who stood on the opposite side of the gathering-ground, with whom they likewise entered into conjugal relations. In this, I speak of the Reeves as a body,

but, there being several of them, I was unable positively to say whether the same individuals attached themselves, in this manner, to two or more birds in succession. Later, however, I saw a clear instance of polyandry on the part of one Reeve, at any rate, and there were signs of it, also, in others. The Reeve in question went twice from one Ruff to another—the same two in both cases—and the nuptial rite was performed with each in turn. The greater severity of the fighting was also, to-day, very noticeable. I also made the discovery of what seems to be another and much smaller meeting-ground. Some five or six Ruffs stood there in quite the characteristic manner, and strained up and whisked their wings forward when any other bird flew by. This they would do though the flying birds were far off. Once, indeed, I could not see them, but the action is too characteristic for its cause to be matter of doubt. Looking through the glasses, I did not recognize these birds, so that possibly we may have here a smaller independent gathering. If so, however, it will be contrary to the opinion of those who should best know these breeding-grounds.

May 1st.—I was down at 3 this morning, but have nothing special to note. It was the same scene as yesterday, but up to 6, when the cold and discomfort drove me out, not nearly so pronounced. At first the Reeves showed a marked preference for a certain bird—a star that has lately risen—which I may call the black Ruff, since his ruff is of that colour, or at least dark. This bird was very active and vigorous, darting about and fighting, or ready to fight, with any others; but whether he was more so than several of these others, with whom he several times encountered, I cannot say. It is easy, of course, to make his success with the Reeves the criterion of this, and to say he was—but that is to argue in a circle. It must be remembered that, during the first two or three days of the pairing—as far as I saw it—this bird had not obtained favour. The Reeves had then a most decided preference for a certain brown Ruff, and, after him, for another whose ruff was of a blue, or bluey-black, colour. Both these birds are fine, handsome males, but neither of them have made themselves especially pre-eminent as fighters, and the brown one, especially, has shown a strong predilection for the particular spot where he always stands or sits. If worried, or

apprehensive, whilst paying his attentions to the Reeves, he would make a rush or two, usually in one direction, against birds on the outer part of the territory, that I have not seen pair—the nuptial plumage, indeed, of several of these is not yet much advanced. On one or two occasions I have seen him come into collision with the other favoured Ruff, whose place is next his, but though these few encounters—I can only recall two—were brisk and spirited, they were only of some seconds' duration, and seemed to be equal, or rather negative, in regard to results. In fact, though a powerful bird and equal, probably, to anything that may come in his way, he seems, for a Ruff, to be of rather a peaceable disposition, and is also more sedentary than any of the others. Much the same may be said in regard to the blue bird—who is also very fond of keeping still in his place—though his contests, in the last few days, owing to the chance of his position, have been more numerous. Though generally holding his own on these occasions, I certainly cannot say that he has done so more than several other birds with whom he has fought, and to all of whom he has been, till lately, preferred. There are, for instance, two, a good deal like himself—especially one—but from whom he is easily distinguished by the very striking character of his creamy head-plumes, and another black, or dark-ruffed one—not the favourite that I have mentioned—who seem to be quite his equals, and with the two first of whom I have seen him have several short fights, wherein he gained no apparent advantage. If there is a difference, however, I should say that he was not quite the equal in prowess of these birds,* and not so active as one of them—the black-ruffed one aforesaid, who seems a very energetic bird. Yet none of the three, nor any other bird except the brown, and now the successful black one, have had anything like the favours that have been accorded to him.

In the early days I was struck by the way in which the Reeves repaired to this bird, and, still more markedly, to the brown one—by neither of whom, most certainly, have they, in

* Such an opinion, however, is of little or no value. The fact is that the fighting is not sufficient, or sufficiently sustained for this point (of which so much is made by those who ignore the real one, the power of the hen, namely) to *come out*.

any sense of the word, been won by fighting, or by any kind of physical activity—whilst leaving all others neglected. Then came coitions, far less frequent, with three or four other birds—perhaps six in all, I do not think more—and now this black-maned lion has become, apparently, the favourite, for the Reeves—it was so yesterday, and has been so again this morning—go to him before they do to the brown or the blue one. Still, they have never abandoned these, and, as far as numbers are concerned, there have never been more at the disposal of this later fancy than at that of the brown bird, at any rate. Yesterday they came down to the latter in a little crowd, and this morning it was much the same thing, though he paired less often than yesterday, or usually. This, however, was not for want of invitations.

How does the case stand then—as far as it is possible to follow anything so long, so intricate, and which one can only observe at intervals, and not from beginning to end? *If* the black-ruffed bird won the Reeves through his fighting qualities—of which I have not seen sufficient evidence—yet, most assuredly, neither the brown- nor the blue-ruffed one did. Yet these two were chosen first, during a comparatively quiet period, when fighting was not nearly so much in evidence as now; so that, having secured harems before anyone else, they should be the fathers of a good many first broods, which, by having been hatched early, would allow their mates good time in which to lay again; and, moreover, it seems but reasonable to suppose that they would secure a certain number of other Reeves later. This ought to make their characteristics predominant in the descendants left by the community in that particular year, and if there were only the same Ruffs and Reeves during following years, the process, it seems likely, would be continued, for, even if old attachments were not remembered, the tastes which had produced them would, in all probability, remain the same. Should new birds, however, join the community, this might introduce a disturbing element, but I cannot learn from inquiry that the number of the Ruffs on these shore-lands is increasing from year to year. I cannot help thinking, myself, however, that, as the Ruffs are undoubtedly polygamous, so are the Reeves polyandrous—in fact, that there must be promiscuity, though

perhaps to a lesser extent in the one sex than in the other. Yet this, to go by what I have seen, would hardly complicate the question of sexual selection. For instance, though all the Reeves were to pair with all the Ruffs, yet those to whom they first united themselves would be more likely to become the parents of the first brood of young than any of the others would be, and so would have the best chance of transmitting their qualities, unless, indeed, the intervals between the first and subsequent unions were of very short duration, and this, according to my observations, was far from being the case. After the hatching-out of the first brood it is reasonable to suppose that the Ruffs by whom any Reeve had been first attracted would prove attractive to her in the same degree again, or, at any rate, would have a better chance of being first chosen.

The reasons which make me think that all or most of the Reeves have paired with all the Ruffs that have been chosen amongst them are the following:—First, there is the definite instance which I have already mentioned. Secondly, I have seen the wish and intent expressed by other Reeves, either through direct solicitation or general deportment. Thirdly, this morning—and I have noted it several times before—the pairing took place, first, on one part of the ground, with the black-ruffed bird especially, and then, considerably later, on another part, with the brown bird especially. As the Reeves did not stay on the ground during the whole interval, I cannot be sure that they were the same in each case, but they came back in a way which makes me think they were, and their numbers were the same or about the same. I cannot help thinking, therefore, that they were the same individual Reeves. Again, if it were a different batch of Reeves that went to the brown Ruff, say, and to the black and other new ones, in a different part of the ground, why should the time for these visits have changed? Why should the same batch, to put it another way, go to a certain bird—an old favourite—at a later time than they used to, if they went to him only? Would they not be likely, after the recuperation of their sexual energies during the night, to feel, as they did before, an early inclination, and gratify it accordingly? But if, as I suspect, the same birds go in batches from one Ruff to another, then the rotation of their visits would be according to the strength

of their inclinations, and we can understand a new fancy taking precedence of an old one. Lastly, the largest number of undoubted Reeves that I have seen on the ground, together, has been thirteen, which, with one away, that I remember, makes fourteen. If we suppose these to be all the Reeves, and if each Ruff that pairs here has a harem, then, allowing six apiece for the brown and the blue one—nor do I think it can be less—this only leaves two between the other four or six.* But the black Ruff's harem must now, I should think, amount to six also, or, at any rate, to four. Without promiscuity, therefore, the numbers would not be sufficient, and even if there be twenty-two Reeves, which is the largest number of Ruffs I have been able to count on the ground, this would still only leave ten between the four or six birds other than the brown and blue ones. Though I cannot feel sure about it, therefore, it seems to me more likely, on the whole, that the Reeve distributes her favours amongst several males. This, at any rate, is very clear, that the male Ruff does not take pains to collect Reeves together, and guard them against rivals. Only in exceptional circumstances have I seen anything like jealousy, and even to these, indeed, the word could hardly be applied. The Ruffs, in fact, do not really seek the Reeves. Rather they are sought by them, and when they have done with them they seem quite indifferent as to where they go or what they do. The two Ruffs with which the Reeve I have spoken of paired successively were quite close together, yet neither of them made the least objection, nor is anything more noticeable than that, as a general rule, to which there are but few exceptions, pairing Ruffs are not interfered with by others. Neither do the Reeves show jealousy, though it would be impossible to be more jealous than female birds can be. The general look of things, in fact, suggests promiscuity.

It was this morning that I saw the longest fight between two Ruffs that I have yet witnessed. I cannot say precisely how long it lasted, not having taken out my watch until some time after it had begun, but it was certainly, I think, under five minutes. These birds fought like demons, and, at the end, I noticed that the white ruff of one of them was crimsoned, here

* I have reason to think that the breeding operations of both the sexes are confined to one meeting-place. (See pp. 369, 377.)

and there, about the throat. Yet neither of the two, as far as I can judge, have yet united themselves with any Reeves, nor have the latter made any advances to them. They have never done anything more, in fact, than dance about at their posts, whilst more fortunate males were being chosen on other parts of the ground. Nor were any Reeves near them at the time of this fight—at least I did not see any, though some were present. These and similar facts incline me to believe that though the fighting of male birds in the breeding-time is, in its origin, on account of the female, yet that it has now a tendency to develop as a separate factor.

May 2nd.—Down at about 6.30, much too late, but in time to see two clear cases of selection on the part of as many Reeves. The first one walked up to the black-ruffed bird—latterly so much distinguished—and touched him on the head with her bill. During the performance of the nuptial rite which followed upon this, three Ruffs, any one of them entirely a match for the chosen bird, stood close by, turned towards it with heads bowed in that strange set attitude which (as well as the quite prostrate one) Ruffs habitually assume in the presence of the Reeve, and which indicates strong sexual feeling. There were also several other Ruffs more or less near. It was impossible not to be very much struck with this. These three birds were all wooers of any Reeves who came to that part of the ground, and had actually been so, if I mistake not, of this very one, on the way to the Ruff of her choice. They were rivals, in fact, yet they stood thus submissive to the choice of the Reeve. I know not, at any rate, what other interpretation to put upon their behaviour, and, if it be the correct one, it certainly bears witness, in a remarkable manner, to the truth of Darwin's views, those views which have received so little justice in the only way that justice can ever be done to them—that of careful and prolonged observation.

Coming to the second example of selection on the part of a Reeve—the second, I mean, this morning—in this instance the choice, though quite as apparent, was not so successfully made. The Reeve in question walked down towards a fine brown-ruffed bird whose head-plumage was of a deep chocolate colour, approaching to black. On her way she was courted by a fine and

very active and vigorous black-ruffed bird, but with him she would have nothing to do ; but, after pausing a little and turning her head with a curious expression that, immediately preceding, as it did, her further onward course, had remarkably the appearance of an adverse decision, she went on to the other one, to whom she unmistakably manifested her partiality. The rival Ruff, however, now ran up, when a scuffle of no duration, and having no particular result, ensued between the two. They were then again separated, and the Reeve, going up to the same bird, invited him as before, but still more markedly. But again the black Ruff intervened (this was before the rite had begun, or was actually on the point of beginning), there was another scuffle, and, as the result of this, he retreated. Here then was a very decided case of partiality—twice shown—and the bird chosen was the victor in the second encounter—in my opinion as the direct result of the favour bestowed on him.* Now, then, one might have expected to see the rite consummated, but these scenes, apparently, had not been to the taste of the Reeve, and after standing, for a little, with a hesitating demeanour, she flew off. Disturbal had influenced her more than the victory of the bird for whom she had shown the most unmistakable preference. Theoretically devoted to “vigour,” it had not attracted her even when favourable to her desires. In all probability, however, she would not have acted in the same way, in the quite early morning, but later, after the first saturnalia, the Reeves, as I have often noticed, are much more modest in their deportment, and the Ruffs themselves show less ardour. Such times are often more favourable for detecting the true actions and motives of the female than when these are more apt to be obscured by the general commotion and excitement that obtain.

In the afternoon I am at the watch-house about 4. There is a considerable amount of activity, nine or ten Reeves being sometimes on the ground together, the Ruffs varying in numbers from about that to some fifteen. Of these only four are paid any attention to by the Reeves, *viz.* the brown, the blue, the black, and the brown-ruffed and black or chocolate-headed bird

* A bird's energy in battle is in proportion to the impulse from which it springs, and this factor is of such importance that it needs a great deal of physical inequality to nullify it.

of the last-mentioned incident. The selection on the part of the Reeves is most evident. They take the initiative throughout, and are the true masters of the situation. Quiet and unobtrusive as they are, compared to the Ruffs, their whole manner betrays conscious power. When several are crowded together the effect of this is much lost, as is natural, but it is often very marked with single birds. Though there are some dozen cases of coition, there is not one of interference during the act itself, one only immediately preceding it. Acquiescence in the Reeve's choice, by every other bird on the ground, is the general and marked feature.* My statement as to the three Ruffs who, this morning, so prominently exemplified this law, being all equal, as fighters, to the favoured rival, was fully borne out by the fighting between all four of them this afternoon. The brown-and-black Ruff, too, seemed inferior, if anything, to the black one whom he defeated in the morning, though, to be sure, that was a small affair, and so were these. Short tussles, in which one bird desists before the other, rather than is defeated by him, are the common feature. Prolonged, envenomed fights are rare.

Later on, the second of two coitions was interfered with, almost in the act, by a Ruff that ran from the other end of the ground. This was a bird who had received no notice, himself, from any Reeve. Such cases are very rare.

May 3rd.—On the spot about 5 a.m. It was raining and blowing as I walked down, and soon came on to pour. This weather seemed to affect the birds. They were more erratic, I thought, ran about more widely, got more out of their places. Pairing took place, but not frequently, whilst I was there. I only saw it with two Ruffs, the usual all-brown one, and another of the brown-ruffed birds, with black or deep chocolate-coloured head, who stands on the opposite side of the ground to where the other one, who has paired before, does. This is a fine, well-made bird, who has ruffled, and fought before any Reeve that came near him, day after day, with the rest. But all this has been of no avail, and until now, when a Reeve comes deliberately to him and may be said to court him, he has never entered into nuptial relations whilst under my observation, nor, as I feel sure, at all. He can fight, too, as far as I can see, as well as another, but

* Cf. also *ante*, pp. 293 and (1906) 424.

fighting, or the capacity to fight, has done nothing for him—he has had to wait until chosen. Nor can he have been chosen as the most vigorous bird, for not only is he not *specially* distinguished in this way, but, as the Reeves have not, hitherto, come much into his neighbourhood, he has had no particular opportunity of showing such extra vigour, did he possess it. Why, then, has he been chosen? All I can say is that he is a handsome bird, but this he has been all the time. But without a doubt, as it appears to me, and whatever the motive, on each occasion, may be, it is the Reeves who choose the Ruffs, and to them, and not to the latter, belongeth power. The very fact that the Ruffs have places where they stand and wait till the Reeves come to them—for a few dartings about over the course do not nullify this general truth—that they do not leave their end of the ground, when the Reeves are not there, and establish themselves at the other end, where they are, is almost, of itself, proof of this. The whole scene and course of events would be different if it was a mere matter of the hardest-fighting birds getting the greatest number of Reeves, and of the Reeves being won in this way. But, as far I can see, things could not proceed on this rude principle. It would be a mere chaos, hardly to be settled. Nature has worked it out much better. The Reeve, most undoubtedly, both has and habitually exercises the capacity of choosing, and her presence and personality affect the Ruffs in such a manner that her choice is generally respected. Even if, on any occasion, it is not, she has only to wait for another opportunity, nor can she ever, I believe, be made by force to act against her will. If unduly pressed or annoyed she can always, and often does, fly away. She is supreme, in fact, on the pairing-ground, but the position of the Ruffs is a far less satisfactory one. They have to await her good pleasure, and if the majority do not wait for it altogether in vain, as seems probable, they must do so, at any rate, judging by what I have seen, for a very considerable time.

I have now found the second Ruff pairing-ground, or, if the smaller place that looked like one be really so, the third. Of its existence I have been convinced for some time, but, hidden always in my dark observatory, it is only on this last day that I have had time to do anything outside it. However, here it is,

almost as large as the other, and lying, like it, amongst pieces of cut turf that have grown to the soil, having, in fact, just the same characteristics and appearance. During the time I watched it—lying flat on the ground at only a short distance—there were some ten or twelve Ruffs there as a maximum, but, more often, from five or six to seven or eight. Of Reeves there were, at one time, some eight or nine, but usually only one or two, or three or four—quite as peopled, therefore, as is the other resort at a similar hour. Here, again, I saw good evidence of the power of refusal possessed by the Reeves, for when pestered by Ruffs that they did not want, on their becoming too obstreperous, they, on several occasions, flew off. At length, however, at about 5.30, one of them walked over, in a way not to be misunderstood—or that I, at any rate, cannot now mistake—to a Ruff at the further side of the ground, who had been the least forward of any, choosing him out of, perhaps, half a dozen, and nuptial relations would certainly, thereupon, have been entered into had it not been for the backwardness of the Ruff itself. This Reeve, however, stayed by him, at first alone and then in company with some three or four other Reeves that subsequently flew in, and between one of this group and the Ruff in question coition was ultimately effected. I have little doubt, myself, that it was with the Reeve who had first singled him out, but, in any case, this bird had shown her partiality quite plainly before. To my eyes this particular Ruff—a stranger to the ground I have watched—seemed, rather, the plainest than the handsomest of those present. Closer inspection, however, showed that he had a full and ample ruff of speckled black and silver or silver-grey, with velvet-black head and head-plumes, and a face the naked skin of which was of a delicate greenish shade. Perhaps, therefore, though there are showier birds, this one is more æsthetically handsome. His ruff is really a very fine one. Here, then, is one more case of marked predilection on the part of the female bird.

This second pairing-ground is some three hundred and eighty paces from the other one, and almost in a straight line with it. As said before, it is almost if not quite as large as the other, and has the same appearance of having been habitually used by the birds year after year. It accounts for many new birds which

I have latterly seen at the old place, for, as I have remarked during the course of this afternoon, though each one has its more special *habitués*, they each fly from one to the other. This of course takes away all value from the fact of several very handsome Ruffs, as they seem to me, never having paired with any Reeve on the ground which I have been watching—or my never having seen them do so, to speak more precisely. They were not at their own club, so to speak, but merely visitors from another one. At this other one, where I have already seen several of them, they may be in as much request as the brown, blue, or black-maned birds have been here. And yet there is no particular reason why they should be. Since the males of this species differ so greatly from one another, there is no general type of coloration which might indicate a standard of taste, and why should the average Reeve's taste conform to our own? Moreover, our own would differ, but if we try to imagine an average one and compare it with that of the birds whose elections I have seen, the remarks which I have already made on this head* seem to me to apply. On this part of the subject, however, I do not wish to lay much stress. Much more evidence would be needed before, upon such observations, alone, one could arrive at any certain conclusion, and moreover it is clear to me that, if election is made by the female bird at all, it is made, in large measure, through the eye. But the Reeves do choose, they do make election, of that I have had clear evidence repeated again and again. Their partialities are as real as our own, and they are not founded on the fighting powers of the bird that is the object of them, nor yet made inoperative through these. What, then, is the exact significance of a pugnacity which does not appear to be of use to the male in proportion to the extent to which it has been developed in him? To answer this question it may be necessary to look to the past as well as to the present, for both are equally the province of evolution. That Ruffs, at one time, fought more and courted less, and that they will, as time goes on, fight still less and court still more, does not seem to me an altogether improbable supposition, in view of the state of things at present existing, for with much fighting—though less than is generally imagined, and rather collectively than indi-

* Cf. *ante*, pp. 165-6.

vidually—there seems but little need of it, and with every evidence of susceptibility, on the part of the Reeve, something yet seems wanting in the display of the male. I could almost imagine that, natural selection having first brought about the larger size, protective plumage and hard carunculated skin of the latter, sexual selection had more recently got to work on all three. What, in fact, could be a more potent solvent of masculine war-like prowess, as a factor in courtship, than an increasing supremacy of the will of the hen, which, not being influenced by such prowess, gradually rendered it nugatory? To this solvent, as it appears to me, the hardy virtues of the Ruff are in course of yielding. His fighting, more particularly when it has directly to do with the Reeve*—when her presence is the immediate cause of it—seems the outcome of a generalized state of excitement to which actual achievement bears no very fixed relation. For the most part it is vagrant, desultory, nor does it last long. Furthermore, the birds either do not hurt each other at all, or but very little, so that a remark made by the authors of an interesting paper on the sexual relations of spiders, to which I have before referred (*ante*, p. 210), would apply almost as well here. It is this:—“The males were rushing hither and thither, dancing opposite now one female and now another. Often two males met each other, when a short passage of arms followed. The males were very quarrelsome and had frequent fights, but we never found that they were injured. Indeed, after having watched hundreds of seemingly terrible battles between the males of this and other species, the conclusion has been forced upon us that they are all sham affairs, gotten up for the purpose of displaying before the females, who commonly stand by interested spectators.” It is something like this with the Ruffs. Some influence seems at work to turn into mere pageantry the grim reality of war. I do not say that the battles—even the shortest—are fictitious—far from it—or entered into with any conscious idea of display, merely, nor have I observed that the hen bird seems specially interested in them. But the stream of evolution seems to be running in this general direction. The

* It has appeared to me—and the fact would be significant—that these characteristics are less marked later in the season, when the hens, being all sitting, do not come to the ground at all.

scene, speaking generally, is of the following description : Some dozen or so of Ruffs are standing or sitting—often dozing—together, quite amicably, on their pairing-ground. Enter a Reeve. There are prostrations, ruffings, bustlings about, dartings hither and thither over the course, with occasional short, sharp encounters, and out of the whole of this the Reeve, quite coolly and as if she knew her business, picks her bird. With this object of her choice she, as a rule, can and does unite herself. If she cannot she flies away. Another time her object will be accomplished. Nothing has been gained by the unfavoured rivals let them have blustered and skirmished “never so.” She is not to be compelled, she is not to be intimidated, her caprices cannot be overruled. Thus, practically, she has the power, and it is along the lines of an increasing recognition of this fact on the part of the Ruff that things, as I believe, are advancing. This would lead to more and more reliance being placed by the male on the power of pleasing the female, and less and less upon the likelihood of winning her by force.

As already intimated, I have seen no evidence of the Reeve being impressed by the fighting qualities, or by the “vigour,” as such, of the male, or that these are elements of paramount importance in his courtship. In saying that a bird notably deficient in this way, and of a sluggish temper in general, is likely to suffer through such defects, I say all that the facts, so far as they have fallen under my observation, warrant me in saying, which is surely not much, for such a bird loses much more through not being a brisk suitor than by being a dull fighter. The above, however, if we exclude birds not yet in full plumage, and whose position, on that account, is altogether subsidiary, is almost a supposititious case. With one or two doubtful exceptions I have seen no mature-looking, full-plumaged Ruff of the sort. What I have seen strong and sustained evidence of is that the Reeve has the full power of choice, and that she exercises it in such a manner as to make it evident that she chooses this or that bird for himself, for something about him, that is to say, by virtue of which she likes him better than another, either always or at this or that time. I believe that this something is, in the main, his appearance,

and that in so far as vigour may be a selected quality, it is selected only incidentally to this, which, however, would often be the case.

In conclusion, I would urge that the facts here brought forward by me, in regard to four different species of birds, are, both singly and cumulatively, strongly in support of Darwin's second great hypothesis of sexual selection, and I believe that, as denial from the chair is replaced, or supplemented, by evidence from the field, the views of that great naturalist and reasoner will be triumphantly and often most strikingly vindicated.

NOTES AND QUERIES.

MAMMALIA.

Variety of Badger.—In 'The Zoologist' (1904, p. 227) I described a variety of the Badger in which all those parts which are normally black were of a pale brown colour. A similar animal was recently trapped in Hawkstone Park, Shropshire, where there is a large and old-established earth containing more than one pair of Badgers. In this example, however, the eyes were *pink*, although the animal could not be styled an albino.—H. E. FORREST (Hillside, Bayston Hill, Shrewsbury).

Melanic Short-tailed Vole.—On my way to Norfolk I stopped at Ely, and bought a half-grown specimen of the above species. It was of a pure jet-black. As animals of this colour are much rarer than either cream or white, its occurrence is of much interest to collectors of varieties. It was caught in a mowing-field near the city on July 7th, 1907.—J. WHITAKER (Rainworth Lodge, Notts).

Daubenton's Bat (*Myotis daubentoni*) in Hertfordshire.—On Sept. 21st I saw several Daubenton's Bats on the Grand Junction Canal in the neighbourhood of Grove Mill, near Watford. I am not aware of any previous Hertfordshire record, but this Bat is probably not uncommon in suitable localities, and has merely been overlooked.—CHAS. OLDHAM (Knutsford).

AVES.

Status of the Grey Wagtail.—In 'The Zoologist' (*ante*, p. 151) Mr. W. H. Parkin asks for information relating to the status of the Grey Wagtail (*Motacilla melanope*) in the north. In Wensleydale, Yorkshire, a pair of Grey Wagtails are to be found by most of the larger becks running into the River Ure, and *M. melanope* is fairly common, though local, by the River Ure itself. Last summer I saw a small party of eight by one of the falls at Aysgarth, and this constitutes the largest number I have seen at one time in the same locality. I think that *M. melanope* is slightly decreasing in numbers; to what this is due I cannot say. The Grey Wagtail occurs in Wharfedale, where it is local and not very numerous. In the neighbourhood of

Leeds I have noticed it in the spring and autumn when it is migrating up and down Airedale respectively; a few also spend the winter a little to the south of Leeds. In Wensleydale both the Pied and Yellow Wagtails occur, but the Pied, though common, is far exceeded in numbers by the Yellow Wagtail, which is very generally distributed; this is contrary to my experience of *M. raii* round Leeds, where I have found it to be local and far from common.—S. HOLE (Rocky Bank, Belle Vue Road, Leeds).

Nesting of the Lesser Redpoll (*Linota rufescens*) in Kent.—My inclination to place this species in the category of a rare breeding bird for the county is based on many years' experience in ornithological work among the birds of the hop-country, having resided there the greater part of my life, and though having many friends still resident, who have done likewise, it is a significant fact that not one of us had a single authenticated record of these birds ever having bred. It has now fallen to my lot to record three nests, all of which are of recent date. The first of these was found on May 3rd, 1896, by Mr. R. Goodchild, of Farnborough, in one of his father's orchards, and was placed high up in a large greengage tree, and contained three eggs; this nest I did not see *in situ*, but Mr. A. H. Meiklejohn was with me at the time the nest was shown, and we had no difficulty in identifying the nest and eggs, both of which were typical. On the eve of May 24th of this year I received a telegram from Mr. T. Gillah, of Forest Hill, to the effect that he had found a nest containing four eggs at Lower Sydenham (not more than six miles from the heart of London). Losing no time, I at once cycled over, meeting Mr. Gillah at Lower Sydenham Station, who took me to the nest. This was placed in a small beech tree, in a narrow strip of wood on the edge of a field, about fifteen feet from the ground. The bird left the nest as I commenced to climb the tree, and remained there for some time, giving me an excellent view of her. We also visited another nest a short distance away. This was situated in a small whitethorn, but unfortunately was forsaken. References to this species for the county by past writers are so meagre that I have not thought it worth while to refer to them. In conclusion, it is curious that, having had no previous experience with this species, I should find it breeding within a few miles of my own house.—PERCY F. BUNYARD (57, Kidderminster Road, Croydon).

An Albino Rook.—We have all read, in the 'Natural History of Selborne,' of the two white Rooks "having their bills, legs, feet, and claws milk-white," which were wantonly destroyed by a "booby of a

carter"; and perhaps the occurrence of white or light-coloured birds amongst their sable relations is no great rarity. About the middle of May last I saw a Rook, about three-parts grown, of a uniform creamy or rather dirty-white colour, except a pale brown patch about the size of a shilling on the left side of its head, including the ear-covert; its legs and toes were white, and the beak very ivory-looking; its eyes were pink and apparently sightless, as is often the case with an albino (or at least my experience points in that direction), and its immaturity was indicated as much by its size as the feathered condition of the base of the beak. The plumage was both ragged and dirty, the bird having been kept in confinement for some fortnight or three weeks previous to its death, and I suppose at the time of its capture it had been crippled in some way, as the little girl to whom it belonged told me she threw her hat after it and knocked it down, and that its appearance amongst the other young Rooks was noticed as soon as it was able to leave the nest and get out upon the branches.—G. B. CORBIN (Ringwood, Hants).

Little Owl (*Athene noctua*) in Bedfordshire.—Bedfordshire is without doubt indebted to the late Lord Lilford for the addition of this nowadays resident species to our local fauna, who, after several years' perseverance, succeeded in establishing this species at Lilford, where in 1889 a pair were found with eggs, and other pairs were afterwards recorded from year to year nesting around that locality. In 1889 there is a doubtful record of one killed at Meppershall, in Bedfordshire, some thirty miles distant from Lilford, in the south-east of the county. In 1893 two were obtained at Woburn and Millbrook, in South-west Bedfordshire. In the spring of 1894 it first appeared at Chawston, in the north-east corner of the county, and from that time appears to have made a stronghold of this neighbourhood. The unusual number of old pollard elms that may be seen in the locality is probably the secret of its rapid increase there. In 1897 several were obtained in various other parts of the county, including Turvey, on the west border, and at Cranfield, a few miles further south. In 1898 increased numbers were sent in to the local taxidermists, two of which, shot at Southill and Chicksands Priory, were said to be birds of the year; one was also caught in a brick-trap in a cottage-garden at Lidlington. In 1899 and 1900 localities from which they are reported became more and more general. Luton, in the extreme south, is now first included in the latter year. In 1901 a nest of four young ones was safely reared from a nest at Green End, Great Barford, and also another nest was said to have been successfully reared off in another locality. A female killed at Southill, May 22nd, from along the roadside, was nesting at the

time, a perfect egg being taken from the bird. In 1902 several pairs nested at Chawston and Wyboston, and two young were taken from a nest at Harlington. In 1903 seven pairs were reported as nesting, including a nest at Carlton in a dead tree lying on the ground, and the one reported at Ampthill ('Field,' July 18th). In 1904 young were also reared successfully at Elstow, Renhold, Kempston. From that year its nesting haunts and the numbers killed have been far too numerous to be worth individually recording; if one might venture to estimate their present numbers in that county it would be upwards of two hundred to three hundred pairs, as in every parish they appear to be known and probably nest. It is already the commonest species of Owl, and undoubtedly still on the increase. In April of the present year I saw no fewer than four during a day's ramble, and others on numerous occasions since during visits to that county. Our local taxidermist kept a record of this bird as sent in to him until he had received upwards of fifty, and up to the present time probably three times that number have passed through his hands. He adds:—"I never yet found a feather in their stomachs, always insects or mice. One killed at Goldington was feeding on a Water Shrew. The sharp winters do not seem to affect them in the least." The increase of the Little Owl has unfortunately been accompanied by the decrease of the one-time common Barn-Owl. They are exceedingly noisy at night, and soon make their presence heard. There is no doubt but that in a few years this species will extend its distribution over this country to a very considerable extent.—J. STEELE-ELLIOTT (Dowles Manor, Salop).

Variety of Coot's Eggs, and Others.—A river-keeper, who has a collection of eggs, showed me four taken late in June, and he supposed they were other than those of the Coot, but they undoubtedly belonged to that species—and, indeed, the man himself said the nest was very like a Coot's. It is well known that the dark spots upon the eggs of this noisy, quarrelsome bird are generally small, and equally distributed over the entire surface of the shell, but in this case the spots were large, and all collected at the larger end—at least upon three out of the four—and the ground colour being somewhat of a lighter stone shade than usual, the markings were the more conspicuous. As there were but four eggs in the nest, these were slightly incubated, and, being late in the season, it is quite possible they were the produce of a second brood, or at least of a second nest where the first had been robbed. I recollect many years ago taking eggs of the Moorhen not far from the neighbourhood where the above-named Coot's were found,

and the larger ends of those were clouded with reddish brown, as if all the usual spots had collected together, and were then distributed from a common centre, the colouring matter growing gradually lighter as it approached the middle of the egg, until lost in the general ground colour. In egg variation, is the explanation easy as to why the markings are so often gathered at the larger end?—as with this thought I was induced to give a casual glance at the contents of my small oological cabinet, and was interested in finding how many species show such variation, the peculiarity being very marked in Red-back Shrike, Reed-Wren, House-Sparrow, Common Bunting, Blackbird, Redshank, Snipe, and several other species.—G. B. CORBIN (Ringwood, Hants).

Ruff near Chester.—I received (Sept. 12th) an immature specimen of Ruff (*Machetes pugnax*), which had been shot on the Dee Marsh, near Chester, and I am told that several other specimens were seen at the same time, but fortunately they did not venture within gunshot. Every year one or more of these interesting birds are more or less observed in the same locality, no doubt on the autumn migration.—A. NEWSTEAD (Grosvenor Museum, Chester).

Sandwich Tern in Norfolk.—On Sept. 19th I had a good view of a fine adult Sandwich Tern (*Sterna cantiaca*) perched on the outlet of the town-sewer at Hunstanton, and was able to bring my boat within thirty yards of it. By the aid of good glasses I could plainly see the (for a Tern) long black legs, and, compared with a young Tern of either the Common or Arctic species which sat by its side, it looked quite a large bird. Two days later I saw what was probably the same bird near the pier. One rather wishes that the protection of the eggs of "Terns, Sea-Swallows, Pearls, or Dip-ears" (all species) by the Norfolk County Council could be extended to the birds throughout the year, but happily there is no wholesale slaughter of sea-birds for the feather-market on the East Anglian coast.—JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds).

Nesting of the Lesser Tern (*Sterna minuta*) in the Outer Hebrides.—On the north-west side of North Uist, almost in a line with Loch Maddy, there is a small sandy island called Kirkibost, the northern portion of which is covered with dunes, sloping gently down to high-water mark, which is fringed with small pebbles and the usual flotsam and jetsam peculiar to this part of the shore, and is here the home of a few pairs of Arctic Tern (*Sterna macrura*). While watching these birds my companion (Mr. T. Aldworth) called my attention to

three among them that appeared to be of more slender build and of more graceful flight, suggesting to us at first Roseate Tern, and from their behaviour we felt certain that they were breeding. We at once decided to watch, taking up our position behind one of the dunes. We had barely time to make ourselves comfortable and fix our glasses before one of the birds alighted, and was immediately identified as a Lesser Tern (*S. minuta*); a diligent search, however, failed at first to reveal the eggs. Having resumed our watching, the bird was soon down again, and commenced scratching and shuffling about, at last settling herself down. We then made a concerted rush to the spot as the bird flew off, revealing to our view, though partly covered up by the sand, two eggs, which unfortunately she had broken in her attempt to bring them to the surface of the drifting sand. They were quite fresh (June 18th). As far as I have been able to ascertain, this is the first authenticated record for the Outer Hebrides, and I believe the most northern—and certainly the most north-westerly—for the British Islands (Aberdeenshire). Of late years eggs *appear* to have been taken in the Orkneys (Saunders's 'Manual,' p. 651); Aberdeenshire (Seebohm's 'Eggs of British Birds,' p. 103); Aberdeenshire (Irby's 'Key List,' 327, p. 55). — PERCY F. BUNYARD (57, Kidderminster Road, Croydon).

White Ringed Plover.—Through the kindness of Mr. Turner, of Swithland, I have been able to add this very rare variety to my collection. Varieties of wading birds are rare. It was shot in Westray, Orkney.—J. WHITAKER (Rainworth Lodge, Notts).

Food of the Black-headed Gull.—Referring to the circulars which have been addressed to farmers, &c., by the Cumberland County Council relative to the harmlessness or otherwise of this Gull, may I be permitted to express my views as based on observations in Upper Wharfedale in 1905, at which place I spent my holiday. A good portion of my time was passed between Cray and Buckden Pike—a wild and desolate tract, where the Lapwing breeds in some numbers. Day after day whilst there Black-headed Gulls used to visit this tract, each one of which was invariably mobbed by Lapwings, after which, in some cases, they flew away to some distance, but frequently the harried birds would only fly to comparatively short distances, quickly returning, only to be again repulsed. This went on more or less during the whole time I was there. These visits of the Gulls were not mere chance visits across the sphere of influence of the Lapwings in passing from one part of the country to another. They were here

for some special purpose, and although no direct testimony can be given by me as to the Gull's egg-eating propensity, the presumptive evidence during my stay was so cumulative as almost to amount to a demonstration. In this neighbourhood I had suspected this habit for some years, but the data rested upon insufficient evidence. From a humanitarian point of view I have been somewhat reluctant to mention the above conclusions, but sentiment should not blind us to the true nature of facts.—G. P. BUTTERFIELD (Wilsden).

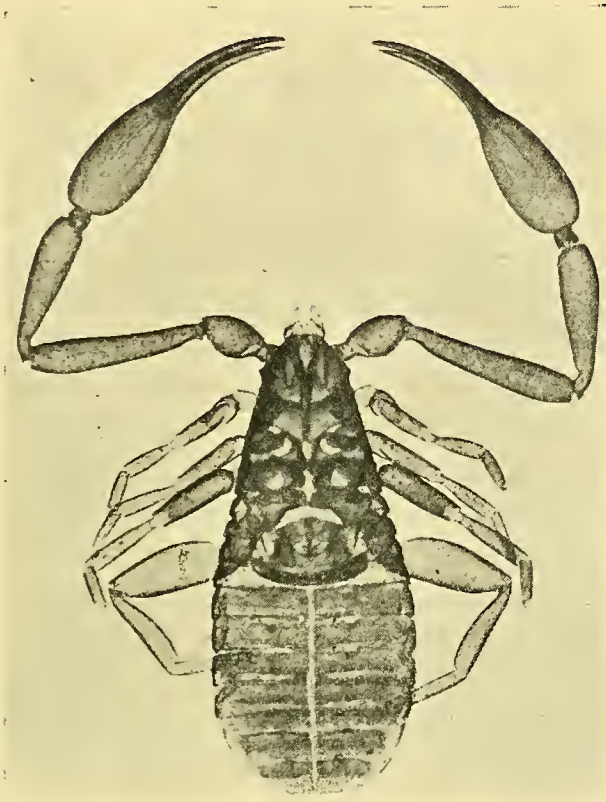
Little Auk in Derbyshire.—When at Sudbury in June last I had an opportunity of inspecting a hitherto unrecorded specimen of the Little Auk, *Mergulus alle* (L.), which is in the possession of Mr. J. Bottrell, of Sudbury. It was picked up dead on the ice of Sudbury Pond on November 29th, 1904, and sent to A. S. Hutchinson, who fortunately noted the date on the case. The bird had been seen about the pond for a day or two previously, and it is interesting to note that another example was shot on the Trent near Donington Park on November 24th, within a day or two of the same time ('Zoologist,' 1906, p. 139).—FRANCIS C. R. JOURDAIN (Clifton Vicarage, Ashburne, Derbyshire).

Fulmar (*Fulmarus glacialis*) on the Suffolk Coast.—On Sept. 30th I received from a gentleman in Lowestoft a parcel containing the head, feet, and wings of a Fulmar Petrel, which he had a day or two before picked up, evidently uninjured but dead, on the beach at Corton, two or three miles north of Lowestoft. The head was perfectly white, and the bird was undoubtedly fully adult. Like two or three others I have myself met with thrown up by the tide, I have no doubt the bird had gilled itself in the Herring-nets on the fishing-grounds and been drowned, to be thrown back overboard and carried south and shorewards by the tides. From report, this species appears to be by no means rare thirty or forty miles out in October, consorting with the Gulls, which find a genial occupation among the Herring shoals.—ARTHUR H. PATTERSON (Ibis House, Great Yarmouth).

ARACHNIDA.

Chelifer cancroides (Linn.) in Manchester.—This false Scorpion is well enough known to naturalists, but can hardly be called an abundant species in this country. Our present authority on the group, Rev. O. Pickard-Cambridge, when writing his Monograph in 1892, could refer to only four British specimens, all taken in London, and now in the British Museum. Since that date the species has been

discovered in various parts of England and Scotland, in stores and in stables. The accompanying micro-photograph is kindly supplied by Messrs. Flatters and Garnett, Limited, who both prepared the slide



CHELIFER CANCROIDES (*enlarged*).

and took the micro-photograph, and is from a specimen (male)—one of two—obtained in the shop-drawer of a Manchester bakery in 1906. This species is distinguished from the other known members of the genus by the long, slender pedipalps, or second pair of appendages.—G. A. WHYTE (7, Charlotte Square, Edinburgh).

OBITUARY.

PROFESSOR CHARLES STEWART, F.R.S.

CHARLES STEWART, an apparently light-hearted zoologist who neither wore his sorrows on his sleeve nor his scientific attainments as a cloak of righteousness, passed away, to the real regret of many sincere friends, on September 27th. He was born in Plymouth sixty-seven years ago, and has held the office of Conservator of the Museum of the Royal College of Surgeons for the past twenty-three years. His scientific career has been varied and important. After studentship at St. Bartholomew's Hospital he was qualified as a member of the Royal College of Surgeons in the year 1862. Admitted as a Fellow of the Linnean Society in 1866, he became President of that Society from 1890 to 1894. He was a Fellow and Vice-President of the Royal Microscopical Society; Treasurer of the Anatomical Society of Great Britain and Ireland from its foundation to the year 1891; Fullerian Professor of Physiology at the Royal Institution from 1894 to 1897; admitted a Fellow of the Royal Society in 1896; and was also an LL.D. of Aberdeen University. We first met Professor Stewart when he was Curator of the Museum of St. Thomas's Hospital, now many years ago, and subsequently not infrequently met him at the meetings of the Entomological Society of London. He had a love of all things zoological, and his visits to the British Museum (also not infrequent) were for the identification of the most diverse creatures. He thus gave the Museum of the Surgeons a more general zoological character, especially illustrating our conceptions of organic evolution.

But he was a man of many parts and many interests—equally at home in his museum or at the Savage Club; he was the most genial of all Professors, and the most learned of all the really genial men we ever met. He has left many friends and a deserved reputation.

NOTICES OF NEW BOOKS.

Wild Life in Australia. By W. H. DUDLEY LE SOUËF, C.M.Z.S.,
&c. Whitcombe & Tombs, Limited.

THIS is by far the best and most interesting book on the general Natural History of Australia that has appeared since Bennett's 'Gatherings of a Naturalist.' It is crammed with observations on animal life, and is full of illustrations acquired through that truthful medium—the camera. Mr. Le Souëf, as Director of the Melbourne Zoological Gardens, is familiar with his subject, and in this book he confines himself to descriptions and impressions of a fauna in its natural and wild environment. When, as he tells us—and as unfortunately we too well know—that fauna is "fast disappearing," his pages are calculated to be of lasting importance.

Without laying much stress on evolutionary hypotheses, Mr. Le Souëf has contributed much first-hand information on the relation of the colours of animals to their environment, and his observations throw much light on this intricate question. For the ornithologist there is abundance to charm and instruct. The account of a vast nesting colony of the "Straw-necked Ibis" may be taken as a sample. The swamp at the time of visit was about six hundred acres in extent, and the minimum number of these birds was estimated as two hundred thousand, occupying about three hundred acres. This Ibis does not appear to be a mere automaton in mental process. "On one occasion they started nesting, and many eggs had been laid, when some very hot weather came on and the shallow water dried rapidly up. The birds evidently realized that it would be dry before their young were hatched, so they deserted it in a body, and left the eggs for the Crows to feast on." Their food consumption is enormous. "The contents of an average crop of an adult bird, by actual counting, were 2410 young grasshoppers, five fresh-water snails, several caterpillars, and some coarse gravel, which,

multiplied by 200,000, brings up to a big total of 482,000,000 odd grasshoppers, as well as vast numbers of caterpillars and snails." Such facts give sidelights to the carnage that occurs in the struggle for existence! We could multiply extracts that relate to animal bionomics, but our better course is to recommend the perusal of the volume.

We have only one fault to find, or rather one suggestion to make, should another edition appear. Both animals and plants are, as a rule, only referred to by their popular or local names. This may be all very well for an Australian colonist, but the addition of the generic and specific name would vastly assist English naturalists, while for foreign readers it is almost imperative.

The Birds of Yorkshire; being a Historical Account of the Avifauna of the County. By T. H. NELSON, M.B.O.U., with the co-operation of W. EAGLE CLARKE, F.R.S.E., &c., and F. BOYES. Two vols. A. Brown & Sons, Limited.

IN ornithological literature the county histories have gradually acquired a higher standard both in text and illustration; these two volumes have reached the high-water mark! There is such a fulness of detail relating to the large avifauna of Yorkshire, and such a wealth of illustration, that this publication can well rank higher than many volumes that are entitled Histories of British Birds. The Yorkshire Naturalists' Union may be congratulated on their enterprise, while Mr. Sheppard, the Hon. Secretary, has carefully acted as its foster-parent through the press.

There has been a considerable discussion in these pages as to whether the Twite may be considered as one of the "fosterer-Cuckoos." It was erroneously reported as such near Aberdeen by one correspondent, and absolutely denied as ever being such by another writer. In the list of birds acting in this capacity to the Cuckoo we see that Mr. Nelson includes the Twite on the authority (H. B. Booth MS.).

The shore and sea birds would alone make the avifauna of Yorkshire famous. The Dunlin breeds, and not too sparingly, in several areas of the county, and some beautiful illustrations

of the nest of that bird appear in the second volume. "The Curlew's ancestry in Yorkshire is of great antiquity, for it is mentioned in connection with the Nevell banquet at Cawood in 1466, the items at the feast including 'Curlews 100' (Leland's 'Collectanea')." An excellent photo-block illustrates young Curlews just hatching. The number of photo-blocks of nests and eggs in these volumes give the best guarantee for the preservation of many species. The gun is now much less used by collectors, and nests will frequently have little molestation by the ornithologist who only "takes" them with his camera.

It is, however, unnecessary to give extracts from volumes which most ornithologists and lovers of birds probably already possess. The work has been compiled and written with the assistance of every competent observer and recorder in Yorkshire, and it is in the wise selection of records (for many given in all good faith are sometimes mistaken and not infrequently erroneous) that Mr. Nelson and his colleagues have shown an adequate discretion and a judicious discrimination. This county history can rank as a trustworthy history of British Birds, and that is probably the highest praise that can be given to a local publication.

Malaria; a Neglected Factor in the History of Greece and Rome.

By W. H. S. JONES, M.A. With an Introduction by Major R. ROSS, F.R.S., &c., and a concluding Chapter by G. G. ELLETT, M.B. Cambridge: Macmillan & Bowes.

THE argument in this book is of transcendent interest. Was the decline in the Greece of Art and Philosophy and the Rome of Law and Conquest incidental to moral degeneration, or was it due to a physical cause?—the moral degeneration being a consequence to malaria. Mr. Jones has apparently proved his thesis that malaria was introduced and spread in the area of those two great civilizations, and in doing this he has pursued the historical method, and searched for his proofs among the best of the classics.

So far the argument has not entered the domain of zoology; the full discussion of this point has been allotted to Major Ross, who has found renown in the discovery that the multitudes of

minute animal parasites of the blood which produce malarial fever are carried from man to man by the agency of a class of gnats called Anophelines, which breed in small pools of water on the ground. "Where such pools are numerous, in the hot months of summer and autumn, as in marshy localities, the insects generally abound; and if a patient with the parasites in his blood enters the locality, they become infected by biting him, and then pass the microbes on to any healthy persons they may feed upon subsequently." The suggestion is that the conqueror of Greece was Malaria, not the Macedonian or the Roman, but the disease-carrying Anophelines—a mosquito sufficient to destroy the mighty spirits of the Greeks and Romans. The dire result of persistent and intermittent malaria on the human system, the human will and energy, is detailed by Dr. Ellett.

This small book, therefore, raises a question which is second to none in human interest, and if its argument is accepted, then the mightiest civilizations that the world has produced may be overthrown by the agency of a horde, not of barbarians, but of insects—humble dipterons—gnats or mosquitoes, as one may prefer to call them—the Anophelines of entomology. This, indeed, is a romance in zoology: oh, that it might have been suggested to Gibbon and described in his immortal prose!

EDITORIAL GLEANINGS.

IN the 'Yearbook of the Department of Agriculture for 1906,' recently published at Washington, Mr. Henry Oldys has published a most interesting paper on "Cage-Bird Traffic of the United States." We read that "three hundred thousand cage-birds, largely Canaries, are annually imported into the United States. Some of these are destined for zoological parks and a few for private aviaries, but the great majority find their way into the hands of those who desire to have a cage-bird or two to brighten the home. This yearly influx of captive birds may seem large, considering the comparatively small number usually in evidence; but it must be remembered that they are scattered over an area of more than three million square miles and are distributed among a population of more than eighty millions, which allows but four birds a year to every one thousand persons or about four hundred birds to a city of the size of Columbus, O.

"The practice of keeping live birds in confinement is world-wide, and extends so far back in history that the time of its origin is unknown. It exists among the natives of tropical as well as temperate countries, was found in vogue on the islands of the Pacific when they were first discovered, and was habitual with the Peruvians under the Incas and the Aztecs under Montezuma. Caged birds were popular in classic Greece and Rome. The Alexandrian Parrakeet—a Ring-necked Parrakeet of India—which is much fancied at the present day, is said to have been first brought to Europe by one of the generals of Alexander the Great. Before this living birds had been kept by the nations of Western Asia, and the voices of Bulbuls and other attractive singers doubtless added to the charms of the hanging gardens of Babylon, while in China and Japan the art of domesticating wild birds has been practised for many centuries.

"It is not difficult to account for the motive that underlies this widespread habit. The same spirit that leads to the domestication of wild flowers for adornment of the home and the pleasure derived from their beauty or fragrance is responsible for the similar transplanting of wild birds from their natural homes to those of their captors, and the parallel extends to the subsequent production of new varieties.

“As a people, Americans have less of this spirit than prevails elsewhere. Despite the multitudes of birds weekly entering the country—a single vessel will occasionally deliver ten or fifteen thousand—our interest in avicultural pursuits is comparatively slight. In Europe aviaries are numerous, and their owners maintain a common interest by means of avicultural organizations and periodicals. Bird shows are held annually or oftener in London, Berlin, and many other European cities. A friendly but keen rivalry prevails among the owners of aviaries as to which shall first succeed in breeding species that have not previously been bred in captivity, or in producing new hybrids. The journals and magazines devoted to aviculture serve as a medium of exchange of methods and experiences, and keep their readers in touch with each other. In Germany, particularly, the practice of keeping, rearing, and studying cage-birds is very common. In many a dwelling one room is set apart for birds, and these bird-rooms are not confined to a particular class, but are found in the homes of people of every rank and condition. As long ago as 1880 some two hundred societies of amateurs existed, and several weekly publications and magazines devoted to birds attested the general interest in avicultural pursuits.

“The breeding of cage-birds for sale is a regular occupation in several parts of Europe. Germany produces hundreds of thousands of singing Canaries in the Hartz Mountains, those of St. Andreasburg being unrivalled songsters; in England, Scotland, and Belgium fancy varieties of Canaries are regularly bred for the trade; and at the Royal Society’s Zoological Gardens of Antwerp, Belgium, the breeding of many species of foreign cage-birds is systematically conducted.

“The United States has few aviaries, and most of these are devoted to Pheasants and other large birds. For a few years an avicultural periodical was published, but the support it received was apparently insufficient, and at present there seem to be no periodicals and very few associations strictly devoted to aviculture. Hence in this country there is not that community of interest and information that characterizes the avocation in Europe. America supports a few small shows, mainly exhibitions of Canaries; and small exhibitions of cage-birds, mostly Canaries, are usually held as adjuncts to the annual poultry shows of New York, Boston, Chicago, Toronto, and other cities. The breeding of Canaries and cage-birds for the trade in any numbers is practically unknown on this side of the Atlantic.

“*Traffic in Domestic Birds.*—The once extensive trade in native American birds has dwindled to the vanishing point. Formerly

Mocking-birds, Bluebirds, Cardinals, Tanagers, Indigo-birds, and Nonpareils were caught in large numbers, and sold either here or abroad, and more or less trade in other species prevailed. Bluebirds, which are known as Blue Robins or Blue Nightingales in England and France, were imported into England some time before 1869, as in that year they were first bred in the London Zoological Gardens. They are regarded with much favour by amateurs, and have been repeatedly bred in private aviaries. Mocking-birds were bred in French aviaries before 1873. While intolerant of cage mates, they are much valued in Europe for their song, which, however, is there considered inferior to that of the Nightingale—a judgment partly assisted, perhaps, by patriotic bias and association. Scarlet Tanagers and Cardinals are ranked very high in Europe, and frequently win prizes in bird shows. Evidence of the esteem as cage-birds in which the latter are held is shown by the fact that they are listed on the price list of a London bird dealer for September, 1906, at more than \$5 apiece. Of interest in this connection is the statement of Gemelli Careri, quoted by Nuttall in his 'Manual of Ornithology,' published in 1832, that 'the Spaniards of Havana, in a time of public distress and scarcity, bought so many of these birds [Cardinals], with which a vessel was partly freighted from Florida, that the sum expended at \$10 apiece amounted to no less than \$18,000.' Indigo-birds and Nonpareils are valued for their attractive plumage. Of the latter thousands were annually exported to Europe, where they sold for \$1.50 to \$2 apiece.

“ In consequence of the continual trapping to supply the increasing demand, several of these birds became rare in localities where once they had been common. Nearly every State had a law protecting non-game birds, but such laws were at that time imperfectly framed and ineffectively enforced. The usual exception authorizing the keeping of birds in cages as domestic pets was unaccompanied by any restriction on trade, which in consequence flourished. Imperfect as these laws were, they were rendered still less effective by the absence of public interest in their observance and adequate provision for their enforcement. Gradually, however, the influence of the bird-protective movement began to make itself felt, and the laws were improved. One State after another adopted a model law framed by a Committee of the American Ornithologists' Union, which, instead of simply prohibiting the killing of a few birds specifically named, as had formerly been done, prohibited the killing, capture, or possession of all birds other than game-birds and a few injurious species, and interdicted all trade in them. The interest in bird-life awakened by the efforts of this

organization and the various State Audubon Societies caused these laws to be more or less vigorously enforced, and the trade in native birds declined proportionately. Supplies were still obtained, however, from States that had not adopted modern laws, and the export trade to Europe continued brisk. One by one these remaining strongholds were carried by the forces of bird protection, until finally, in 1904, Louisiana, the only State left from which birds were procurable, adopted the model law, and now, beyond a few surreptitious and illegal shipments, the domestic and foreign trade in native American birds has been entirely abolished. Occasionally a small consignment of Mocking-birds or Cardinals is smuggled to Hamburg or some other European port, but the life of the trade is gone.

“*Traffic in Foreign Birds.*—The importation of foreign cage-birds has grown to its present proportion, not only in this country, but in Europe as well, within the last fifty years. Up to the middle of the last century, apart from Parrots and some other of the larger species, few birds were imported into Europe, and as late as 1860 only about sixty different kinds of foreign birds were brought in, and these in moderate numbers. But about this time a rapid increase began, and by 1880 the species imported approximated seven hundred, and the individuals from 500,000 to 800,000. The Japanese Robin, a favourite cage-bird of to-day, was first brought to the London Zoological Gardens in 1886, and the Shell Parrakeet of Australia, now one of the best known of exotic birds, and sold wholesale in London for about \$1.37 a pair, was first brought to England by Gould in 1840, and for the next ten years commanded \$100 to \$125 a pair.

“In the United States the growth of importation has undergone a similar development, lagging, however, slightly behind the European growth. In both cases the sudden invasion of the markets by foreign birds was due to the advantages of quick transportation. When supplies from distant lands were brought by sailing vessels but few birds survived the long voyages. But the steamship afforded opportunity for conveying birds with speed and safety, and dealers were quick to avail themselves of the changed conditions. As long ago as 1865 there was a brisk American trade in foreign cage-birds of all kinds, and by 1880 this had so increased that a single dealer in New York City handled 70,000 Canaries each season.

“*Number of Birds Imported.*—The decline in the trade in domestic cage-birds has doubtless stimulated the trade in foreign cage-birds, which advanced from 235,433 imported under permit of the Department of Agriculture in the year ending June 30th, 1902, to 322,297

in the year ending June 30th, 1906—an increase of 37 per cent. in four years. At the beginning of this period the model bird-protective law previously mentioned had been adopted by sixteen States; at its close it was in force in thirty-five.

“Of the birds imported in the year ending June 30th, 1906, 274,914 were Canaries and 47,383 miscellaneous birds. The Canaries were nearly all raised in Germany. Thirty-three per cent. of the miscellaneous birds were from the Orient, 30 per cent. from Europe, 22 per cent. from Australia, 7 per cent. from Cuba and Mexico, 6 per cent. from Africa, and 1 per cent. from South America. The remaining 1 per cent. were of unknown origin. In addition to these 2700 Canaries, mostly from Germany, and about 6000 Parrots from various tropical countries came in without permit, no permit being issued for these birds when they are unaccompanied by others.

“*How Birds are Secured.*—A peep behind the scenes is always interesting, and when we see diverse and remote regions of the world pouring their treasures of bird-life into our country a desire is awakened to know by what means this is accomplished.

“In some cases the method is as old as the history of maritime commerce. From the time when vessels began to make voyages to other countries sailors have brought back trophies of various sorts, including specimens of the fauna of distant lands. Some birds are still thus brought in and are bought by dealers in the various ports of entry.

“This method, somewhat systematized, prevails at San Francisco, where the trade, temporarily suspended by the earthquake and fire, is now beginning to revive. Supplies are here obtained from the crews of steamers coming from China and Japan, who make a regular business of transporting cage-birds, usually under an arrangement with the steamship companies by which they are employed whereby freight is paid out of the proceeds of sales. The birds thus imported are considerable in number, but few in species, being mainly Java Sparrows, Diamond Sparrows, Chinese Mocking-birds, and other common kinds.

“But most of the birds imported are secured by more highly organized methods. Several of the leading importers maintain forces of men to secure the desired birds either in their native haunts or in European ports to which they are brought by the agents of other importers.

“Parrots are generally taken while still in the nest. During the nesting season the leading American houses send men to Cuba, Mexico,

or South America to obtain stock. Headquarters are established by these agents at some point convenient to the Parrot country, and natives are employed to secure the young birds, which are forwarded to the United States in periodical shipments. Agents have sometimes been sent from this country to Africa to secure supplies of the favourite African Grey Parrot, but these are usually obtained in European ports from vessels arriving with supplies for the large European houses.

“Small birds, other than Canaries; are generally captured with nets. Expert netters continually visit remote regions in the interest of wholesale houses of Hamburg, London, Liverpool, and other large cities of Europe. Similar expeditions are dispatched from New York and Philadelphia to Cuba and Mexico, and occasionally to more distant lands—even India; but the principal American houses maintain connections with establishments in Germany, through which their supplies of Old World and South American birds are more commonly procured.

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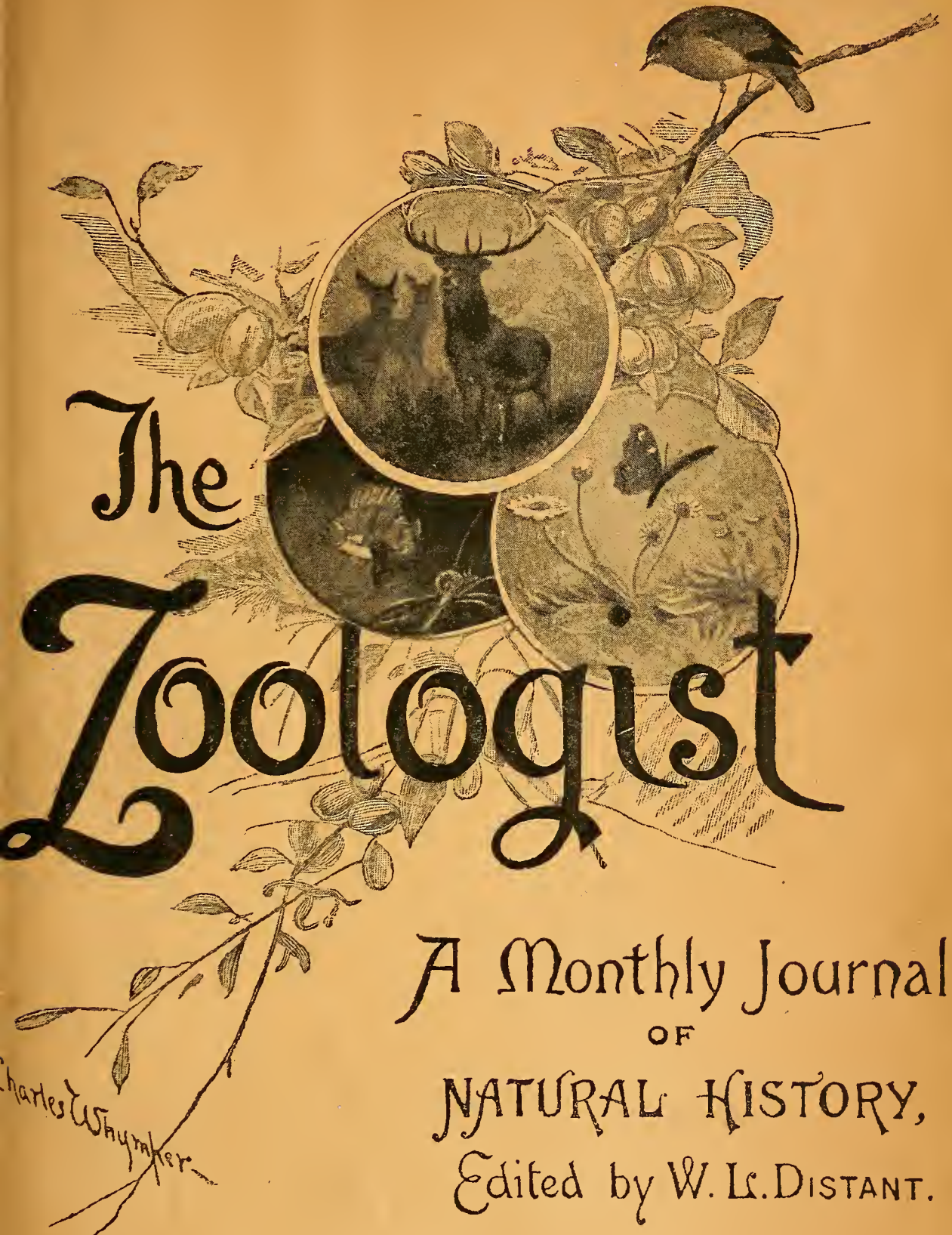
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THE ZOOLOGIST

No. 797.—November, 1907.

BIOLOGICAL SUGGESTIONS.

EXTERMINATION IN ANIMAL LIFE.

Part II.—BY HUMAN AGENCY.

BY W. L. DISTANT.

(Continued from vol. ix. p. 345.)

WHEN we examine the direct action of man in animal extermination we may safely affirm that from the time of his appearance the whole fauna "groaneth and travaileth in pain together until now." In his early stage, when he hunted for food, there had arisen a predatory foe against whom size was no protection, but rather an inducement for slaughter; the substitution of the pastoral for the hunter stage of existence brought little amelioration, for then many animals were exterminated for the safety of the herds. Increasing civilization was the death-knell to many species, for sport not only claimed its own, but the industrial manufactures in daily life inaugurated a virtual reign of terror. Hides and tusks of mammals, feathers of birds, the oil of the cetacean, &c., were all brought to the altar of commerce, and frequently in such quantities as to have for ever destroyed the original contributors. Forests disappeared as mankind learnt to appreciate the value of timber. Animals hitherto little molested in the struggle for existence became almost decimated, as they were found to provide a delicacy for the table. Woman sought to increase her attraction for man by adorning her wearing apparel with the feathers

of beautiful birds, and thus the inception of a new feminine fashion often meant and means an extensive avian massacre in tropical forests. Unhappy animated nature might be said to shiver as man progressed; science has often been unable to preserve the remains of an exterminated species in a glass case. The prosperous tradesman who has achieved wealth in the sale or manufacture of the bodies of one class of animals has often, by these means, enabled his progeny to become wholesale slayers of others for pleasure; thus sport succeeds business, and soon rarity precedes extinction. The wealthy orchid grower so dearly loves his plants that his travelling agent not seldom depopulates the area of a local species to satisfy the housing capacities of glass structures at home. If a bird or insect has unfortunately sunk to the condition of rarity in its native haunts, or has become an endemic species, its complete decay is at once accelerated by the eagerness of naturalists to obtain specimens before it is too late. The names of new heroes will in the future be known to sport; the man who shot the last Lion* will follow an earlier record of the fortunate who slew the last White Rhinoceros.† The name of the executioner of the last of the Elephants should not be forgotten in the coming days when the world may be a vast shop under the direction of a body of eminent financiers.

The Beaver, exterminated in some of its former haunts, now lives on, it may be said, by a change of fashion. The case has been clearly stated by Marsh. When a Parisian manufacturer invented the silk hat, which soon came into almost universal use, the demand for Beaver's fur fell off, and this animal, whose habits prove an important agency in the formation of bogs and other modifications of forest nature, immediately began to increase, reappeared in haunts which it had long abandoned, and can no longer be regarded as rare enough to be in immediate

* "Africa is the only portion of the globe where the Lion remains lord of the forest, as the king of beasts. The question has frequently been discussed, 'Why should the Lion have vanished from the scene where in ancient days he reigned in all his glory?' The answer is simple—the Lions have been exterminated."—Sir S. Baker, 'Wild Beasts and their Ways,' vol. i. p. 307.

† The late Mr. J. H. Gurney writes:—"I have seen the man who exterminated the *Nestor productus* from Philip Island, he having shot the last of that species left on the island' ('Zoologist,' 1854, p. 4298).

danger of extirpation.* So small an insect as the gnat is, as pointed out by Mr. E. A. Butler, for its existence not independent of the action of man. In the evil days, when every house had its water-butt, and when stagnant ponds abounded on every side, often in close proximity to human dwellings, the conditions were so much the more favourable for the multiplication of gnats, and wherever such conditions now exist, the insects are liable to be both numerous and troublesome. But the extensive abolition of water-butts, the introduction of closed and indoor cisterns, and better land drainage have all tended to reduce the number of *Culicidæ* in this country, whatever may be the case elsewhere. † Small White Herons or Egrets are destroyed during the season in which they have their nests and young, in order to supply plumes for ladies' hats. A better feeling having been aroused even in female devotees to fashion, the shopkeepers found it advisable to state that these plumes were then artificially made. The late Sir William Flower found that these plumes consisted of genuine feathers, and protested: "One of the most beautiful of birds is being swept off the face of the earth under circumstances of peculiar cruelty, to minister to a passing fashion, bolstered up by a glaring falsehood." †

If a sportsman visits South Africa for the first time, and has alone read the accounts of the game given by authors who wrote as recently as thirty or forty years ago, he will think he has been conveyed to the wrong continent. In many parts which then swarmed with game he will now find as many buck as he would meet with on a Surrey plateau, which some high veld so much resembles. Sandeman, travelling in 1878, bears witness to the charnel-house that then existed:—"While the waggons kept to the now well-worn track towards Heidelberg, A. and I took a wide tour of the veld in search of bôk, but, although we came across

* 'Man and Nature,' p. 84.

† 'Our Household Insects,' p. 234.—On the other hand, the destructive influence of these insects on man is detailed in a recent book reviewed in these pages (*ante*, p. 393), 'Malaria; a Neglected Factor in the History of Greece and Rome.'

‡ 'Nature,' liv. p. 204.—*Cf.* 'The Emu,' vii. p. 71, where Mr. Mattingley, under the title of "Plundered for their Plumes," records the destruction—"shot off their nests"—of the Australian Egrets, *Mesophoyx plumifera* and *Herodias timoriensis*.

myriads of bones, skulls, and horns of Wildebeeste and Blesse-bôk, bearing witness to the wholesale slaughter which took place only a few years ago, when the Boers first found out the value of the skins, we did not come across any bôk, although we saw plenty of fresh spoor. The massacres which then took place have thinned the game—to an almost incredible extent for so short a time—throughout the greater part of South Africa. In many parts the veld is literally speckled all over with the white-bleached bones of the bôk killed only for their hides, and when stripped left to rot away.”* Alas! there is no zoological Ezekiel hardy enough to prophesy that there shall be a shaking and coming together of these bones. Man has indeed had dominion over the beasts of the earth in this neighbourhood, and these primitive Boers have proved Attilas to the South African mammalian fauna. The Elephant is gradually disappearing in British Central Africa; this, according to Mr. Sharpe, is not due to the number killed by Europeans, but to the fact that the natives throughout the country are constantly destroying them.† After the perusal of many African books on sport and travel one cannot help remarking on the amount of needless suffering inflicted on the Elephant by the inexperience of the sportsman in not striking the animal’s head where the bullet will penetrate the brain, thus not only ensuring instant death but also the safety of the destroyer. As an illustration, it is easy to cite from numerous records, and accounts of the unnecessary sufferings entailed on these creatures may be found in Von Höhnel’s ‘Discovery of Lakes Rudolf and Stefanie,’ or in Andersson’s ‘Okavango River,’ compared with the more skilful and effectual slaying described by Mr. Faulkner in his ‘Elephant Haunts.’ Dr. Junker quotes Westendorp to the effect that the enormous destruction of Elephants to supply the civilized world with ivory is shown by the calculation that in the twenty years from 1856 to 1876 Africa supplied Europe on an average with 1,500,000 lb. of ivory annually, besides 250,000 lb. exported to India, and about 150,000 lb. to America, representing altogether at least 51,000 Elephants.‡ Mr. Scott Elliot, in East Africa, describes the game as still abundant between Languru and the Kikuyu bush,

* ‘Eight Months in an Ox Waggon,’ p. 106.

† ‘Geographical Journal,’ vol. vii. p. 374.

‡ ‘Travels in Africa, 1875-8,’ Eng. Transl., p. 304.

despite the exterminating proceedings of sportsmen. "A tale of 380 head in three months fell to one sportsman."* Andersson mentions that his assistant Hans once shot with his own hand no fewer than nine Rhinoceros in the course of a single day;† he also states that Oswell and Vardon killed in one year no fewer than eighty-nine of these animals.‡ Instances could be multiplied and recorded of the excessive and wanton destruction of the South African mammalian fauna, but they do not need repetition. The Boer still loves to shoot for sport while there is still a market to at least defray expenses; European sportsmen still expend large sums to achieve the result of a "record bag." Could any game survive such a war? Is game preservation, now established, too late? The Tsetse-fly afforded these unfortunate ruminants some protection, for, though harmless to them, it caused certain death to oxen, and hence the waggon, with its hunters, could not travel through the "fly country." But this immunity will soon be a thing of the past. Hunters do not care to shoot on foot in such a climate, nor could they easily do so, and thus the Zulu country long held large game. "But now, since it has become the fashion for the hunters to arm natives to shoot for them, even in this country extermination is going on rapidly."§

In America the Bison is a well-known instance of man's extirpation. For its destruction the telegraph-wire was actually put in use. According to Mr. Baillie-Grohman, in the early eighties, when the "Northern Pacific" was being built through Dakota and Montana, the movements of the "Northern herd," which was practically the last big band of Bison in existence, was known from day to day to the gang of market-hunters along the railway, who were supplying the contractors with the game required to feed the four thousand navvies in their employ.|| Those engaged in the cattle-ranch business considered that the Bison could not be slaughtered too quickly, "for were not their thousands wasting the bunch-grass upon which the more valuable domestic kine, driven in vast herds from distant Texas,

* 'A Naturalist in Mid-Africa,' p. 17.

† 'Lake Ngami,' p. 58.

‡ *Ibid.*, p. 401.

§ T. E. Buckley, Proc. Zool. Soc. 1876, p. 278.

|| 'Fifteen Years' Sport and Life,' &c., p. 29.

were to fatten?"* Colonel H. Inman, late Assistant-Quartermaster of the U. S. Army, in his 'The Old Santa Fé Trail,' states that in Kansas alone, between 1868-81, 2,500,000 dols. were paid out for Buffalo bones gathered in the plains, and used by the carbon companies. The price paid averaged eight dollars per ton of bones, so that according to his calculation the above sum represented the skeletons of over 31,000,000 Buffalo.† In 1885 Peccaries were so abundant in the counties of Medina, Uvalde, and Zavalla, Texas, that their well-known trails were everywhere to be seen, while their favourite haunts could be readily picked out by the peculiar musty odour characteristic of these little animals. Shortly after this date, hogskin goods being in favour, a price of fifty cents each was offered for Peccary hides, with the result that by 1890 the Peccaries had become practically exterminated.‡ In 1873 Leith Adams stated that "the Moose is decreasing steadily; indeed, considering the wholesale destruction practised by settlers and Indians, it is remarkable how many survive."§

The hunting spirit is still strong in America. Mr. T. S. Palmer states that in the United States several States now require both residents and non-residents to secure licences before hunting. The returns for 1903 show that in ten of the States which have such a system, *viz.* Colorado, Idaho, Illinois, Michigan, Minnesota, Nebraska, North Dakota, Washington, Wisconsin, and Wyoming, the total number of licensed hunters was 261,241. The largest numbers in any of these States were 73,823 in Wisconsin and 95,250 in Illinois, and the average in all was 26,124. "The destruction which an army of 26,000 hunters roaming at will over any State might bring about is beyond computation."|| Again, according to the same writer, the population of the United States, on June 1st, 1905, exclusive of Alaska, Hawaii, and Porto Rico, was estimated by the Census Bureau at 82,565,005, and the population of the sixteen States which issued both resident and non-resident licences at

* *Cf.* Baillie-Grohman, 'Fifteen Years' Sport and Life,' &c., p. 29.

† *Ibid.*, p. 169.

‡ Lucas, 'Rep. Nat. Mus. Washington,' 1891, pp. 610-11.

§ 'Field and Forest Rambles,' p. 90.

|| 'Yearbook Dept. Agric.' 1904, p. 511.

23,848,780. The total number of licences issued in these States was 503,049. "In other words, a little more than half a million persons were licensed to hunt, of whom only 3,043, or six-tenths of 1 per cent., were hunting outside their own States."*

Guillemard writes that on Masafuera and Juan Fernandez Islands, off the coast of South America, a few skins of the fur Seals are still taken, "and in bygone days the South Shetland, Crozet, and Falkland Islands were the resort of countless thousands of these animals. But they are now nearly extinct, and almost every Seal-skin that finds its way into the London market is obtained upon one or other of the islands rented by the Alaska Commercial Company."†

The inevitable destruction of the Alligator "fishing" in Florida is being hastened by the robbing of the reptile nests of their eggs. According to Dr. E. D. Cope: "Facts recently gathered by the Fish Commission show that the reptiles cannot long escape practical extermination." Between the years 1880 and 1894 it has been estimated that 2,500,000 Alligators were killed in Florida.‡ So persistently has the Wood-Duck (*Aix sponsa*) been pursued that, according to Mr. Wells W. Cooke, in some sections it has been practically exterminated. Even in States in which it still breeds commonly, as in Delaware and Maryland on the Atlantic Coast, and in Illinois in the Mississippi Valley, public sentiment fails to recognize the importance of adequately protecting the bird, and the laws still permit it to be destroyed late in the spring. As a result the Wood-Duck is constantly diminishing in numbers, and soon is likely to be known only from books or by tradition.§

If we transport ourselves from Africa, the once paradise for Antelopes, to Australia, where marsupials hold a corresponding sway, we see the same process of destruction, the same inevitable extinction in progress. What availeth numbers when, at Peak Downs alone, as we learn from Carl Lumholtz, one of the sheep-owners told him that in the course of eighteen months he had killed 64,000 of these animals, especially Wallabies (*Macropus*

* 'U.S. Dept. Agric. Bur. Biol. Surv.' Circular No. 54, p. 14 (1906).

† 'Cruise of the Marchesa,' second edition, p. 142.

‡ 'Ann. Rep. Smithsonian Instit. for 1898,' p. 171 (1900):

§ 'U. S. Dept. Agric. Biol. Surv.' Bull. No. 26, p. 8 (1906).

dorsalis) and Kangaroo-Rats (*Lagorchestes conspicillatus*), and also many thousands of the large Kangaroo (*Macropus giganteus*)? * What animal life can long withstand such wholesale massacres? The discoveries of Tasman, Dampier, and Cook will result in the total extinction of more than one human race, and in the partial extermination of a singular land fauna belonging to a mighty island-continent. The Kangaroo will follow the Aborigine, and both in time become parts of a story to be told, an incident in the battle of human civilization. Other animal life in Australia is beginning to feel the destructive appetite of civilized man. The Cassowary is too large and distinct a bird to escape attention. Of *Casuaricus australis*, Mr. Ramsay, in 1876, relates:—“It was tolerably plentiful only a few years ago even in the neighbourhood of Cardwell, but since the advent of sugar-planters, &c., on the Herbert River and adjacent creeks these fine birds have been most ruthlessly shot down and destroyed for the sake of their skins, several of which I saw used for hearth-rugs and door-mats.” † Prof. Dendy, with good reason, urged upon naturalists in Australia and New Zealand the advisability of making the most of their time and opportunities in securing representatives of the cryptozoic (sun-hating) fauna ere it be exterminated by the wholesale destruction of forests that is going on. “For when the clearing process is complete, and the last logs have disappeared from the ground, we may expect to lose sight for ever of many peculiar forms which formerly dwelt there.” ‡ Nearly half a century ago Bennett saw what was coming, and uttered his warning:—“One of the exciting causes of the destruction of every living native animal that can be met with is the pretence of enriching our museums, while at the same time the overstocked market in Europe renders them for the most part unsaleable; and it is a well-known fact that the skins of Australian birds, &c., have been re-exported from England to Australia for sale.” § According to Coghlan (‘Wealth and Progress of New South Wales’), the New South Wales Government spent in 1891 the extraordinary sum of £50,000 in bonuses

* ‘Among Cannibals,’ p. 29.

† ‘Proc. Zool. Soc. Lond.’ 1876, p. 120.

‡ ‘Address, Biol. Sect. Austral. Assoc. Adv. Sci. 1895.’

§ ‘Gatherings of a Naturalist in Australasia,’ p. 175.

for the destruction of 871 Emus, over one million of marsupials, 65,000 Hares and Rabbits, 11,530 Dingoes, 3502 Eagle hawks, and some other marauders. From a back number of the 'Sydney Morning Herald' it appears that in the year 1888 upwards of ten thousand Emus were destroyed in one district alone, while in the same period fifteen hundred of their eggs were broken on one estate.* The Lyre-bird of Australia, which lays but one egg each season, is doomed by the possession of a magnificent tail. Mr. Aflalo states:—"Not long since, for example, two enterprising brothers employed a number of men to shoot the luckless male birds, in which, after some practice, they were unfortunately so successful that five hundred dozen of the beautiful tails were reported to have reached Sydney in the course of a few weeks.† Of the Moas of New Zealand, some authorities consider that they were killed off by the race which is believed to have inhabited New Zealand before the advent of the Maoris.‡ The Mamo, a honey-sucker (*Drepanis pacifica*), restricted in its range to the Pacific Islands, and now apparently extinct, has had a cause of its disappearance suggested by Mr. Scott Wilson. He saw some of the celebrated feather wreaths, or "leis," of the natives composed of yellow feathers taken from this bird, and from the fact that the Hawaiian name of the bird "Mamo" is the same as that of the costly war-cloaks, he concludes that the robes in olden times were chiefly wrought of the beautiful golden-yellow feathers from its back, which are much deeper in colour, as they are larger and longer, than the axillary tufts of the O-o (*Moho nobilis*). As only a few feathers on each bird were used, it may be imagined how many thousand birds it required to furnish the feathers of a single robe, and it is a greater wonder that there were enough birds than that the species of the brighter colour became extinct. Small bunches of these feathers were received by the kings as a poll-tax from the lower classes of the people, but there were not enough, so the chiefs used to have "a regular staff of birdcatchers who were expert in this vocation."§

* Cf. Aflalo, 'A Sketch Nat. Hist. Australia,' p. 104.

† *Ibid.*, p. 131.—Cf. also 'The Emu,' v. p. 57: "Notes on the Victoria Lyre-bird (*Menura victoriæ*)," by A. E. Kitson.

‡ Lydekker, 'Phases of Animal Life,' p. 152.

§ Cf. Lucas, 'Rep. Nat. Mus. Washington,' 1891, p. 628.

Europe tells the same tale. Organized Government destruction is often a most deadly means of extermination, especially when, as is generally the case, monetary rewards are paid for the animals slain. The following is the official list of birds and beasts of prey killed throughout Norway during the years 1893 and 1894 :—

	Bears.	Wolves.	Lynxes.	Gluttons.	Foxes.	Eagles.	Hawks.
1893.	72	50	56	40	11,400	969	4846
1894.	57	37	44	46	8,646	1081	4727*

According to Sir H. Pottinger: "Taking consecutive returns of from forty to fifty years ago, we find that, on a rough average, considerably over two hundred Bears were killed annually in Norway, about the same number of Wolves, half as many Lynxes, and a quarter as many Gluttons."† The comparison of these figures will tell its own tale. The Glutton alone seems to hold its own, a fact which, as the above-quoted writer points out, "speaks volumes for the stealthy habits of these animals, and the secure fastnesses which the Norwegian wilds afford them. They alone of all the outlawed tribes have succeeded in holding their own against the vengeful persecution of man." In the palmy days of Rome many animals must have been more plentiful than now, and have been decimated by the requirements of the arena. We read that four hundred Bears were killed in a single day under Caligula; three hundred on another day under Claudius. Under Nero four hundred Tigers fought with Bulls and Elephants; four hundred Bears and three hundred Lions were slaughtered by his soldiers. In a single day, at the

* 'Zoologist' (3), xix. p. 425.—On the other hand, even administrative destruction is sometimes powerless to exterminate. As Prince Kropotkin writes :—"That terrible enemy of the crops of South Russia—the '*Souslik*' (*Spermophilus*)—of which some ten millions are exterminated every year by man alone, lives in numberless colonies; and while the Russian provincial assemblies gravely discuss the means of getting rid of this enemy of society, it enjoys life in its thousands in the most joyful way" ('Nineteenth Century,' vol. xxviii. p. 704).—A similar record applies to the Rabbit in Australia, of which a few years ago, in New South Wales alone, the Government paid for the skins of twenty-seven million Rabbits in twelve months, and yet extermination is as far off as ever (writer in the 'Times,' quoted by the 'Spectator,' January 4th, 1896).

† 'Badminton Magazine,' vol. ii. p. 299.

dedication of the Colosseum by Titus, five thousand animals perished. Under Trajan the games continued for one hundred and twenty-three successive days. And, says Mr. Lecky, these are but a few of the many examples given by Magnin, who has collected a vast array of authorities on the subject.*

It is probable that many species of wildfowl only continue to exist by their migratory habits and their consequent long absence from the neighbourhood of the gunner. What a more prolonged visit to the areas where shooting is in vogue would effect on their numbers may be estimated by the perusal of a few inventories of game-bags. "As many as eighty-five, and upon another occasion one hundred and six, Teal have been picked up after a well-directed shot from a punt-gun—the former by Sir Ralph Payne-Gallwey, the latter off the Irish coast."† "Sometimes during a lull in a spell of rough weather vast flocks of Wigeon concentrate themselves on the ooze, and it is at this time they are sought by the puntsman or fowler. When good shots have been obtained at such masses of birds over a hundred have been killed at a single shot, and this explains why Wigeon are sold so cheaply in the markets."‡ Long ago Kohl recorded that on the coasts of the North Sea twenty thousand Wild Ducks were usually taken in the course of the season in a single decoy, and sent to the large maritime towns for sale.§ After this, though no reasons are given, we are not surprised to read that the Pied Labrador Duck (*Somateria labradoria*), formerly abundant on the coast of Labrador and the mouth of the St. Lawrence, appears to have become extinct since 1852.|| Snaring is equally destructive. On the island of St. Kilda, with his fowling-rod one man has been known to have once bagged no fewer than six hundred and twenty Puffins in a single day.¶ On the same island it has been calculated that 22,500 Solan Geese have been caught and con-

* 'Origines du Théâtre,' pp. 445-53. Quoted by Lecky, 'Hist. Europ. Morals,' vol. i. p. 280.

† Cf. Watson, 'Poachers and Poaching,' p. 198.

‡ Watson, *ibid.*, p. 201.

§ 'Die Herzogthümer Schleswig und Holstein,' i. p. 203. Quoted by Marsh, 'Man and Nature,' p. 97.

|| Ogilvie Grant, 'Royal Nat. Hist.' iv. p. 355.

¶ Kearton, 'With Nature and a Camera,' p. 81.

sumed in a single year.* One woman has been known to snare as many as 280, and another 127 Puffins in three hours;† while, on the authority of Mr. Sands, who lived on St. Kilda for about nine months, it is stated that in one year alone close upon 90,000 were killed by the natives.‡

The giant Sturgeon or Hausen (*Acipenser huso*), with all the protection afforded by great fecundity, was at one time to be met with in the Danube by thousands, “but relentless slaughter has greatly reduced not only their numbers but likewise their size.”§ In Russia the size of the Pike-perch (*Lucioperca sandra*) is becoming smaller owing to the demand being greater than the supply. About 26,000,000 of these fishes are exported from Astrakhan every year.|| In Jersey Mr. Hornell states:—“I have known as many as two hundred immature Guernsey Crabs (*Cancer pagurus*) in one man’s basket, not one of which was of the proper size of $4\frac{1}{4}$ inches across the back, while time after time I have seen men bringing back six to twelve or more Lobsters averaging from five to seven inches long. What wonder, then, that after such improvident and senseless procedure there should ensue a period of dearth? At every spring tide hordes of men and boys invade the littoral armed with basket and hook, bent on an indiscriminate collection of Crabs and Lobsters of any size procurable.”¶ We have heard of decrease in the fish of the Norfolk Broads, and we read:—“In a fortnight’s fishing on Oulton Broad, Suffolk, a lady and her husband have landed 2539 Roach.”***

It is needless to go on recording facts which are everywhere obtainable proving that man’s hand has fallen heavily on nearly every other living creature. What we have recorded is principally the effect of his direct action. His indirect action has been equally destructive, and we can only find space to give a few instances. The domestic Cat was introduced to the island of

* Kearton, ‘With Nature and a Camera,’ p. 90.

† *Ibid.*, p. 112.

‡ *Ibid.*, p. 113.

§ ‘Roy. Nat. Hist.’ v. p. 515.

|| Seeley, ‘The Fresh-water Fishes of Europe,’ p. 41.

¶ ‘Journ. of Marine Zool. and Microscop.’ ii. p. 75.

*** ‘Sun,’ October, 1902.

Rarotonga by missionaries, and for a time proved a blessing by keeping down the small indigenous Rat which then overran the island. Rats becoming scarce, the Cat took to hunting birds. Some species were soon exterminated, and other birds have taken refuge among the almost inaccessible rocks of the interior. The stillness of the forest is now intolerable save for the hum of insects.* We may mention the more or less complete extirpation of Rattlesnakes in North America that followed the introduction of hogs. In the Virgin Islands "the land mollusks were completely destroyed by the practice of burning over the land, and only dead shells remain to show their former abundance in that locality."† The most deadly enemy of the Prairie-hen (*Tympanuchus americanus*) is the prairie fire in spring, which destroys every nest within its sweep. According to Mr. E. W. Nelson, in the early seventies in North-western Illinois, the farmers in many places burned the prairies in spring after the Prairie-hens had nested, and often gathered for household use large numbers of the eggs thus exposed.‡ What the Boers have done to the fauna of South Africa by their annual grass fires can never be estimated, as we scarcely can tell what has been destroyed. The small green Cicadas were very plentiful, and their shrill noise well known, at Sydney. Now, Mr. Le Souëf tells us, "the imported Sparrows in the neighbourhood of that city looked upon these insects as one of their sources of food-supply, and when they heard their note at once attacked them. In course of time only the quiet ones will survive, or those that sing at night."§ *Aporia cratægi*, a white Pierine butterfly, is now becoming very scarce in its old haunts in this country. According to Mr. Kirby it is supposed that its disappearance is due to the multiplication of insect-eating birds, a consequence of the Wild Birds Protection Act.|| The moth "*Lælia cænosa* has become practically extinct in Britain during the last thirty years," Mr. Tutt remarks. "This is generally supposed to have been due to the drainage of part of Barwell and Wicken Fens, but it was probably partly due

* W. Wyatt Gill, 'Jottings from the Pacific,' p. 126.

† Lucas, 'Rep. Nat. Mus. Washington,' 1891, p. 613.

‡ Judd, 'U. S. Dept. Agriculture,' Bull. No. 24, p. 13 (1905).

§ 'Wild Life in Australia,' p. 245.

|| 'Hand-book to the Order Lepidoptera,' vol. ii. p. 141.

to the greed of collectors, for a professional collector told me that the larvæ were so abundant five-and-twenty years ago (this was written in 1896) that it paid him to give up his ordinary work in order to collect all he could find, as he received from a London dealer about eighteenpence a dozen for them. This man alone collected some thousands every year.* “In Victoria (Australia) the days of the Lyre-bird (*Menura victoriæ*) are numbered, unless it develop the habit of nesting in trees or spots inaccessible to its far more dangerous enemy—an introduced one—the European Fox.”†

The extermination of man by man, the extinction of aboriginal races by more progressive peoples, is a story well known to anthropologists, and requires separate detail. Wild nature must have ever regarded the genus *Homo* as its deadliest foe.

Even the American trees have suffered by vandal hands. Miss S. Fenimore Cooper tells us:—“At a particular point in the wilds of Oregon, near the bank of the Columbia River, there stood a single tree of great size—one of the majestic pines of that region, and long known as a landmark to the hunters and emigrants passing over those solitary wastes. The members of an expedition sent out to explore that country by the Government, arriving near the point, were on the watch for that pine to guide their course; they looked for it some time, but in vain. At length, reaching the spot where they supposed it ought to have stood—a way-mark in the wilderness—they found the tree lying on the earth. It had been felled and there left to rot by some man, claiming, no doubt, to be a civilized being.”‡ In Australia the big gum-trees near the township of Fernshaw, some fifty miles north of Melbourne, in size completely eclipse the Californian Wellingtonias, but are being rapidly exterminated. “The land they grow on is good land, with twenty or more feet of vegetable soil in many spots, and it is wanted; and so the gums are given as victims to the axe and the firebrand.”§

* ‘British Moths,’ p. 86.

† Kitson, ‘The Emu,’ v. p. 58. Cf. direct persecution by man (*ante*. p. 409).

‡ ‘Journ. Naturalist in United States,’ vol. i. p. 255 (1855).

§ Ward, ‘Rambles of an Australian Naturalist’ (edited by P. Fountain), p. 86.

AN ANNOTATED LIST OF CORNISH FISHES.

BY JAMES CLARK, M.A., D.Sc., A.R.C.S.

IN this list an attempt is made to indicate the present status and distribution of fishes in the Cornish waters, which is largely based on observations made and data obtained during the past eight years. References to the works of Couch, Matthias Dunn, Cornish, and Day are made only in the case of rare species, exceptional occurrences, or change in distribution, migratory habit or numerical status. The limits of the paper prevent more than an occasional passing remark on the habits, breeding, or food of the fishes mentioned, and as the fishes of Scilly will be treated separately, all special reference to them is omitted.

The writer wishes to express his deep indebtedness to his fellow-members on the Fisheries Committee of the county, and especially to Mr. Matthias Dunn, son of the great fisherman-naturalist of the same name, and to Mr. E. J. Pezzack, County Fishery Officer, for valuable help most generously given; to his friend Dr. E. J. Allen for placing all the resources of the Marine Biological Laboratory so freely at his disposal; to Mr. H. Rice, of Truro, for numerous personal notes on fishing in the St. Mawes district; to fishermen all round the county for specimens, and for frequent permission to handle their catches; and lastly to his biological students at the Technical Schools, Truro, for loyal and enthusiastic assistance in every department of the subject.

To distinguish between Matthias Dunn, father and son, the former is referred to throughout under his full name, the latter as Dunn *f.* (= *filius*).

The Perch (*Perca fluviatilis*, L.) is not indigenous, but has been naturalized in many ponds throughout the county. Thirty or forty years ago the Sea Bass (*Labrax lupus*, Day) appeared off the Cornish coast almost every year about the month of August

in enormous shoals that made the surface of the water boil like a strong tide (Dunn *f.*). These shoals specially favoured the Gwineas Rock, near Gorran, the Gull Rock, Portscatho, the Runnelstone, and the Wolf, and appeared occasionally in the sandy bays of the south and east, and at least once on the north coast, namely, at Perranporth about 1864 (Hicks). At Gwineas Rock Matthias Dunn found it impracticable to use a seine on account of the broken nature of the beach, and employed dynamite to kill the fish till stopped by Act of Parliament. By this means as many as six hundred fish, up to 10 and 12 lb. in weight, could be obtained in a morning (Dunn *f.*). In recent years vast shoals have been scarce, and till quite lately apparently restricted to the west of the county. During the past three years, however, they have been reported from Coverack, the Bizzies in Gerrans Bay, and the Gwineas Rock, as well as from the Runnelstone, the Wolf, and Land's End. Bass, however, is usually common throughout the summer, and especially in August and September, all round the coast, and may be caught in abundance with hand-lines in favoured places like St. Mawes, the Gull Rock, Portscatho, west of the Manacles, and around Newquay; and with long lines in deeper water. Mullet seiners, too, sometimes catch a small shoal of Bass, or come upon them when feeding where rocks abut on the sand. In stormy weather, both on the north and on the south coast, they often feed in numbers in shallow water close to the land, especially on a lee shore. They are then occasionally taken in a narrow trammel shot between them and the open sea, into which attempts are made to drive them by throwing stones. They are, however, difficult to frighten, and though they may dart away at the splash, return immediately, and swim through and round the centre of disturbance. Bass are often taken in the Fowey and Tamar, occasionally in fresh water beyond the reach of the tides.

The Comber (*Serranus cabrilla*, Linn.) occurs frequently along the south coast on broken, rocky ground during the summer. It is often common at Polperro (Robinson), at Mevagissey and Gorran, and in July, 1905, was plentiful for a few days near Coverack. Day says it is rare at Penzance, but during the last eight years it has been taken several times to the east of St. Michael's Mount, and occasionally in the Crab-pots at

Newlyn. It is evidently common at times further west, as in August, 1906, the writer found several being used as bait at Porthgwarra. In July, 1904, a small specimen, about seven inches long, was sent in for identification from Sennen Cove, the most northerly point in the west at which it has been found. The Dusky Perch (*Epinephelus æneus*, Geoffr.) was described and figured by Couch from a Polperro specimen as *Serranus gigas*. Two or more examples were obtained subsequently, but it has not been recorded for the last sixty years. Stone Bass (*Polyprion cernium*, Day) is evidently of more frequent occurrence than formerly. In July, 1891, four were gaffed at some floating barnacle-covered timber near Zennor; in 1892 Matthias Dunn sent one from Mevagissey to the Plymouth Laboratory, and in 1894 or 1895 he took five or six close to Gorran Haven when no wreckage was in sight. In 1893 J. B. Cornish captured one near some wreckage at Newlyn. In August, 1899, two were obtained feeding on a barnacle-covered log at the south end of the Manacles; in July, 1902, one was taken on a hand-line near the outer Whelp Rock at the Dodman; a few weeks later one was sent in from Newquay; and in June, 1906, several were seen, and one, twenty-two inches long, captured near Porthgwarra. Apparently the only example of the Maigre (*Sciæna aquila*, Lacep.) identified recently is one, twenty-nine inches long, caught in a seine near St. Anthony Lighthouse, Falmouth, on the 11th of September, 1903. The Four-toothed Gilt-head (*Dentex vulgaris*, Cuv. et Val.) has not been recorded since 1851. The Black Sea Bream (*Cantharus lineatus*, Mont.) is very scarce. A young specimen, six and a quarter inches long, was taken by Holt in the Hamoaze, at the mouth of the Lynher, in July, 1897 (M. B. A.), and three adults were captured with a hand-line baited with lugworm off Trewavas Head on the 7th of August, 1902. The Bogue (*Box vulgaris*, Cuv. et Val.) has not been recorded since 1873. The Sea Bream (*Pagellus centrodontus*, De la Roche) is common all round the coast, and sometimes congregates in great numbers, especially in the late summer. After a large dumping of Mackerel, it is almost always much in evidence, particularly in Mount's Bay. Very large specimens are often obtained off the Runnelstone, and occasionally near Newquay. The great hauls taken by the steam trawlers are

said lately to have diminished very considerably its numbers (Dunn *f.*). The young, called "chad," are often abundant in the coves, and take bait very freely in the summer and autumn. Spanish Bream (*Pagellus bogaraveo*, Brunn.) is now much scarcer than formerly (Dunn *f.* and Rice), but single specimens are still frequently taken with baited hooks along the south coast. During the last eight years examples have been identified from Polperro, Mevagissey, Percuil River, Cadgwith and Mousehole, and several others have been reported. *Pagellus owenii* Günther, and *P. acarne*, Cuv. et Val., have each been recorded once from the county (Day). The Pandora, or King of the Breems (*P. erythrinus*, L.), is probably common, but is generally confused with other Breems. It was plentiful in Mount's Bay in 1906, and several were taken at Cadgwith in 1907. Specimens have also been identified from the Edges, Polperro, from Gorran, and from the Manacles. Couch's Sea Bream (*Pagrus orphus*, Risso) is represented in the British fauna by a single specimen taken near Polperro in 1842 (Day). The Gilt-head (*P. auratus*, L.) is another rare accidental visitor, last recorded in 1870.

The Red Mullet, or Surmullet (*Mullus barbatus* var. *surmuletus*, L.), is locally common along the south coast, but scarce on the north. Matthias Dunn used to say that it very greatly diminished in numbers after the wet, sunless year of 1879, and was never again so plentiful. In March it is taken by the trawlers fifteen to twenty miles out at sea, but by July it comes closer inshore, and is then taken chiefly by ground-seines, but occasionally by trammels and set nets. It appears to feed by preference where rocks and rocky ledges rise out of sand, and so close to the rocks themselves that on a highly favoured spot near St. Mawes, where thousands are taken every year, the boat has literally to scrape against the rock to be successful. Another favourite ground near Falmouth is a narrow inshore lane of sand, with shallow rocks inside and bigger rocks to seaward, that stretches from off Killigerran Head towards the Gull Rock beyond Portscatho. Near Mevagissey Matthias Dunn would occasionally take as many as six hundred in a day, and in season it is still plentiful on at least two very limited areas there. It is taken regularly and often in quantity off the mouth of the Helford River, and, with trammels, in the estuary itself. In the

west, one of its favourite haunts is near Lamorna, but it is usually taken in some quantity in many other districts where congenial feeding-grounds occur. At St. Ives it is taken in seines, but is not plentiful. Specimens are occasionally taken inshore during the winter. One, for example, was captured near St. Anthony early in January, 1902, and another near Portscatho in December, 1903. It is doubtful if the Plain Mullet (*M. barbatus*, L., type) has ever been identified with certainty in the county. A careful watch has been kept for its occurrence for the past eight years, but without success.

The Wrasses are a perplexing group, because of their remarkable fin and colour variation, and for the past five years they have in consequence received considerable attention at Truro. Their strong hard flesh makes them very useful bait, especially for Lobster-pots. The Ballan Wrasse (*Labrus maculatus*, L.) is very common on rocky, weed-covered shores all along the south and west, and in patches along the north coast. The most abundant forms are of a warm brownish-yellow or greenish-brown colour, with a bright blue or nearly white centre on every scale of the head and body. Bluish forms, too, are not uncommon. The variety *lineatus*, Don., green with narrow longitudinal bands of yellow, is common at Mevagissey, at Gyllyngvase, Falmouth, between the Manacles and Coverack, and on the north coast near Strace Pool, at the head of Watergate Bay, and probably occurs at intervals all along the coast. At Gyllyngvase yellow bands are occasionally replaced by smears of dull brown passing gradually into the green, and one has been obtained there of a dull bottle-green, with whitish spots. Forms in various shades of green, from pale sage to brightest emerald, sometimes with white body spots, but generally without them, have been brought in from time to time, usually from the *Zostera* beds at Falmouth and Helford. On the 13th of July, 1907, a fine specimen, over four pounds in weight, of greenish umber-brown with a broad orange band on both sides and a pale spot on each scale, was sent in from Cadgwith. A pale yellow form was common near the Gurnard's Head in September, 1906. Red forms are usually scarce, but have been obtained in various shades, from pale carmine to deep mahogany; the former at Polperro and Scilly, the latter once at Cadgwith. Holt, however,

has shown that within certain limits an individual may change its colours in comparatively short time. The Comber has been given specific rank, but is only a form with a more or less continuous white band along each side, from the eye to the base of the caudal fin. About half-a-dozen specimens have been seen during the past eight years from the south coast, and one from St. Ives. The Cook, or Cuckoo Wrasse (*Labrus mixtus*, L.), is common along the south and west on rocky bottoms in deeper waters than the Ballan Wrasse. When fishing near rocks two or three miles out to sea, one often finds it unpleasantly plentiful. On the north coast it appears to be very local. The male of this species is Couch's Blue-striped Wrasse, and the female his Three-spotted Wrasse. The colours show great variation. The Conner (*Crenilabrus melops*, L.) is plentiful in rock-pools, and close inshore on a seaweed bottom all round the coast, and especially in the west. The species is very variable, but it has not been found practicable to apply the varietal names. Jago's Goldsinny (*Ctenolabrus rupestris*, L.) is by no means common, but occasional specimens have been found lately at Mevagissey, Coverack, Mount's Bay, and one in July, 1906, near Sennen Cove. The only two British specimens of the Scale-rayed Wrasse (*Acantholabrus palloni*, Risso) known to Day were obtained near Mevagissey, the last about seventy years ago. The Rock Cook (*Centrolabrus exoletus*, L.) was not considered rare by Couch or Cornish; but the only specimens seen by the writer are two from Cadgwith in June, 1901, and one from a Crab-pot from Porthgwarra. It has been reported from Polperro by Robinson. A single specimen of the Rainbow Wrasse (*Coris julis*, L.) was taken in Mount's Bay in 1802.

The Miller's Thumb, or River Bullhead (*Cottus gobio*, L.), is fairly common among the clearer streams of the county. The Father-Lasher (*Cottus scorpius*, L.), though a northern species, is of very frequent occurrence all round the coast in rock-pools, and in shallow water on weed-covered beaches. The Long-spined Bullhead (*Cottus bubalis*, Euphr.) is plentiful on rocky bottoms from tidal pools down to deep water. The Grey Gurnard (*Trigla gurnardus*, L.) is very common on trawling-grounds all round the coast, but Dunn *f.* believes that the enormous quantities taken by the steam trawlers have perceptibly diminished

its numbers. Up to about thirty years ago, he says, large shoals were of frequent occurrence in the Bristol Channel, and it was often caught by lines hanging over the stern of passing ships. Such shoals are occasionally reported still. An enormous one was seen off the Wolf in July, 1900, and another about ten miles south of the Lizard in June, 1902. One was seen about twenty miles north-west of Pendean in 1901, and another a little further to the north in 1905. The Piper (*Trigla lyra*, L.) varies greatly in number, but is at times fairly common, though usually scarce in winter. It was plentiful, however, some miles south of the Dodman in December, 1903. Cornish considered it a scarce fish in the west of the county, but steam trawlers in some years find it moderately common there. The Tub or Sapphirine Gurnard (*Trigla hirundo*, L.) is usually more plentiful than the Piper in the trawling-grounds of the south and west, and is occasionally taken with bait on the north coast. The Streaked Gurnard (*Trigla lineata*, Gmel.) was formerly considered very scarce, but off the south coast it is now of regular occurrence, and small catches of a dozen up to a hundred or more are brought in by Newlyn boats from the "Gurnard" grounds. Similar quantities are occasionally noticed among the catches at Gorran and Mevagissey, and it is a well-known fish at Polperro. The writer obtained three along with Red and Grey Gurnard with a beam-trawl in the Silver Pits, Gerrans Bay, in July, 1902, and seven a few days later on the "Steam trawlers' Ground," Falmouth Bay. Red Gurnard, or Elleck (*Trigla cuculus*, L.), is common at all seasons on the trawling-grounds round the coast. It is very largely used for Crab-pot bait, especially at St. Ives. The Lanthorne Gurnard (*Trigla obscura*, L.) was obtained nearly sixty years ago at Falmouth and Helford, but has not been recorded since. The Pogge, or Armed Bullhead (*Agonus cataphractus*, L.), was well-known to Couch as a Cornish fish, but has apparently become very rare since, as it was never seen by Matthias Dunn or by Cornish. In July, 1897, Holt obtained a specimen from the mouth of the Lynher River; and in August, 1902, two were dredged in the mouth of Helford River. The Armed Gurnard (*Peristethus cataphractus*, Gmel.) has not been recorded since the time of Couch.

The Adult Lump sucker (*Cyclopterus lumpus*, L.) is occasion-

ally entangled in the Mackerel nets ten to twenty miles south of the Dodman (Dunn *f.*). It has been taken several times lately in Falmouth Bay, and is of fairly frequent occurrence about Penzance. Immature specimens, from 1 lb. upwards, have been fairly common lately some miles out at sea all along the south coast. Cocks found a solitary specimen of the Sea Snail (*Liparis vulgaris*, Flem.) in Falmouth Harbour, but it does not seem to have been found again in the county. Montagu's Sucker (*Liparis montagui*, Cuv.) is evidently not uncommon, as it is frequently picked up under stones on the beaches of the south and west at low spring tide, and has been taken several times in rock-pools at Gyllyngvase Beach, Falmouth.

The Two-spotted Goby (*Gobius ruthensparri*, Euphr.) has generally been regarded as rare in Cornish waters, but in August, 1903, the writer dredged it in abundance from the edge of the *Zostera* bed downwards off the mouth of Helford River. Late in June, 1904, he obtained it in equal abundance in the entrance to Falmouth Harbour, and has obtained it several times since in Falmouth Bay. Specimens have also been sent in lately from Mevagissey and Marazion. Willughby's Goby (*Gobius paganellus*, Gmel.) is very common in Falmouth Bay, Mount's Bay, and round Land's End in rock-pools, under stones near low-water mark, or in shallow water with a stony bottom. It has also been identified from Polperro, Gorran, and from near Cadgwith. The Rock Goby (*Gobius niger*, L.) is abundant in rock-pools and in shallow water all round the coast. In clear waters it may be frequently seen in Gerrans Bay swarming round the "scuddy" rocks, that is, rocks just peeping out of a sandy bottom. The Giant Goby (*Gobius capito*, Cuv. et Val.) was found by F. Pickard-Cambridge in the rock-pools at Portscatho in August, 1903 (see the 'Field' for Oct. 24th, 1903).* On the 12th July, 1907, two were captured in a pool close to low-water mark at Gyllyngvase. It appears that Couch had identified his specimens as *Gobius niger*. The Freckled Goby (*Gobius minutus*, L.) is common in shallow sandy coves and estuaries all round the coast, but presents considerable variation. The Painted Goby (*Gobius pictus*, Malm.) is said to be abundant along the south coast. Jeffrey's Goby (*Gobius jeffreysii*, Günther) is a deep-water species that has

* Cf. also 'Zoologist,' 1903, p. 429.

been obtained near the Eddystone. A mature female of *Gobius scorpioides*, Collet, one of the smallest fishes known, was dredged by Holt in eighteen fathoms in Falmouth Harbour in July, 1897. The Transparent Goby (*Aphia pellucida*, Nardo) is abundant in Cawsand Bay in July, and has been taken in the Lynher above Waterlake in April (M. B. A.). Enormous numbers appear at times off Mevagissey followed by a shoal of Herrings, for which they constitute an attractive food supply. Great swarms have also appeared in Mount's Bay (Dunn *f.*). In June, 1906, several were taken in a hand-net at King Harry Passage on the Fal. The Crystal Goby (*Crystallogobius nilssonii*, Düb. et Kor.) is common in the deeper parts of Falmouth Bay and, to judge from the specimens sent in, plentiful around Mevagissey and locally in Mount's Bay.

The John Dory (*Zeus faber*, L.) is common all round the coast. During the winter the majority evidently prefer deep water, but throughout the summer it delights in shallow inshore water where weeds and small fishes abound. It may often be seen in great numbers following up shoals of Sprats and other small fry, and, though usually slow and sluggish in its movements, shows remarkable activity as it jerks backwards and forwards with its mouth open among the smaller fish that serve as food. Large specimens are often taken with bait, the most successful being a live young Chad fastened by the tail. When swallowed head first the spines of the Chad act as so many hooks. The finest fish are generally obtained by trawling in deep water, but good catches are often made in ground-seines both near the shore and two or three miles out at sea. The largest Cornish specimen that has passed through the writer's hands weighed 11 lb. The Boar-fish (*Capros aper*, L.) up till 1843 was regarded as one of the rarest of British fishes, but that year it appeared in large numbers from Plymouth westwards. Always very local, it vanished altogether in 1846, and was represented by an occasional solitary specimen up to 1870, when it became remarkably plentiful along the south coast of the county, and for nine years was so abundant locally as every now and then to fill the trawls. As it is not a marketable fish, it became in places a veritable pest. In 1879, after a violent east wind, it entirely died out, and, though occasionally taken on deep trawling-grounds, was not again seen in shallow water till 1894

(Dunn). At present it is locally plentiful on the trawling-grounds off the south coast and in the west. It is frequently taken in Crab-pots, especially when set with Spider Crab. The Trumpet Fish (*Centriscus scolopax*, L.) is an extremely rare accidental vagrant from the Mediterranean. An undoubted British example was thrown on shore at Menabilly, near Fowey, in 1804. On the 16th of June, 1906, one of the writer's biology students found a dead specimen in good condition on some wet mud near the mouth of the Helford River, where it had evidently just been left by the receding tide. When the writer received it wrapped up in paper two days later the odour of decomposition was barely perceptible, so that presumably it must have died only a short time before it was discovered. The specimen, which is 6·3 in. long, has been placed in the museum of the Royal Institution of Cornwall.

Immense quantities of Mackerel (*Scomber scombrus*, L.) appear off the coast in spring and early summer, and are caught with drift-nets till the schools break up about the end of May or early in June, when they come more inshore, and are taken freely with the seine and the hand-line. The Cornish boats may in some years begin to fish with satisfactory results very early in January, but the regular fishing season is from March to June. At that period several hundred boats make their headquarters at Newlyn, and others at Looe, Mevagissey, Falmouth, and St. Ives. During March and April, the recognized time of the spring Mackerel fishery in Cornwall, the Looe boats fish for the most part five to twenty miles south-west to west of the Eddystone; the Mevagissey boats off the Dodman and Falmouth Bay; those from Newlyn and the neighbourhood off the Lizard to Wolf Rock and in Mount's Bay, and those from St. Ives ten to sixty miles off that port. In May and June, the time of the summer Mackerel fishery, the Looe fishermen go to great distances south-west of the Eddystone, the Mevagissey men usually fish forty to sixty miles south-west of the Dodman, the Mount's Bay men from south-west of Mount's Bay to within sight of Ushant Light, and from there to Cape Clear in the south-west of Ireland. They also at times make big catches outside the Bishop Rock, Isles of Scilly. The St. Ives men go sixty or seventy and in some years (*e. g.* 1905) ninety miles, N.N.W. round to N.N.E., and in some seasons fish

off the Isles of Scilly. The Cornish fishermen say that Mackerel is always most abundant where the water is green, and samples of such water is generally found to be very full of small "bait." In September and October the Mackerel, as a rule, return to deep water, but a few often linger behind, where small fish are plentiful, and grow rapidly in size. On the 26th October last year two were sent in from Falmouth, one of which weighed 2 lb. 1 oz. and the other 2 lb. 2½ oz. The Spanish Mackerel (*Scomber colias*, Gmel.) is an occasional visitor from the Mediterranean, sometimes in small shoals. In June, 1901, about fifty were brought into Newlyn from near the Wolf; in the early days of June, 1906, several were taken near Gerrans, and in the summer of 1907 Dunn *f.* saw two that had been brought in from Mount's Bay. The Short-finned Tunny (*Orcynus thynnus*, L.) is an irregular visitor, chiefly to the west of the county, from July to November. In September, 1899, several were taken in a Pilchard drift-net near the Wolf Rock; in July, 1901, two were obtained about three miles south of the Runnelstone, and on the 8th of November one was taken to the north of St. Ives; in August, 1906, two small specimens were sent in for identification out of a number that had been caught to the south of Mousehole Island. The Germon or Long-finned Tunny (*O. germon*, Lacep.) is a rare vagrant that has not been reported since 1846. The Pelamid (*Pelamys sarda*, Bloch.) has been much confused with the Short-finned Tunny. Occasional specimens have undoubtedly been taken off the south coast, but the only specimen handled by the writer was one weighing 4 lb. that had been taken in a Mackerel drift-net south of the Bishop early in June, 1903, and was reported in a local newspaper as a gigantic Mackerel. The Plain Bonito (*Auxis rochei*, Risso) is a very rare vagrant, not recorded since 1844. The Sucking-fish (*Echeneis remora*, L.) was obtained by Dunn *f.* in 1867, eighteen miles off the Dodman, and by Cornish from Mount's Bay in 1877. Several Cornish specimens of the Scabbard Fish (*Lepidopus caudatus*, Euphr.) are mentioned by Day, but none have been recorded since. The Silvery Hair-tail (*Trichiurus lepturus*, L.) has been taken at intervals, and, as a rule, singly along the south coast. One was obtained at the mouth of the Helford River on the 15th of December, 1899, and another at Sennen Cove, near the Land's

End, in January, 1905. The Sword-fish (*Xiphias gladius*, L.) is occasionally reported by fishermen, but rarely captured. Several instances of the occurrence of Ray's Bream (*Brama raii*, Bl. Sch.) on the Cornish coast are collected by Day. In March, 1891, a specimen about 1 ft. 8 in. long was taken with a gaff at Portscatho, and sent to the Marine Biological Laboratory by Matthias Dunn. On the 12th of March, 1905, after a violent storm, a large specimen was thrown up dead near St. Anthony Lighthouse, Falmouth. In 1887 one was obtained in a Grey Mullet seine at Scilly—the first capture off Cornwall in the open sea (Cornish). Two occurrences of the Opah or King-fish (*Lampris luna*, Gmel.) are recorded by Day, but it does not seem to have been taken since 1865. The only two known British examples of *Luvarus imperialis*, Rafin., were obtained in Cornwall, one off the Dodman on the 30th of April, 1866, and the other exactly five months later at Falmouth.

The Scad or Horse-Mackerel (*Caranx trachurus*, L.) is common and locally abundant in all the Cornish seas, usually appearing in April and returning to deep water in October, but the young often swarm in the coves throughout the winter. Being of little commercial value, it is often very troublesome to Cornish Mackerel and Pilchard fishermen by literally filling their nets. This year (1907) it has been unpleasantly abundant in the west about Scilly. The Pilot-fish (*Naucrates ductor*, L.) is of frequent occurrence, not only as a companion of Sharks, but also as a follower of vessels. One was taken in Falmouth Bay on the 30th of September, 1899; two at Penzance in November, 1903; and one close to St. Mawes on the 23rd of June, 1907. Two examples of the Derby (*Lichia glauca*, L.) have been taken in the west, the last in 1878. A stray specimen of *Lichia vadigo*, Risso, 19 in. long, was taken in a Pollack-net off Prussia Cove in 1892 (Günther, Ann. & Mag. Nat. Hist. ser. 6, x. 335). The only British example of the Rudder-fish (*Pammelas perciformis*, Mitchill) was found alive in a floating wooden case about six miles from Penzance in October, 1874. About two dozen examples of the Black-fish (*Centrolophus pompilus*, L.) are recorded from Cornwall by Day. Holt describes six or eight small specimens, 12 to 14 in. long, taken in a Mackerel-net near the Runnelstone in 1891 (Journ. M.B.A. ii. 265). In June, 1900, a

Mevagissey Mackerel-boat that had been disturbed in its operations south of the Dodman by several Porbeagle Sharks, brought in a specimen that measured $18\frac{1}{2}$ in. in length. Dunn *f.* says it has appeared in Mackerel-nets once or twice lately in the mouth of the Channel. The Cornish Centrolophus (*C. britannicus*, Günther) is a doubtful species. The only known example was thrown up on the shore near Looe in February, 1859.

The two Weevers are deservedly dreaded by bathers, fishermen, and shrimpers, because of the poisonous spines of the operculum and first dorsal fin. The Greater Weever (*Trachinus draco*, L.) is locally not uncommon at times round the coast on sand and fine gravel from between tide-marks downwards. It seems to be of most frequent occurrence where Shrimps abound. The Lesser Weever (*T. vipera*, Cuv. et Val.) is apparently scarcer in the west of the county than the other, but is elsewhere locally common on similar ground. The gorgeous adult male of the Dragonet or Skulpin (*Callionymus lyra*, L.) is frequently obtained on sandy or gravelly bottoms at a depth of twenty-five fathoms downwards both off the south and north coasts, and may be common. The female evidently prefers shallower water, while the young are often plentiful close inshore. A fully developed male of the Spotted Dragonet (*C. maculatus*, Bonap.), a distinctly northern species, was trawled by Holt in Falmouth Bay in July, 1897, at a depth of thirty to thirty-five fathoms.

The Cornish Sucker (*Lepadogaster gouanii*, Lacep.) is common on the south coast in small rock-pools, under stones between tide-marks, and in shallow water. On the north coast it seems to be scarce or very local. The Double-spotted Sucker (*L. bimaculatus*, Flem.) is by no means so common. During the past eight years it has been dredged at a depth of fifteen fathoms at Polperro, and up to twenty-five fathoms in Falmouth Bay. It has also been taken at low spring tide at Gorran, Gyllyngvase, and near Mousehole, and dredged in shallow water in Nanjizal Bay, Land's End. Couch is evidently the only naturalist who has obtained the Connemara Sucker (*L. decandollei*, Risso) off the Cornish coast.

(To be continued.)

NOTES AND QUERIES.

AVES.

The First Recorded British Example of the White-spotted Bluethroat.—Having recently had an opportunity of examining the disputed specimen of the White-spotted Bluethroat, obtained near Scarborough in April, 1876 (*cf.* Zool. 1902, p. 464; 1903, pp. 23, 431, 455; 1904, pp. 31, 263), and which I exhibited at the British Ornithologists' Club on the 16th October last, I am pleased to be able to state that its identity is fully established. It is in every way typical of the white-spotted form (*Cyanecula wolffi*), the white in the centre of the blue throat being most distinct, and about half an inch in diameter. The plumage, even after the lapse of thirty years, still retains its deep intense hue. On questioning the present owner of the specimen as to the facts of the occurrence, he corroborated in every respect the original statements of the Rev. J. G. Tuck and Mr. W. Eagle Clarke, though, as the females of the two forms of Bluethroat cannot be distinguished, it is unfortunate that a misleading statement was made as to the sex of this example, which accounts for its rejection by the authors of recent ornithological works. In case any sceptic may proffer a suggestion that it was an imported skin, my informant added that he remembers his father bringing home the bird, telling him he had found it below the telegraph-wires, and at the same time pointing out where it had been damaged by coming in contact with them. For further particulars inquirers are referred to the 'Birds of Yorkshire,' i. pp. 38, 39.—T. H. NELSON (The Cliffe, Redcar).

Status of the Grey Wagtail (*Motacilla melanope*) in Yorkshire.—Referring to the notes on this subject (*ante*, pp. 151 and 382), I may state that this species is sparsely distributed along the moorland becks immediately to the north of Scarborough, the eastern boundary of the breeding haunts in Britain of this and several other species of birds.—W. GYNGELL (Gladstone Road, Scarborough).

Richard's Pipit at Yarmouth. — An example of Richard's Pipit (*Anthus richardi*) was netted on the North Denes at Yarmouth on October 22nd, and is now in the possession of Mr. W. Lowne. A few

other specimens have previously been reported here at long intervals. The first one recorded for Norfolk was obtained in the same locality in November, 1841. Although an autumnal migrant, it is sparingly met with in Great Britain; yet it is freely distributed in the southern parts of Europe during the winter. I once saw one of these large Pipits searching for food amongst the aquatic herbage which grows on the rands on the north side of Breydon in September, 1890. I noticed how extremely active it was in its movements. A Lark being near, I had a fine opportunity of observing the two species at one view.—B. DYE (Row 60, No. 10, Great Yarmouth).

Eggs of Red-backed Shrike (*Lanius collurio*).—It may interest your readers to learn my experience relative to this subject, and it will be interesting to me to know of their observations in the same direction. It seems common knowledge that many of our summer migrants return each year to the same nesting locality, and as an instance I will cite the bird under notice as one species apparently possessed of this habit. In the county of Wiltshire I know of two spots, about six or seven miles apart, where a pair of these birds are regularly to be found during the period of their stay with us, and my observations respecting the two nests extend over the years 1903, 1904, 1906, 1907. The first pair were noticed in 1903 near a railway bank, and their nest contained five eggs of the grey variety. They were seen in the same place in 1904, but the nest was not located. In 1905 no visit was made by me, but in 1906 they had again returned, and the nest discovered within a few yards of the one previously found in 1903. This contained as a full complement four eggs only, which on this occasion were of the pink variety. My observations of the second nest were made within the past two seasons (1906–7). The nest, situated about five feet from the ground in an overgrown thorn hedge, contained six eggs of the grey type, while the one discovered this year (1907) and situated quite near the other had five eggs, which were marked with pink blotches rather than spotted—quite an unusual type. It will therefore be seen from these remarks that, although the eggs were found in precisely the same localities—indeed, a few yards only was the space between each year's nest in both cases—the eggs varied in colour as described above. My contention is, on the face of this experience, that the eggs are liable to this variation, and that there is little doubt that they belong to the same birds which return each year. While dealing with this subject I should like to mention that with regard to the eggs of the Cuckoo I have found no variation whatever, after some years of careful observation in certain localities. In one

district I found eggs of the Cuckoo all in Sedge-Warblers' nests, and absolutely identical, for four successive seasons (1903-6 inclusive), which leaves no doubt in my mind that the eggs were the production of one bird. This certainly seems very remarkable when one considers for a moment all the risks migration entails.—D. W. MUSSEL-WHITE (7, Jessica Road, Wandsworth Common).

Spread of the Little Owl in Herts.—Noticing the note in the last number of 'The Zoologist' (*ante*, p. 384) about this species, I thought it might be of interest to record what I could find out about it in the neighbourhood of Ware, Herts; so I wrote to my grandfather, T. F. Buxton, Esq., of Easneye, Ware, to ask him what he had observed in that neighbourhood. He tells me that they first appeared in the spring of 1897; that year they nested in an old pear-tree at Little Briggins Farm. They brought off two young, one of which was picked up dead. The old birds and the single young one stayed about, and next spring (1898) they nested again. This time it was in the loft of a barn, among some hurdles which were being stored there. No one knew of the nest until, unfortunately, it was found and disturbed in removing the hurdles for use. The foreman in charge at once stopped the work and locked the loft, but the nest with four eggs was deserted. The Owls stayed about till that autumn, and then disappeared. This species is still sometimes heard of in that neighbourhood.—P. A. Buxton (32, Great Cumberland Place, London, W.).

Little Owl (*Athene noctua*) Breeding in Hertfordshire.—In connection with Mr. Stuart Maples' note on the occurrences of the Little Owl in Hertfordshire during 1906 (*ante*, p. 353), and Mr. Steele-Elliott's account of the spread of the species in Bedfordshire (pp. 384, 385), it will be of interest to record that the Little Owl has been discovered breeding in Hertfordshire in two instances this past spring. A nest was found about the middle of June near Watton-at-Stone by some boys who saw the parent bird fly from a decaying oak. The nest was in a deep hole about ten feet from the ground, and contained four young just ready to fly. They were caught the same evening when they left the nest-hole and perched on the branches to be fed. Two of them were released after being kept in captivity for some weeks; the other two are still in cages in this village, and are in good health and plumage, having become quite tame. Mr. W. Percival Westell has informed me of another nest found this year between St. Albans and Hatfield. It was in a hole in a willow-tree, and, although one of the birds was shot by a keeper, the young were safely reared. Mr. Westell adds:—"Several keepers have reported to me the presence of this

interesting bird, and I know it is present in the Watford district. As far as I remember, I first saw a specimen here about five years ago, but the past season is the first I have known for it to nest here." There is, however, a record of this bird having nested in Hertfordshire in former years. Dr. Hartert informs me that a pair nested and reared two young in 1897 on one of Mr. T. Fowell Buxton's farms at Easeneye, near Ware. In the following year they again nested on the same farm in the loft of a barn, where, however, they were disturbed, and deserted their eggs. It is quite probable that the discovery of two nests in different parts of the county this year, together with the frequent appearance of the bird during the last year or two, points to the permanent establishment of the Little Owl as a resident species in Hertfordshire, as in Bedfordshire and Northamptonshire. — ALLAN ELLISON (Watton-at-Stone, Herts).

Peregrine and Greenshank.—A Peregrine Falcon, at the entrance to Breydon, on October 17th, gave chase to a Greenshank, which sent forth repeated terrified shrieks in a single clanging note. When nearly overtaken the hunted bird pitched head first into the water, and dived and swam in a most active fashion. The Falcon, baffled for the moment, wheeled round, when the wader again took to wing, loudly voicing its indignation and terror. It was again harried, only to repeat its diving and swimming. A friend of mine at this moment ran into his boat-shed to procure his gun, with the intention of securing the Peregrine if possible. A third time the swoop of the pursuing bird proved unsuccessful, when it gave up the attempt, and made back for Breydon; the Greenshank, profiting by its retreat, winged its way across the town beachwards. — ARTHUR H. PATTERSON (Ibis House, Great Yarmouth).

Early Nesting of the Green Cormorant.—This year the Green Cormorants or Shags (*Phalacrocorax graculus*) started nesting remarkably early in Orkney. They commenced building their nests in January, and the first eggs were found on February 24th on the island of Sules Skerry. The weather during these months was very stormy but not cold, and perhaps this latter fact had something to do with their early nesting, which is much earlier than has ever been known in Orkney before. — H. W. ROBINSON (Lansdowne House, Lancaster).

Flock of the Glossy Ibis in Orkney.—On September 24th a flock of nineteen or twenty Glossy Ibises (*Ibis falcinellus*) appeared at Sandwick, in Orkney, a small township about four miles inland, and about

eight miles from Stromness, where they frequented some marshy ground there. The man who made the discovery did not think of shooting them at first, and so for three days they remained in peace; but on the 27th this idea seemed to strike him, and from this date until October 1st he shot two or three each day as they were feeding in a burn, until he had accounted for no fewer than ten. They were very wary, and rose high in the air when disturbed. Most of them were sent, I believe, to Mr. Mallock, of Perth, and it would be interesting to know whether they were old or young birds. I do not think there are a dozen records of this bird having visited Scotland, and the occurrence of a flock of them in Orkney is most unusual, as I believe the species has only occurred twice before in these islands—*viz.* a young bird near Stromness on September 19th, 1903, which I mentioned in the 'Field,' &c., at the time; and another near Kirkwall as long ago as September, 1857, exactly half a century ago. It will be noticed that the three occurrences were all in September during the autumn migration.—H. W. ROBINSON (Lansdowne House, Lancaster).

Nesting of the Lesser Tern in the Outer Hebrides (*ante*, p. 386, and 'Field,' September 28th, 1907).—At the time Buckley and I issued the volume of our series of faunas relating to the Outer Hebrides we were not aware of any *authentic* instances of the nesting of the Lesser Tern anywhere in these islands. (It ought always to be remembered that we have consistently advocated chronological sequence of records.) But later I have recorded the earliest instances known of its nesting, and these will be found noted in my "Avifauna of the Outer Hebrides" (Annals Scottish Nat. Hist., April, July, and October, 1902; and January, 1903, p. 15, of the latter Annals and number). May I also refer your correspondents upon this subject to a still later article by Mr. Donald Guthrie, "Notes on Birds of South Uist, Outer Hebrides" (*op. cit.*, April, 1903, p. 78). At those places the correspondents—in 'Zoologist' and 'Field'—will learn the true sequence of the dispersal of this species in the Outer Hebrides. The locality *given* (Zool. *loc. cit.*) near North Uist indicates a further dispersal of the species, and certainly, so far as I am aware, it is the most north-westerly recorded.—J. A. HARVIE-BROWN (Dunipace, Larbert, Stirlingshire, N.B.).

Is the Black-headed Gull an Egg-thief?—In the last number of this Journal (p. 387) my friend Mr. E. P. Butterfield relates his experience respecting the behaviour of a number of Black-headed Gulls and Lapwings on the breeding-grounds of the latter, and (presumably) during the nesting season of the Lapwings. Mr. Butterfield did not

see any egg taken, nor any deliberate attempt to take any by these Gulls, but was convinced that the visits of the Gulls "were not mere chance visits, but were for some special purpose." The only inference is that the Gulls wanted the eggs of the Lapwings, or else some special food from the ground whereon the Lapwings were nesting. Until I can get some actual proof of egg-stealing by the Black-headed Gull, I shall continue to believe that in this case the Gulls' object was not in any way to interfere with the eggs or young of the Lapwings. Although I know the district between Cray and Buckden Pike fairly well, I have never witnessed anything of a similar nature between Black-headed Gulls and Lapwings, either there or in any other part of this district. I do not wish to doubt a single word of Mr. Butterfield's statement, as I know him too well, and have known him so long, to feel certain that he would present the facts as fairly and as accurately as it would be possible to do so. But Lapwings are very jealous guardians of their nesting areas, and will promptly fly at any fair-sized bird of very diverse habits which happens to cross their chosen territory. I will only say that for the past few years I have endeavoured (in this district) to bring to light a single fact to justify the statements of a few local gamekeepers that the Black-headed Gull is a harrier of eggs; but up to now I have not met with a single jot of evidence to bear out this accusation—but I have learned much which tends to prove the contrary. Last year, on the margin of one of our large reservoirs (where is situated the largest breeding colony of Black-headed Gulls in this neighbourhood), a Common Sandpiper made its exposed nest, and deposited its four eggs. The water rose in the reservoir, and presumably covered the nest and eggs, and the birds deserted them. The water receded and left the eggs fully exposed to view. Now this particular spot is always a favourite resting-place of the Gulls, and as we approached quite a score of them arose from around the Sandpiper's deserted nest and eggs. But even at the end of the season (on July 28th) the four eggs remained untouched and intact, still neatly arranged with the small end pointing inwards. No excuse even could be made that the eggs were set, or they would have floated away, or would have become deranged with the rising of the reservoir. This convinced us that the Black-headed Gull did not interfere with Sandpipers' eggs, whatever it might do with those of the Grouse or Lapwing. The same year a nesting colony of these Gulls were greatly persecuted and fired at by the gamekeepers for their supposed robbing the eggs of gamebirds; so that eventually about a dozen pairs nested near to a small tarn on a moor a few miles away. Fortunately the shooting there was

under the control of a good sportsman and a fairly good ornithologist, and one of the best known public men in the district. Consequently the Gulls were allowed to rest in peace. After the shooting season the same gentleman informed me that at the particular part of the moor where the Gulls had nested they had made the best "bag" of Grouse, and better than in any past season on that part of the moor; and that he had remarked upon this fact to his keeper at the time. Unfortunately he would not permit me to make known the full data for fear that it might "only be a coincidence." Although I do not wish to infer that the *increased* "bag" was in any way due to the Gulls, it is quite clear that their presence on this particular spot had not been of disadvantage to the Grouse. Referring to the insinuations of certain gamekeepers—it is much more likely to be the work of Rooks, Crows, or Jackdaws, and probably of Lesser Black-backed Gulls, which latter now pay regular visits in small parties, or in honeymoon pairs, to this district at just about the laying-time of the Grouse. With the average gamekeeper a Gull *is a Gull*, just as a Hawk *is a Hawk* (even if it should prove to be a Cuckoo when shot). So far as I can see, the Black-headed Gull is essentially a farmer's friend, and a scavenger in this district. Almost any day during the spring and summer a few of them may be seen "fishing" on the River Aire below Shipley, and after the admission of the Bradford Beck (now almost a main sewer), and where the water is almost inky-black, and nothing but a Rat can live in it.

In the above I have only spoken for the Black-headed Gull in this district (where it is a summer visitor, arriving early in March and leaving at the end of September or early in October), where it has largely increased as the result of the construction of numerous sewage-beds along the Aire Valley. No doubt in districts where large gulleries are strictly preserved, and where no check is placed upon their increase, the birds will have to alter their food in order to meet the increased demand; but even under such trying circumstances I should be much surprised to learn that this species had taken to egg-stealing.—HARRY B. BOOTH (Shipley, Yorks).

Pomatorhine Skua at Yarmouth.—On October 23rd an immature example of the Pomatorhine Skua (*Stercorarius pomatorhinus*) was shown me in the flesh, and which had a few days before been captured by the crew of a fishing-lugger, among whose nets it had come to grief. The under parts were white, with a beautifully speckled gorget, very much resembling a Sanderling in the nuptial plumage. Some bars on the back were edged with fawn colour. Unfortunately the bird was

useless as a specimen, the throat being greasy, while round the base of the bill the feathers were already very loosely attached. On opening the mouth I noticed some tiny larvæ of the blowfly, which rather surprised me; but it is just possible that in the warm cabin of the boat, situated as it is near the engines, sundry bluebottles had shipped themselves as members of the crew. — ARTHUR H. PATTERSON (Ibis House, Great Yarmouth).

ARACHNIDA.

Chelifer cancroides (Linn.).—It was a surprise to me to read, in 'The Zoologist' (*ante*, p. 388), that the Rev. O. Pickard-Cambridge was only able to refer to four British specimens of *Chelifer* in 1892. *Chelifers* of this species have always been fairly common in this neighbourhood, and I have generally met with a few when sifting dead leaves in search of minute *Helices*, especially amongst beech and hawthorn leaves. A paper on Pseudoscorpions was read before the Quekett Microscopical Society on October 25th, 1867, and in the discussion which followed it was stated that nine species of the genera *Chelifer* and *Obisium* had then been found in Great Britain. The excellent microphotograph of *Chelifer cancroides* in 'The Zoologist' will, I hope, be followed by similar photos of the other British species. — JOHN R. B. MASEFIELD (Rosehill, Cheadle, Staffordshire).

OBITUARY.

HOWARD SAUNDERS.

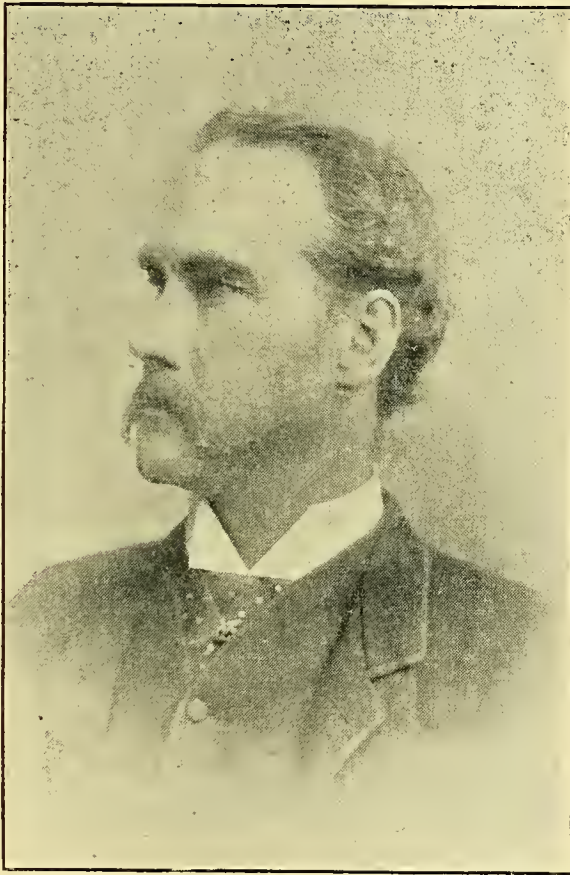
It is with deep regret that we have to record the death of Mr. Howard Saunders, F.L.S., F.Z.S., F.R.G.S., which occurred at his London residence on Sunday the 20th of October. After a long and painful illness, which he bore with the most heroic fortitude, he passed away at the age of seventy-two. His loss will be mourned by a very wide circle of friends and acquaintances in all parts of the world, but more particularly by ornithologists, for, though a man of many and varied tastes, he was best known through his writings on birds, and was more especially famous as the author of the widely known 'Manual of British Birds,' and for his monograph of the Gulls (*Laridæ*), which formed part of volume xxv. of 'The Catalogue of the Birds in the British Museum' (1896).

Mr. Saunders's death, following so closely on that of Prof. Alfred Newton, makes the year 1907 an extremely sad one in the history of ornithology, for these two men were universally acknowledged to be our most learned authorities on British Birds. All difficult questions relating to British ornithology were invariably referred to one or other of them, and no one ever appealed for help without obtaining the fullest information and the soundest advice.

Mr. Saunders was born in London in 1835, and was educated at Dr. Gavin Smith's school at Rottingdean, where at an early age he displayed a special interest in birds, and made his first recorded observation. Born of an old and honourable merchant family of the City of London, he received during his early years a business training, which may be traced in his accurate and methodical manner of dealing with any subject he undertook. All his writings bear testimony of the same careful and painstaking treatment, and it is not too much to say that his 'Manual of British Birds,' which is perhaps the best and most widely appreciated of his works, will always remain a model of accuracy and learning compressed into the smallest possible bulk. To each species he devoted only a page and a half of letterpress, but within that limited space he managed to include not only a complete description of its various plumages, but its geographical range, habits, and all other important details.

At the age of twenty Mr. Saunders left England in the clipper-ship 'Atrevida,' bound for South America, and his observations on the Albatrosses noted during the voyage were published in a letter to the 'Ibis' for 1866. During 1855 to 1856 he visited Brazil, Chile, and

Peru, and remained in the latter country until 1860, his time being chiefly spent in antiquarian researches, and in acquiring a perfect knowledge of the Spanish language. Subsequently he made a remarkable journey across the Andes to the head-waters of the Amazon, and descended that river to Para. Thence he returned to England, where he devoted the greater part of his time to the study of ornithology. Between the years 1863 and 1870 he paid frequent visits to Spain, his proficiency in Spanish being of great use to him during his travels. The results of his observations on the birds of the Spanish peninsula



were published in a series of articles which he contributed to the 'Ibis,' 1869-1872.

In 1868 Mr. Saunders married Emily, daughter of the late William Minshull Bigg, and his marriage proved an exceedingly happy one, for his wife took the keenest interest in his work, and the help which she afforded him in his scientific career cannot be too highly spoken of. His house was open to all naturalists, and it was one of his boasts that no one could ever upset his household arrangements or prove *de trop*, as he was always prepared for any chance visitors either at lunch or at dinner. In 1870 he was elected a member of the British

Ornithologists' Union, and took a leading part in its conduct, being still Secretary at the time of his death. He was twice Editor of the 'Ibis,' from 1883-1886, and again from 1895-1900. From 1880-1885 he was Honorary Secretary to Section D of the British Association for the Advancement of Science. He was a Fellow of the Zoological, Linnean, and Royal Geographical Societies, and served on the Councils of all of them, and from time to time contributed valuable papers to their 'Proceedings.' He was also a Member of the Société Zoologique de France, Honorary Member of the American Ornithologists' Union, and of various other European societies.

It is impossible to estimate too highly the value of his life's work in the cause of Palæartic Ornithology, but he did not devote himself solely to the study of birds, for he took the deepest interest in geographical research, more especially in that relating to the Arctic and Antarctic regions.

His ornithological writings were noted for their excellence rather than for their number, for Mr. Saunders was by no means a voluminous writer. In 1882 he took over from the late Professor Newton the editorship of the fourth edition of Yarrell's 'British Birds,' and in the most admirable manner re-wrote the third and fourth volumes which were still required to complete the edition. Subsequently he conceived the idea of writing his greatest work, the 'Manual of British Birds,' mentioned above, which was published in 1889, and passed through a second edition ten years later. On this subject we have already touched, as also on his monograph of the Gulls. On these latter, to the study of which he had devoted the greater part of his life, he was undoubtedly the greatest authority in the world, and he possessed a remarkably fine collection of their skins, which was acquired by the Trustees of the British Museum in 1894. He presented to the nation his fine collection of eggs of Gulls and Terns, and, from time to time, numbers of skins of birds from Southern Spain and other parts of the world.

He was always ready to place at the disposal of others his great store of information, and a large number of books written by his friends passed through his hands for revision. He was a man of singularly sound judgment, and possessed of a wonderful sense of proportion, consequently his help and sympathy in both public and private difficulties were constantly sought and invariably forthcoming. The loss of such a man and such a friend has plunged the little community of British ornithologists into heartfelt sorrow.

W. R. OGILVIE-GRANT.

NOTICES OF NEW BOOKS.

Notes on the Birds of Rutland. By C. REGINALD HAINES,
M.A., &c. R. H. Porter.

THIS is a small book relating to a small avifauna of a small county, but a sterling ornithological publication, for not only is a carefully compiled account given of the 200 birds included with certainty in the fauna, but in the introduction some cogent reasons are given why more birds could scarcely be expected in the confines of this county. There is, of course, no sea coast, which means much; of its area of little over 100,000 acres not 100 acres are waste land or heath, and not 200 acres are water; there are scarcely 400 acres of woodland, while orchards cover less than 150 acres; permanent pasture absorbs more than half of the whole area, and rotation crops account for another 36,000 acres. In reading such facts as these we feel confident that the time will soon be at hand when some competent and philosophical ornithologist will, with all the excellent county bird books now available for consultation, write a volume on the natural conditions which effect the distribution and status of birds in the different counties of Great Britain.

The Rutland birds have waited for a recorder; Montagu Browne had not studied the birds of the small county as he had those of Leicestershire; and we are told that, "with one important exception, there are no records or notes bearing upon the subject which date back more than a hundred years." Mr. Haines has therefore rendered a distinct service in giving us, what cannot be doubted is, an adequate account of the birds of our smallest English county.

The Nervous System of Vertebrates. By J. B. JOHNSTON,
Ph.D., &c. John Murray.

THIS is an important book for the serious student of animal evolution, though its method and practice are rather more abstruse than the bionomic and distributional features largely

followed in the pages of 'The Zoologist.' In the author's words, an attempt has been made "to give an account of the nervous system as a whole, to trace its phylogenetic history, and to show the factors which have determined the course of evolution." This functional point of view is intended to supply a study of the nervous system to supplement our observations on animal bionomics; we record the action; Prof. Johnston seeks to describe the nervous system by which it is produced, and its evolution or unfolding from primitive to more specialized forms. Such a book for detailed review would be beyond the scope of 'The Zoologist.' We will, however, advise its study by any sufficiently advanced student who can follow its method by the possession of sufficiently acquired familiarity with experimental and anatomical methods. Our conception of evolution is largely dependent for its accuracy on such knowledge, but most zoologists are, in their decisions on this great question, very much in the position of a jurymen whose verdict is not inconsiderably influenced by the light and leading of the personage who occupies the judge's chair. We cannot escape it; many facts and much opinion must necessarily be acquired "second-hand."

We have only one discrepancy to point out. In the chapter devoted to "The Evolution of the Cerebral Hemispheres" the author writes that in man they are larger and more complex than "in animals"; unless the word "other" is interposed between these last two words, what becomes of evolution?

A Correction.—In our notice of Mr. Le Souëf's 'Wild Life in Australia' (*ante*, p. 391), we expressed regret that there were no generic and specific names to distinguish the animals referred to in that very interesting book, which we read from start to finish. It has since been pointed out to us that an "Index of Scientific Names" is inserted *after the Index*. We did not read beyond the index, and though we much regret our statement, we think that the publishers are largely to blame in inserting that appendix in such a position (without any reference to it in the text), though it is included in the "Contents." We read neither "Contents" nor "Index," being absorbed in the other pages of a delightful narrative.

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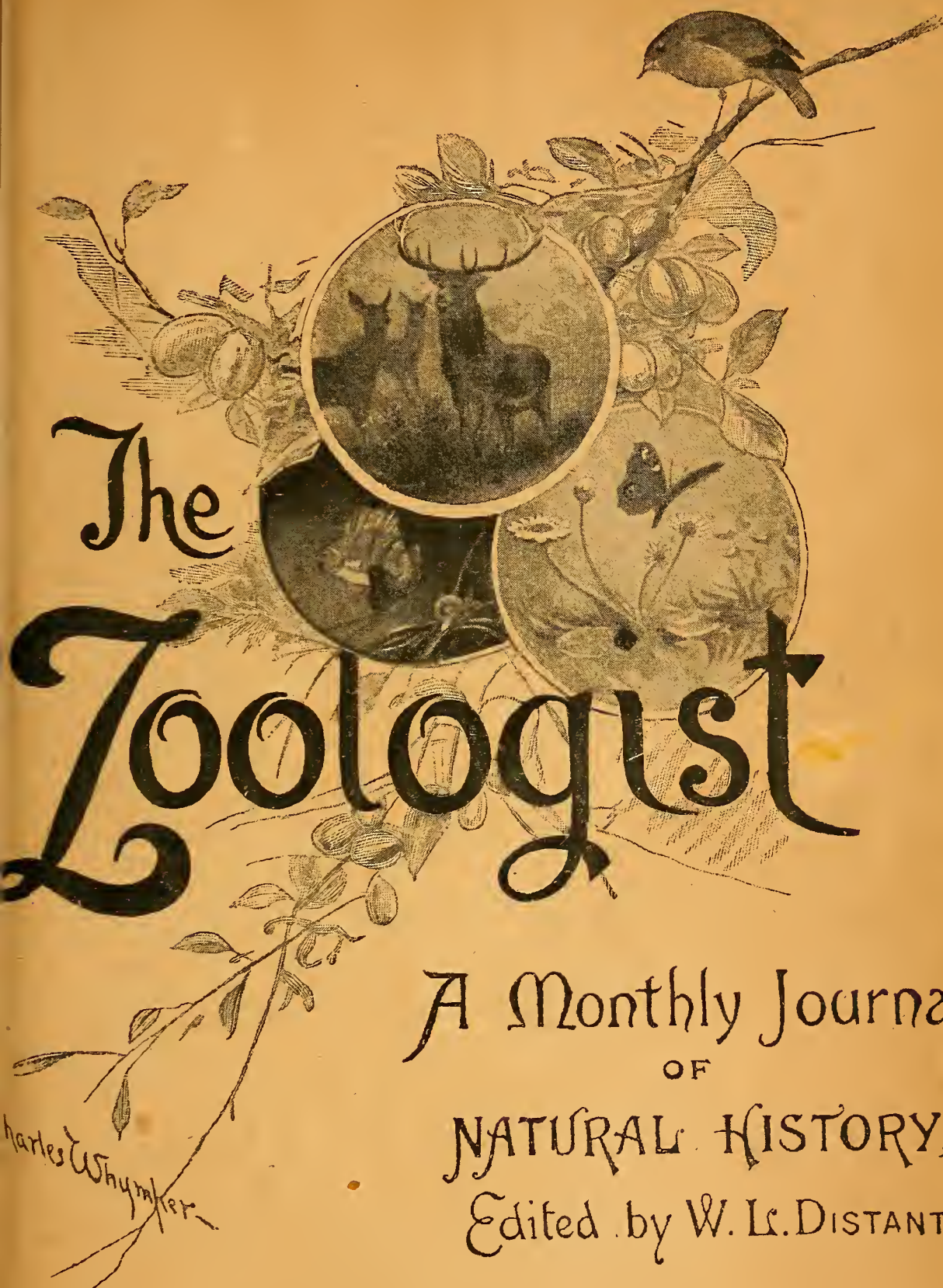
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SEA-EAGLE (*Haliaeetus albicilla*) ON A CARCASS.

THE ZOOLOGIST

No. 798.—December, 1907.

EXPERIENCES WITH EAGLES AND VULTURES IN ALBANIA.

BY R. B. LODGE.

(PLATE III.)

WHILE in Albania this year I was able to put into execution an idea I had long contemplated for the purpose of photographing Eagles and Vultures at close quarters—*i. e.* to hide up in a hollow tree or other similar hiding-place, with the fresh carcase of some animal laid out as a bait.

It is astonishing what a number of animals—horses, donkeys, calves, and cows—one sees lying about, having perished in some way or another. Many of them get bogged, and, unable to extricate themselves from the deep mud through which they are obliged to struggle continually, perish miserably, providing food for the Vultures and Eagles constantly on the search for food.

Riding through the country it is a common occurrence to pass such a carcase, and to see on the neighbouring trees the carrion-eaters waiting to descend once more to their interrupted feast. From the innermost recesses of a half-devoured carcase I have seen dozens of the smaller fry, such as Magpies and Hooded Crows, emerge in a perfect cloud, which had been too busily engaged to notice our approach before.

The commonest Eagle here is undoubtedly the Sea-Eagle

(*Haliaëtus albicilla*). A few Imperial Eagles were observed, and once I saw a Golden Eagle on a tree near a dead horse in course of being devoured; but the Sea-Eagle is to be seen constantly.

On the lagoons a pair of Sea-Eagles may often be seen harrying the big flocks of Coots and Ducks. From a distance one may frequently hear the noise made by the thousands of terrified birds all rising in the air together at the Eagle's stoop at one of their number, and on one occasion we picked up a Black-headed Gull which we had just before seen struck down by one of these birds; but they also live largely on carrion. In a nest in a huge silver poplar, in 1906, which contained a nearly full-grown young bird, we found many skulls and blade-bones of calves and other animals, proving that the eaglet had been chiefly brought up on carrion picked up in the surrounding forest.

This year (1907) two nests of *Haliaëtus albicilla* were found not more than five hundred yards apart. Between these two nests was a small clearing, in the middle of which lay a defunct Donkey. It was only found after the whole of the flesh had been stripped from the bones; but, as there was a big hollow tree close at hand, and another dead Donkey within reach, I had the fresh carcase brought to the spot in a bullock-cart, and stowed myself away in the tree. Three whole days I spent therein, and a very tight fit it was in spite of a lot of axe-work to enlarge the shell of the tree. I have spent long hours in many uncomfortable positions, but I think this tree was the worst place I was ever in. I had to stand—and it was only with the greatest difficulty that I could squeeze myself in after the camera was set up—and it was quite impossible to shift either of my feet without upsetting the tripod. After a few hours the discomfort of such a cramped and strained position became perfectly unbearable—such torture I was in from being unable to vary my position. The worst of it was that neither Eagles nor Vultures came to the spot. The hole in front was too big to be filled up naturally enough to deceive such keen-eyed birds, and the Donkey was gradually devoured each night by the Jackals, until it ceased to be an attraction. Magpies and Ravens were the only visitors in the daytime, though for hours three Griffons sat motionless on a dead tree close at hand. I could see them quite plainly from my

hiding-place; but if they could not see me they must have been able to see something which aroused their suspicions, for they finally took their departure without having partaken of the banquet I had provided for them.

A few weeks later another tree was utilised in the same way. It was more conveniently situated, for instead of an hour's ride through the forest it could be reached by walking about twenty minutes, and it provided much better accommodation inside. In fact, I spent a week comfortably sitting inside a huge prostrate trunk, with plenty of room to move about, or even to lie down, and at the same time perfectly hidden from the keen sight of my guests, which had not the slightest idea of my presence. Even the Ravens, suspicious and ever watchful as they are, came quite freely, sometimes a dozen at a time. I could often hear them settle on the trunk just over my head.

The fare I provided for them was plentiful and good. First I bought a sick cow, and had it killed within easy distance, fifteen or twenty yards. When that was picked clean—as it was in a day—a succession of dead Calves and Donkeys was brought to the banqueting-ground by bullock-cart, and laid out conspicuously.

The worst of it was that, in my anxiety not to betray my presence in any way, I did not provide myself with a peep-hole, but only a round hole just big enough to take the lens. It was thus only possible to see my subject through the camera itself, and this proved to be a great drawback. The first bird to appear on these occasions was invariably a Magpie. First of all the curious cry would be heard in the bushes around, and then, with wavering flight, a Magpie would fly to the carcase, soon to be followed by others, until quite a number would be collected together. Then the Hooded Crows would begin to arrive. Presently the deep guttural croak of a Raven from the summit of some tree would tell me that one of these birds had made its appearance; but not until it had satisfied itself that all was safe would it commence feeding.

The first Griffon (*Gyps fulvus*) came rather late one evening. As mentioned before, I could only see the carcase through the camera, and then not the whole of it; so that, seeing the

carcase—that of a large calf—suddenly shake violently, evidently dragged about by some powerful animal, I concluded that a dog had found it out. To make sure, however, I turned the camera slightly, and saw, to my surprise, a large Griffon energetically attacking the farther end. I was amazed to see with what apparent ease the bird could move such a heavy object.

The next morning I was in position at an early hour, and soon heard the “swish-swish” of heavy wings beating the air, and the croaks of Vultures assembling for the feast. Then they began to descend, until there were over thirty Griffons, and one Black Vulture (*Vultur monachus*), in a dense and seething mass of hissing, grunting birds, each one tearing off and gulping down as quickly as possible huge lumps of flesh and entrails. In the short space of an hour, or perhaps a little more, the whole of the calf had disappeared, and the birds one by one began to flap heavily away, leaving the Magpies and Crows to pick up the smaller fragments and clean up the bones.

During this extraordinary scene I had been busy exposing plate after plate, until I had used my whole stock of eighteen, with but faint hopes, however, of success; for, most unfortunately, the morning was exceptionally dull, heavy rain-clouds obscuring the light of the sun. My misgivings proved to be only too well-founded, all of the negatives being hopelessly under-exposed.

Another day at the end of March I was rather more successful in results. After photographing several Ravens and Hoodies, two Kites (*Milvus regalis*) appeared together, and remained some little time, giving me several chances. Then an Egyptian Vulture (*Neophron percnopterus*) came into view of the lens, and there were quickly nine of these birds quarrelling and fighting over the tit-bits. A single Griffon also came, but departed before I could get a chance to photograph it. Then suddenly appeared in the middle of the carcase an immature Sea-Eagle (*Haliaëtus albicilla*).

The Neophrons retired to a respectful distance while his majesty dined. It was a splendid sight to see this noble-looking bird stare around him in majestic fashion if any of the Vultures presumed to approach too closely; and, though he did not disdain to dine off carrion, it was done in a most dignified

manner, with none of the gulping and gobbling so characteristic of the Vultures.

My further use of this useful hiding-place was stopped by ploughing being commenced close to my hosts, a family of Albanian farmers, with whom I lived, a self-invited guest, for over a week.

A most interesting week I had with them in this forest, being treated with the utmost kindness and courtesy. True to their national hospitality they would take no payment in money, but accepted gladly my watch—a cheap American five-shilling watch—and my spurs; and I only hope that at some future time I shall be able to accept their pressing invitation to visit them again and stay for a month, or six months, or as long as I like.

EXTENDED BREEDING-RANGE OF THE MARSH-WARBLER (*ACROCEPHALUS PALUSTRIS*) INTO HAMPSHIRE.

BY HARRY BEESTON.

ORNITHOLOGISTS will learn with much interest that the Marsh-Warbler is extending its breeding area in the South of England to the eastward.

This year I have reliable and unmistakable evidence that this rare (?) warbler has nested (I cannot say for certain reared a brood) in Hampshire.

For obvious reasons I refrain from giving the exact locality; it is sufficient to state that the birds have been noted in one locality *at least*, within two miles of the West Sussex border, between that boundary and Hayling Island. It is more than likely that diligent search another year may reveal their presence in other suitable localities, several of which exist in the district. The bird is in my opinion a much commoner species than is usually supposed, the nest and eggs resembling so very closely those of the Reed-Warbler that they are quite likely overlooked and mistaken for those of that bird.

Briefly, the circumstances which brought the bird to my notice are as follows:—

On June 7th, 1907, I had shown to me *two* eggs for identification, which I thought at first were rather *light-coloured* specimens of the Reed-Warbler (*Acrocephalus streperus*). They had been taken by a boy (most good things are discovered, and too often destroyed, by either boys or dogs) in a small secluded reed-bed.

No information could be obtained about either the bird or nest, except that the nest was *built and suspended among the reeds*, but had been torn out and destroyed.

At first I concluded that the nest *was* that of *Acrocephalus streperus*, and that the eggs were a very light-coloured variety of that bird's eggs.

The *position* of the nest seemed to confirm that view. The eggs, as stated, were taken on June 7th, and a Reed-Warbler's nest with four eggs was observed on the same date. The Marsh-Warbler's nest only contained two eggs when taken. I was not at all satisfied that the eggs were those of the Reed-Warbler, so I made one or two visits to the reed-bed in the hope of seeing the birds and *hearing the song*; but I was not successful in doing either, and for a few days I heard nothing further.

On June 15th I was much surprised at being shown *four more eggs* taken from a nest in the same reed-bed. These eggs were in every particular similar to the two previous ones. I now determined to go carefully into the matter, and was enabled to examine the nest (it had in this instance fortunately not been destroyed) and to obtain more details of construction and situation.

It was built in the *centre* of the reed-bed, by the side of a small stream flowing through the bed, and *was suspended about four feet above the ground, to four or five reeds, exactly like a Reed-Sparrow's nest.*

Almost all authorities agree in stating that the nest of *A. palustris* is *not suspended* among the reeds, but placed "*in the herbage near the water*" (R. Bowdler Sharpe, 'Lloyd's Natural History of British Birds,' vol. i. p. 232), and "*often placed at some little distance from the water in low bushes overgrown with reeds, or in nettles and other water-plants.*"

In order that no mistake should be made, I forwarded nest and eggs to South Kensington Museum, to Dr. Bowdler Sharpe, on July 25th, 1907, and he forthwith pronounced them to be those of the Marsh-Warbler.

I have made a very careful and critical examination of the nest, and find it constructed as follows:—The outside is composed of fine dry grass-stalks and grass-leaves, narrow strips of thin bleached seaweed, a few dried flower-heads of reed-grass, dead stems and flower-heads of an umbelliferous plant, an odd spider's cocoon or two, and a greenish substance which I at first took to be moss, but upon examination with a lens I found to be a species of fine green algæ, whether seaweed or freshwater weed I am unable to say, probably the former. Into the rim of

the nest has been neatly woven a quantity of white wool, very much like cotton-wool, but in all probability pieces of sheep's-wool from bushes and fences near the nesting site. Intertwined with the wool of the rim, and also forming part of the inside cup of the nest, is a quantity of the above-mentioned stems and flower-heads of reed-grass, the cup itself being lined with fine stems of dried reed-grass.

The nest measures four inches in depth, across the rim two inches, and depth two inches. Outside, it is rather loosely constructed, but the interior is neatly and compactly made.

It contained five eggs when first found, one of which was unfortunately destroyed. The eggs exactly correspond to the descriptions given by the best authorities, being quite different in ground-colour and markings from those of the Reed-Warbler. It almost amounts to a certainty that the breeding-range of this bird is much more widespread in the Southern Counties than is generally supposed. On account of its haunts, habits, song, nesting periods and sites being so very similar to those of its congener the Reed-Warbler, it is without doubt almost always passed over unobserved, until by some accident it is discovered and reported. It may be that further observation will reveal its presence in other parts of this and adjoining counties.

To show how little it is known in Hampshire, or, at any rate, how it may have been mistaken for its ally, I quote the following from the recently published 'Birds of Hampshire and the Isle of Wight,' by Kelsall and Munn, with regard to its apparent rarity in this county:—"A rare summer visitor. In Mr. Hart's collection there is a specimen (a bird) procured in May, 1869, and he has also a clutch of eggs taken near Christchurch. A nest with eggs was taken at Alresford Great Pond in June, 1863, by Mr. W. H. Smith."

The record concludes with these pertinent remarks:—"We do not think that this species is really so scarce as it is supposed to be, but rather is overlooked; though the bird resembles the Reed-Warbler its nest is placed in situations similar to the Sedge-Warbler's." It is evident this example is a clear exception to the rule as given by most authorities.

Have the bird and its nest been found and authoritatively identified in Hampshire since 1863? If so, when, where, and

under what circumstances? It would be interesting to have the information.

It appears almost certain, too, that there must have been *more than one pair of birds* in the reed-bed, as there was not sufficient time from June 7th, when the two first eggs were taken, to June 15th, when the second nest was seen with five eggs, for the same pair of birds to have constructed a new nest and completed a second clutch of five eggs, unless it is possible for the birds to have made the nest in *three days*, and then commenced laying immediately it was completed, which seems scarcely feasible.

ICHTHYOLOGY IN JAPAN.

BY Prof. McINTOSH, M.D., LL.D., F.R.S., &c.

THE third part of the first volume of the 'Fishes of Japan,' chiefly in their economic aspects, by K. Otaki, A.B., T. Fujita, and T. Higurashi, No. 3, vol. i. and No. 1, vol. iv. (Shokwabo, publisher, Tokyo, Japan), contains an account of six species. The first is the Black Pagrus (*Sparus schlegeli*, Bleek.), which is not equal to the Red Tai (*Pagrus major*) in delicacy and popularity, but large numbers are captured in the shallower waters in summer by nets and lines. The spawning season is in May and June, and the pelagic ova of 1 mm. in diameter hatch in two days. In a year they reach six inches in length, and in two years ten inches and maturity—a rapid development. The Japanese fishes of the group to which this form belongs show, as Dr. Günther pointed out long ago, an approach to those of the Mediterranean. Indeed, the invertebrate fauna of Japan resemble in certain instances that of the North Sea. The next species—the Maguro or Black Eye (*Thunnus schlegeli*, Steind.)—is caught by long lines and nets, and, as some reach the length of eight feet, the fishing is of an exciting character. On the Pacific Coast pound-nets of a complex character are employed. The preparation of the fish into "fushi," the dried fish-stick, is one of the important industries of the country. The Maiwashi or Sardine (*Clupanodon melanosticta*, T. & S.) is extensively canned, salted, and dried, as well as used in the preparation of oil, and as a fertilizer. Just as in the case of Herrings and Sprats, large flocks of Sea-gulls and the appearance of Whales warn the fishermen, who encircle the fish with nets, which are then drawn to the beach. The pelagic eggs of this form have an oil-globule, and each fish is stated to produce forty thousand. Though the Konoshiro (*Konosirus punctatus*, T. & S.)—an ally of the former and, like the Tarpon, with the last dorsal ray prolonged into a whip-like filament—is an inferior fish, yet it is of

considerable commercial importance, especially in autumn. It is captured by fixed nets and seines. The Common Carp, again, has been an important food-fish in Japan since the beginning of the Christian era, and is taken by gill-nets, cast-nets, hooks, and weirs. The latter are made of bamboos, and are ingeniously elaborate. The Gold Carp has been considered good food for nearly as long a period. It attains the length of eighteen inches, and a weight of $3\frac{1}{2}$ lb. The four imperial quarto plates accompanying this part maintain the high standard of the previous plates, and are a credit to Japan and to science, and the same may be said of the figures of the nets, pounds, and other apparatus in the Japanese text.

The first part of the fourth volume deals with nine important species, five pertaining to the *Salmonidæ*, three to the Apodous fishes, and the last is *Pagrus major*. Each species receives careful notice in regard to specific characters, coloration, habits, food, reproduction, distribution, and economic value, and the figures still maintain the same high character. It would be an improvement, however, if the English text were revised by a skilled reader, though it must be stated that no ambiguity results from the present orthography.

The first species is the famous Red Tai or Madai (*Pagrus major*, T. & S.), so highly esteemed in Japan as to be a kind of national emblem. The largest attain the length of two feet and a weight of six pounds. It is estimated that the ova, which have an oil-globule and are 1 mm. in diameter, number eighteen million, so that it is clear they cannot all ripen at once. An interesting fact in connection with this fish is the use of a seine with body or bag and wings, together with a long auxiliary scare-line with keg-buoys and sinkers. No fewer than forty-six men are required to manipulate it, *viz.* twenty-four net-hands in two boats, ten auxiliary net-men in two boats, eight anchor-men in two boats, and four watchers or supervisors in a special boat. The plan of using a scare-line, as in certain other countries, is noteworthy.

The *Salmonidæ* include *Onchorynchus keta*, Walb., the Dog-Salmon or Hake, one of the Quinnet Salmon found on both sides of the North Pacific. It weighs from seven to ten pounds, and is caught chiefly by seines in Northern Japan. Another species

is *O. masou*, Brevoort, a land-locked form in Japan, and growing and maturing in suitable fresh water. Artificial flies for the capture of this and other *Salmonidæ* in Japan will soon be extensively used. The Pond-Smelt or Chika (*Mesopus olidus*, Palloc), with adhesive eggs 1 mm. in diameter, and the Ice-fish, Whitebait, or Shira-uwo (*Salana microdon*, Blkr.), also with adhesive eggs, but only about two thousand in number, are two small forms of considerable value. They are caught with seines and fixed nets. A fish very popular with the Japanese is the Ayu, Annual-fish, or Flavorous-fish, a form which was well known 200 B.C. It is about ten inches long, and much prized for its flavour and sweetness; so much so that protective regulations for its culture to supply the Imperial table were in force between A.D. 810–824. It passes its early life in the sea, and ascends rivers in March and April to spawn, the eggs adhering to the gravel. It is caught by nets, either fixed or cast, by hook and line, and by Cormorants—a method which has been in vogue in Japan for two thousand five hundred years.

The Japanese Eel (*Anguilla japonica*, T. & S.) is valuable in the home-market, and almost all the fresh waters of Haido and the southern part of Hokkaido are stocked with it. *Muraenosox cinereus*, T. & S., the Biter, attains a length of 2½ ft., and is furnished with knife-like teeth. *Congrettus anago*, T. & S., the Anago or hole-dweller, frequents a bottom of sandy mud inshore. Both are captured by hand-lines, by trawls, trawl-lines, and drift-nets.

The sea-fisheries of Japan are both extensive and valuable, and her position in the Pacific Ocean is such that it is unlikely that even her teeming population will ever seriously affect her marine food-fishes, however clamant local fears and prejudices may be.

AN ANNOTATED LIST OF CORNISH FISHES.

BY JAMES CLARK, M.A., D.Sc., A.R.C.S.

(Continued from p. 427.)

COUCH recorded the Cat-fish or Wolf-fish (*Anarrhichas lupus*, L.) from Fowey and Looe. One over three feet long was found on the beach at Whitsand Bay, Land's End, in an advanced state of decomposition in December, 1906, after a spell of very stormy weather. The Gattorugine (*Blennius gattorugine*, Bloch) is common on rocky ground along the south coast from fifteen fathoms downwards, and has been obtained at St. Ives and Millook on the north. Single specimens have been obtained eight miles south of the Dodman in forty fathoms, and in July, 1907, several were captured at Coverack. It is usually taken in Crab-pots with fine net over the bottom. Montagu's Blenny (*B. galerita*, L.) is at times frequently captured in the rock-pools at Gorran, Gyllyngvase, and Mount's Bay, and has been taken at Polperro, Mevagissey, Cadgwith, and St. Ives, but its numbers vary greatly, and in some years, as in 1901 and 1907, hardly a specimen was found. The Butterfly Blenny (*B. ocellaris*, L.) has since 1899—at least up to 1906—been quite common in the pools among the weed-covered rocks at Gyllyngvase, and as many as eleven have been captured in a single afternoon. This year, however, only two specimens have been found in nine visits. Three examples were dredged in fifteen fathoms off the mouth of the Helford River in June, 1904, and one was found dead on Marazion beach in February, 1900. The Shanny (*B. pholis*, L.) is common, and in places abundant, along the south in rock-pools and among stones. Round Land's End and along the north coast it is very local. Occasionally numbers may be seen resting on rocks and in crevices above the surface of the pool, into which they jump when disturbed with a pattering like big rain-drops. The Crested Blenny (*Carelophus ascanii*, Walb.) is said to be not uncommon in the south of Cornwall, but

rare in Mount's Bay. The only specimen seen by the writer was dredged in twenty-five fathoms in Falmouth Bay in June, 1902. The Butter-fish or Gunnel (*Centronotus gunnellus*, Bl. Schn.) is often found between tide-marks on moist ground along the south and west, but is very local on the north coast. It is occasionally found in Crab-pots. A single example of the Red Band-fish (*Cepola rubescens*, L.) was recorded from Mevagissey by Dunn. The Angler, Monk-fish, or Sea Devil (*Lophius piscatorius*, L.) is common all round the coast, coming inshore in summer and autumn, and often passing into the estuaries. Six years ago a specimen measuring 2 ft. 9 in. came up the Fal above Malpas. In 1905 a large Angler was caught in a trammel south of Mount's Bay, with a Shag inside, and Dunn *f.* says this has occurred several times within his personal knowledge.

The Cod (*Gadus morrhua*, L.) is still common both on sandy and on rocky ground all round the coast, but is not often taken in really good condition for the table. The Haddock (*G. æglefinus*, L.) is perhaps the most uncertain of the Cornish food-fishes in its appearance. For some years previous to 1870 it was plentiful at Megavissey, but that year it left the coast entirely (Matthias Dunn). In the early sixties the fishermen from Falmouth and St. Mawes took it in considerable quantity, and large catches were at least occasionally made further west. From 1870 onwards only occasional specimens were caught, but in 1886 over a hundred were taken near the Wolf Rock (Hicks). From that time it remained very scarce till five or six years ago. Lately trawlers have brought in up to four or five hundred occasionally from the Silver Pits, two to four miles south of Mouse-hole Island, and small catches of much larger fish have been made in the vicinity of Wolf Rock. In 1904 several were taken with hand-lines near Newquay. The Bib, Pout, or Whiting Pout (*G. luscus*, L.) is still plentiful all round the coast, though Dunn *f.* says it is not so abundant as formerly. It is one of the most local of fish, concealing itself in thousands in the same gully or channel or ledge on a sunken rock year after year, and venturing out to feed on low rock or sand only at night. In its gully or "Bib-pit" it takes bait, as a rule, most voraciously, and numbers may be taken in a remarkably short time, provided the exact locality of the Bib-chain can be hit upon, but only a few

yards away one may fish for hours without a bite. It is occasionally taken at night by trawlers on sandy bottoms three or four miles out at sea. The Power Cod or Poor Cod (*G. minutus*, L.) is plentiful both on the south and on the north. It is often taken in large quantity by trawlers, especially in the spring, and comes to bait readily, but is of little use as food. The Whiting (*G. merlangus*, L.) is abundant, and, as a rule, in excellent condition all round the coast throughout the late autumn and winter. In the autumn it often feeds close inshore on young Pilchards, but promptly retires into deep water when the temperature of the water falls. Trawling is often highly profitable, and it comes readily to bait. The Poutassou (*G. poutassou*, Risso) is a Mediterranean Cod obtained in the adult state by Couch from Polperro in 1840. Great shoals of young fish appeared at Mevagissey in 1861, 1871, and 1881 (Dunn). On May 28th, 1904, the water from Coverack round to the Manacles was literally alive with them, the largest not more than three inches in length. Dunn *f.* says mature Poutassou are taken now and then by Newlyn boats twenty miles or more south of Scilly. The Coal-fish or Rauning Pollack (*G. virens*, L.) occurs all round the coast, and is often abundant, especially during winter and spring. It sometimes follows up the Pilchard shoals in large numbers, and is then taken in quantity along with Whiting Pollack. The long-line fishermen at Polperro and elsewhere often capture very fine specimens, but the largest are taken at the Runnelstone and round Land's End, though in December, 1905, one weighing 46 lb. was landed at Newquay. From its great strength and the violent rush with which it takes the bait, angling for Coal-fish is most exciting sport. In July, 1901, an enormous shoal of small fry appeared between Pendower beach and the Gull Rock at Portscatho, and in September, 1906, there were several thousand young fish from 5 to 7 in. long in Whitsand Bay, near the Land's End. Whiting Pollack or Pollack (*G. pollachius*, L.) is common on rocky ground all round the coast, and in some localities abundant. It is extensively caught by long-line fishermen all the year round, and is the amateur's fish *par excellence*. Live Sand-eels, rubber bait, and a slice of Mackerel are all very deadly, and the artificial fly is often used. In the west of the county, and on a specially favoured reef, the

fish are often very large, and specimens weighing 9 or 10 lb. are of frequent occurrence. Matthias Dunn obtained specimens of the Norway Pout (*G. esmarkii*, Nillson) from the stomach of a Hake (not Pollack as reported) caught in a trawl forty miles north-west of St. Ives, two of which were sent to Holt for identification in 1897. In August, 1900, Garstang identified a specimen 7 in. long, taken in a ground-seine between Saltash and the Lynher River. Hake (*Merluccius vulgaris*, Cuv.) has been decidedly scarcer of late years than formerly, especially in inshore waters, and in some districts, like Falmouth, has almost completely disappeared. It occurs all the year round, but is most in evidence in autumn and winter. It is still moderately common at times in deep water along the south coast, and in the mouth of the English Channel, and in the west and towards south-west steam trawlers make heavy catches. This year (1907) a large number have been caught with hand-lines by the drift-boats from Newlyn, many of them in very fine condition. Except at the mouth of the Bristol Channel, it is scarce on the north coast. The Greater Fork-beard (*Phycis blennioides*, Bl. Schn.) was described by Couch as common in the autumn and winter, but Cornish considered it rare. In 1892 one was brought in at Plymouth that had been captured on a Whiting-hook, and Holt records one that was trawled in Cawsand Bay. On the 10th of December, 1900, one was taken in a trawl at the mouth of the Helford River, and one was brought in at Newlyn this year (1907) that had been caught fifty miles N.N.W. of the Longships. Ling (*Molva vulgaris*, Flem.) is common on a rough bottom all round the coast, and is caught with hook and line during the winter and early spring. The finest are obtained at Scilly, which has long been celebrated for the excellence of its salted Ling. The Five-bearded Rock-Ling (*Motella mustela*, L.) is fairly common in rock-pools under stones, and in shallow water along the south of the county. In September, 1906, several were found in a small sand-pool on the shores of Whitsand Bay, Land's End. It is evidently scarce and local on the north coast, but in the summer of 1905 was plentiful in pools in Widemouth Bay, near Bude. The Four-bearded Rock-Ling (*M. cimbria*, L.) was recorded by Cocks from Falmouth. Holt mentions a specimen 8½ in. long in the stomach of a Hake trawled in or off the

Bristol Channel (Journ. M. B. A. v. 343). The Three-bearded Rock-Ling (*M. tricirrata*, Bl.), sometimes called the Whistler about Penzance, is locally common in rock-pools and in weed-covered beaches between tide-marks down to deep water along the south and west coast. It has been found in the rock-pools at St. Ives, and one, 16½ in. long, was taken with Herring-bait near Newquay in October, 1904. The Lesser Fork-beard (*Raniceps raninus*, L.) was taken by Matthias Dunn at Mevagissey, and several times by Cornish in Mount's Bay. In recent years it has been taken at Polperro in 1899, in Falmouth Bay by hook and line in June, 1902, and again in July, 1907, and near St. Michael's Mount in September, 1903. The solitary British example of *Ophidium barbatum*, L., was obtained at Padstow, and is now in the British Museum.

Halibut (*Hippoglossus vulgaris*, Flem.) is occasionally taken off the south coast, but is not common. In July, 1901, one was caught in Gerran's Bay that weighed 107 lb. In April, 1900, one weighing 42 lb. was caught on a spiller at Gorran; in April, 1902, three weighing from 6 up to 11 lb. were taken with hand-lines at the Bizzies Rock, Portscatho; in February, 1905, one, 84 lb. in weight, was captured near the outer end of the Manacles in Falmouth Bay. Last spring (1907) several were landed by liners at Newlyn. A single specimen of the Long Rough Dab (*H. limandoides*, Bl.) was obtained at Falmouth by Cocks prior to 1849. The Turbot (*Rhombus maximus*, L.) is pretty common along the south coast, and often attains a large size. It is also taken in the Bristol Channel, but gets very scarce off the north-east of the county. Brill (*R. lævis*, Gottsche) is common all round the coast in shallow and deep water. Common Topknot (*Zeugopterus punctatus*, Bl.) is by no means scarce along the south coast, where it is frequently taken in trammels, and at times in Mullet-nets. Off Mevagissey and in Mount's Bay it occurs usually on rocky bottoms that are not very rough, while in Falmouth Bay it seems to prefer weed-covered "scuddy" rocks. It has also been obtained recently at Sennen Cove, Land's End, off St. Ives, and in April, 1906, at Bude. The One-spotted Topknot (*Z. unimaculatus*, Risso) has only twice been taken in Cornish seas, the last in 1880. Four specimens of the Norway Topknot (*Z. norvegicus*, Günther) were trawled in July,

1891, between the Eddystone and Rame Head in twenty-five fathoms, and another—a ripe female—in March, 1892, six miles from Plymouth Breakwater. The Sail-fluke, Megrim, or Merry Sole (*Lepidorhombus megastoma*, Don.) is usually plentiful on the trawling-grounds along the south, is the commonest of flat-fish in the neighbourhood of Land's End, and is taken in quantity about the mouth of the Bristol Channel. It rarely comes into shallow water, but two were taken with bait close inshore at Port Isaac in April, 1902, after a storm. The Scald-fish or Scald-back (*Arnoglossus laterna*, Walb.) is common all round the coast on sand or gravel—the young inshore, the mature fish on the trawling-grounds. It is locally abundant in Mount's Bay, Land's End, and the Bristol Channel. Two specimens of the Broad Scald-fish (*A. grohmanni*, Bonap.), both females full of spawn, were trawled by Holt in Gerran's Bay in July, 1897 (M. B. A.). Plaice (*Pleuronectes platessa*, L.) is usually abundant all round the coast, but most of the fish are immature, and consequently undersized. Certain well-defined areas between Polperro and Fowey and in the east end of Gerran's Bay are among the finest Plaice-grounds in the county. Great shoals often appear in the more protected bays in the autumn. As winter comes on they pass into deep waters, but these they gradually leave in early spring, and in May are often fairly close inshore. The Lemon Dab (*P. microcephalus*, Don.) is somewhat local, but on the whole common along the south coast on trawling-grounds in clear water. The deep-sea trawlers at Newlyn often obtain it in quantity (Dunn *f.*). In the county it is often called the Merry Sole. The Dab (*P. limanda*, L.) is still common on a sandy bottom along the south coast, and locally in the mouth of the Bristol Channel, but Dunn *f.* says it is not so plentiful as twenty years ago. The Witch or Pole Dab (*P. cynoglossus*, L.) is a rare casual. Dunn *f.*, in 1905, saw two that had been brought into Newlyn by deep-sea trawlers. The Flounder (*P. fesus*, L.) is very common in the estuaries all round the coast, passing out into the open sea in spring for spawning purposes. The Sole (*Solea vulgaris*, Quensel) is common all round the coast, and, according to Dunn *f.*, has not diminished in numbers during the last few years, as is apparently the case elsewhere. The Lemon Sole (*S. lascaris*, Risso) is a rare casual in Cornish waters,

evidently not recorded since 1880. The Thick-back or Variegated Sole (*S. variegata*, Don.) is taken in fair quantity by deep-sea trawlers only, along the south coast and at the mouth of the Channel. It is also occasionally taken north and north-west of St. Ives. The Solenette (*S. lutea*, Risso) is generally overlooked through being mistaken for the young of the Common Sole. It is fairly common, and at times abundant on a sandy bottom from shallow water downwards. It is occasionally taken by trawlers in large quantity, and generally thrown overboard because of its small size. It has been identified at St. Ives and at Padstow.

A single half-grown specimen of the subtropical *Balistes maculatus*, Gmel., in the British Museum, is stated to have been received from Polperro, but Day has great hesitation in accepting the species as British. An example of the File-fish (*B. capriscus*, Gmel.) was taken at Porthloe in 1865, and passed through Couch's hands into the British Museum. The Globe-fish (*Tetrodon lagocephalus*, L.) is an occasional casual in the south. One was taken in Falmouth Bay on the 8th of September, 1891, and was seen by the writer five days later. It measured $15\frac{1}{2}$ in. in length. Another was picked up by a fisherman on Seaton beach about the middle of August, 1905, and is now in the British Museum. The Sun-fish (*Orthogoriscus mola*, L.) is a frequent casual all along the south coast, and at St. Ives. A small one about $2\frac{1}{2}$ ft. long and 21 in. deep was gaffed off Newquay in July, 1902, three were recorded about Bude in 1905, and one, 4 ft. 3 in. long and 3 ft. 5 in. deep, was obtained off Trevoise Head, Padstow, early in August, 1907. The Oblong Sun-fish (*O. truncatus*, Retz) is much rarer, only five having been recorded since 1855, the last, a specimen about 19 in. long, being thrown up on Porthcothan beach, near Padstow, in June, 1896 (Hicks).

(To be continued.)

SOME FISH-NOTES FROM GREAT YARMOUTH
FOR 1907.

BY ARTHUR H. PATTERSON, A.M.B.A.

THE past year has been to me one of the least interesting of years so far as appertains to matters piscine. The long dreary months of gloom and chilliness seem to have been all against the local shrimper-folk, on whom I have greatly to depend for strange and uncommon sea-waifs; they had scant time to bestow upon anything beyond the manipulation of their nets and boats and the scraping together of a bare living, "let alone," as they assured me, "bortherin' about curios." Indeed, rare fishes and crustaceans appear to have been 'conspicuously absent, and my pickle-bottles remained in their cuddies uncorked until the end of the season; and I have but one new species to add to my East Norfolk list, *viz.* the Four-horned Cottus.

A large Conger was reported captured near Southwold and brought into Yarmouth on Jan. 30th; it weighed 53 lb., and measured 6 ft. 8½ in.

An attempt was made to sell Dog-fishes in the town in January, and an itinerant fish-vendor barrowed a number of goodly sized Picked Dogs (*Acanthias vulgaris*) about the town, having first divested them of skins, tails, heads, and fins. These two-foot lengths of "Japanese Hake," as he was pleased to term them, looked assuredly tempting, and very much resembled skinned Weevers, or Gurnards, pulled to an extraordinary length. He cleared out his stock-in-trade, some being sold outright, others being left out "on approval"; in two or three instances he was asked for more, but in other cases prejudice stepped in, and he could not argue his clients into a continuance of custom. The experiment was not a sufficient success to warrant the trouble of "Dogs" being marketed, and only in exceptional instances, when any considerable number are netted, do these fish change hands. These are smuggled into the fried-fish shops of less scrupulous fishmongers, who prefer to hide them under

the counter to exposing them in the window, until *wanted*. Dead examples of various sizes have not infrequently been washed ashore, having been pitched out of the Herring-luggers during the Herring-fishing. Quite a number of Picked Dogs ventured up Breydon in November; I saw Jary the watcher, who pursues Smelts in the winter months, capture several at one haul. I amused myself—rather cruelly, I fear—in watching the movements of two or three I threw into a brackish ditch at the foot of the walls; their method of swimming near the surface was very erratic and undulating.

I obtained in February a very beautiful 11 in. Brill, the upper side of which was entirely white, with the exception of four brown shilling-sized spots and three smaller ones; these were distributed around the fish, four being on the white dorsal fin—*i. e.* on the right side of the fish—one was on the base of the tail, and the other two on the anal fin. This fish was figured in the 'Countryside' of Nov. 23rd.

On Feb. 6th a twelve-inch Mackerel foolishly came up with the tide to Breydon, a most unusual locality for the species. The sewage-tainted water proved too much for its powers of endurance, and coming to the surface near the entrance of the Bure a person who had been watching its erratic movements deftly caught it by hand.

A freshly captured Torpedo Ray (*Torpedo vulgaris*) was brought from Lowestoft by a fish-vendor, from whom I purchased it, on Feb. 9th; and from the same man I received a Starry Ray (*Raia radiata*), the size of a dinner-plate, on Feb. 20th. I discovered in its mouth a Skulpin (*Callionymus lyra*). I have been unable to ascertain the precise localities where these two interesting fishes were captured, but from their freshness I am inclined to think they were taken in our East Norfolk waters.

Knowing my interest in strange fishes, a fisherman's wife called on me with three Bullhead-like fishes, which I at once believed to be the Four-horned Cottus (*Cottus quadricornis*), a species for which I had been on the look-out for a number of years. The longest measured $8\frac{1}{2}$ in. in length. This was on March 3rd. With them came five Broad-nosed Pipe-fishes (*Siphonostoma typhle*). I could not learn from the woman the exact locality

of their capture; I only ascertained that these *Cottus* were taken in the vicinity of Lowestoft, and sold there with other fishes. I have more recently seen an example taken by a friend on Yarmouth Pier, which places its claim to my local list beyond dispute; but unfortunately he had made a most execrable attempt to preserve it, so that its value as a "specimen" was entirely gone. This species is my only addition to the Norfolk list for 1907.

On the same date, on the south beach, I found a mauled example of the Lump-sucker (*Cyclopterus lumpus*), upon which the Hooded Crows had been most industriously dining. On March 4th a 3½ lb. Ballan Wrasse (*Labras maculatus*) was taken in the neighbourhood.

On March 11th a fine example of the Greenland Bullhead (*Cottus grælandicus*) was given me, that had been placed on the top of a consignment of Herrings from Norway.

A Smear-dab (*Pleuronectes microcephalus*) came to hand on March 30th, the upper surface of which was of the normal colour, but the surrounding fins and tail were perfectly white.

The washing ashore, on April 28th, of a number of heads of the Tope (*Galeus vulgaris*) without the bodies was to me highly suggestive!

A 26 lb. Cod, on May 17th, was so stunted in shape that its proportionately huge-looking head was exactly one-third its entire length.

My first little stranger from the shrimp-boats came in on May 21st in the person of a very small Lesser Forkbeard (*Raniceps trifurcatus*), which measures barely 3½ in. in length.

From the stomach of an Angler (*Lophius piscatorius*) captured on Breydon, the date of which my informant (Jary) could not remember, he took four Flounders the size of one's hand, one "slip" (young Sole), three Viviparous Blennies, and six "whitebait" (3 in. Herrings).

On June 6th a 15 in. Mackerel, entirely devoid of the characteristic back-stripes, was sent me by Mr. R. Beazor, fish-merchant, from the fish-wharf. On the 15th I obtained a Transparent Goby (*Latrunculus pellucidus*) from a shrimp-boat.

The tailless Sole, taken in June, has already been referred to, and figured in 'The Zoologist' (*ante*, p. 276).

Jago's Goldsinney (*Ctenolabrus rupestris*) must certainly have occurred in local waters this year in unusual numbers. Up till June, 1906, this species had not been recorded for Norfolk; on the 5th of that month I obtained an example from a local shrimp-boat. On June 24th of this year another was brought me, identical in size with that of last year (*viz.* about four inches), and two others subsequently. Three in one season certainly suggests the probability of others in the locality that were probably destroyed, as well as escaped the nets.

Greater Weever (*Trachinus draco*) taken on Breydon, July 7th, the first I have known captured there. Lesser Weevers are abundantly taken in August.

Herring-syle abounded on Breydon and on the rivers during August. Myriads of these small fishes flashed at the surface in their sportive wanderings, to the great delight of the unusual number of Common and other Terns that came to share in the spoils. When left stranded in kicking shoals on the flats by the fall of the tide the numerous Gulls joined in the foray, and filled their crops with them. When netting with Jary the watcher on August 18th we unwittingly drew to the mud-flats numbers of these little Herrings, some of the more obese of which I dissected on my return to the houseboat. I found some examples literally packed with Opossum Shrimps; one little $4\frac{1}{2}$ in. fellow had its stomach so distended that the compact mass of crustaceans equalled in size a Barcelona nut. The Smelts had a high time among the "whitebait," and the large number of Atherines (*Atherina presbyter*) frequenting Breydon this summer (!) also fed freely on the smaller ones.

On gutting a Breydon-caught Flounder, on August 21st, to fry for my tea, I found in its stomach a younger Flounder—an unusual thing—that must certainly, from its size, have been doubled up in order to be swallowed.

A queerly formed Eel was preserved for me by a local dealer in Eels named Brand. It was strangely "crinkled" from the head to the tail, giving one the curious idea of a cockscrew that had been crushed flat. It is many years since I saw one precisely similar.

A lad when fishing from some baulks moored by the side of Breydon, observing the contortions of a queer little fish in a gap

in the raft, deftly slipped his hand under it, and threw it on the timbers. I came up at the time, and it was handed to me, and proved to be a small Garfish (*Belone vulgaris*), about nine inches in length. This is the first record I have of one taken on Breydon. An example taken some years ago within five miles of Norwich must certainly have gone up river through this estuary.

During November I met with two Lamperns (*Petromyzon fluviatilis*) which had been taken with Sprats near Southwold, and forwarded on to Yarmouth for my inspection and naming. It seemed that they were not well known to the Sprat-fishers. The Sprat season is, of course, in November, and Lamperns are usually met with in April when on their migrations. One was sent me from Gorleston.

An immense number of Herrings were taken at the latter part of October, and so great was the crush of boats that many "lasts" of these fish were spoiled before being able to find landing room. Great numbers were taken out to sea and thrown overboard, many of them to be washed ashore, to the infinite delight of huge swarms of Gulls, that gorged themselves for days on the offensive carcasses rotting at the tide-mark. If ever Gulls were a blessing they were esteemed so at that time. The putrid Herrings lay strewn for several days for miles along the shore.

The Greater Dog-fishes (*e. g.* Porbeagles and the like) were conspicuously wanting this season, and the Picked Dogs only seemed troublesome. Cetaceans were scarce—probably frightened away by the numerous steam-luggers—and only two or three Porpoises thrown from the fishing-boats were stranded on the beach. A number of Goose Barnacles (*Lepas anatifera*) were washed ashore with a set-in of easterly winds in November, and afforded seaside shooters considerable interest.

NOTES ON TERRESTRIAL ISOPODS FROM NORTH DEVON.

BY BRUCE F. CUMMINGS.

THE Woodlice in Great Britain have been somewhat neglected, and a great deal remains to be done by way of geographical distribution. Also, there are very few recorded observations on their habits, though they have received considerable attention from anatomists. It is therefore with the hope of enlisting more field observers of these crustaceans that I write the following few field notes.

I have found Messrs. Webb & Sillem's book, 'The British Woodlice,' invaluable for identifying species, and it also contains plates of all the British species. The Rev. Canon Norman has a series of notes in 'The Annals and Magazine of Natural History' on "The British Land Isopoda." In January this year Mr. C. Gordon Hewitt published a memoir on *Ligia oceanica*, which constitutes No. XIV. of the Liverpool Marine Biological Committee's series of memoirs. With these books at your disposal it is possible to begin operations at once. Collecting Woodlice dovetails well with beetle-hunting, and I have often reprieved a blank day with the Coleoptera by turning my attention to the Woodlice, which are to be found in precisely similar localities.

The process of the shedding of the outer cuticular layer in different species of Crustacea has engaged the acute observation and descriptive powers of many well-known naturalists, from the classic records of the illustrious Réaumur, on the Crayfish, onwards, and the process is no less interesting in the Woodlouse. However, the following is by no means intended as exhaustive, or even as a full account, but only some of my notes, by the way, on moulting Woodlice.

I took a specimen of *Porcellio scaber* last year, which began moulting almost immediately. Previously it was sluggish, and remained fixed to a clod of earth, though otherwise there was no

sign to indicate the approaching ordeal. The cuticle split transversely across the middle of the thorax, and the posterior part became loose and white in colour as the air got in between the old and new skins. The Woodlouse then began throwing waves along the last half of the body; the soft jelly-like consistency of the new skin easily permitted this. In this way the old skin was loosened, and the animal, by walking forward, drew out its limbs and body free. As far as I could see, the legs of the old skin did not split to allow the regenerated legs to escape the more easily, as in the Lobster. As a rule, each of the two halves of the skin are shed whole, but in this case the posterior half was badly fractured, and the animal took a considerable time in ridding itself of the fragments. The skin of the front part of the body was shed in the same way after an interval of two days, which allowed the hinder portion to become hard.

On Sept. 25th this year I discovered a large *Oniscus asellus* underneath a log of wood with crowds of others. It had shed the last half of its skin, and the first half had so far severed its connection with the body that the animal had no power whatever over the half exuviated skin, but it walked about very readily on its hind limbs when disturbed, carrying the rigid front half of its body a little off the ground. It looked very ridiculous. At length the front part of the head grew white; this spread along the lateral borders of the segments, and finally down the middle of the dorsal surface, when, after a series of body-waves, the animal drew back and freed itself. However, it was some time before it left the shell entirely, for after the last effort it seemed to rest on its oars, so to speak, and scarcely troubled to come out of the old shell, though it was quite free to do so. The new legs were useless for some time, but the antennæ were soon on the move, and waving nervously.

Intermittently, I have been working for nearly fifteen months, and of the twenty six British species I have taken sixteen in the neighbourhood of Barnstaple. There is a list, in the recently published 'Victoria County History of Devon,' by the Rev. T. R. R. Stebbing, which enumerates fourteen. Of these I have not yet taken *Metoponorthus cingendus*, which has only been taken in South Devon and in Ireland.

Ligia oceanica, Linn.—Common everywhere on the River Taw

and the North Devon coast. At Plymouth Mr. Hewitt found them most numerous, and of maximum size on Drake's Island. At Santon the smaller specimens, which are mottled with light patches (though these patches are faintly visible even in adults), I found most frequently near the water's edge, and the large ones for the most part always a considerable way above high-water mark. On St. Kilda Mr. Hewitt has found these seashore feeders on a hill no less than 450 ft. above the level of the sea. They have very strong claws on the feet, a necessary equipment to allow them to run about under moving water.

Trichoniscus pusillus, Brandt.—Common everywhere in grassy damp places. They are very delicate creatures.

T. roseus, Koch.—On March 10th this year, underneath flat stones near a pool at Venn, Barnstaple, I noticed several of this handsome species. Three were white in colour instead of pink, but the yellow dorsal line was present in all. Since that time I have found them common at Venn within restricted limits. Occasionally they were consorting with ants and with impunity. As a rule, Woodlice keep clear of ants' nests.

Trichoniscoides albidus, Budde-Lund.—I base my record of this species on a headless specimen taken from the grass with which a Common Shrew (*Sorex vulgaris*) had built her nest in a field near Barnstaple. It was pure white, with large round tubercles on the dorsal surface (which *Haplothalmus danicus*, Budde-Lund, also has), the posterior angles of each thoracic segment were prolonged and protruded considerably, and the upper surface generally was flat. The lateral edges of each segment were serrated, there being about, on an average, five teeth to either side of each segment. [The figure of this species in 'British Woodlice' shows eight or nine.] The species has been taken, as far as I am aware, only at Eton and in Sunderland, in Great Britain (W. M. Webb). Before feeling satisfied as to the correctness of my identification, I should like to take other specimens from the same neighbourhood. If my fragment does not belong to this species, as far as I can see it can belong to no other species at present on the British list.

Oniscus asellus, Linn.—Common.

Philoscia muscorum, Scop.—Common everywhere in grass-tufts and under stones. The hind legs are very long, and it runs

proportionally faster. Varies a great deal in colour. There are two distinct, clearly defined varieties, one light yellow and the other deep brown. On the extreme lateral part of each segment of the thorax they all have a longitudinal pink stripe. A specimen which I took was marked almost entirely with pink, giving the animal, at a distance, the appearance of being as red as *Trichoniscus roseus*. On the coast at Santon the brown form is very common, and I remember taking only two yellow forms in that locality. The yellows are prevalent in pasture-lands. At Reigate, Surrey, I have noticed the species frequently, and I took two from under the bark of a tree some distance from the ground.

P. couchii Kinah.—Common on the beach at Santon at the base of the sandstone cliffs. It was originally discovered at Polperro by Prof. Kinahan in 1858, but has since been taken in South Devon.

Platyarthrus hoffmannseggii, Brandt.—The only Woodlouse found in the nests of British ants. In North Devon I have seen it almost everywhere with the common Yellow Ant (*Formica fusca*). Only on one occasion have I seen it with any other species, and then there were several in the runs of a nest of the Black Ant (*F. nigra*); but on closer examination it looked, by the number of dead bodies of Yellow Ants lying about, as if the Black Ants had stormed and captured the nest, or at least a portion of it. Mr. E. E. Lowe, late Curator of the Plymouth Museum, has taken it, according to Messrs. Webb and Sillem, with *Myrmica rubra* at Newton Ferrers. Nothing apparently is known of its relations with the ants.

Porcellio scaber, Latr.—Common everywhere. At Santon I have taken a white specimen with only a few black scattered spots, the size of pin-pricks, on it. The common colour varieties are a grey pepper-and-salt and a pretty rust-brown.

P. pictus, Brandt & Ratzeb. — One specimen only, underneath stone.

P. dilatatus, Brandt.—One specimen only, taken from underneath our front-door mat! It is grey in colour.

P. levis, Latr.—On Oct. 26th this year I took one from a grass-tuft in a meadow near Barnstaple. It is a well-marked, shapely animal.

Metoponorthus pruinosus, Brandt.— Of a faint blue colour, with two joints to the flagellum, and with long hind legs. Has occurred at Exeter (Parfitt) and Torquay (Stebbing). I discovered one only, in the vicinity of our own house. I rather fancy it escaped from a bundle of moss which I had brought home to examine for beetles.

Armadillidium nasatum, Budde-Lund.— At Santon in large numbers on the cliff-top under stones. Last summer I took a beautiful specimen (19 mm.) of a handsome “butter-scotch” yellow colour; also two smaller ones of the same colour. The ordinary grey form is also to be seen in numbers at Venn and near Braunton, and on the banks of the Taw near Wrafton. It is local.

A. vulgare, Latr.— The Common Pill Louse. Common. I have not noticed it on Codden Hill and other high hills in the district.

A. pulchellum, Zenck.— On Sept. 19th, 1907, I found one specimen under a piece of chert among the heather on Codden Hill (600 ft.). It is 6 mm. in length and smooth, but the dorsal surface is punctate.

On the sands under seaweed, &c., at the estuary of the Taw and Torridge, I collected several specimens of an *Armadillidium* this spring which I have been unable to identify. They were slightly longer than *A. pulchellum*, of a white colour, with the distal joint of the flagellum three times the length of the other, and the upper surface not smooth but slightly wrinkled longitudinally. The antennæ were short ($1\frac{1}{4}$ mm.); the telson truncated at the end, and the frontal lobe low. One out of the six I took was close approaching the normal grey colour of the *Armadillidia*.

There is much we do not know about the variations of the different species, and of the development of the young after they have left the brood-pouch. In the winter *Oniscus asellus* becomes sluggish, but does not hibernate. *Armadillidium* seems to hibernate, and sleeps very deeply; at this time it cannot be unrolled without injuring the animal. Further, they seem to burrow deeply below the earth to hibernate, as I have found *Armadillidium* much less frequently in the winter. One spot I know, where I could scarcely see one specimen of *A. nasatum* at

the present moment (Nov. 6th), yet in the spring they are there under the stones in hundreds.

The most recent addition to our knowledge is the occurrence of *Trichoniscus stebbingii* at Glasgow.

It should be added that in the moulting process the tendons and the chitinous lining of the mid-gut are also shed with the rest of the coat. I am not sure whether the lining of the mid-gut is shed whole or not; I believe it breaks up in small pieces inside the animal, and is passed out with other waste material, or even a portion is digested and then re-secreted. Perhaps some reader can enlighten me?

NOTICES OF NEW BOOKS.

A Bird Collector's Medley. By E. C. ARNOLD, M.A.
West, Newman & Co.

THIS is a book written by an enthusiastic bird collector, who shoots and sets up his own specimens, and is his own artist. He has, however, fallen on evil times. As he remarks:—"Time was when the possession of a good collection of stuffed birds tended to distinguish a man as a naturalist; to-day he is more likely to find himself regarded as a cold-blooded and heartless butcher"; and there is little doubt that, among Norfolk ornithologists at least, the narrative of his foray on the Broads, and his shooting of some of the scarce and jealously guarded Bearded Tits, which resulted in his having spent "a thoroughly delightful day," will not eradicate that impression.

But most of us, some time at least, have known the delights of collecting, and used the gun; the writer of this notice, at all events, must make that avowal, and it is not so many years ago that a rare bird would entice him, gun in hand, over many a weary trek on the Transvaal veld; he must also acknowledge his having, when a boy, shot his first bird on Patterson's Breydon. It is living again the old life to read these interesting pages, and we must remember that many of the rare visitors secured by the collector would not have remained and bred if unmolested, nor would they have otherwise been recorded. Nevertheless, as we grow older the dislike of taking animal life becomes more pronounced, even apart from that of the rarer species; the killing of a wounded and disabled animal is always an ordeal.

Mr. Arnold takes us over many good haunts of rare birds, and incidentally gives us many facts and hints. The "Notes on Bird-preserving" contain nuggets of experience. On bird protection one paragraph is worthy of the utmost consideration:—"There should be scattered about, here and there in our island, a few well-chosen bird sanctuaries, where a gun is never fired, and where the birds can breed in peace. The Farne

Islands and Wicken Fen are cases in point. The New Forest might well be made another, and if one or two Broads known as resorts of the Bearded Tit, and perhaps some recognized haunt of the Dartford Warbler, were added, there would be no need to meddle with any seaside places, which, after all, are seldom more than temporary stopping-places for the birds." We are not quite sure as to the last view, but are entirely in favour of the first proposition.

The book is fully illustrated, twelve of the plates being coloured, and doing credit to the reproducers.

Wild Life on a Norfolk Estuary. By ARTHUR H. PATTERSON.
Methuen & Co.

THIS is a third book by Mr. Patterson on the fauna of Eastern Norfolk, and is almost entirely devoted to the Breydon estuary behind Great Yarmouth, a tidal water he has known so long and loved so well. In this volume he has probably exhausted his note-books, and the readers of 'The Zoologist' will recognize some narrative that has previously appeared from his pen in these pages. Its great charm and most original feature is the account of the rough, hardy Breydoners who have acquired a more or less precarious living by shooting over and fishing these waters. It also contains much valuable data giving comparison of the Breydon fauna as it was in the early days of many who are living now, and its somewhat attenuated status of to-day. Mr. Patterson may well claim to be known as the natural historian of Breydon, and his three books will remain a repository of the annals of wild life around Yarmouth. When shall we find a naturalist who will give us a similar account, and based on the same long study and experience, of one or more of the great inland Norfolk Broads?

The illustrations induce special comment. They are by the author, who modestly states, "I am a self-taught amateur artist." He, however, does not only draw birds, but gives us his long experience and observation of their pose, so that we may say we see their specific attitudes—not their appearance as in a well set-up case, but as live birds seen and drawn by a good field naturalist.

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